



**KSR** College of  
Engineering

AN AUTONOMOUS INSTITUTION



NAAC  
ACCREDITED **A++**

NBA  
ACCREDITED  
PROGRAMMES



**B.E. - COMPUTER SCIENCE AND DESIGN**

**REGULATIONS 2024**

**(Academic Year 2024-25 Onwards)**

**Curriculum & Syllabus  
Semester I to IV**







**K.S.R. COLLEGE OF ENGINEERING: TIRUCHENGODE - 637 215**  
**(Autonomous)**

**DEPARTMENT OF COMPUTER SCIENCE AND DESIGN**

**B.E. – Computer Science and Design**  
**(REGULATIONS 2024)**

**Vision of the Institution**

<b>IV</b>	To become a globally renowned institution in Engineering and Management, committed to providing holistic education that fosters research, innovation and sustainable development
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**Mission of the Institution**

<b>IM 1</b>	Deliver value-based quality education through modern pedagogy and experiential learning.
<b>IM 2</b>	Enrich Engineering and Managerial Skills through cutting-edge laboratories to meet evolving global demands.
<b>IM 3</b>	Empower research and innovation by integrating collaboration, social responsibility, and commitment to sustainable development.

**Vision of the Department / Programme: (Computer Science and Design)**

<b>DV</b>	To produce professionals for designing technology with ethical values, ingenious attitude and team spirit required for the continual development of the society and the nation.
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**Mission of the Department / Programme: (Computer Science and Design)**

<b>DM 1</b>	To bestow academic environment for the development of skilled professionals qualified with knowledge, skills, values, and ethics, thereby take a role in the field of computer science and design.
<b>DM 2</b>	Imbibing holistic, creative learning and ethical attitude for embracing global challenges and leadership qualities in the field of computer science and design.
<b>DM 3</b>	To influence graduates with the skills to become self-employed entrepreneurs and future leaders.

**Programme Educational Objectives (PEOs): (Computer Science and Design)**

<b>The graduates of the programme will be able to</b>	
<b>PEO 1</b>	<b>Techno Commercial Engineer:</b> To develop the ability to think critically, analyse and make innovative design for offering techno-commercially feasible solutions.
<b>PEO 2</b>	<b>Governance of Super Intelligence:</b> To apply current tools and technologies to contribute for industries, public sectors, research organization for solving time critical problems.
<b>PEO 3</b>	<b>Enduring Exploration:</b> To impart the knowledge of inventive design skills and lifelong learning to succeed in their professional challenges

*Calattin*

**Chairman (BOB)**

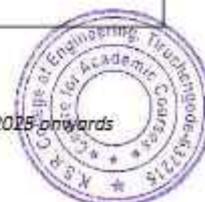
K.S.R. College of Engineering



Applicable for the students admitted from 2024-2025 onwards

## Programme Outcomes (POs) of B.E. - Computer Science and Design

Program Outcomes (POs)	
PO1	<b>Engineering Graduates will be able to:</b> <b>Engineering Knowledge:</b> Apply knowledge of mathematics, natural science, computing, engineering fundamentals and an engineering specialization as specified in WK1 to WK4 respectively to develop to the solution of complex engineering problems.
PO2	<b>Problem Analysis:</b> Identify, formulate, review research literature and analyze complex engineering problems reaching substantiated conclusions with consideration for sustainable development. (WK1 to WK4)
PO3	<b>Design/Development of Solutions:</b> Design creative solutions for complex engineering problems and design/develop systems/components/processes to meet identified needs with consideration for the public health and safety, whole-life cost, net zero carbon, culture, society and environment as required. (WK5)
PO4	<b>Conduct Investigations of Complex Problems:</b> Conduct investigations of complex engineering problems using research-based knowledge including design of experiments, modelling, analysis & interpretation of data to provide valid conclusions. (WK8).
PO5	<b>Engineering Tool Usage:</b> Create, select and apply appropriate techniques, resources and modern engineering & IT tools, including prediction and modelling recognizing their limitations to solve complex engineering problems. (WK2 and WK6)
PO6	<b>The Engineer and The World:</b> Analyze and evaluate societal and environmental aspects while solving complex engineering problems for its impact on sustainability with reference to econom
PO7	<b>Ethics:</b> Apply ethical principles and commit to professional ethics, human values, diversity and inclusion; adhere to national & international laws. (WK9)
PO8	<b>Individual and Collaborative Team work:</b> Function effectively as an individual, and as a member or leader in diverse/multi-disciplinary teams.
PO9	<b>Communication:</b> Communicate effectively and inclusively within the engineering community and society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations considering cultural, language, and learning differences
PO10	<b>Project Management and Finance:</b> Apply knowledge and understanding of engineering management principles and economic decision-making and apply these to one's own work, as a member and leader in a team, and to manage projects and in multidisciplinary environments.
PO11	<b>Life-Long Learning:</b> Recognize the need for, and have the preparation and ability for i) independent and life-long learning ii) adaptability to new and emerging technologies and iii) critical thinking in the broadest context of technological change. (WK8)
Program Specific Outcomes (PSOs)	
PSO1	<b>Career through professional:</b> Acquire knowledge in several areas of Computer Science and Design to promote skills necessary for a profession, entrepreneurship and higher education.
PSO2	<b>Software design and development:</b> Ability to use appropriate tools and platforms successfully, as well as improve them, to produce applications/products for new media design in areas likes multimedia, animation, virtual reality and gaming.

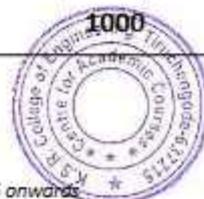


S. No.		Course Code	Course Title	Category	Periods / Semester					C=	Max. Marks		
					L	T	P	SL	Tot	T/30	CA	ES	Tot
Induction Programme				-	-	-	-		-	-	-	-	-
<b>THEORY COURSES</b>													
1	24ENT19	Professional Communication	HSMC	45	0	0	45	90	3	40	60	100	
2	24EET06	Basics of Electrical and Electronics Engineering	ESC	45	0	0	45	90	3	40	60	100	
3	24ITT16	Programming for Problem Solving	ESC	45	0	0	45	90	3	40	60	100	
4	24GET19	தமிழ்மரபு /Heritage of Tamils	HSMC	15	0	0	15	30	1	40	60	100	
<b>THEORY COURSES WITH LABORATORY COMPONENT</b>													
5	24MAI19	Matrices and Calculus	BSC	30	15	30	45	120	4	50	50	100	
6	24CHI06	Chemistry for Engineers	BSC	45	0	30	45	120	4	50	50	100	
<b>LABORATORY COURSES</b>													
7	24ITP16	Programming for Problem Solving Laboratory	ESC	0	0	30	0	30	1	60	40	100	
8	24MEP16	Engineering Graphics Laboratory	ESC	15	0	30	15	60	2	60	40	100	
9	24GEP16	Engineering Experience Laboratory	ESC	0	0	30	0	30	1	60	40	100	
<b>EMPLOYABILITY ENHANCEMENT COURSE</b>													
10	24SSP19	Aptitude and Coding Skills-I	EEC	0	0	30	0	30	1	60	40	100	
<b>TOTAL</b>				<b>240</b>	<b>15</b>	<b>180</b>	<b>255</b>	<b>690</b>	<b>23</b>				



**Chairman (BOS)**  
K.S.R. College of Engineering

Applicable for the students admitted from 2024-2025 onwards



SEMESTER II												
S. No.	Course Code	Course Title	Category	Periods / Semester					C= T/30	Max. Marks		
				L	T	P	SL	Tot		CA	ES	Tot
<b>THEORY COURSES</b>												
1	24CST29	Python Programming	PCC	45	0	0	45	90	3	40	60	100
2	24CST21	Design Thinking	PCC	30	0	0	30	60	2	40	60	100
3	24GET29	தமிழரும் தொழில்நுட்பமும் / Tamil and Technology	HSMC	15	0	0	15	30	1	40	60	100
<b>THEORY COURSES WITH LABORATORY COMPONENT</b>												
4	24MAI29	Probability and Statistics	BSC	30	15	30	45	120	4	50	50	100
5	24PHI07	Engineering Physics	BSC	45	0	30	45	120	4	50	50	100
6	24ECI26	Digital Principles and System Design	ESC	45	0	30	45	120	4	40	60	100
<b>LABORATORY COURSES</b>												
7	24ENP29	Professional Communication Laboratory	HSMC	0	0	30	0	30	1	60	40	100
8	24CSP29	Python Programming Laboratory	PCC	0	0	30	0	30	1	60	40	100
<b>EMPLOYABILITY ENHANCEMENT COURSE</b>												
9	24SSP29	Aptitude and Coding Skills-II	EEC	0	0	30	0	30	1	60	40	100
<b>MANDATORY COURSE</b>												
10		Mandatory Course – I	MC	0	0	30	0	30	0	-	-	-
<b>TOTAL</b>				<b>210</b>	<b>15</b>	<b>210</b>	<b>225</b>	<b>660</b>	<b>21</b>	<b>900</b>		

SEMESTER III												
S. No.	Course Code	Course Title	Category	Periods / Semester					C= T/30	Max. Marks		
				L	T	P	SL	Tot		CA	ES	Tot
<b>THEORY COURSES</b>												
1	24MAT37	Discrete Mathematical Structures	BSC	45	15	0	60	120	4	40	60	100
2	24CDT31	Operating Systems for Design	PCC	45	0	0	45	90	3	40	60	100
3	24CDT32	User Experience Design	PCC	45	0	0	45	90	3	40	60	100
4	24CBT36	Data Structures and Algorithms	PCC	45	0	0	45	90	3	40	60	100
5	24CST37	Java Programming	PCC	45	0	0	45	90	3	40	60	100
<b>LABORATORY COURSES</b>												
6	24CDP31	Operating Systems for Design Laboratory	PCC	0	0	45	0	45	1.5	60	40	100
7	24CBP36	Design Studio – I	PCC	0	0	30	0	30	1	60	40	100
8	24CBP37	Data structures and Algorithms Laboratory	PCC	0	0	45	0	45	1.5	60	40	100
9	24CSP37	Java Programming Laboratory	PCC	0	0	45	0	45	1.5	60	40	100
<b>EMPLOYABILITY ENHANCEMENT COURSE</b>												
10	24SDP39	Soft Skills Development-III	EEC	0	0	30	0	30	1	60	40	100
<b>TOTAL</b>				<b>225</b>	<b>15</b>	<b>150</b>	<b>240</b>	<b>675</b>	<b>22.5</b>			

*Chaitanya*



SEMESTER IV												
S. No.	Course Code	Course Title	Category	Periods / Semester					C=T/30	Max. Marks		
				L	T	P	SL	Tot		CA	ES	Tot
<b>THEORY COURSES</b>												
1	24MAT46	Numerical and Computational Techniques	BSC	45	15	0	60	120	4	40	60	100
2	24ITT46	Database Management Systems	PCC	45	0	0	45	90	3	40	60	100
3	24ITT47	Computer Organization and Architecture	PCC	45	0	0	45	90	3	40	60	100
4	24CST46	Design and Analysis of Algorithms	PCC	45	0	0	45	90	3	40	60	100
<b>THEORY COURSES WITH LABORATORY COMPONENT</b>												
5	24CBI46	Advanced Java Programming	PCC	15	0	90	15	120	4	50	50	100
<b>LABORATORY COURSES</b>												
6	24ITP46	Database Management Systems Laboratory	PCC	0	0	60	0	60	2	60	40	100
7	24CSP46	Design and Analysis of Algorithms Laboratory	PCC	0	0	60	0	60	2	60	40	100
8	24CSP47	Design Studio-II	PCC	0	0	30	0	30	1	60	40	100
<b>EMPLOYABILITY ENHANCEMENT COURSE</b>												
9	24SDP49	Soft Skills Development -IV	EEC	0	0	30	0	30	1	60	40	100
<b>TOTAL</b>				<b>195</b>	<b>15</b>	<b>270</b>	<b>210</b>	<b>690</b>	<b>23</b>	<b>900</b>		
* The students should undergo a 2-week Internship /Industrial training during the IV semester summer vacation												

SEMESTER V												
S. No.	Course Code	Course Title	Category	Periods / Semester					C=T/30	Max. Marks		
				L	T	P	SL	Tot		CA	ES	Tot
<b>THEORY COURSES</b>												
1	24CDT56	Principles of Compiler Design	PCC	45	0	0	45	90	3	40	60	100
2	24CBT56	Computer Networks	PCC	45	0	0	45	90	3	40	60	100
3	24ITT56	Full Stack Development	PCC	45	0	0	45	90	3	40	60	100
4		Professional Elective – I	PEC	45	0	0	45	90	3	40	60	100
<b>THEORY COURSES WITH LABORATORY COURSES</b>												
5	24CDI51	Fundamentals of Data Science	PCC	45	0	30	45	120	4	40	60	100
6	24CDI52	User Interface Design	PCC	45	0	30	45	120	4	40	60	100
<b>LABORATORY COURSES</b>												
7	24CBP56	Networks Laboratory	PCC	0	0	45	0	45	1.5	60	40	100
8	24ITP56	Full Stack Development laboratory	PCC	0	0	45	0	45	1.5	60	40	100
<b>EMPLOYABILITY ENHANCEMENT COURSE</b>												
9	24CDP51	Internship	EEC	0	0	0	0	0	1	100	-	100
10	24CDP52	Industry Oriented Course - I	EEC	0	0	0	0	0	1	100	-	100
11	24CDP53	Seminar Presentation	EEC	0	0	30	0	30	1	100	-	100
<b>MANDATORY COURSE</b>												
12		Mandatory Course – II	MC	30	0	0	0	30	0	100	-	100
<b>TOTAL</b>				<b>300</b>	<b>0</b>	<b>180</b>	<b>270</b>	<b>750</b>	<b>26</b>	<b>1200</b>		
* The students should undergo an internship during the IV semester summer vacation												



SEMESTER VI												
S. No.	Course Code	Course Title	Category	Periods / Semester					C= T/30	Max. Marks		
				L	T	P	SL	Tot		CA	ES	Tot
<b>THEORY COURSES</b>												
1	24GET69	Entrepreneurship Development	HSMC	45	0	0	45	90	3	40	60	100
2	24GET09	Universal Human Values and Ethics	HSMC	45	0	0	45	90	3	40	60	100
3	24CDT61	Game Design	PCC	45	0	0	45	90	3	40	60	100
4		Professional Elective – II (DAV)	PEC	45	0	0	45	90	3	40	60	100
<b>THEORY COURSES WITH LABORATORY COMPONENT</b>												
5	24CDI61	Machine Learning	PCC	45	0	30	45	120	4	40	60	100
<b>LABORATORY COURSES</b>												
6	24CDP61	Game Design Laboratory	PCC	0	0	45	0	45	1.5	60	40	100
<b>EMPLOYABILITY ENHANCEMENT COURSE</b>												
7	24CDP61	Mini Project	EEC	0	0	60	0	60	2	60	40	100
8	24CDP62	Industry Oriented Course - II	EEC	0	0	0	0	0	1	100	-	100
9	24CDP63	Technical Comprehension	EEC	0	0	30	0	30	1	100	-	100
<b>MANDATORY COURSE</b>												
10		Mandatory Course – III	MC	30	0	0	0	30	0	100	-	100
<b>TOTAL</b>				<b>255</b>	<b>0</b>	<b>165</b>	<b>225</b>	<b>645</b>	<b>21.5</b>	<b>1000</b>		

SEMESTER VII												
S. No.	Course Code	Course Title	Category	Periods / Semester					C= T/30	Max. Marks		
				L	T	P	SL	Tot		CA	ES	Tot
<b>THEORY COURSES</b>												
1	24CDT71	Mobile Interactive Design	PCC	45	0	0	45	90	3	40	60	100
2	24CST76	Standards in Computer Science and Engineering	PCC	15	0	0	15	30	1	100	-	100
3		Professional Elective – III	PEC	45	0	0	45	90	3	40	60	100
4		Professional Elective – IV	PEC	45	0	0	45	90	3	40	60	100
5		Professional Elective – V	PEC	45	0	0	45	90	3	40	60	100
6		Open Elective –I	OEC	45	0	0	45	90	3	40	60	100
<b>EMPLOYABILITY ENHANCEMENT COURSE</b>												
7	24CDP72	Project work Phase – I	EEC	0	0	60	0	60	2	60	40	100
<b>TOTAL</b>				<b>240</b>	<b>0</b>	<b>60</b>	<b>240</b>	<b>540</b>	<b>18</b>	<b>700</b>		

SEMESTER VIII												
S. No.	Course	Course Title	Category	Periods / Semester					C= T/30	Max. Marks		
				L	T	P	SL	Tot		CA	ES	Tot
<b>EMPLOYABILITY ENHANCEMENT COURSE</b>												
1	24CDP81	Project Work Phase – II	EEC	0	0	240	0	240	8	60	40	100
<b>TOTAL</b>				<b>0</b>	<b>0</b>	<b>240</b>	<b>0</b>	<b>240</b>	<b>8</b>	<b>100</b>		
<b>TOTAL CREDITS</b>									<b>163</b>			

**TOTAL NUMBER OF CREDITS TO BE EARNED FOR AWARD OF THE DEGREE = 163**

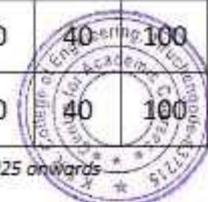
**Note:** HSMC- Humanities and Social Sciences including Management courses, BSC - Basic Science Courses, ESC - Engineering Science Courses, PCC - Professional core courses, PEC- Professional Elective courses, OEC- Open Elective courses, EEC – Employability Enhancement Courses & MC- Mandatory courses.

	<b>K. S. R COLLEGE OF ENGINEERING</b> <b>An Autonomous Institution</b> Approved by AICTE and Affiliated to Anna University, Chennai Accredited by NAAC ('A++' Grade)	<b>Curriculum</b> <b>UG</b> <b>R - 2024</b>
	<b>Department</b>	<b>Department of Computer Science and Design</b>
	<b>Programme</b>	<b>B.E. Computer Science and Engineering (CSD)</b>

HUMANITIES, SOCIAL SCIENCE AND MANAGEMENT COURSES (HSMC)												
S. No.	Course Code	Course Title	Category	Periods / Semester					C= T/30	Max. Marks		
				L	T	P	SL	Tot		CA	ES	Tot
1	24ENT19	Professional Communication	HSMC	45	0	0	45	90	3	0	60	100
2	24GET19	தமிழ்மரபு /Heritage of Tamils	HSMC	15	0	0	15	30	1	40	60	100
3	24GET29	தமிழ்ரும் தொழில்நுட்பமும்/ Tamils and Technology	HSMC	15	0	0	15	30	1	40	60	100
4	24ENP29	Professional Communication Laboratory	HSMC	0	0	30	0	30	1	60	40	100
5	24GET69	Entrepreneurship Development	HSMC	45	0	0	45	90	3	40	60	100
6	24GE09	Universal Human Values and Ethics	HSMC	45	0	0	45	90	3	40	60	100
<b>TOTAL</b>				<b>165</b>	<b>0</b>	<b>30</b>	<b>165</b>	<b>360</b>	<b>12</b>	<b>220</b>	<b>340</b>	<b>600</b>
BASIC SCIENCE COURSES (BSC)												
1	24MAI19	Matrices and Calculus	BSC	30	15	30	45	120	4	50	50	100
2	24CHI06	Chemistry for Engineers	BSC	45	0	30	45	120	4	50	50	100
3	24MAI29	Probability and Statistics	BSC	30	15	30	45	120	4	50	50	100
4	24PHI07	Engineering Physics	BSC	45	0	30	45	120	4	50	50	100
5	24MAT37	Discrete Mathematical Structures	BSC	45	15	0	60	120	4	40	60	100
6	24MAT46	Numerical and Computational Techniques	BSC	45	15	0	60	120	4	40	60	100
<b>TOTAL</b>				<b>240</b>	<b>60</b>	<b>120</b>	<b>300</b>	<b>720</b>	<b>24</b>	<b>280</b>	<b>320</b>	<b>600</b>
ENGINEERING SCIENCES COURSES(ESC)												
1	24EET06	Basics of Electrical and Electronics Engineering	ESC	45	0	0	45	90	3	40	60	100
2	24ITT16	Programming for Problem Solving	ESC	45	0	0	45	90	3	40	60	100
3	24ITP16	Programming for Problem Solving Laboratory	ESC	0	0	30	0	30	1	60	40	100
4	24MEP16	Engineering Graphics Laboratory	ESC	15	0	30	15	60	2	60	40	100
5	24GEP16	Engineering Experience Laboratory	ESC	0	0	30	0	30	1	60	40	100



	24ECI26	Digital Principles and System Design	ESC	45	0	30	45	120	4	40	60	100
<b>TOTAL</b>				<b>90</b>	<b>0</b>	<b>0</b>	<b>90</b>	<b>180</b>	<b>6</b>	<b>80</b>	<b>120</b>	<b>200</b>
<b>EMPLOYABILITY ENHANCEMENT COURSES (EEC)</b>												
1	24SSP19	Aptitude and Coding Skills-I	EEC	0	0	30	0	30	1	60	40	100
2	24SSP29	Aptitude and Coding Skills-II	EEC	0	0	30	0	30	1	60	40	100
3	24SDP39	Soft Skills Development-III	EEC	0	0	30	0	30	1	60	40	100
4	24SDP49	Soft Skills Development -IV	EEC	0	0	30	0	30	1	60	40	100
5	24CDP51	Internship	EEC	0	0	0	0	0	1	100	-	100
6	24CDP52	Industry Oriented Course - I	EEC	0	0	0	0	0	1	100	-	100
7	24CDP53	Seminar Presentation	EEC	0	0	30	0	30	1	100	-	100
8	24CDP61	Mini Project	EEC	0	0	60	0	60	2	60	40	100
9	24CDP62	Industry Oriented Course - II	EEC	0	0	0	0	0	1	100	-	100
10	24CDP63	Technical Comprehension	EEC	0	0	30	0	30	1	100	-	100
11	24CDP72	Project work Phase – I	EEC	0	0	60	0	60	2	60	40	100
12	24CDP81	Project Work Phase – II	EEC	0	0	240	0	240	8	60	40	100
<b>TOTAL</b>				<b>0</b>	<b>0</b>	<b>540</b>	<b>0</b>	<b>540</b>	<b>21</b>	<b>920</b>	<b>280</b>	<b>1200</b>
<b>PROFESSIONAL CORE COURSES (PCC)</b>												
1	24CST29	Python Programming	PCC	45	0	0	45	90	3	40	60	100
2	24CST21	Design Thinking	PCC	30	0	0	30	60	2	40	60	100
3	24CSP29	Python Programming Laboratory	PCC	0	0	30	0	30	1	60	40	100
4	24CDT31	Operating Systems for Design	PCC	45	0	0	45	90	3	40	60	100
5	24CDT32	User Experience Design	PCC	45	0	0	45	90	3	40	60	100
6	24CBT36	Data Structures and Algorithms	PCC	45	0	0	45	90	3	40	60	100
7	24CST37	Java Programming	PCC	45	0	0	45	90	3	40	60	100
8	24CDP31	Operating Systems for Design Laboratory	PCC	0	0	45	0	45	1.5	60	40	100
9	24CBP36	Design Studio – I	PCC	0	0	30	0	30	1	60	40	100
10	24CBP37	Data structures and Algorithms Laboratory	PCC	0	0	45	0	45	1.5	60	40	100
11	24CSP37	Java Programming Laboratory	PCC	0	0	45	0	45	1.5	60	40	100
12	24ITT46	Database Management Systems	PCC	45	0	0	45	90	3	40	60	100
13	24ITT47	Computer Organization and Architecture	PCC	45	0	0	45	90	3	40	60	100
14	24CST46	Design and Analysis of Algorithms	PCC	45	0	0	45	90	3	40	60	100
15	24CBI46	Advanced Java Programming	PCC	15	0	90	15	120	4	50	50	100
16	24ITP46	Database Management Systems Laboratory	PCC	0	0	60	0	60	2	60	40	100
17	24CSP46	Design and Analysis of Algorithms Laboratory	PCC	0	0	60	0	60	2	60	40	100



18	24CSP47	Design Studio-II	PCC	0	0	30	0	30	1	60	40	100
19	24CDT56	Principles of Compiler Design	PCC	45	0	0	45	90	3	40	60	100
20	24CBT56	Computer Networks	PCC	45	0	0	45	90	3	40	60	100
21	24ITT56	Full Stack Development	PCC	45	0	0	45	90	3	40	60	100
22	24CDI51	Fundamentals of Data Science	PCC	45	0	30	45	120	4	40	60	100
23	24CDI52	User Interface Design	PCC	45	0	30	45	120	4	40	60	100
24	24CBP56	Networks Laboratory	PCC	0	0	45	0	45	1.5	60	40	100
25	24ITP56	Full Stack Development laboratory	PCC	0	0	45	0	45	1.5	60	40	100
26	24CDT61	Game Design	PCC	45	0	0	45	90	3	40	60	100
27	24CDI61	Machine Learning	PCC	45	0	30	45	120	4	40	60	100
28	24CDP61	Game Design Laboratory	PCC	0	0	45	0	45	1.5	60	40	100
29	24CDT71	Mobile Interactive Design	PCC	45	0	0	45	90	3	40	60	100
30	24CST76	Standards in Computer Science and Engineering	PCC	15	0	0	15	30	1	100	-	100
<b>TOTAL</b>				<b>780</b>	<b>0</b>	<b>660</b>	<b>780</b>	<b>2220</b>	<b>74</b>	<b>1490</b>	<b>1510</b>	<b>3000</b>



**Chairman (BOS)**



PROFESSIONAL ELECTIVE COURSES (PEC) : VERTICALS			
VERTICAL-1	VERTICAL-2	VERTICAL-3	VERTICAL-4
INTELLIGENT & SECURE COMPUTING TECHNOLOGIES	DATA SCIENCE FOR INTELLIGENCE SYSTEM	COMPUTATIONAL INTELLIGENCE AND MACHINE LEARNING	FULL STACK DEVELOPMENT
Quantum Computing	Recommender Systems	Natural Language Processing	Micro service Architecture
Modern Cryptography	Predictive Analytics	MLOps	User Experience Design
AI in Cyber Security	Smart Systems	Responsible AI	DevOps
Cloud Services Management	Image and Video Analytics	Conversational AI	Software Testing and Automation
Blockchain Technologies	Text and Speech Analysis	Generative AI	Agile Methodologies
Immersive Technologies	Knowledge Discovery	Secure Coding	MERN Stack

S. No.	Course Code	Course Title	Category	Periods / Semester					C= T/30	Max. Marks		
				L	T	P	SL	Tot		CA	ES	Tot
<b>VERTICAL 1: INTELLIGENT &amp; SECURE COMPUTING TECHNOLOGIES</b>												
1	24CDE01	Quantum Computing	PEC	45	0	0	45	90	3	40	60	100
2	24CDE02	Modern Cryptography	PEC	45	0	0	45	90	3	40	60	100
3	24CDE03	AI in Cyber Security	PEC	45	0	0	45	90	3	40	60	100
4	24CDE04	Cloud Services Management	PEC	45	0	0	45	90	3	40	60	100
5	24CDE05	Blockchain Technologies	PEC	45	0	0	45	90	3	40	60	100
6	24CDE06	Immersive Technologies	PEC	45	0	0	45	90	3	40	60	100
<b>VERTICAL 2: DATA SCIENCE FOR INTELLIGENCE SYSTEM</b>												
1	24CDE07	Recommender Systems	PEC	45	0	0	45	90	3	40	60	100
2	24CDE08	Predictive Analytics	PEC	45	0	0	45	90	3	40	60	100
3	24CDE09	Smart Systems	PEC	45	0	0	45	90	3	40	60	100
4	24CDE10	Image and Video Analytics	PEC	45	0	0	45	90	3	40	60	100
5	24CDE11	Text and Speech Analysis	PEC	45	0	0	45	90	3	40	60	100
6	24CDE12	Knowledge Discovery	PEC	45	0	0	45	90	3	40	60	100
<b>VERTICAL 3: COMPUTATIONAL INTELLIGENCE AND MACHINE LEARNING</b>												
1	24CDE13	Natural Language Processing	PEC	45	0	0	45	90	3	40	60	100
2	24CDE14	MLOps	PEC	45	0	0	45	90	3	40	60	100
3	24CDE15	Responsible AI	PEC	45	0	0	45	90	3	40	60	100
4	24CDE16	Conversational AI	PEC	45	0	0	45	90	3	40	60	100
5	24CDE17	Generative AI	PEC	45	0	0	45	90	3	40	60	100
6	24CDE18	Secure Coding	PEC	45	0	0	45	90	3	40	60	100

## VERTICAL 4: FULL STACK DEVELOPMENT

1	24CDE19	Micro service Architecture	PEC	45	0	0	45	90	3	40	60	100
2	24CDE20	User Experience Design	PEC	45	0	0	45	90	3	40	60	100
3	24CDE21	DevOps	PEC	45	0	0	45	90	3	40	60	100
4	24CDE22	Software Testing and Automation	PEC	45	0	0	45	90	3	40	60	100
5	24CDE23	Agile Methodologies	PEC	45	0	0	45	90	3	40	60	100
6	24CDE24	MERN Stack	PEC	45	0	0	45	90	3	40	60	100

S. No.	Course Code	Course Title	Category	Periods / Semester					C= T/30	Max. Marks		
				L	T	P	SL	Tot		CA	ES	Tot
<b>MANDATORY COURSE – I, II and III</b>												
1	24MCP09	Yoga for Stress Management	MC	0	0	30	0	30	0	-	-	-
2	24MCT01	Constitution of India	MC	0	0	30	0	30	0	100	-	100
3	24MCT02	Environmental Science and Sustainability	MC	0	0	30	0	30	0	100	-	100
4	24MCT03	Introduction to Gender Studies	MC	0	0	30	0	30	0	100	-	100
5	24MCT04	Life Science for Engineers	MC	0	0	30	0	30	0	100	-	100
6	24MCT05	Industrial Safety	MC	0	0	30	0	30	0	100	-	100
7	24MCT06	Essence of Indian Knowledge System	MC	0	0	30	0	30	0	100	-	100
8	24MCT07	Elements of Literature	MC	0	0	30	0	30	0	100	-	100
9	24MCT08	Disaster Management	MC	0	0	30	0	30	0	100	-	100

S. No.	Course Code	Course Title	Category	Periods / Semester					C= T/30	Max. Marks		
				L	T	P	SL	Tot		CA	ES	Tot
<b>OPEN ELECTIVE DETAILS</b>												
<b>AUTOMOBILE ENGINEERING</b>												
1	24AUO01	Basics of Automobile Engineering	OEC	45	0	0	45	90	3	40	60	100
2	24AUO02	Hybrid Vehicles	OEC	45	0	0	45	90	3	40	60	100
<b>BIO-MEDICAL ENGINEERING</b>												
3	24BMO01	Basics of Biomedical Instrumentation	OEC	45	0	0	45	90	3	40	60	100
4	24BMO02	Biometric systems	OEC	45	0	0	45	90	3	40	60	100
<b>CIVIL ENGINEERING</b>												
5	24CEO01	Smart Buildings	OEC	45	0	0	45	90	3	40	60	100
6	24CEO02	Climate Change	OEC	45	0	0	45	90	3	40	60	100
<b>COMPUTER SCIENCE AND ENGINEERING</b>												
7	24CSO01	Data structures and Algorithms using C	OEC	45	0	30	45	90	4	50	50	100
8	24CSO02	Fundamentals of Java Programming	OEC	15	0	90	15	90	4	50	50	100
9	24CSO03	Full Stack Framework	OEC	45	0	0	45	90	3	40	60	100

10	24CS004	Digital Marketing	OEC	45	0	0	45	90	3	40	60	100
<b>COMPUTER SCIENCE AND ENGINEERING (IoT)</b>												
11	24IOO01	Industrial Internet of Things	OEC	45	0	0	45	90	3	40	60	100
12	24IOO02	Introduction to Sensors and IoT	OEC	45	0	0	45	90	3	40	60	100
<b>COMPUTER SCIENCE AND ENGINEERING (Cyber Security)</b>												
13	24CBO01	Ethical Hacking	OEC	45	0	0	45	90	3	40	60	100
14	24CBO02	Digital and Mobile Forensics	OEC	45	0	0	45	90	3	40	60	100
15	24CBO03	Applied Java Programming	OEC	15	0	90	15	90	4	50	50	100
<b>COMPUTER SCIENCE AND DESIGN</b>												
16	24CS006	Data Science Fundamentals	OEC	45	0	0	45	90	3	40	60	100
17	24CS007	Artificial Intelligence and Machine learning	OEC	45	0	0	45	90	3	40	60	100
18	24CS008	Data Exploration and Visualization	OEC	45	0	0	45	90	3	40	60	100
<b>ELECTRONICS AND COMMUNICATION ENGINEERING</b>												
19	24ECO01	Drone Technology	OEC	45	0	0	45	90	3	40	60	100
20	24ECO02	Wearable Devices	OEC	45	0	0	45	90	3	40	60	100
21	24ECO03	5G /6G Communication	OEC	45	0	0	45	90	3	40	60	100
22	24ECO04	Embedded IoT	OEC	45	0	0	45	90	3	40	60	100
<b>ELECTRICAL AND ELECTRONICS ENGINEERING</b>												
23	24EEO01	Solar and Wind Energy System	OEC	45	0	0	45	90	3	40	60	100
24	24EEO02	Hydrogen and Hybrid Energy System	OEC	45	0	0	45	90	3	40	60	100
25	24EEO03	Electric Vehicle Technology	OEC	45	0	0	45	90	3	40	60	100
26	24EEO04	Energy Conservation and Management	OEC	45	0	0	45	90	3	40	60	100
<b>INFORMATION TECHNOLOGY</b>												
27	24ITO01	Introduction to Mobile Application Development	OEC	45	0	0	45	90	3	40	60	100
28	24ITO02	Introduction to Big Data and Analytics	OEC	45	0	0	45	90	3	40	60	100
29	24ITO03	Augmented Reality / Virtual Reality	OEC	45	0	0	45	90	3	40	60	100
<b>MECHANICAL ENGINEERING</b>												
30	24MEO01	3D Printing	OEC	45	0	0	45	90	3	40	60	100
31	24MEO02	Robotics and Automation	OEC	45	0	0	45	90	3	40	60	100
32	24MEO03	Lean Manufacturing	OEC	45	0	0	45	90	3	40	60	100
<b>SAFETY AND FIRE ENGINEERING</b>												
33	24SFO01	Occupational health and safety	OEC	45	0	0	45	90	3	40	60	100
34	24SFO02	Electrical safety	OEC	45	0	0	45	90	3	40	60	100
35	24SFO03	Building Fire safety	OEC	45	0	0	45	90	3	40	60	100
36	24SFO04	Construction safety	OEC	45	0	0	45	90	3	40	60	100



**Chairman (BOS)**  
K.S.R. College of Engineering

Applicable for the students admitted from 2024-2025 onwards

## Summary

Name of the Programme: B.E Computer science and Design

CATEGORY	I	II	III	IV	V	VI	VII	VIII	TOTAL CREDITS	%
HSMC	4	2	-	-	-	6	-	-	12	7.36
BSC	8	8	4	4	-	-	-	-	24	14.72
ESC	10	4	-	-	-	-	-	-	14	8.59
PCC	-	6	17.5	18	20	8.5	4	-	74	45.40
PEC	-	-	-	-	3	3	9	-	15	9.20
OEC	-	-	-	-	-	-	3	-	3	1.84
EEC	1	1	1	1	3	4	2	8	21	12.88
MC	-	✓	-	-	✓	✓	-	-	-	-
<b>Total</b>	<b>23</b>	<b>21</b>	<b>22.5</b>	<b>23</b>	<b>26</b>	<b>21.5</b>	<b>18</b>	<b>8</b>	<b>163</b>	<b>100</b>



Chairman (BOB)





24ENT19	PROFESSIONAL COMMUNICATION	Category	L	T	P	SL	C
		HSMC	45	0	0	45	3
<b>(Common to All Branches)</b>							
<b>PRE-REQUISITE:</b> A comprehensive understanding of basic English grammar, vocabulary, and sentence structure with familiarity in Communication and Technical Writing are considered as pre-requisite for the course.							
<b>OBJECTIVE:</b> To equip learners with essential verbal and written communication skills, including technical writing, necessary for academic, professional, and workplace success.							
<b>UNIT - I</b>	<b>UNDERSTANDING COMPARISONS AND CONTRASTS</b>	<b>(9)</b>					
<b>Reading:</b> Technical brochures, telephone messages, social media messages. <b>Writing:</b> Emails/letters introducing oneself, Compare and Contrast Essay. <b>Grammar:</b> Present Tenses, Framing WH and Yes-No questions. <b>Vocabulary:</b> Portmanteau words, One-word substitutions.							
<b>UNIT - II</b>	<b>WRITING REPORTS AND PARAGRAPHS</b>	<b>(9)</b>					
<b>Reading:</b> Technical texts, biographies, travelogues, travel & technical blogs. <b>Writing:</b> Paragraph writing, Short Report on an event/industrial visit. <b>Grammar:</b> Past Tenses, Active & Passive Voice transformations, Prepositions. <b>Vocabulary:</b> Word formations using Prefixes & Suffixes.							
<b>UNIT - III</b>	<b>DESCRIBING THE PROCESS/PRODUCT</b>	<b>(9)</b>					
<b>Reading:</b> Advertisements, gadget reviews, user manuals, news reports. <b>Writing:</b> Definitions, Instructions, Product/Process description, Checklists. <b>Grammar:</b> Future Tenses, If clauses, Concord. <b>Vocabulary:</b> Nominal Compounds, Discourse Markers (connectives & sequence words).							
<b>UNIT - IV</b>	<b>TRANSCODING AND RECOMMENDATIONS</b>	<b>(9)</b>					
<b>Reading:</b> Newspaper articles, Journal reports. <b>Writing:</b> Recommendations, Transcoding.(Conversion of non-verbal to verbal information) <b>Grammar:</b> Articles, Relative pronouns, Modals. <b>Vocabulary:</b> Collocations, Homonyms.							
<b>UNIT - V</b>	<b>SUMMATION AND DESCRIPTION</b>	<b>(9)</b>					
<b>Reading:</b> Editorials and Opinion blogs, Company profiles. <b>Writing:</b> Descriptive/Narrative Essays, Job/Internship Application with Resume. <b>Grammar:</b> Numerical adjectives, Relative Clauses. <b>Vocabulary:</b> Cause & Effect Expressions, Homophones.							
<b>TOTAL (T:45 , SL:45) = 90 PERIODS</b>							

*Shreyas*  
Chairman (BOS)



**COURSE OUTCOMES:**

At the end of the course, the learners will be able to:

COs	Course Outcome	Cognitive Level
CO1	Recognize the structure of comparison texts using correct tenses and appropriate vocabulary.	Understand
CO2	Construct short paragraphs and reports using past tense and clear expressions.	Understand
CO3	Comprehend processes and products using future forms and appropriate vocabulary.	Understand
CO4	Interpret visuals like charts or graphs to produce well-structured written content.	Understand
CO5	Draft essays and job applications clearly, using proper grammar and structure.	Understand

**TEXT BOOKS:**

1. English for Engineers & Technologists, Orient Blackswan Private Ltd. Department of English, Anna University, 2023.
2. Nitin Bhatnagar, Communicative English for Engineers and Professionals, Pearson, 2024.

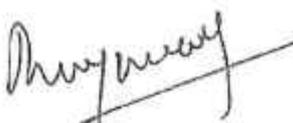
**REFERENCES:**

1. Dr. K.N. Shoba, and Dr. Lourdes Jovani, English for Science & Technology-II Cambridge University Press. Francis, Department of English, Anna University, 2023.
2. Lakshminarayanan, A Course Book on Technical English, Scitech Publications (India) Pvt. Ltd. 2022.
3. Kulbhusan Kumar, RS Salaria, Effective Communication Skill, Khanna Publishing House, 2023.

Mapping of COs with POs and PSOs

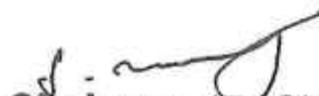
COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	-	-	-	-	-	-	-	2	3	-	3	-	-
CO2	-	-	-	-	-	-	-	2	3	-	3	-	-
CO3	-	-	-	-	-	-	-	2	3	-	3	-	-
CO4	-	-	-	-	-	-	-	2	3	-	3	-	-
CO5	-	-	-	-	-	-	-	2	3	-	3	-	-

1-Low, 2-Medium, 3-High

  
Chairman (BoS)



24EET06	BASICS OF ELECTRICAL AND ELECTRONICS ENGINEERING	Category	L	T	P	SL	C
		ESC	45	0	0	45	3
(Common to AE, BME, CSE, CSE (CS), CSD, CSE (IoT), IT, MECH, SFE)							
<b>PREREQUISITE:</b> Basic knowledge of calculus, differential equations, and physics (especially electromagnetism) with strong problem-solving skills for circuit analysis.							
<b>OBJECTIVE:</b> <ul style="list-style-type: none"> <li>To introduce the fundamentals of electrical and electronic systems, enabling analysis and application of basic circuits, machines and digital components.</li> </ul>							
<b>UNIT - I</b>	<b>DC AND AC CIRCUITS</b>	<b>(9)</b>					
<b>DC circuits:</b> Electrical quantities – Ohm's law – Kirchhoff's current and voltage laws – Series and parallel resistors – Simple problems. <b>AC circuits:</b> Waveforms, average value, RMS value, form factor, peak factor, power and power factor – Pure R, L and C – Series RL and RC circuits.							
<b>UNIT - II</b>	<b>ELECTRICAL MACHINES</b>	<b>(9)</b>					
<b>DC machine:</b> construction, working principle and applications – Single phase induction motor: Capacitor start capacitor run induction motor – Three phase induction motor: construction and working principle – Single phase transformer: construction and working principle.							
<b>UNIT - III</b>	<b>ELECTRICAL INSTALLATIONS</b>	<b>(9)</b>					
Classification of wiring system – Earthing – Types: pipe earthing, plate earthing, strip earthing – On-line and Off-line UPS – Lamps: Fluorescent tube, LED.							
<b>UNIT - IV</b>	<b>ANALOG ELECTRONICS</b>	<b>(9)</b>					
<b>PN junction diode and Zener diode:</b> Principle of operation and V-I characteristics – Half and full wave rectifier – Bipolar Junction Transistor: Construction and working.							
<b>UNIT - V</b>	<b>DIGITAL ELECTRONICS</b>	<b>(9)</b>					
<b>Digital logic gates:</b> NOT, AND, OR, NAND, NOR, EXOR – Digital circuits: half-adder, full-adder, JK and D flip flop – Introduction to Arduino components and IDE.							
<b>LECTURE = 45, SELF LEARNING = 45, TOTAL = 90 PERIODS</b>							

  
Chairman (BoS)



COURSE OUTCOMES:														
Upon completion of the course, the students will be able to:														
COs	Course Outcome												Bloom's Taxonomy Level	
CO1	Interpret the fundamental concepts of electrical circuits to solve the DC and AC circuit problems.												Understand	
CO2	Elaborate the construction and working principles of DC machines, induction motors and transformers.												Understand	
CO3	Describe the wiring systems, earthing techniques and the functionality of UPS and lighting systems.												Understand	
CO4	Identify the operation and characteristics of PN junction, Zener diode and BJT.												Understand	
CO5	Illustrate the functionality of digital logic gates, adders, flip-flops and Arduino components.												Understand	
TEXT BOOKS:														
1 Kothari D.P and Nagrath I.J, "Basic Electrical and Electronics Engineering", Second Edition, McGraw Hill, Uttar Pradesh, 2020.														
2 Bhattacharya S.K, "Basic Electrical and Electronics Engineering", Pearson Education, Delhi, Second Edition, 2017.														
REFERENCES:														
1 Jain V.K, Amitabh Bajaj, "Design of Electrical Installation", University Science Press, New Delhi, 2016.														
2 Ramamoorthy M, Chandra Sekhar O, "Electrical Machines", PHI Learning Pvt. Ltd, Delhi, 2018.														
3 Christopher Siu, "Electronic Devices, Circuits, and Applications", Springer International Publishing, 2022.														
4 Kothari D.P, Dhillon J.S, "Digital Circuits & Design", First Edition, Pearson, Delhi, 2015.														
Mapping of COs with POs and PSOs														
COs/ POs	PO1	PO2	PO3	PO4	PO5	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	2	-	-	-	-	-	-	1	1	-	2	-	-
CO2	3	2	-	-	-	-	-	-	1	1	-	2	-	-
CO3	3	2	-	-	-	-	-	-	1	1	-	2	-	-
CO4	3	2	-	-	-	-	-	-	1	1	-	2	-	-
CO5	3	2	-	-	-	-	-	-	1	1	-	2	-	-

  
Chairman (BoS)



24ITT16	PROGRAMMING FOR PROBLEM SOLVING	Category	L	T	P	SL	C
		ESC	45	0	0	45	3
<b>(Common to BME, CSE, CSE(CS), CSD, CSE(IoT), IT, ECE, EEE)</b>							
<b>PREREQUISITE:</b>							
Students must have basic computer literacy, including familiarity with operating systems, file management, and software usage. A Basic understanding of algorithms and flowcharts are required to design and visualize problem solving strategies. Students must have basic knowledge on programming principles, such as variables, simple data types, control structures, problem solving and logical thinking skills.							
<b>OBJECTIVES:</b>							
The course introduces fundamental programming concepts using the C language, covering computer organization, algorithm representation, and basic syntax. Students will learn control structures, functions, arrays, pointers, and string handling. The course also covers complex data types like structures and unions, storage classes, and file operations. By the end, students will be able to analyze problems, design algorithms, and implement solutions using C programming.							
<b>UNIT - I</b>	<b>INTRODUCTION TO COMPUTING AND C</b>	<b>(9)</b>					
Introduction to Computing: Organization of computer – Hardware and Software – Number system and Conversions – Representation of an algorithm: pseudo code, flowchart with examples. Introduction to C –features of C – Structure of C program – Character set – C tokens – Keywords – Identifiers – Constants – Variables – Data types – Operators – Precedence and Associativity.							
<b>UNIT - II</b>	<b>CONTROL STRUCTURES</b>	<b>(9)</b>					
Decision Making and Branching: Introduction – decision making with if statement – simple if statement – if-else statement – nested if-else statements – if-else-if ladder statement – switch statement – goto statement – conditional operator – Decision making and looping: Introduction – while statement – do-while statement – for statement.							
<b>UNIT - III</b>	<b>FUNCTIONS AND ARRAY</b>	<b>(9)</b>					
Functions: Declaration and definition – Function prototype – parameter and arguments – Return type – passing argument by value and by reference – Function scope and lifetime – Function pointer – Arrays: array declaration and initialization – One dimensional array and Two dimensional array with example.							
<b>UNIT - IV</b>	<b>POINTERS AND STRINGS</b>	<b>(9)</b>					
Pointers: Definition – Initialization – Pointer's arithmetic – Pointers to pointers – Pointers and arrays. String: Declaring and initializing string variables – String handling functions and operations.							
<b>UNIT - V</b>	<b>STRUCTURE, UNION AND FILE</b>	<b>(9)</b>					
Structures: Declaration – Definition – Structure within a structure – Union – Storage classes – Preprocessor directives – Files: Defining and opening a file – Closing a file – input/output operations on files – Command line arguments.							
<b>L= 45, T=0, P=0, SL=45, TOTAL: 90 PERIODS</b>							

<b>COURSE OUTCOMES:</b>													
<b>At the end of the course, the learners will be able to:</b>													
<b>COs</b>	<b>Course Outcome</b>											<b>Cognitive Level</b>	
CO1	Discuss about number systems and perform conversions between different number systems and depict about basic structure of C program.											Understand	
CO2	Apply the concept of Looping and conditional statements to solve real-world programming problems efficiently. .											Apply	
CO3	Develop modular programs using functions and implement single and two-dimensional arrays for efficient data storage and manipulation.											Apply	
CO4	Apply pointer concepts with arrays and functions, and develop efficient C programs using string operations for effective memory management and text processing.											Apply	
CO5	Implement user-defined data types using structures and unions, manage memory with storage classes and perform file operations and command-line processing in C programs.											Apply	
<b>TEXT BOOKS:</b>													
1. Herbert Schildt, C - The Complete Reference, Tata McGraw-Hill, New Delhi, Fourth Edition, 2017.													
2. Byron S Gottfried and Jitendar Kumar Chhabra, "Programming with C", Tata McGraw Hill Publishing Company, Third Edition, 2011.													
<b>REFERENCES:</b>													
1. Yashavant Kanetkar, "Let Us C: Authentic guide to C programming language", BPB Publication, 19th Edition, 2022.													
2. Robert C. Seacord, "Effective C", No Starch Press, 2020.													
3. E Balagurusamy, "Programming In Ansi C", McGraw Hill Education, Eighth Edition, 2019.													
4. Ashok N.Kamathane, 'Computer Programming, Pearson Education, India, Third Edition ,2015.													
5. <a href="https://archive.nptel.ac.in/courses/106/105/106105171/">https://archive.nptel.ac.in/courses/106/105/106105171/</a>													
<b>Mapping of COs with POs and PSOs</b>													
<b>COs/ POs</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>	<b>PO7</b>	<b>PO8</b>	<b>PO9</b>	<b>PO10</b>	<b>PO11</b>	<b>PSO1</b>	<b>PSO2</b>
CO1	3	2	-	-	-	-	-	1	1	-	-	1	2
CO2	3	3	3	-	-	-	-	1	1	-	-	1	2
CO3	3	3	3	-	-	-	-	1	1	-	-	1	2
CO4	3	3	3	-	-	-	-	1	1	-	-	1	2
CO5	3	3	3	-	-	-	-	1	1	-	-	1	2
1-low, 2-medium, 3-high													

  
**Chairman (BoS)**  
 K.S.R. College of Engineering

Applicable for the students admitted from 2024-2025 onwards



24GET19	தமிழர்மரபு	CATEGORY	L	T	P	SL	C
		HSMC	15	0	0	15	1
(அனைத்து துறைகளுக்கும் பொதுவானது)							
முன்கூட்டிய துறைசார் அறிவு : தேவை இல்லை							
அலகு - I	மொழி மற்றும் இலக்கியம்						[03]
இந்திய மொழிக் குடும்பங்கள் - திராவிட மொழிகள் - தமிழ் ஒரு செம்மொழி - தமிழ் செவ்வியலக்கியங்கள் - சங்க இலக்கியத்தின் சமயச்சார்பற்ற தன்மை - சங்க இலக்கியத்தில் பகிர்தல் அறம் - திருக்குறளில் மேலாண்மைக் கருத்துக்கள் - தமிழ் காப்பியங்கள், தமிழகத்தில் சமணபௌத்த சமயங்களின் தாக்கம் - பக்தி இலக்கியம், ஆழ்வார்கள் மற்றும் நாயன்மார்கள் - சிற்றிலக்கியங்கள் தமிழில் நவீன இலக்கியத்தின் வளர்ச்சி - தமிழ் இலக்கியவளர்ச்சியில் பாரதியார் மற்றும் பாரதிதாசன் ஆகியோரின் பங்களிப்பு.							
அலகு - II	மரபு - பாறை ஓவியங்கள் முதல் நவீன ஓவியங்கள் வரை - சிற்பக் கலை						[03]
நடுகல் முதல் நவீன சிற்பங்கள் வரை - ஐம்பொன் சிலைகள் - பழங்குடியினர் மற்றும் அவர்கள் தயாரிக்கும் கைவினைப் பொருட்கள், பொம்மைகள் - தேர் செய்யும் கலை - சுடுமண் சிற்பங்கள் - நாட்டுப்புறத் தெய்வங்கள் - குமரிமுனியில் திருவள்ளுவர் சிலை - இசை கருவிகள் - மிருதங்கம், பறை, வீணை, யாழ், நாதஸ்வரம் - தமிழர்களின் சமூகபொருளாதார வாழ்வில் கோவில்களின் பங்கு.							
அலகு - III	நாட்டுப் புறக் கலைகள் மற்றும் வீர விளையாட்டுக்கள்						[03]
தெருக்கூத்து, கரகாட்டம், வில்லுப்பாட்டு, கணியான் கூத்து, ஓயிலாட்டம், தோல்பாவைக் கூத்து, சிலம்பாட்டம், வளரி, புலியாட்டம், தமிழர்களின் விளையாட்டுகள்.							
அலகு - IV	தமிழர்களின் துணைக் கோட்பாடுகள்						[03]
தமிழகத்தின் தாவரங்களும், விலங்குகளும் - தொல்காப்பியம் மற்றும் சங்க இலக்கியத்தில் அகம் மற்றும் புறக் கோட்பாடுகள் - தமிழர்கள் போற்றிய அறக்கோட்பாடு - சங்கக்காலத்தில் தமிழகத்தில் எழுத்தறிவும் கல்வியும் - சங்ககால நகரங்களும் துறை முகங்களும் - சங்ககாலத்தில் ஏற்றுமதி மற்றும் இறக்குமதி - கடல் கடந்த நாடுகளில் சோழர்களின் வெற்றி.							
அலகு - V	இந்திய தேசிய இயக்கம் மற்றும் இந்திய பண்பாட்டிற்குத் தமிழர்களின் பங்களிப்பு						[03]
இந்திய விடுதலைப்போரில் தமிழர்களின் பங்கு - இந்தியாவின் பிற்பகுதிகளில் தமிழ் பண்பாட்டின் தாக்கம் - சுயமரியாதை இயக்கம் - இந்திய மருத்துவத்தில் சித்தமருத்துவத்தின் பங்கு கல்வெட்டுகள் கையெழுத்துப்படிக்கள் - தமிழ்ப் புத்தகங்கள்களின் அச்ச வரலாறு.							
Total (L= 15, SL=15) =30 Periods							

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பாடம் கற்றுத்தின் விளைவுகள்: பாடத்தை வெற்றிகரமாக கற்று முடித்த பின்பு, மாணவர்களால் முடியும் விளைவுகள்		அறிவாற்றல் நிலை
CO1:	தமிழ்மொழியின் செந்தண்மை மற்றும் இலக்கியம் குறித்த தெரிதல்	புரிதல்
CO2:	தமிழர்களின் சிற்பக்கலை, ஓவியக்கலை மற்றும் இசைக் கருவிகள் குறித்த தெளிவு.	புரிதல்
CO3:	தமிழர்களின் நாட்டுப் புரைக் கலைகள் மற்றும் வீரவிளையாட்டுகள் குறித்த தெளிவு	புரிதல்
CO4:	தமிழர்களின் திணைக் கோட்பாடுகள், சங்ககாலவணிகம் மற்றும் சோழர்களின் வெற்றிகள் குறித்த தகவல்கள்.	புரிதல்
CO5:	இந்திய தேசிய இயக்கம், சுயமரியாதை இயக்கம் மற்றும் சித்த மருத்தவம் பற்றிய புரிதல்.	புரிதல்

## Text Books:

1	தமிழகவரலாறு-மக்களும்பண்பாடும்-கேசேபிள்ளை (வெளியீடு தமிழ்நாடு பாடநூல் மற்றும் கல்வியில் பணிகள் கழகம்) ,உலகத் தமிழாராய்ச்சி நிறுவனம், சென்னை, 2002
2	கணிணித்தமிழ்முனைவர் இல. சுந்தரம், விகடன் பிரசுரம், 2016

## Reference Books :

1	கீழடி-வைகை நதிக்கரையில் சங்ககால நகரநாகரிகம்,(தொல்லியல்துறைவெளியீடு)
2	பொருறை - ஆற்றுங்கரை நாகரிகம்(தொல்லியல் துறை வெளியீடு)
3	Social Life of Tamils (Dr.K.K.Pillay) A joint Publication of TNTB & ESC and RMRL – (in print)
4	Social Life of the Tamils – The Classical Period (Dr.S.Sigaravelu) (Published by: International Institute of Tamil Studies).

## Mapping of COs with POs and PSOs

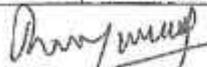
COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	-	-	-	-	-	3	3	-	2	-	3	-	-
CO2	-	-	-	-	-	3	3	-	2	-	3	-	-
CO3	-	-	-	-	-	3	3	-	2	-	3	-	-
CO4	-	-	-	-	-	3	3	-	2	-	3	-	-
CO5	-	-	-	-	-	3	3	-	2	-	3	-	-
Avg.	-	-	-	-	-	3	3	-	2	-	3	-	-

1. சிறிது (குறைந்த) 2. மிதமான (நடுத்தர) 3. கணிசமான (உயர்)

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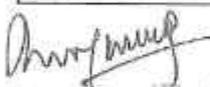
24GET19	HERITAGE OF TAMILS	CATEGORY	L	T	P	SL	C	
		HSMC	15	0	0	15	1	
(Common to all branches)								
<i>Prerequisite(s): No prerequisites are needed for enrolling into the course</i>								
<b>UNIT - I</b>	<b>LANGUAGE AND LITERATURE</b>							<b>[03]</b>
Language Families in India - Dravidian Languages – Tamil as a Classical Language - Classical Literature in Tamil – Secular Nature of Sangam Literature – Distributive Justice in Sangam Literature - Management Principles in Thirukural - Tamil Epics and Impact of Buddhism & Jainism in Tamil Land - Bakthi Literature Azhwars and Nayanmars - Forms of minor Poetry - Development of Modern literature in Tamil - Contribution of Bharathiyar and Bharathidhasan.								
<b>UNIT - II</b>	<b>HERITAGE - ROCK ART PAINTINGS TO MODERN ART – SCULPTURE</b>							<b>[03]</b>
Hero stone to modern sculpture - Bronze icons - Tribes and their handicrafts - Art of temple car making - Massive Terracotta sculptures, Village deities, Thiruvalluvar Statue at Kanyakumari, Making of musical instruments - Mridhangam, Parai, Veenai, Yazh and Nadhaswaram - Role of Temples in Social and Economic Life of Tamils.								
<b>UNIT - III</b>	<b>FOLK AND MARTIAL ARTS</b>							<b>[03]</b>
Therukoothu, Karagattam, VilluPattu, KaniyanKoothu, Oyillattam, Leather puppetry, Silambattam, Valari, Tiger dance - Sports and Games of Tamils.								
<b>UNIT - IV</b>	<b>THINAI CONCEPT OF TAMILS</b>							<b>[03]</b>
Flora and Fauna of Tamils & Aham and Puram Concept from Tholkappiyam and Sangam Literature - Aram Concept of Tamils - Education and Literacy during Sangam Age - Ancient Cities and Ports of Sangam Age - Export and Import during Sangam Age - Overseas Conquest of Cholas.								
<b>UNIT - V</b>	<b>CONTRIBUTION OF TAMILS TO INDIAN NATIONAL MOVEMENT AND INDIAN CULTURE</b>							<b>[03]</b>
Contribution of Tamils to Indian Freedom Struggle - The Cultural Influence of Tamils over the other parts of India – Self-Respect Movement - Role of Siddha Medicine in Indigenous Systems of Medicine – Inscriptions & Manuscripts – Print History of Tamil Books.								
<b>Total (L= 15, SL=15) =30 Periods</b>								
<b>Course Outcomes:</b>							<b>Cognitive Level</b>	
<b>At the end of the course, the student will be able to</b>								
<b>CO1:</b>	Recognize the extensive literature of Tamil and its classical nature.						Understand	
<b>CO2:</b>	Apprehend the heritage of sculpture, painting and musical instruments of ancient people.						Understand	
<b>CO3:</b>	Review on folk and martial arts of Tamil people.						Understand	
<b>CO4:</b>	Insight thinai concepts, trade and victory of Chozha dynasty.						Understand	
<b>CO5:</b>	Realize the contribution of Tamil in Indian freedom struggle, self-esteem movement and siddha medicine.						Understand	

  
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Text Books:	
1	Social Life of Tamils (Dr.K.K.Pillay) A joint Publication of TNTB & ESC and RMRL – (in print)
2	Historical Heritage of the Tamils (Dr.S.V.Subatamanian, Dr.K.D. Thirunavukarasu) (Published by : International Institute of Tamil Studies)
Reference Books:	
1	Social Life of the Tamils – The Classical Period (Dr.S.Sigaravelu) (Published by: International Institute of Tamil Studies).
2	The Contribution of the Tamil to Indian Culture (Dr.M.Valarmathi) (Puplished by International Institute of Tamil Studies).
3	Keeladi – ‘Sangam City Civilization on the banks of river Vaigai; (Jointly Published by: Department of Archaeology & Tamilnadu Text Book and Educational Services Corporation, Tamilnadu)
4	Studies in the History of India with Special Reference to Tamilnadu (Dr.K.K.Pillay) (Published by: The Author)

Mapping of COs with POs and PSOs													
COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	-	-	-	-	-	3	3	-	2	-	3	-	-
CO2	-	-	-	-	-	3	3	-	2	-	3	-	-
CO3	-	-	-	-	-	3	3	-	2	-	3	-	-
CO4	-	-	-	-	-	3	3	-	2	-	3	-	-
CO5	-	-	-	-	-	3	3	-	2	-	3	-	-
Avg.	-	-	-	-	-	3	3	-	2	-	3	-	-
1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)													

  
Chairman (BOS)



24MAI19	MATRICES AND CALCULUS	Category	L	T	P	SL	C
		BSC	30	15	30	45	4
<b>SEMESTER I - B.E / B.TECH ( Common to All Branches )</b>							
<b>PREREQUISITE</b> The Students should have a basic understanding of calculus, matrices, and differential equations to effectively follow the concepts in this course.							
<b>OBJECTIVES:</b> Build a strong foundation in eigen values, eigen vectors, quadratic forms, and higher-order linear differential equations. Develop skills in differential and vector calculus to analyze curves, optimize multivariable functions, and interpret vector fields.							
<b>UNIT - I</b>	<b>LINEAR ALGEBRA</b>						<b>(9)</b>
Characteristic equation – Eigen values and Eigen vectors of a real matrix – Properties of Eigen values and Eigen vectors (Excluding proof) – Cayley Hamilton theorem (excluding proof) – Quadratic forms – Reduction of quadratic form to canonical form by orthogonal transformation.							
<b>UNIT - II</b>	<b>ORDINARY DIFFERENTIAL EQUATIONS</b>						<b>(9)</b>
Linear differential equations of second and higher order with constant coefficients – Differential equations with variable coefficients – Cauchy's and Legendre's linear equations – Method of variation of parameters.							
<b>UNIT - III</b>	<b>DIFFERENTIAL CALCULUS</b>						<b>(9)</b>
Curvature - Radius of curvature (Cartesian co-ordinates only) – Centre of curvature and Circle of curvature – Involute and Evolute (Parabola, Ellipse, Hyperbola and Rectangular hyperbola ).							
<b>UNIT - IV</b>	<b>FUNCTIONS OF SEVERAL VARIABLES</b>						<b>(9)</b>
Partial derivatives – Euler's theorem for homogenous functions – Taylor's series expansion - Maxima and Minima for functions of two variables – Method of Lagrangian multipliers.							
<b>UNIT - V</b>	<b>VECTOR CALCULUS</b>						<b>(9)</b>
Gradient, Divergence and Curl – Directional derivative – Irrotational and solenoidal vector fields – Green's theorem in plane, Gauss divergence theorem and Stoke's theorem (Cube, Cuboid and Rectangular Paralleopiped only).							
<b>List of Exercise/Experiments(MAT LAB):</b>							
<ol style="list-style-type: none"> <li>1. Calculate the characteristic equation and eigenvalues</li> <li>2. Find the eigenvector and diagonalization of a given matrix.</li> <li>3. Solving ODE with constant coefficients</li> <li>4. Detect the solution of ODE with variable coefficients</li> <li>5. Identify the radius of curvature</li> <li>6. Establish the Evolute of curve.</li> <li>7. Reckon the Taylor's series for functions of two variables.</li> <li>8. Compute the maxima and minima.</li> <li>9. Estimate the directional derivative, divergence and curl.</li> <li>10. Determine line integral, surface integral and volume integral.</li> </ol>							
<b>L = 30 , T = 15 &amp; P = 30 &amp; SL = 45, TOTAL: 120 PERIODS</b>							

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Applicable for the students admitted from 2024-2025 onwards

**COURSE OUTCOMES:**

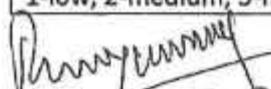
At the end of the course, the students will be able to:

COs	Course Outcome	Cognitive Level
CO1	Apply eigen values, eigen vectors, and the Cayley-Hamilton theorem to solve matrix problems and diagonalize quadratic forms into canonical form.	Apply
CO2	Apply methods to solve second and higher-order linear differential equations with constant and variable coefficients.	Apply
CO3	Apply concepts of differential calculus to find curvature, center of curvature, and evolutes of standard Cartesian conic sections.	Apply
CO4	Apply partial derivatives, Jacobians, and lagrangian multipliers to determine local extremum of multivariable functions.	Apply
CO5	Apply vector differential operators to the vector fields and verify Green's, Gauss divergence, and Stokes' theorems for geometries.	Apply

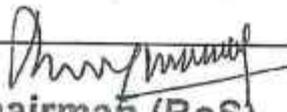
**TEXT BOOKS:**1. Ravish R Singh and Mukul Bhatt, "Engineering Mathematics – I", Mc-Graw Hill Publications, New Delhi, 2<sup>nd</sup> Edition, 2020.2. B. S. Grewal, "Higher Engineering Mathematics", Khanna Publishers, New Delhi, 40<sup>th</sup> Edition, 2020.**REFERENCES:**1. Bali N. P and Manish Goyal, "Engineering Mathematics", Laxmi Publications Pvt Ltd., 7<sup>th</sup> Edition, 2020.2. Dass H.K, "Advance Engineering Mathematics", S. Chand and company, 11<sup>th</sup> Edition, 2014.3. Jain R.K. and Iyengar S.R.K, "Advanced Engineering Mathematics", Narosa Publications, 8<sup>th</sup> Edition, 2012.4. Erwin Kreyszig, "Advanced Engineering Mathematics", Wiley India, New Delhi, 10<sup>th</sup> Edition 2016.5. <https://archive.nptel.ac.in/courses/111/108/111108157/>6. <https://archive.nptel.ac.in/courses/111/105/111105122/>**Mapping of COs with POs and PSOs**

COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	3	3	3	2	-	-	1	-	-	2	-	-
CO2	3	3	3	3	2	-	-	1	-	-	2	-	-
CO3	3	3	3	3	2	-	-	1	-	-	2	-	-
CO4	3	3	3	3	2	-	-	1	-	-	2	-	-
CO5	3	3	3	3	2	-	-	1	-	-	2	-	-
Avg.	3	3	3	3	2	0	0	1	0	0	2	0	0

1-low, 2-medium, 3-high


  
Chairman (BoS)


24CH106	CHEMISTRY FOR ENGINEERS	Category	L	T	P	SL	C
		BSC	45	0	30	45	4
<b>(Common to AI&amp;DS, BME, CSE, CSE(CS), CSE(CSD), CSE(IoT), ECE, EEE and IT)</b>							
<b>PREREQUISITE</b>							
The students must have knowledge about the basic concepts of water parameters, electro chemistry, organic reactions and their applications.							
<b>OBJECTIVES:</b>							
To equip the learners to apply the chemical principles and their applications in the engineering fields.							
<b>UNIT - I</b>	<b>WATER TREATMENT</b>						<b>(9)</b>
Hardness – types, units – estimation of hardness by EDTA method; Boiler feed water – requirements, disadvantages of using hard water in boilers – scale and sludge – priming and foaming – caustic embrittlement – boiler corrosion. Softening methods – internal conditioning – calgon, phosphate – external conditioning – zeolite process and ion exchange process; Desalination – reverse osmosis. Domestic water treatment (Sterilisation process Only).							
<b>UNIT - II</b>	<b>ELECTROCHEMISTRY AND CORROSION</b>						<b>(9)</b>
Introduction – electrode potential – Nernst equation – EMF series and its significance; E – Vehicles - Need - Types – Advantages and Disadvantages; Corrosion – causes, consequences – classification – chemical corrosion – electro chemical corrosion – mechanism; Galvanic & differential aeration corrosion – factors influencing corrosion – corrosion control (Sacrificial anode and Impressed Current Cathodic protection method).							
<b>UNIT - III</b>	<b>ENERGY STORAGE DEVICES</b>						<b>(9)</b>
Batteries – primary battery – Dry cell, secondary batteries – lead-acid and lithium-ion batteries. Fuel cells – H <sub>2</sub> -O <sub>2</sub> fuel cell, solar cells – principle, applications and advantages; Nuclear energy: Light water Nuclear power plant - breeder reactor.							
<b>UNIT - IV</b>	<b>POLYMER CHEMISTRY</b>						<b>(9)</b>
Polymer – definition – degree of polymerization – functionality. Polymerization – addition, condensation and co-polymerization – free radical mechanism of addition polymerization; Preparation properties & uses of PVC, Nylon – 6,6 & Teflon. Plastics – classification – thermosetting and thermoplastics. Fabrication of polymers – compression and Injection moulding.							
<b>UNIT - V</b>	<b>NANO CHEMISTRY AND COMPOSITES</b>						<b>(9)</b>
Introduction – basics of nanochemistry – distinction between nanoparticles, molecules and bulk materials - synthesis of nanomaterials [CVD, laser evaporation, pyrolysis] - applications of nanomaterials. Composite – Introduction: Definition and need for composite – Types of composites: Properties and application of FRP and MMC.							
<b>List of Exercise/Experiments:</b>							
1. Estimation of total, permanent and temporary hardness of water sample By EDTA method							
2. Estimation of chloride content in water by Argentometric method [Mohr's Method]							
3. Conductometric titration of strong acid with strong base (HCl Vs NaOH)							
4. Estimation of dissolved oxygen in water (Winkler's Method)							
5. Conductometric titration of mixture of acids (HCl & CH <sub>3</sub> COOH) with strong base							
6. Estimation of Fe <sup>2+</sup> ion by potentiometric titration							
7. Estimation of HCl by p <sup>H</sup> - Metry							
8. Conductometric precipitation titration using BaCl <sub>2</sub> -Na <sub>2</sub> SO <sub>4</sub>							
<b>L = 45, P = 30, SL = 45, TOTAL = 120 PERIODS</b>							

  
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COURSE OUTCOMES: At the end of the course, the students will be able to:		
COs	Course Outcome	Cognitive Level
CO1	Interpret the treatment solutions for drinking water, boiler feed water, and wastewater reuse.	Understand
CO2	Describe different types of electrochemical cells, including galvanic and electrolytic cells.	Understand
CO3	Categorize different energy storage methods, such batteries, fuel cell and solar cell for the production of electricity.	Understand
CO4	Summarize the basics concepts of polymer chemistry in designing the materials for engineering and technology.	Understand
CO5	Illustrate the nano materials and composites for engineering and technology.	Understand

**TEXT BOOKS:**

1. S S. Dara and S. S. Umare, "A Text book of Engineering Chemistry", S.Chand & Co.Ltd., 12<sup>th</sup> Edition, 2015.
2. P.C. Jain and Monica Jain, "Engineering Chemistry", Dhanpat Rai Pub. Co., 16<sup>th</sup> Edition, 2013.
3. Wiley, "Engineering Chemistry", Wiley India Pvt. Ltd., 2<sup>nd</sup> Edition, 2013.

**REFERENCES:**

1. Dr. A. Ravikrishnan, "Engineering Chemistry", Srikrishna Hi-tech Publishing Company Pvt. Ltd., 21<sup>st</sup> Edition, 2022.
2. J. Mendham, R. C. Denney, J. D. Barnes, M. J. K. Thomas and B. Sivasankar, "Vogel's Text book of Quantitative Chemical Analysis", Pearson Education Pvt., Ltd., 6<sup>th</sup> Edition, 2019.
3. Shashi Chala, "A Text book of Engineering Chemistry", Dhanpat Rai Pub. Co., 2015.
4. S. K. Bhasin and Sudha Rani, "Laboratory Manual of Engineering Chemistry", Dhanpat Rai Publishing Company Private Limited, 3<sup>rd</sup> Edition, 2012.

**Mapping of COs with POs and PSOs**

COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO 1	PSO 2
CO1	3	2	-	-	-	1	-	2	1	-	1	-	-
CO2	3	2	-	-	-	1	-	2	1	-	1	-	-
CO3	3	2	-	-	-	1	-	2	1	-	1	-	-
CO4	3	2	-	-	-	1	-	2	1	-	1	-	-
CO5	3	2	-	-	-	1	-	2	1	-	1	-	-

1-low, 2-medium, 3-high

**Laboratory Equipment Details  
(Requirements for a batch of 30 students)**

S.No.	Description of Equipment	Quantity required
1.	Electronic balance	1 No.
2.	pH meter	6 Nos.
3.	Conductivity meter	6 Nos.
4.	Potentiometer	6 Nos.

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<b>COURSE OUTCOMES:</b>													
At the end of the course, the students will be able to:													
COs	Course Outcome										Experiment	Cognitive Level	
CO1	Apply the basic concept of MS word, Excel, Power Point presentation and MS Access.										1,2,3,4	Apply	
CO2	Develop the program using the concept of control statements.										5,6,7	Apply	
CO3	Demonstrate the use of functions and arrays in Programming.										8,9	Apply	
CO4	Apply the concepts of pointers and strings.										10,11	Apply	
CO5	Develop the program using the files and structure operations.										12	Apply	
<b>REFERENCES:</b>													
1.Jeff Szuha, "Learn C Programming", Packt Publishing, United Kingdom, Second Edition, 2022.													
2.E Balagurusamy, "Programming In Ansi C", McGraw Hill Education, Eighth Edition, 2019.													
Mapping of COs with POs and PSOs													
COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	3	2	-	-	-	-	1	1	-	-	1	2
CO2	3	3	2	-	-	-	-	1	1	-	-	1	2
CO3	3	3	2	-	-	-	-	1	1	-	-	1	2
CO4	3	3	2	-	-	-	-	1	1	-	-	1	2
CO5	3	3	2	-	-	-	-	1	1	-	-	1	2
1-low, 2-medium, 3-high													

<b>LIST OF EQUIPMENTS (For a Batch of 30 Students)</b>		
SI. No	Name of the Equipment's	Qty.
1.	A computer with a modern processor and sufficient RAM.	30 Nos.
2.	Microsoft Office Suite (preferably MS Office 2016 or later) including: <ul style="list-style-type: none"> <li>MS Word (for document preparation and mail merge)</li> <li>MS Excel (for mark sheet creation, formulas, functions, and charts).</li> <li>MS PowerPoint (for presentations with animations and timers).</li> <li>MS Access (for database creation, data manipulation, and report generation).</li> <li>Email Client (e.g., Outlook or any configured email system) for sending mail merge outputs.</li> </ul>	30 Nos.
3.	Turbo C software or any standard C Compiler (e.g., GCC, Code Blocks)	30 Nos.

  
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Applicable for the students admitted from 2024-2025 onwards



24MEP16	ENGINEERING GRAPHICS LABORATORY	Category	L	T	P	SL	C
		ESC	15	0	30	15	2

(Common to BME, CSE, CSE(CS), CSD, CSE(IoT), IT, ECE, EEE)

**PREREQUISITE**

Engineering Graphics Laboratory requires a good understanding of geometry. This includes knowledge of shapes, angles, dimensions, and spatial reasoning. The ability to visualize and interpret three-dimensional objects from two-dimensional drawings is crucial.

**OBJECTIVES:**

Instruct the utility of drafting & modeling packages in orthographic and isometric drawings and train the usage of 2D and 3D modeling

**List of Exercise/Experiments:**

1. Study of drawing tools, commands and coordinate systems in 2D software.
2. Cycloid and Conic curves.
3. Orthographic projections of pictorial views.
4. Orthographic views of straight lines.
5. Orthographic views of planes.
6. Orthographic views of simple solids.
7. The sectional view and the true shape of simple solids.
8. Development of lateral surfaces of simple solids.
9. Isometric projection of simple solids.
10. Drafting the 2D multi-view drawings from 3D model.

**LIST OF EQUIPMENT (for a batch of 30 Students)**

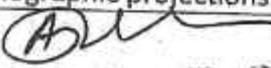
S.No.	Name of the Equipment	Quantity
1.	Intel i3 Processor, 8 GB RAM with 2 GB Graphics Card	30 Nos
2.	Licensed software for drafting and modeling	30 Nos

L:15 P:30 SL:15 TOTAL: 60 PERIODS

**COURSE OUTCOMES:**

At the end of the course, the students will be able to:

COs	Course Outcome	Exp. No.	Cognitive Level
CO1	Explain the fundamentals of engineering drawing and AutoCAD tool.	1	Understand
CO2	Construct projections of points, lines, and planes, then develop a virtual drawing using AutoCAD tool.	2,3 & 4	Apply
CO3	Apply projection principles to convert pictorial views into orthographic drawings	5,6	Apply
CO4	Model the Solid Projections and Sectioning of the solids by the AutoCAD tool.	7,8	Apply
CO5	Develop isometric drawings of simple objects reading the orthographic projections of those objects.		Apply

  
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**REFERENCES:**

1. Bhatt. N. D., Engineering Drawing, Charotar Publishing House, Fifty Third Edition, 2014.
2. Basant Agarwal and Agarwal. C. M., Engineering Drawing, Tata McGraw Hill Publishing Company Limited, 2018.

**Mapping of COs with POs and PSOs**

COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	2	-	-	3	-	-	-	-	-	-	-	-
CO2	3	3	2	-	3	-	-	-	-	-	-	-	-
CO3	3	3	2	-	3	-	-	-	-	-	-	-	-
CO4	3	3	2	-	3	-	-	-	-	-	-	-	-
CO5	3	3	2	-	3	-	-	-	-	-	-	-	-

1-low, 2-medium, 3-high

  
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24GEP16	ENGINEERING EXPERIENCE LABORATORY	Category	L	T	P	SL	C
		ESC	0	0	30	0	1
<b>(Common to BME, CSE, CSE(CS), CSD, CSE(IoT), ECE, EEE, IT)</b>							
<b>PREREQUISITE:</b>							
A solid foundation in basic electrical components such as switches, wires, fuses, and light bulbs, including the roles of line, neutral, and ground wires. Basic understanding of physics and core principles of electrical and mechanical engineering.							
<b>OBJECTIVE:</b>							
To develop practical skills in basic electrical wiring, electronic interfacing with Arduino and IoT, and fundamental mechanical tools and systems.							
<b>LIST OF EXPERIMENTS</b>							
<b>GROUP - A (ELECTRICAL)</b>							
<ol style="list-style-type: none"> <li>1. Fluorescent lamp wiring.</li> <li>2. Stair-case wiring.</li> <li>3. Residential house wiring using switches, fuse, indicator and lamp.</li> <li>4. Measurement of Energy in single phase system.</li> </ol>							
<b>GROUP - B (ELECTRONICS)</b>							
<ol style="list-style-type: none"> <li>1. Study of Electronic Components, Instruments, Internet of Things (IoT) and Arduino IDE.</li> <li>2. Controlling the Light Emitting Diode (LED) with a push button using Arduino.</li> <li>3. Interfacing of a Sensor (Ultrasonic, Rain, Voltage, Current &amp; PIR) with Arduino Uno.</li> <li>4. Controlling of LED through Wi-Fi using ESP8266.</li> </ol>							
<b>GROUP - C (MECHANICAL)</b>							
<ol style="list-style-type: none"> <li>1. Study of plumbing line sketches for water supply and carpentry tools.</li> <li>2. Study of welding tools and centrifugal pump.</li> </ol>							
<b>COURSE OUTCOMES:</b>							
At the end of the course, the students will be able to:							
COs	Course Outcome	Bloom's Taxonomy Level					
CO1	Construct different types of wiring used in residential houses.	Apply					
CO2	Measure the energy in single-phase system.	Apply					
CO3	Demonstrate different electronic components, instruments, IoT and Arduino IDE.	Apply					
CO4	Construct the control circuit with the help of Arduino and sensors.	Apply					
CO5	Describe the plumbing, carpentry, welding components and centrifugal pump works for engineering practices and applications.	Understand					

  
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**REFERENCES:**

1. Gupta J.P., "A Course in Electrical Installation Estimating and Costing", S.K. Kataria and Sons, Delhi, Reprint 2013 Edition, 2013.
2. Mike Cheich, "Arduino Book for Beginners", Programming Electronics Academy, 2021.

Mapping of COs with POs and PSOs													
COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	3	2	-	-	2	2	3	2	-	3	-	-
CO2	3	3	2	-	-	2	2	3	2	-	3	-	-
CO3	3	3	2	-	-	-	2	3	2	-	3	-	-
CO4	3	3	2	-	-	-	2	3	2	-	3	-	-
CO5	3	3	2	-	-	-	2	3	2	-	3	-	-

**LIST OF EQUIPMENT (For a Batch of 30 Students)**

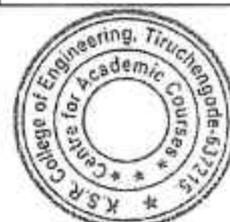
S.No.	Name of the Equipment	Qty.
1.	Single-phase house wiring setup	2 Nos.
2.	Staircase wiring setup	2 Nos.
3.	Fluorescent lamp wiring setup	2 Nos.
4.	Energy Meter	5 Nos.
5.	Electrical Measuring Instruments	10 Nos.
6.	Ultrasonic Sensor	5 Nos.
7.	Rain Sensor	5 Nos.
8.	Voltage Sensor	5 Nos.
9.	Current Sensor	5 Nos.
10.	PIR Sensor	5 Nos.
11.	ESP8266 & Cable	15 Nos.
12.	Arduino UNO & Cable	15 Nos.
13.	DHT 11	5 Nos.
14.	Temperature sensor	5 Nos.
15.	Red LED	15 Nos.
16.	2-leg push Button	15 Nos.
17.	4-leg push Button	15 Nos.
18.	Personal Computer	15 Nos.

  
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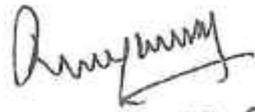


24SSP19	APTITUDE AND CODING SKILLS – I	Category	L	T	P	SL	C	
		EEC	0	0	30	0	1	
<b>(Common to All Branches)</b>								
<b>OBJECTIVES:</b> The course aims to introduce students to the fundamentals of aptitude, highlighting its importance and real-world applications. It is designed to build proficiency in verbal reasoning, thereby enhancing analytical and problem-solving skills. The curriculum also focuses on developing a strong foundation in English grammar, essential for effective communication.								
<b>UNIT - I</b>	<b>BASIC OF NUMBER SYSTEMS &amp; FOUNDATION</b>							<b>(6)</b>
Introduction to Number System and its Classification - Divisibility Rules and Problems -Place Value & Face Value - HCF & LCM and its properties.								
<b>UNIT - II</b>	<b>BASICS OF SHARE BASED CONCEPTS</b>							<b>(6)</b>
Introduction to Average – Basics of Ratio and proportion – Basics of Partnership–Introduction to Percentage								
<b>UNIT - III</b>	<b>LOGICAL REASONING</b>							<b>(4)</b>
Analogies - Alpha and numeric series - Number Series - Coding and Decoding - Direction and distance								
<b>UNIT - IV</b>	<b>VERBAL ABILITY</b>							<b>(7)</b>
Introduction to Grammar – Tenses – Parts of Speech – Preposition – Articles – Modal Verbs								
<b>UNIT - V</b>	<b>C PROGRAMMING</b>							<b>(7)</b>
C Basics-Control Statements Decision making – Functions – Arrays & Strings – Pointers - User Defined Data Types - Storage Classes - Memory Management - Preprocessor.								
<b>TOTAL: 30 PERIODS</b>								
<b>COURSE OUTCOMES:</b> At the end of the course, the students will be able to:								
COs	Course Outcome							Cognitive Level
CO1	Explain the classification of number systems, apply divisibility rules to identify number properties							Understand
CO2	Apply the concepts of averages, ratios, and proportions to solve real-life problems and interpret data effectively.							Apply
CO3	Solve number series problems by identifying and applying suitable numerical patterns or rules.							Apply
CO4	Apply the rules of grammar to enhance written and spoken communication.							Apply
CO5	Apply the fundamental concepts of C programming to develop efficient and structured programs.							Apply

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<b>TEXT BOOKS:</b>													
1. R S Aggarwal, Quantitative Aptitude for Competitive Examinations.													
2. R.S. Aggarwal, A Modern Approach to Verbal & Non-Verbal Reasoning													
3. Wren & Martin, High School English Grammar & Composition													
4. Brian W. Kernighan and Dennis Ritchie, The C Programming Language 2e, Pearson Education, 2015.													
5. Yashavant Kanetkar, The C Programming Language 2e, BPB publications, 15 <sup>th</sup> Edition, 2016													
<b>REFERENCES:</b>													
1. <a href="https://www.geeksforgeeks.org/quantitative-aptitude/?ref=shm">https://www.geeksforgeeks.org/quantitative-aptitude/?ref=shm</a>													
2. Stephen G. Kochana, Programming in C, 3 <sup>rd</sup> Edition.													
3. K. N. King, C Programming: A Modern Approach, 2e, 2008.													
4. Aaron M. Tenenbaum, Yedidya Langsam, and Moshe J. Augenstein, Data Structures Using C, Pearson Education-India, 1990.													
5. Robert L. Kruse and Bruce P. Leung, Data Structures and Program Design in C, Pearson Education 2007.													
6. <a href="https://www.geeksforgeeks.org/c-programming-language/">https://www.geeksforgeeks.org/c-programming-language/</a>													
7. <a href="https://www.geeksforgeeks.org/data-structures/">https://www.geeksforgeeks.org/data-structures/</a>													
<b>Mapping of COs with POs and PSOs</b>													
COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	2	-	-	2	-	-	2	-	-	3	-	-
CO2	3	3	2	-	2	-	-	2	-	-	3	-	-
CO3	3	3	2	-	2	-	-	2	-	-	3	-	-
CO4	3	3	2	-	2	-	-	2	-	-	3	-	-
CO5	3	3	2	-	2	-	-	2	-	-	3	-	-
Avg.	3	3	3	-	2	-	-	2	-	-	3	-	-

  
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24CST29	PYTHON PROGRAMMING	Category	L	T	P	SL	C
		ESC	45	0	0	45	3
<b>(Common to All Branches)</b>							
<b>PREREQUISITE:</b> A basic understanding of programming principles such as variables and loops, paired with good problem-solving abilities is required. Logical thinking and analytical skills are critical for effective programming.							
<b>OBJECTIVES:</b> To provide a comprehensive foundation in Python programming, covering core concepts, data structures, OOP principles, file and database handling as well as web and GUI development using frameworks like Django and Tkinter.							
<b>UNIT – I</b>	<b>FUNDAMENTALS OF PYTHON</b>						<b>(9)</b>
Introduction to Python – Advantages of Python programming – Variables and Data types – Comments – Indentation – I/O function – Operators – Selection control structures – Looping control structures – Functions: Declaration – Types of arguments – Anonymous functions: Lambda.							
<b>UNIT – II</b>	<b>HANDLING STRINGS AND EXCEPTIONS</b>						<b>(9)</b>
Strings – List – Tuples – Dictionaries – Sets – Exception Handling: Built-in Exceptions – User-defined exception – Modules and Packages.							
<b>UNIT – III</b>	<b>OBJECT ORIENTED PROGRAMMING CONCEPTS</b>						<b>(9)</b>
Object Oriented Programming basics –Inheritance and Polymorphism – Operator Overloading and Overriding – Get and Set Attribute Values – Name Mangling – Duck Typing – Relationships.							
<b>UNIT– IV</b>	<b>FILES AND DATABASES</b>						<b>(9)</b>
File I/O operations – Directory Operations – Reading and Writing in Structured Files: CSV and JSON – Data manipulation using MySQL.							
<b>UNIT – V</b>	<b>WEBPROGRAMING AND GUI USING PYTHON</b>						<b>(9)</b>
Frameworks: Introduction to Django – Django CRUD – Socket Programming– Sending email – UI design: Tkinter – Events – CGI: Introduction to CGI Programming, GET and POST Methods.							
<b>L=45, SL=45, TOTAL: 90 PERIODS</b>							

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 Applicable for the students admitted from 2024- 2025 onwards

**COURSE OUTCOMES:**

At the end of the course, the students will be able to:

COs	Course Outcome	Cognitive Level
CO1	Describe Python syntax to write code using data types, operators, loops and conditionals.	Understand
CO2	Interpret string manipulation, data structures and exception handling to build robust applications.	Understand
CO3	Implement object-oriented programming principles including inheritance and polymorphism to design effective solutions.	Apply
CO4	Apply file I/O operations and database management techniques to efficiently manage and manipulate data.	Apply
CO5	Develop web applications and graphical user interfaces using Python frameworks and libraries.	Apply

**TEXT BOOKS:**

1. Yashwant Kanetkar, Aditya Kanetkar, "Let Us Python", BPB Publications, 5th Edition, 2023.
2. Wesley J.Chun, "Core Python Programming", Pearson Education, 2nd Edition, 2017.

**REFERENCES:**

1. Robert Oliver, "Python Quick Start Guide: The Simplified Beginner's Guide to Python Programming Using Hands-On Projects and Real-World Applications", Clyde Bank Media LLC, 1st Edition, 2023
2. Allen B. Downey, "Think Python", O'Reilly Media, 2nd Edition, 2016.
3. David Beazley, Brian K. Jones, "Python Cookbook", O'Reilly Media, 3rd Edition, 2013
4. Mark Lutz, "Python Pocket Reference", O'Reilly Media, 5th Edition, 2014
5. www.python.org
6. [https://onlinecourses.swayam2.ac.in/cec22\\_cs20/preview](https://onlinecourses.swayam2.ac.in/cec22_cs20/preview)

**Mapping of COs with POs and PSOs**

COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	2	-	-	-	-	-	1	1	-	2	1	2
CO2	3	2	-	-	-	-	-	1	1	-	2	1	2
CO3	3	3	2	-	-	-	-	1	1	-	2	1	2
CO4	3	3	2	-	-	-	-	1	1	-	2	1	2
CO5	3	3	2	-	-	-	-	1	1	-	2	1	2

1-low, 2-medium, 3-high

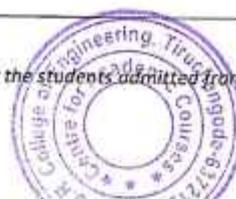
  
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Applicable for the students admitted from 2024-2025 onwards

24CST21	DESIGN THINKING	Category	L	T	P	SL	C
		PCC	30	0	0	30	2
<b>(COMMON TO CSD,CSE,CSE(CS),CSE(IOT)and IT)</b>							
<b>PRE-REQUISITE</b>							
Students are expected to have an empathetic mindset to help them understand users, a curious mindset to explore and questions assumptions, a collaborative mindset for interdisciplinary teamwork, an iterative approach for refining ideas and creativity to generate innovative solutions							
<b>OBJECTIVES</b>							
To equip students with knowledge and skills in Design Thinking by introducing its fundamental principles and guiding them through the stages of Feel, Define, Divergence and Convergence and Communication using practical tools and case studies to encourage creative problem solving and user centered innovation							
<b>UNIT - I</b>	<b>FUNDAMENTALS OF DESIGN THINKING</b>	<b>(6)</b>					
What is Design Thinking? – When to use Design Thinking? – How to do it? – Who are involved in this? – Design The Thinking – Personal Visualization, The Wheel of Life & Balancing Priorities – Appreciating ‘Design’ – The 3 Laws of Design Thinking.							
<b>UNIT - II</b>	<b>STEP 1: THE ‘FEEL’ STAGE</b>	<b>(6)</b>					
What is this stage about? – What role does a Design Thinker play in this stage? Tools – What is the purpose in this stage? – Persona – Journey Mapping – Stakeholder Mapping & CATWOE Analysis – Cartographic Perspective (L0) – Empathy Map – Case Study: Understanding the Stakeholders.							
<b>UNIT - III</b>	<b>STEP 2: THE ‘DEFINE’ STAGE</b>	<b>(6)</b>					
What is this stage about? – What role does a Design Thinker play in this stage? – What is the most important aspect of this stage? – Tools – What is the purpose in this stage? – Five-Whys – Anti-Pattern – Paraphrasing the Problem – Challenge Mapping – LORD: Definitive skill set for a Design Thinker – Case Study: Relooking at the Problem.							
<b>UNIT - IV</b>	<b>STEP 3: THE ‘DIVERGENCE’ &amp; ‘CONVERGENCE’ STAGE</b>	<b>(6)</b>					
What is this stage about? – What role does a Design Thinker play in this stage? – What is the most important aspect of this stage? – Tools – What is the purpose in this stage? – Brainstorming – Metaphor – Random Association Technique – End-State Visualization – 10gm-100gm-1000gm – Prototyping – Wire framing for digital products – Case Study: Prototyping and Communicating for Effective Outcome.							
<b>UNIT - V</b>	<b>STEP 5: THE ‘COMMUNICATION’ STAGE</b>	<b>(6)</b>					
What is this stage about? – What role does a Design Thinker play in this stage? – What is the most important aspect of this stage? – Tools – What is the purpose in this stage? – The 4Cs Framework – Naming – Packaging – Story boarding – Presentation – Distribution.							
<b>L=30, T=0, P=0, TOTAL: 30 PERIODS</b>							



<b>COURSE OUTCOMES:</b>													
<b>At the end of the course, the students will be able to:</b>													
<b>COs</b>	<b>Course Outcome</b>											<b>Cognitive Level</b>	
<b>CO1</b>	Summarize the key principles of design thinking and their relevance to real-world problem contexts.											Understand	
<b>CO2</b>	Interpret the significance of a design mindset in fostering creativity and innovation.											Understand	
<b>CO3</b>	Apply design thinking methods effectively at each stage of the problem-solving process.											Apply	
<b>CO4</b>	Implement the phases of design thinking to address complex challenges systematically.											Apply	
<b>CO5</b>	Execute design thinking techniques and tools to create, test, and refine potential solutions.											Apply	
<b>TEXT BOOKS:</b>													
<ol style="list-style-type: none"> <li>1. UnMukt – The Science &amp; Art of Design Thinking, Arun Jain</li> <li>2. Don Norman, The Design of Everyday Things, MIT Press, 2013</li> <li>3. Tim Brown, Change by Design: How Design Thinking Transforms Organizations and inspires innovation, Harper Collins Publishers Ltd, New York, First Edition, 2009.</li> </ol>													
<b>REFERENCES:</b>													
<ol style="list-style-type: none"> <li>1. Chrisitan Mueller-Roterberg, Handbook of Design Thinking – Tips &amp; Tools for how to design thinking, kindle Direct Publishing, First Edition, 2018.</li> <li>2. Johnny Schneider, Understanding Design Thinking, Lean and Agile, O'Reilly Media, California, First Edition, 2017</li> <li>3. Roger Martin, The Design of Business, Why Design Thinking is the next competitive advantage, Harvard Business Press, United States, First Edition, 2009.</li> <li>4. Idris Mootee, Design Thinking for Strategic Innovation, John Wiley &amp; Sons Inc, New Jersey, First Edition, 2013.</li> </ol>													
<b>Mapping of COs with POs and PSOs</b>													
<b>COs</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>	<b>PO7</b>	<b>PO8</b>	<b>PO9</b>	<b>PO10</b>	<b>PO11</b>	<b>PSO1</b>	<b>PSO2</b>
<b>CO1</b>	3	2	-	-	-	-	1	1	1	-	1	1	2
<b>CO2</b>	2	2	-	-	-	-	1	1	1	-	1	1	2
<b>CO3</b>	3	3	2	-	-	-	1	1	1	-	1	1	2
<b>CO4</b>	3	3	2	-	-	-	1	1	1	-	1	1	2
<b>CO5</b>	3	3	3	-	-	-	1	1	1	-	1	1	2
1-low, 2-medium, 3-high													

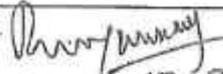
  
**Chairman (BoS)**  
 K.S.R College of Engineering



Applicable for the students admitted from 2024–2025 onwards

24GET29	தமிழரும் தொழில் நுட்பமும்	CATEGORY	L	T	P	SL	C
		HSMC	15	0	0	15	1
(அனைத்து துறைகளுக்கும் பொதுவானது)							
முன் கூட்டிய துறைசார் அறிவு: தேவை இல்லை							
அலகு - I	நெசவு மற்றும் பாணைத் தொழில்நுட்பம்						[03]
சங்ககாலத்தில் நெசவுத் தொழில் - பாணைத் தொழில்நுட்பம் கருப்பு சிவப்பு பாண்டங்கள்- பாண்டகளில் கீறல் குறியீடுகள்							
அலகு - II	வடிவமைப்பு மற்றும் கட்டிடத் தொழில்நுட்பம்						[03]
சங்ககாலத்தில் வடிவமைப்பு மற்றும் கட்டுமானங்கள் & சங்க காலத்தில் வீட்டுப் பொருட்களில் வடிவமைப்பு - சங்க காலத்தில் கட்டுமானப் பொருட்களும் நடுகல்லும்-சிலப்பதிகாரத்தில் மேடை அமைப்பு பற்றிய விவரங்கள்-மாமல்லபுரச் சிற்பங்களும், கோவில்களும்- சோழர்காலத்துப் பெருங்கோயில்கள் மற்றும் பிற வழிபாட்டுத் தலங்கள்-நாயக்கர் காலக்கோயில்கள்-மாதிரி கட்டமைப்புகள் பற்றி அறிதல், மதுரை மீனாட்சி அம்மன் ஆலயம் மற்றும் திருமலைநாயக்கர்மஹால் - செட்டிநாட்டு வீடுகள்-பிரிட்டிஷ்காலத்தில் சென்னை இந்தோ-சாரோசெனிக் கட்டிடக்கலை.							
அலகு - III	உற்பத்தித் தொழில்நுட்பம்						[03]
கப்பல் கட்டும் கலை-உலோகவியல்-இரும்புத்தொழிற்சாலை-இரும்பை உருக்குதல், எஃகு- வரலாற்றுச்சான்றுகளாக செம்பு மற்றும் தங்கநாணயங்கள்-நாணயங்கள் அச்சடித்தல்-மணி உருவாக்கும் தொழிற்சாலைகள்-கல் மணிகள்-கண்ணாடி மணிகள்-சுடு மண்மணிகள்-சங்குமணிகள்-எலும்புத்துண்டுகள்-தொல்லியல் சான்றுகள்-சிலப்பதிகாரத்தில் மணிகளின் வகைகள்.							
அலகு - IV	வேளாண்மை மற்றும் நீர்ப் பாசனத் தொழில்நுட்பம்						[03]
B.E. - Computer Science and Design Regulations 2024							
காலநடைகளுக்காக வடிவமைக்கப்பட்ட கிணறுகள்-வேளாண்மை மற்றும் வேளாண்மை சார்ந்த செயல்பாடுகள்-கடல்சார் அறிவு - மீன் வளம்-முத்து மற்றும் முத்துக் குளித்தல்-பெருங்கடல் குறித்த பண்டைய அறிவு-அறிவுசார் சமூகம்.							
அலகு - V	அறிவியல் தமிழ் மற்றும் கணினித்தமிழ்						[03]
அறிவியல் தமிழின் வளர்ச்சி- கணினித்தமிழ் வளர்ச்சி-தமிழ் நூல்களை மின்பதிப்பு செய்தல்- தமிழ் மென் பொருட்கள் உருவாக்கம்-தமிழ் இணையக்கல்விக் கழகம்-தமிழ் மின்நூலகம்- இணையத்தில் தமிழ் அகராதிகள் சொற்குவைத் திட்டம்.							
Total (L= 15, SL=15) =30 Periods							

பாடம் கற்றதின் விளைவுகள் : பாடத்தை வெற்றிகரமாக கற்று முடித்த பின்பு, மாணவர்களால் முடியும் விளைவுகள்	அறிவாற்றல் நிலை
CO1 சங்ககாலத் தமிழர்களின் நெசவு மற்றும் பாணைவனைதல் தொழில் நுட்பம் குறித்து கற்றுணர்ந்தல்.	புரிதல்
CO2 சங்ககாலத் தமிழர்களின் கட்டிட தொழில் நுட்பம் கட்டுமான பொருட்கள் மற்றும் அவற்றை விளக்கும் தளங்கள் குறித்து அறிவு.	புரிதல்
CO3 சங்ககாலத் தமிழர்களின் உலோகத் தொழில் நாணயங்கள் மற்றும் மணிகள் சார்ந்த தொல்லியல் சான்றுகள் பற்றிய அறிவு.	புரிதல்
CO4 சங்ககாலத் தமிழர்களின் வேளாண்மை, நீர்ப்பாசன முறைகள் மற்றும் முத்து குளித்தல் குறித்த தெளிவு.	புரிதல்
CO5 நவீன அறிவியல் தமிழ் மற்றும் கணினி தமிழ் குறித்த புரிந்துகொள்ளும் மற்றும் பயன்படுத்தலும்.	பகுப்பாய்வு

  
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Text Books :	
1	தமிழகவரலாறு- மக்களும் பண்பாடும்- கே.கே.பிள்ளை (வெளியீடு தமிழ்நாடு பாடநூல் மற்றும் கல்வியில் பணிகள் கழகம்)
2	கணிசித்தமிழ் - முனைவர் இல. சுந்தரம் (விகடன் பிரசுரம்)
Reference Books :	
1	சீழடி- வைகை நதிக்கரையில் சங்ககால நகரநாகரிகம்.(தொல்லியல் துறை வெளியீடு)
2	பொருறை - ஆற்றுங்கரை நாகரிகம் ( தொல்லியல் துறை வெளியீடு)
3	Studies in the History of India with Special Reference to Tamilnadu (Dr.K.K.Pillay) (Published by : The Author)
4	Porunai Civilization (Jointly Published by: Department of Archaeology &Tamilnadu Textbook and Educational Services Corporation, Tamilnadu)

Mapping of COs with POs and PSOs													
COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	-	-	-	-	-	3	3	-	2	-	3	-	-
CO2	-	-	-	-	-	3	3	-	2	-	3	-	-
CO3	-	-	-	-	-	3	3	-	2	-	3	-	-
CO4	-	-	-	-	-	3	3	-	2	-	3	-	-
CO5	-	-	-	-	-	3	3	-	2	-	3	-	-
Avg.	-	-	-	-	-	3	3	-	2	-	3	-	-
1. சிறிது (குறைந்த) 2. மிதமான (நடுத்தர) 3. கணிசமான (உயர்)													

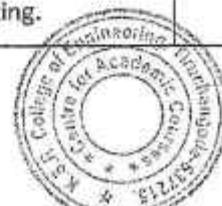
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Chairman (BoS)



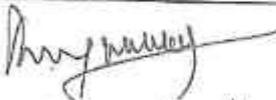
24GET29	TAMILS AND TECHNOLOGY	CATEGORY	L	T	P	SL	C
		HSMC	15	0	0	15	1
(Common to All Branches)							
<i>Prerequisite(s): No prerequisites are needed for enrolling into the course</i>							
UNIT - I	WEAVING AND CERAMIC TECHNOLOGY						[03]
Weaving Industry during Sangam Age – Ceramic technology – Black and Red Ware Potteries (BRW) – Graffiti on Potteries.							
UNIT - II	DESIGN AND CONSTRUCTION TECHNOLOGY						[03]
Designing and Structural construction House & Designs in household materials during Sangam Age – Building materials and Hero stones of Sangam age – Details of Stage Constructions in Silappathikaram– Sculptures and Temples of Mamallapuram– Great Temples of Cholas and other worship places – Temples of Nayaka Period – Type study (Madurai Meenakshi Temple) – ThirumalaiNayakar Mahal –Chetti Nādu Houses, Indo –Saracenic architecture at Madras during British Period.							
UNIT - III	MANUFACTURING TECHNOLOGY						[03]
Art of Ship Building – Metallurgical studies – Iron industry – Iron smelting, steel – Copper and gold – Coins as source of history – Minting of Coins – Beads making – industries Stone beads – Glass beads –Terracotta beads –Shell beads/ bone beats – Archeological evidences – Gem stone types described in Silappathikaram.							
UNIT - IV	AGRICULTURE AND IRRIGATION TECHNOLOGY						[03]
Dam, Tank, ponds, Sluice, Significance of KumizhiThoompu of Chola Period, Animal Husbandry – Wells designed for cattle use – Agriculture and Agro Processing – Knowledge of Sea – Fisheries – Pearl – Conche diving – Ancient Knowledge of Ocean – Knowledge Specific Society.							
UNIT - V	SCIENTIFIC TAMIL & TAMIL COMPUTING						[03]
Development of Scientific Tamil – Tamil computing – Digitalization of Tamil Books – Development of Tamil Software – Tamil Virtual Academy – Tamil Digital Library – Online Tamil Dictionaries – Sorkuvai Project.							
<b>Total (L= 15, SL=15) =30 Periods</b>							
<b>Course Outcomes:</b>							<b>Cognitive Level</b>
At the end of the course, the student will be able to							
CO1	Understand the weaving and ceramic technology of ancient Tamil People nature.						Understand
CO2	Comprehend the construction technology, building materials in sangam Period and case studies.						Understand
CO3	Infer the metal process, coin and beads manufacturing with relevant archeological evidence						Understand
CO4	Realize the agriculture methods, irrigation technology and pearl diving.						Understand
CO5	Apply the knowledge of scientific Tamil and Tamil computing.						Apply

*[Signature]*  
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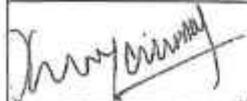


Text Books:	
1	Social Life of Tamils (Dr.K.K.Pillay) A joint Publication of TNTB & ESC and RMRL – (in print)
2	Social Life of the Tamils – The Classical Period (Dr.S.Sigaravelu) (Published by: International Institute of Tamil Studies).
Reference Books:	
1	Historical Heritage of the Tamils (Dr.S.V.Subatamanian, Dr.K.D. Thirunavukarasu) (Published by : International Institute of Tamil Studies)
2	The Contribution of the Tamils to Indian Culture (Dr.M.Valarmathi)(Puplished by International Institute of Tamil Studies).
3	Keeladi – 'Sangam City Civilization on the banks of river Vaigai; (Jointly Published by: Department of Archaeology &Tamilnadu Text Book and Educational Services Corporation, Tamilnadu)
4	Studies in the History of India with Special Reference to Tamilnadu (dr.K.K.Pillay) (Published by: The Author)

Mapping of COs with POs and PSOs													
COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	-	-	-	-	-	3	3	-	2	-	3	-	-
CO2	-	-	-	-	-	3	3	-	2	-	3	-	-
CO3	-	-	-	-	-	3	3	-	2	-	3	-	-
CO4	-	-	-	-	-	3	3	-	2	-	3	-	-
CO5	-	-	-	-	-	3	3	-	2	-	3	-	-
Avg.	-	-	-	-	-	3	3	-	2	-	3	-	-
1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)													

  
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24MAI29	PROBABILITY AND STATISTICS	Category	L	T	P	SL	C
		BSC	30	15	30	45	4
<b>SEMESTER II - B.E / B.TECH ( Common to All Branches )</b>							
<b>PREREQUISITE:</b>							
A basic understanding of algebra, calculus, and introductory statistics is required to grasp the concepts of probability, hypothesis testing, and statistical methods used in engineering and quality control.							
<b>OBJECTIVES:</b>							
To build a foundational understanding of probability and random variables, enable the application of two-dimensional random variables in engineering contexts, develop the ability to perform hypothesis testing for both small and large samples, introduce the principles of experimental design in agricultural studies, and provide knowledge of statistical quality control techniques.							
<b>UNIT - I</b>	<b>ONE DIMENSIONAL RANDOM VARIABLES</b>	<b>(9)</b>					
One dimensional Random Variable - Discrete and continuous random Variables -Expectations - Moment generating functions and their properties - Binomial, Poisson, Uniform and Normal distributions.							
<b>UNIT - II</b>	<b>TWO - DIMENSIONAL RANDOM VARIABLES</b>	<b>(9)</b>					
Joint distributions – Marginal and conditional distributions – Covariance – Karl Pearson's Coefficient of Correlation - Spearman's Rank Correlation - Regression Analysis.							
<b>UNIT - III</b>	<b>TESTING OF HYPOTHESIS</b>	<b>(9)</b>					
One sample and two sample test for means of large samples (Z- test), One sample and two sample test for means of small samples (t-test), Chi-square - Independent of Attributes - F test for equality of variances.							
<b>UNIT - IV</b>	<b>DESIGN OF EXPERIMENTS</b>	<b>(9)</b>					
Analysis of variance - One way and two way classifications - Completely Randomized Design - Randomized Block Design - Latin Square Design.							
<b>UNIT - V</b>	<b>STATISTICAL QUALITY CONTROL</b>	<b>(9)</b>					
Control charts for measurements ( $\bar{X}$ and R charts) – Control charts for C and P charts – Acceptance sampling for construction of an OC curve.							
<b>List of Exercise/Experiments (R Software):</b>							
<ol style="list-style-type: none"> <li>Determine the probability by using binomial distribution.</li> <li>Find the probability with the help of normal distribution.</li> <li>Determine the correlation co-efficient between X and Y.</li> <li>Calculate and plot the regression lines.</li> <li>Test the significance of difference between experimental and theoretical values of the data by using chi-square test.</li> <li>Examine the small samples using F distribution.</li> <li>Analyze the data using Randomized Block Design (RBD).</li> <li>Inspect the data using Latin Square Design (LSD).</li> <li>Find the <math>\bar{X}</math> and R charts.</li> <li>Compute c and p charts.</li> </ol>							
 <b>Chairman (BOS)</b>		<b>L = 30, T = 15 &amp; P = 30 &amp; SL = 45, TOTAL: 120 PERIODS</b>					

Chairman (BOS)

K.S.R. College of Engineering

Applicable for the students admitted from 2024-2025 onwards

COURSE OUTCOMES:		
At the end of the course, the students will be able to:		
COs	Course Outcome	Cognitive Level
CO1	Apply the concepts of one dimensional random variables to compute expectations and analyze the standard distributions.	Apply
CO2	Apply statistical methods to compute marginal and conditional distributions, and perform correlation and regression analysis.	Apply
CO3	Apply Z-test, t-test, Chi-square test, and F-test to analyze sample data and draw inferences on independence of attributes.	Apply
CO4	Apply analysis of variance techniques for one-way and two-way classifications, and implement experimental designs using CRD, RBD and LSD.	Apply
CO5	Construct control charts for measurements Mean and Range charts and attributes charts to assess process control and product quality.	Apply

**TEXT BOOKS:**

1. S.P. Gupta, "Statistical Methods", Sulthan Chand & Sons, 46<sup>th</sup> Edition ,2021.
2. Milton. J. S. and Arnold. J.C., "Introduction to Probability and Statistics", Tata McGraw Hill, 4<sup>th</sup> edition, 2007.

**REFERENCES:**

1. Devore. J.L., "Probability and Statistics for Engineering and the Sciences", Cengage Learning, New Delhi, 8<sup>th</sup> Edition, 2014.
2. Spiegel. M.R., Schiller. J. and Srinivasan, R.A., "Schaum's Outline of Theory and Problems of Probability and Statistics", Tata McGraw Hill Edition, 2004.
3. Walpole. R.E., Myers. R.H., Myers. S.L. and Ye. K., "Probability and Statistics for Engineers and Scientists", Pearson Education, Asia, 9<sup>th</sup> Edition, 2010.
4. R.C.Gupta, "Statistical Quality Controls", Khanna Publishers, Delhi, 8<sup>th</sup> Edition , 2008.

**Mapping of COs with POs and PSOs**

COs/ POs	PO1	PO2	PO3	PO4	PO 5	PO 6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	3	3	3	2	-	-	1	-	-	2	-	-
CO2	3	3	3	3	2	-	-	1	-	-	2	-	-
CO3	3	3	3	3	2	-	-	1	-	-	2	-	-
CO4	3	3	3	3	2	-	-	1	-	-	2	-	-
CO5	3	3	3	3	2	-	-	1	-	-	2	-	-
Avg.	3	3	3	3	2	-	-	1	-	-	2	-	-

1-low, 2-medium, 3-high

*[Signature]*  
Chairman (BoS)



24PHI07	ENGINEERING PHYSICS	Category	L	T	P	SL	C
		BSc	45	-	30	45	4
(Common to CSD, BME,CSE,CSE(IoT),CS,ECE,EEE &IT)							
<p><b>PREREQUISITE:</b> The students must have knowledge about basic concepts of light sources, dual nature of radiation, conductivity of metals, semiconducting materials, different types of magnetic materials, super conducting materials and their applications.</p>							
<p><b>OBJECTIVES:</b> To provide a comprehensive understanding of the fundamental principles, mechanisms, applications of lasers, fiber optics, quantum physics, semiconductors, magnetic materials and superconductors in modern Science and technology.</p>							
<b>UNIT – I</b>	<b>LASER AND FIBRE OPTICS</b>	<b>( 9 )</b>					
<p><b>Lasers:</b> Principles of spontaneous emission and stimulated emission - Einstein's co-efficient A &amp; B-population inversion – CO<sub>2</sub> laser – semiconductor diode laser – homo – junction &amp; hetero – junction (qualitative analysis only) – applications.</p> <p><b>Fibre Optics:</b> propagation of light in optical fibre– numerical aperture and acceptance angle – types of optical fibre (materials, refractive index profile and modes of propagation) – applications -fibre optic sensors: pressure and displacement sensors.</p>							
<b>UNIT – II</b>	<b>QUANTUM MECHANICS</b>	<b>( 9 )</b>					
<p>Introduction – black body radiation– Planck's theory (derivation) – deduction of Wien's displacement law and Rayleigh – Jean's Law from Planck's theory– Compton effect (derivation) – de-Broglie concept of matter waves – physical significance of a wave function – Schrödinger wave equations (Time dependent &amp; time independent) – particle in a box (one dimensional).</p>							
<b>UNIT – III</b>	<b>CONDUCTING MATERIALS</b>	<b>( 9 )</b>					
<p>Classical free electron theory – expression for electrical conductivity – thermal conductivity – Wiedemann-Franz law – drawbacks of classical free electron theory – quantum theory – Fermi energy – Fermi -Dirac distribution function – density of states and carrier concentration of metals.</p>							
<b>UNIT – IV</b>	<b>SEMICONDUCTING MATERIALS</b>	<b>( 9 )</b>					
<p>Introduction – Intrinsic semiconductor: carrier concentration in an intrinsic semiconductor– Fermi level of an intrinsic semiconductor– variation of Fermi energy level with temperature – Extrinsic semiconductors: carrier concentration in n– type and p-type semiconductors (qualitative analysis only)– Fermi level of extrinsic semiconductors– variation of Fermi energy level with temperature and carrier concentration in an extrinsic semiconductors – Hall effect – determination of Hall co-efficient for n – and p – type semiconductors– applications.</p>							
<b>UNIT – V</b>	<b>MAGNETIC AND SUPERCONDUCTING MATERIALS</b>	<b>( 9 )</b>					
<p><b>Magnetic Materials:</b> Introduction – origin of magnetic moment – dia, para and ferromagnetic materials– domain theory of ferro-magnetism – Hysteresis – soft and hard magnetic materials.</p> <p><b>Superconducting Materials:</b> Introduction to superconductivity – properties and types of superconductor – application of superconductors: magnetic levitation– SQUIDS– cryotron.</p>							
<p><b>List of exercises/experiments:</b></p> <ol style="list-style-type: none"> <li>Determine the thickness of the given thin paper using Air wedge method.</li> <li>Find the acceptance angle and numerical aperture of a given optical fibre.</li> <li>Evaluate the wavelength of semiconductor laser.</li> <li>Estimate the particle size of the lycopodium powder using semiconductor laser</li> <li>Enumerate the thermal conductivity of a bad conductor by Lee's disc method.</li> <li>Compute the band gap of an intrinsic semiconductor.</li> <li>Calculate the width of the CD groove with a help of semiconductor laser.</li> <li>Assess the Hysteresis loss of magnetic materials using B-H curve.</li> </ol>							
<p><i>[Signature]</i> R.V.M. RAMESHARAJAN CHAIRMAN</p>		<p><b>Lecture: 45, Laboratory: 30, SL:45, TOTAL: 120 PERIODS</b></p>					

**Course Outcomes:**

At the end of the course, the students will be able to:

COs	Course Outcome	Cognitive level
CO1	Elucidate laser principles, types, light propagation and the applications of optical fibers.	Understand
CO2	Apply quantum theory for Planck's theory, Compton Effect and Schrödinger's equation of matter waves.	Apply
CO3	Calculate electrical conductivity and Fermi energy by considering quantum free electron theory.	Apply
CO4	Infer charge carrier behavior in intrinsic, extrinsic semiconductors and Hall effect.	Understand
CO5	Describe principles, classifications, applications of magnetic materials and superconductors.	Understand

**Text Books :**

1. M.N. Avadhanulu and P.G. Kshirsagar, "A text book of Engineering Physics", S. Chand and Company, New Delhi, 11<sup>th</sup> Edition, 2018.
2. R.K. Gaur & S.L. Gupta, "Engineering Physics", Dhanpat Rai Publication, New Delhi, 7<sup>th</sup> Edition, 2014.

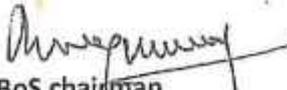
**Reference Books :**

1. R. Murugesan and Kiruthiga Sivaprasath, "Modern Physics", S. Chand & Company, New Delhi, 17<sup>th</sup> Edition, 2014.
2. V. Rajendran, "Engineering Physics", Tata McGraw-Hill, New Delhi, 1<sup>st</sup> Edition, 2011.
3. S.O. Pillai, "Solid State Physics", New Age Publication, Chennai, 10<sup>th</sup> Edition, 2023.
4. Arthur Beiser, Shobhit Mahajan, S. Rai Choudhury, "Concepts of Modern Physics", McGraw-Hill, New Delhi, 7<sup>th</sup> Edition, 2015.

**Mapping of COs with POs and PSOs**

COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO 1	PSO 2
CO1	3	2	-	-	-	-	1	2	2	-	2	-	-
CO2	3	3	2	-	-	-	1	2	2	-	2	-	-
CO3	3	3	2	-	-	-	1	2	2	-	2	-	-
CO4	3	2	-	-	-	-	1	2	2	-	2	-	-
CO5	3	2	-	-	-	-	1	2	2	-	2	-	-
Avg.	3	2	-	-	-	-	1	2	2	-	2	-	-

1-low, 2-medium, 3-high

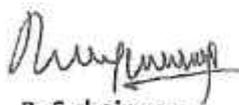
  
BoS chairman

Chairman (BoS)



24PHI07 - ENGINEERING PHYSICS  
 I Year B.E (BME, CSE, CSD, GSE (IOT), CS, ECE, EEE, & B.Tech IT)  
 Requirements for a batch of 30 students  
 Regulation (2024)

S.No.	Description of Equipment	Quantity required
1.	Air wedge apparatus. (with traveling microscope and accessories)	5 Nos
2.	Acceptance angle and numerical aperture of an optical fibre. (with accessories)	5 Nos
3.	Wavelength of semiconductor laser beam. ( with accessories)	5 Nos
4.	Particle size of Lycopodium powder. (with accessories)	5 Nos
5.	Lee's disc apparatus. (with accessories)	5 Nos
6.	Band gap apparatus. (with accessories)	5 Nos
7.	Width of the groove of CD using laser. (with accessories)	5 Nos
8.	B-H curve apparatus. (with accessories)	5 Nos

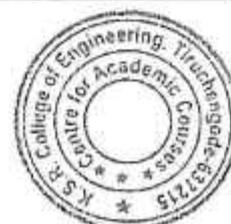
  
 BoS chairman  
 Chairman (BoS)





24ECI26	DIGITAL PRINCIPLES AND SYSTEM DESIGN	Category	L	T	P	SL	C	
		PCC	45	0	30	45	4	
<b>PREREQUISITE:</b> Students should have basic knowledge on binary numbers, logic gates, algebra and discrete mathematics.								
<b>OBJECTIVE:</b> This course provides a comprehensive understanding of digital logic design, covering number systems, Boolean algebra, combinational and sequential circuits, and processor architecture. It equips students with the skills to design and analyze digital systems using logic gates, Karnaugh maps, and Hardware Description Languages (HDL).								
<b>UNIT - I</b>	<b>BOOLEAN ALGEBRA AND LOGIC GATES</b>							<b>(9)</b>
Review of Number Systems – Arithmetic Operations – Binary Codes – Boolean Algebra and Theorems – Boolean Functions – Simplification of Boolean Functions using Karnaugh Map and Tabulation Methods – Logic Gates.								
<b>UNIT - II</b>	<b>COMBINATIONAL LOGIC</b>							<b>(9)</b>
Combinational Circuits – Analysis and Design Procedures – Adder and Subtractor – Magnitude Comparator – Code Converters – Decoders and Encoders – Multiplexers and Demultiplexers.								
<b>UNIT - III</b>	<b>SYNCHRONOUS SEQUENTIAL LOGIC</b>							<b>(9)</b>
Sequential Circuits – Latches and Flip Flops – Analysis and Design Procedures – State Reduction and State Assignment – Shift Registers – Counters.								
<b>UNIT - IV</b>	<b>PROCESSOR DESIGN</b>							<b>(9)</b>
Processor Organization – Design of ALU: Arithmetic Circuits – Logic Circuits – Arithmetic Logic Unit – Status Register – Design of Shifter – Processor Unit.								
<b>UNIT - V</b>	<b>SIMPLE COMPUTER DESIGN AND HDL</b>							<b>(9)</b>
Inter Register Transfer – Conditional Control Statements – Instruction Codes – Design of a Simple Computer – Hardware Description Language (HDL) for Combinational Circuits and Sequential Logic Circuits								
<b>List of Experiments:</b>								
1. Verification of Boolean theorems using logic gates.								
2. Design and implementation of combinational circuits using logic gates for arbitrary functions, Code Converters.								
3. Design and implementation of combinational circuits using MSI devices:								
a) 4 - bit binary adder / subtractor								
b) Parity generator / checker								
c) Multiplexers and De-Multiplexers								
4. Design and Implementation of sequential circuits:								
a) Shift-registers								
b) Synchronous counter								
5. HDL Models for combinational / sequential circuits.								
<b>TOTAL(T:45, P:30, SL:45) : 120 PERIODS</b>								
<b>COURSE OUTCOMES:</b> <b>At the end of the course, the learners will be able to:</b>								
COs	Course Outcome	Exp. No	Cognitive Level					
CO1	Apply Boolean theorems and techniques, Karnaugh Map and Tabulation method for simplifying Boolean functions.	1	Apply					
CO2	Develop skills to design and analyze combinational logic circuits, including adders, subtractors, and multiplexers.	2,3	Apply					
CO3	Design synchronous sequential circuits using latches, flip-flops	4	Apply					
CO4	Design processors which include arithmetic and logic circuits.	4	Apply					

*C. Gurup*  
Chairman (BoS)

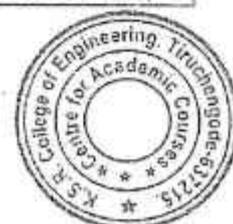


CO5	Design simple computer architectures and implement using HDL for both combinational and sequential logic circuits										5	Apply	
<b>TEXT BOOKS:</b>													
1. Morris Mano, M., "Digital Logic and Computer Design", Prentice-hall of India private limited, First Edition, 2016.													
2. John F. Wakerly, "Digital Design Principles and Practices", Pearson Education, Fourth Edition, 2008.													
<b>REFERENCES:</b>													
1. Charles H. Roth Jr, "Fundamentals of Logic Design", Jaico Publishing House, Fifth Edition, 2003.													
2. Kharate, G.K., "Digital Electronics", Oxford University Press, First Edition, 2012.													
3. Morris Mano, M., and Michael D. Ciletti, "Digital Design", Pearson Education, Fifth Edition, 2013.													
4. Donald D. Givone, "Digital Principles and Design", Tata Mcgraw Hill, First Edition, 2003.													
COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	3	2	-	-	-	1	2	-	-	3	-	-
CO2	3	3	2	-	2	-	1	2	-	-	3	-	-
CO3	3	3	2	-	2	-	1	2	-	-	3	-	-
CO4	3	3	2	-	2	-	1	2	-	-	3	-	-
CO5	3	3	2	-	3	-	1	2	-	-	3	-	-

## LIST OF EQUIPMENT (For a batch of 30 students)

Sl.No.	Name of the Equipment	Qty
1	Digital IC Tester	2
2	Digital IC Trainer Kit	15
3	Dual/Single Mode Power Supply	15
4	Digital Multimeter	5
5	Computer with HDL Simulation Software	5
6	IC7400	50
7	IC7404	50
8	IC7402	50
9	IC7408	50
10	IC7411	50
11	IC7432	50
12	IC7483	50
13	IC7485	50
14	IC7486	50
15	IC7474	50
16	IC7476	50
17	IC7447	50
18	Bread Board	20
19	Wires	Sufficient Quantity

*C. Guntur*  
Chairman (BoS)



**Lab Requirement for a batch of 30 Students**

Sl. No.	Description of Equipment / Software	Quantity required
1.	Server	1
	Intel core i3 - 2120	
	4 GB RAM / 240 GB SSD	
	OS: Windows 2011	
	Headphones with mike	
2.	Client Systems	30
	Intel core i3 - 2120	
	4 GB RAM / 240 GB SSD	
	OS: Windows 2011	
	Headphones with mike	
3.	Software	1
	a) Interactive Teacher control software	
	b) English Language Lab Software	
	c) Career Lab Software	

*Murugan*  
Chairman (BoS)





24ENP29	PROFESSIONAL COMMUNICATION LABORATORY	Category	L	T	P	SL	C	
		HSMC	0	0	30	0	1	
<b>(Common to All Branches)</b>								
<b>OBJECTIVE:</b> To enhance learners' proficiency in listening, speaking, reading, and writing through structured activities and professional communication practices relevant to academic and workplace settings.								
<b>UNIT - I</b>	<b>VERBAL AND CRITICAL REASONING</b>							<b>(6)</b>
<b>Syllogism</b> – Drawing conclusions from given logical statements, <b>Assertion and Reason</b> – Judging the link between a claim and its reason, <b>Verbal Analogies</b> – Completing word pairs based on relationships, <b>Statement and Assumption</b> – Identifying hidden assumptions in statements, <b>Statement and Conclusion</b> – Choosing valid conclusions from given data, <b>Critical Reasoning</b> – Evaluating arguments for logic and consistency.								
<b>UNIT - II</b>	<b>LISTENING</b>							<b>(6)</b>
<b>Listening to Announcement</b> – Understanding key details and context from public messages, <b>Short Conversation</b> – Extracting specific information from brief dialogues, <b>Motivational Speech</b> – Grasping main ideas, tone, and speaker's intent, <b>Telephone Conversation</b> – Comprehending spoken exchanges over the phone.								
<b>UNIT - III</b>	<b>SPEAKING</b>							<b>(6)</b>
<b>Talking about Oneself</b> – Sharing personal details clearly and confidently, <b>Oral-presentation on a General Topic</b> – Presenting ideas briefly with clarity and structure, <b>Group Discussion on Current Affairs</b> – Expressing and support opinions in group settings, <b>Role Play</b> – Performing situational conversations using appropriate language, <b>Mock &amp; HR Interview</b> – Answering common interview questions with clarity and confidence.								
<b>UNIT - IV</b>	<b>READING</b>							<b>(6)</b>
<b>Reading Short Texts</b> – Understanding the main message and key ideas, <b>Reading for General and Specific Information</b> – Locating relevant details in various texts, <b>Case Studies on Problem Solving</b> – Analyzing real-life scenarios to identify issues and solutions.								
<b>UNIT - V</b>	<b>WRITING</b>							<b>(6)</b>
<b>Written communication: Letters (Apology &amp; Complaint)</b> – Writing formal letters using appropriate tone and structure, <b>E-mails (Appreciation &amp; Permission)</b> – Composing clear and courteous emails, <b>Technical Report</b> – Using standard format for preparing structured technical report, <b>Agenda / Minutes</b> – Preparing format for meeting agendas and recording minutes.								
<b>TOTAL (P:30) = 30 PERIODS</b>								

*Pravin Kumar*  
Chairman (BoS)



**List of Experiments:**

1. Syllogism, Assertion & Reason and Verbal Analogies
2. Statement & Assumption, Statement & Conclusion and Critical Reasoning
3. Listening: Announcement and Short Conversation
4. Listening: Motivational Speech and Telephone Conversation
5. Speaking: Taking about oneself, Mock & HR Interview and Mini-presentation
6. Speaking: Group Discussion and Role Play
7. Reading: Multiple Choice & Fill in the Blanks
8. Reading: Analyzing Case Studies on Problem Solving
9. Writing: Complaint/Apology Letter and Appreciation/Permission Email
10. Writing: Format of Technical Report and Format of Agenda/Minutes

**COURSE OUTCOMES:**

Upon completion of the course, the students will be able to:

COs	Description	Ex. No.	Cognitive Level
CO1	Comprehend assumptions and draw conclusions from verbal reasoning tasks.	1 & 2	Understand
CO2	Understand spoken texts to identify key points and the speaker's intent.	3 & 4	Understand
CO3	Use appropriate language and tone in personal, group, and interview conversations.	5 & 6	Understand
CO4	Recognize main ideas and supporting points in short texts and case studies.	7 & 8	Understand
CO5	Draft formal letters, emails, reports, and meeting notes in the correct format.	9 & 10	Understand

**TEXT BOOKS:**

1. Bhatnagar Nitin, Communicative English for Engineers and Professionals, Pearson India, 2010.
2. Kulbhusan Kumar, RS Salaria, Effective Communication Skill, Khanna Publishing House, 2018.

**REFERENCES:**

1. Jack C Richards, Interchange, Cambridge University Press, 2022.
2. RS Aggarwal, A Modern Approach to Verbal & Non-Verbal Reasoning, S Chand, 2024.

**Mapping of COs with POs and PSOs**

COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	2	-	-	-	-	-	-	2	3	-	-	-	-
CO2	2	-	-	-	-	-	-	2	3	-	-	-	-
CO3	2	-	-	-	-	-	1	2	3	-	-	-	-
CO4	2	-	-	-	-	-	1	-	3	-	-	-	-
CO5	2	-	-	-	-	-	1	-	3	-	-	-	-

1-Low, 2-Medium, 3-High

*Anurag*  
Chairman (BoS)



24CSP29	PYTHON PROGRAMMING LABORATORY	Category	L	T	P	SL	C
		ESC	0	0	30	0	1
<b>(Common to All Branches)</b>							
<b>PREREQUISITE:</b> Students must have basic knowledge on programming principles, such as variables, simple data types, control structures, problem solving and logical thinking skills.							
<b>OBJECTIVES:</b> To develop programming skills in Python by performing string operations using functions for mathematical problem-solving, applying conditionals and loops, exploring sets and dictionaries for data handling and gaining foundational knowledge in polymorphism, exception handling, GUI design and web development.							
<b>List of Exercise/Experiments:</b> <ol style="list-style-type: none"> <li>1. Implementing programs using Strings. (reverse, palindrome, character count, replacing characters)</li> <li>2. Implementing programs using Functions (GCD of two numbers, Factorial)</li> <li>3. Scientific problems using conditional statements and loops. (Largest among three numbers, Number series, Number Patterns)</li> <li>4. Implementing real-time applications using Sets, Dictionaries (Sorting, Searching, Remove Duplicates)</li> <li>5. Implementing real-time/technical applications using Lists, Tuples. (Swapping two elements, Reversing a List / Sorting Tuples)</li> <li>6. Create a Python program to demonstrate polymorphism with inheritance. (Single, Multilevel Inheritance, Hierarchical)</li> <li>7. Implement a simple calendar in python program without using the calendar module using string array or list.</li> <li>8. Write a program to demonstrate the user-defined exception handling mechanism in Python.</li> <li>9. Design and implement a graphical user interface to perform any arithmetic operation.</li> <li>10. Implementing a web application with MySQL database integration for CRUD operations (Flask / Django Framework)</li> </ol>							
<b>L=0, T=0, P=30, TOTAL: 30 PERIODS</b>							



**Chairman (BoS)**



**COURSE OUTCOMES:**

At the end of the course, the students will be able to:

COs	Course Outcome	Experi ments	Cognitive Level
CO1	Apply string operations and functions to solve problems like reversing text, palindrome check, GCD, and factorial.	1,2	Apply
CO2	Solve problems and manage data efficiently using conditionals, loops, sets, and dictionaries.	3,4	Apply
CO3	Develop applications using lists, tuples, and demonstrate polymorphism through inheritance in Python.	5,6	Apply
CO4	Build programs in Python that effectively use arrays or lists along with custom exception handling.	7,8	Apply
CO5	Implement GUI applications and web-based systems with MySQL integration to perform CRUD operations.	9,10	Apply

**REFERENCES:**

1. Yashwant Kanetkar, Aditya Kanetkar, "Let Us Python", BPB Publications, 5th Edition, 2023.
2. Wesley J.Chun, "Core Python Programming", Pearson Education, 2nd Edition, 2017.

**Mapping of COs with POs and PSOs**

COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO 9	PO 10	PO11	PSO1	PSO2
CO1	3	3	2	-	-	-	1	-	1	-	2	1	2
CO2	3	3	2	-	-	-	1	-	1	-	2	1	2
CO3	3	3	2	-	-	-	1	-	1	-	2	1	2
CO4	3	3	2	-	-	-	1	-	1	-	2	1	2
CO5	3	3	2	-	-	-	1	-	1	-	2	1	2

1-low, 2-medium, 3-high

**LIST OF EQUIPMENTS (For a Batch of 30 Students)**

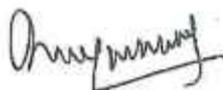
Sl.No	Name of the Equipment's	Qty.
1.	A computer with a modern processor, RAM and Windows or Linux.	30 Nos.
2.	Programming Tools: Python 2.7.11 / 3.x with IDLE	30 Nos.
3.	IDEs: Eclipse (PyDev), VS Code, Jupyter Notebook	30 Nos.

  
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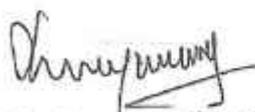
Applicable for the students admitted from 2024-2025 onwards

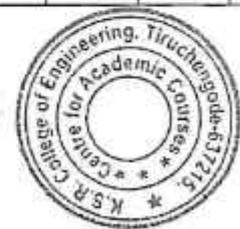
24SSP29	APTITUDE AND CODING SKILLS –II	Category	L	T	P	SL	C
		EEC	0	0	30	0	1
<b>(Common to All Branches)</b>							
<b>OBJECTIVES:</b>							
This course aims to expose students to various concepts of aptitude problem solving, enabling them to tackle problems effectively and enhance their analytical skills in alignment with company-specific requirements. It also focuses on developing proficiency in verbal reasoning to strengthen critical thinking abilities.							
<b>UNIT - I</b>	<b>NUMBERS AND SHARE BASED CONCEPTS</b>						<b>(6)</b>
Problems on Numbers – Unit Digits – Squares and Cubes – Remainder Theorem – Averages - Ratio Proportions and Partnership – Percentage – Profit and Loss.							
<b>UNIT - II</b>	<b>BASICS OF WORK BASED CONCEPTS</b>						<b>(6)</b>
Introduction to time and work –Introduction to Time, Speed and Distance, Problems on Trains.							
<b>UNIT - III</b>	<b>LOGICAL REASONING</b>						<b>(4)</b>
Blood Relations – Ranking and Ordering – Inequalities – Cause and Effect.							
<b>UNIT - IV</b>	<b>VERBAL ABILITY</b>						<b>(7)</b>
Yes or No and “WH” Questions – Conjunctions – Count / Uncounted Nouns – Direct and Indirect Speech – Active and Passive Voice.							
<b>UNIT - V</b>	<b>PYTHON PROGRAMMING FUNDAMENTALS</b>						<b>(7)</b>
Introduction-Features-Environment setup; Basic syntax: variable-data types-operators-control statements-if-if-else- loop-break-continue, etc. List- operations on list; String operations- access; Tuple: operations on tuple; Dictionaries: Accessing dictionaries, working with dictionaries; Functions- Exception Handling-Input & Output-Modules-OOPs concepts-Numerical Programming.							
<b>TOTAL: 30 PERIODS</b>							
<b>COURSE OUTCOMES:</b>							
<b>At the end of the course, the students will be able to:</b>							
COs	Course Outcome						Cognitive Level
CO1	Interpret fundamental concepts to analyse and approach basic quantitative problems effectively.						Understand
CO2	Apply the concepts of time and work, time, speed and distance, to solve real-time quantitative aptitude problems effectively.						Apply
CO3	Apply logical reasoning techniques to solve problems related to ranking and ordering, decision-making and analytical skills.						Apply
CO4	Apply grammatical concepts to construct grammatically-correct and contextually appropriate sentences.						Apply
CO5	Apply fundamental Python programming concepts to develop and implement basic computational solutions.						Apply

  
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<b>TEXT BOOKS:</b>													
<ol style="list-style-type: none"> <li>1. R S Aggarwal, Quantitative Aptitude for Competitive Examinations.</li> <li>2. R.S. Aggarwal, A Modern Approach to Verbal &amp; Non-Verbal Reasoning.</li> <li>3. Wren &amp; Martin, High School English Grammar &amp; Composition</li> <li>4. Allen B. Downey, Think Python: How to Think like a Computer Scientist, 2<sup>nd</sup> Edition, O'Reilly Publishers, 2016</li> <li>5. Karl Beecher, Computational Thinking: A Beginner's Guide to Problem Solving and Programming, 1<sup>st</sup> Edition, BCS Learning &amp; Development Limited, 2017.</li> </ol>													
<b>REFERENCES:</b>													
<ol style="list-style-type: none"> <li>1. Paul Deitel and Harvey Deitel, Python for Programmers, Pearson Education, 1<sup>st</sup> Edition, 2021.</li> <li>2. Martin C. Brown, Python: The Complete Reference, 4<sup>th</sup> Edition, Mc-Graw Hill, 2018.</li> <li>3. <a href="https://www.python.org/">https://www.python.org/</a></li> </ol>													
<b>Mapping of COs with POs and PSOs</b>													
COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	2	-	-	2	-	-	2	-	-	3	-	-
CO2	3	3	2	-	2	-	-	2	-	-	3	-	-
CO3	3	3	2	-	2	-	-	2	-	-	3	-	-
CO4	3	3	2	-	2	-	-	2	-	-	3	-	-
CO5	3	3	2	-	2	-	-	2	-	-	3	-	-
Avg.	3	3	3	-	2	-	-	2	-	-	3	-	-

  
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24MAT37	DISCRETE MATHEMATICAL STRUCTURES	Category	L	T	P	SL	C
		BSC	45	15	0	60	4
<b>SEMESTER III - (Common to CSE, CSE(CS), CSD, CSE(IoT) &amp; IT)</b>							
<b>PREREQUISITE:</b> Basic knowledge of set theory, elementary algebra, and mathematical logic, along with analytical thinking skills, is essential for understanding the concepts of discrete structures and their applications in computer science.							
<b>OBJECTIVES:</b> To provide students with a strong foundation in discrete mathematical structures, including propositional and predicate logic, set theory, functions, graph theory, and combinatorics, with a focus on their significance and applications in computer science.							
<b>UNIT - I</b>	<b>PROPOSITIONAL CALCULUS</b>						<b>[12]</b>
Propositions – Logical connectives – Compound propositions - Conditional and biconditional propositions - Truth tables - Tautologies and contradictions - Contra positive - Logical equivalences and implications - Normal forms - Principal conjunctive and disjunctive normal forms - Rules of inference Theory - Validity of arguments.							
<b>UNIT - II</b>	<b>PREDICATE CALCULUS</b>						<b>[12]</b>
Predicates - Statement functions – Variables - Free and bound variables – Quantifiers - Universe of discourse - Logical equivalences and implications for quantified statements - Theory of inference - The rules of universal specification and generalization - Validity of arguments.							
<b>UNIT - III</b>	<b>SET THEORY AND FUNCTIONS</b>						<b>[12]</b>
Set Theory: Cartesian product of sets - Relation on sets – Types of relations and their properties - Relational matrix and the graph of a relation - Equivalence relation. Functions: Definition – Classification of functions – Composition of functions – Inverse functions – Permutation functions.							
<b>UNIT - IV</b>	<b>GRAPH THEORY</b>						<b>[12]</b>
Graphs - Types of graphs – Matrix representation of graphs and graph isomorphism – Connectivity – Euler and Hamilton paths - Trees - Spanning trees - Shortest path algorithm: Dijkstra's algorithm and Kruskal's algorithm.							
<b>UNIT - V</b>	<b>COMBINATORICS</b>						<b>[12]</b>
Mathematical induction – Counting principle – Sum and product rule – The pigeonhole principle - Recurrence relations – Solution of recurrence relations – Generating Functions – Solving recurrence relation by generating functions.							
<b>L = 45, T = 15, SL = 60, TOTAL = 120 PERIODS</b>							

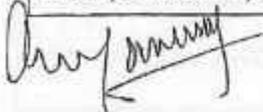
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COURSE OUTCOMES: At the end of the course, the students will be able to:													
COs	Course Outcome											Cognitive Level	
CO1	Apply the propositional concepts to determine tautologies, normal forms and validate arguments using rules of inference.											Apply	
CO2	Apply the concepts of predicates, quantifiers and rules of inference to validate arguments involving quantified statements.											Apply	
CO3	Apply the principles of set theory to represent and examine the relations and functions.											Apply	
CO4	Apply the graph theory concepts of Euler and Hamiltonian paths and solve shortest path problems using Dijkstra's and Kruskal's algorithms.											Apply	
CO5	Apply the principles of mathematical induction, counting techniques and the pigeonhole principle to solve recurrence relations.											Apply	
<b>TEXT BOOKS:</b>													
1. Trembly J.P, and Manohar R, "Discrete Mathematical Structures with Applications to Computer Science", Tata McGraw-Hill Publishing Co. Ltd, New Delhi, 43 <sup>rd</sup> Re-print 2014.													
2. Venkatraman M.K, Sridharan. N and Chandrasekaran N. "Discrete Mathematics", 'The National Publishing Company', Chennai, 2014.													
<b>REFERENCES:</b>													
1. Kenneth. H. Rosen, "Discrete Mathematics and its Applications", Tata McGraw Hill P.Co, 2013, 7 <sup>th</sup> Edition.													
2. Bernard Kolman, Robert C. Busby, Sharan Cutler Ross, "Discrete Mathematical Structures", Pearson Education Pvt Ltd., New Delhi, 2013, Sixth Indian reprint.													
3. Grimaldi. R.P. "Discrete and Combinatorial Mathematics: An Applied Introduction", 5 <sup>th</sup> Edition, Pearson Education Asia, Delhi, 2013.													
4. Koshy. T. "Discrete Mathematics with Applications", Elsevier Publications, 2006.													
5. Lipschutz. S. and Mark Lipson., "Discrete Mathematics", Schaum's Outlines, Tata McGraw Hill Pub. Co. Ltd., New Delhi, 3 <sup>rd</sup> Edition, 2010.													
6. <a href="https://www.youtube.com/watch?v=DmClf8ypks">https://www.youtube.com/watch?v=DmClf8ypks</a>													
<b>Mapping of COs with POs and PSOs</b>													
COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	3	3	3	-	-	-	1	-	-	2	-	-
CO2	3	3	3	3	-	-	-	1	-	-	2	-	-
CO3	3	3	3	3	-	-	-	1	-	-	2	-	-
CO4	3	3	3	3	-	-	-	1	-	-	2	-	-
CO5	3	3	3	3	-	-	-	1	-	-	2	-	-
1-Low, 2-Medium, 3-High													

  
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24CDT31	OPERATING SYSTEMS FOR DESIGN	Category	L	T	P	SL	C
		PCC	45	0	0	45	3
<b>PREREQUISITE:</b>							
Students should have a fundamental understanding of computer.							
<b>OBJECTIVES:</b>							
To grasp core operating system concepts like process management, concurrency, memory, and security. Also, to explore advanced distributed and multiprocessor OS design for efficient and reliable computing.							
<b>UNIT – I</b>	<b>INTRODUCTION TO OPERATING SYSTEM</b>	<b>(9)</b>					
Overview of Operating Systems, Operating System Functions and Design Issues, Design Approaches, Types of Advanced Operating Systems.							
<b>UNIT – II</b>	<b>PROCESS MANAGEMENT AND SYSTEM INTERACTION</b>	<b>(9)</b>					
Process Abstraction and Management, System Calls, Threads and Symmetric Multiprocessing Micro- kernels, Distributed Operating system: Architecture, Design Issues, Distributed mutual exclusion, Distributed deadlock detection, shared memory, Distributed scheduling.							
<b>UNIT – III</b>	<b>SCHEDULING AND CONCURRENCY</b>	<b>(9)</b>					
Scheduling: Uniprocessor, Multiprocessor, and Real-time Systems, Concurrency and Classical Problems, Mechanisms for Synchronization: Semaphores, Monitors, Process Deadlock and Deadlock Handling Strategies							
<b>UNIT-IV</b>	<b>MEMORY, I/O, AND SECURITY MANAGEMENT</b>	<b>(9)</b>					
Memory Management and Virtual Memory, Virtual Machines, I/O Management, File and Disk Management, Operating System Security and Protection Systems, Security Goals, Trust and Threat Models, Access Control Fundamentals (Lampson's Access Matrix),Mandatory Protection Systems, Reference Monitor, Security in Unix, Windows.							
<b>UNIT – V</b>	<b>MOBILE OPERATING SYSTEMS</b>	<b>(9)</b>					
Mobile Operating Systems: ARM and Intel architectures - Power Management - Mobile OS Architectures - Underlying OS - Kernel structure and native level programming - Runtime issues- Approaches to power management-- Distributed scheduling - Distributed shared memory --Multimedia file systems							
<b>L=45, SL=45 TOTAL: 90 PERIODS</b>							

<b>COURSE OUTCOMES:</b>		
<b>At the end of the course, the students will be able to:</b>		
<b>COs</b>	<b>Course Outcome</b>	<b>Cognitive Level</b>
CO1	Demonstrate understanding of fundamental concepts, functions, and design approaches of various operating systems.	Understand
CO2	Examine the processes, threads, and system calls in distributed and multiprocessing environments.	Apply
CO3	Apply scheduling algorithms and synchronization mechanisms to handle concurrency and deadlock.	Apply
CO4	Analyze the memory, I/O, and system security using protection models and access control techniques.	Analyze
CO5	Understand mobile OS architectures, power management, and distributed systems.	Understand

  
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**TEXT BOOKS:**

1. Advanced concept in operating system: M. Singhal, N.G. Shivratri, Indian Edition, 2017
2. Operating system internal and design principles: William Stallings, published by Pearson Education, 2018.
3. Operating System Concepts 10Ed Global Edition (Pb 2023). by Abraham Silberschatz.

**REFERENCES:**

1. Operating System Security, Trent Jaeger, Morgan & Claypool Publishers, 2008.
2. The Design of the Unix Operating System, Maurice J Bach, PHI.

**Mapping of COs with POs and PSOs**

COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	2	-	-	-	-	-	-	1	-	2	3	3
CO2	3	3	2	-	-	-	-	-	1	-	2	3	3
CO3	3	3	2	-	-	-	-	-	1	-	2	3	3
CO4	3	3	3	2	-	-	-	-	1	-	2	3	3
CO5	3	2	2	-	-	-	-	-	1	-	2	3	3

1-low, 2-medium, 3-high

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24CDT32	USER EXPERIENCE DESIGN	Category	L	T	P	SL	C
		PCC	45	0	0	45	3
<b>PREREQUISITE:</b>							
Students should have a basic knowledge of fundamental computer skills.							
<b>OBJECTIVES:</b>							
To equip students with the knowledge and skills of design thinking principles, UI/UX concepts, and user research techniques. And to develop proficiency in using design tools for creating, prototyping, and testing user-centered digital interfaces.							
<b>UNIT – I</b>	<b>DESIGN THINKING FUNDAMENTALS</b>	<b>(9)</b>					
Introduction to Design thinking – Concept, Purpose - 5 stages of design thinking – Empathize, Define, Ideate, Prototype Test - User Interface / User Experience (UI/UX) – Definition of Design with respect to digital media - User Interface - User experience - Difference between UI and UX- History of UX - Need of UI and UX.							
<b>UNIT – II</b>	<b>USER REQUIREMENTS AND ITS ANALYSIS</b>	<b>(9)</b>					
Introduction to research and analysis tool (freeware) such as FigJam - User requirements – Definition, Types of user research - Qualitative research, Quantitative research. Tools to collect user requirements – personal observation, interviews, questionnaire, User/ Expert reviews - User requirement analysis - Understanding target audience and client requirements, Competitive analysis, Affinity mapping, Defining User Persona.							
<b>UNIT – III</b>	<b>USER INTERFACE DESIGN</b>	<b>(9)</b>					
Storyboarding, User journey mapping - Gestalt principles of design - Aesthetics in UI design - Using Light, Color and Contrast Effectively in UI Design - Introduction to any freeware design tool such as Figma - Visual Communication Design - effective visual communication for graphical user							
<b>UNIT-IV</b>	<b>USER EXPERIENCE DESIGN TOOL</b>	<b>(9)</b>					
Introduction to User Experience design - UX design open source tool such as - Figma features – Navigations, interactions, Buttons Creating library - Gamification, micro-animation - Creating visual identity of the project – design system, design theme.							
<b>UNIT – V</b>	<b>PROTOTYPING AND TESTING</b>	<b>(9)</b>					
Introduction to Wireframing - Purpose of wireframing, Types – low fidelity, medium fidelity, high fidelity - Basics of sketching, Creating low fidelity wireframes, medium fidelity and high fidelity in Figma - Basic considerations in wireframing – device, size, behavior, interaction - Elements used in wireframing – visual design, high fidelity elements - Prototyping and Testing.							
<b>L=45, SL=45 TOTAL: 90 PERIODS</b>							

<b>COURSE OUTCOMES:</b>		
At the end of the course, the students will be able to:		
COs	Course Outcome	Cognitive Level
CO1	Identify the principles of user-centered design and its importance in creating effective interfaces.	Understand
CO2	Outline design briefs and identify key requirements and constraints.	Understand
CO3	Apply the design concept based on user research and design briefs.	Apply
CO4	Apply design principles to a project, including balance, contrast, emphasis, movement, pattern, unity, and white space.	Apply
CO5	Examine the design tools and software to create a design, including Sketch, Figma, Adobe XD, and InVision.	Apply

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**TEXT BOOKS:**

1. "Designing for Emotion" by Aarron Walter - This book covers design thinking and user research, providing practical tips for designing engaging experiences.
2. "Figma: A Comprehensive Guide" by Figma - This book provides a comprehensive guide to using Figma for user experience design, covering both UI and UX design principles.
3. "UX Design: A Practical Guide" by Joe Natoli - This book covers UX design principles, tools, and techniques, including prototyping and testing.

**REFERENCES:**

1. Jesse James Garrett The Elements of User Experience: User-Centered Design for the Web and Beyond New Riders Publishing, 201 West 103 Street, Indianapolis, IN 46290 800-545- 5914 ISBN:978-0-321-68368-7
2. Falk Uebernickel, Li Jiang, Walter Brenner, Britta Pukall, Therese Naef Design Thinking: The Handbook World Scientific Publishing Co Pte Ltd, No.16, South West Boag Road T. Nagar, Chennai 600017, INDIA ISBN-10: 9811203504 ISBN-13: 978-9811203503
3. [https://aim.gov.in/pdf/Design\\_Thinking.pdf](https://aim.gov.in/pdf/Design_Thinking.pdf) Design thinking phases and learning resources.
4. <https://www.figma.com/resource-library/design-basics/> Design basics using Figma (Freeware)

**Mapping of COs with POs and PSOs**

COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	2	-	-	-	-	-	-	1	-	2	3	3
CO2	3	2	-	-	-	-	-	-	1	-	2	3	3
CO3	3	3	2	-	-	-	-	-	1	-	2	3	3
CO4	3	3	2	-	-	-	-	-	1	-	2	3	3
CO5	3	3	2	-	-	-	-	-	1	-	2	3	3

1-low, 2-medium, 3-high

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24CBT36	DATA STRUCTURES AND ALGORITHMS	Category	L	T	P	SL	C
		PCC	45	0	0	45	3
<b>(Common To CSE-CS, CSD and CSE (IoT) )</b>							
<b>PREREQUISITE:</b> Basic knowledge of programming concepts in C.							
<b>OBJECTIVES:</b> To enable students to design, implement, and analyze efficient data structures and algorithms for optimized problem-solving with attention to time and space complexity.							
<b>UNIT – I</b>	<b>BASICS OF DATA STRUCTURES</b>	<b>(9)</b>					
Abstract Data Types (ADTs) – List ADT – Array-based implementation – Linked list implementation – Singly linked lists – Doubly linked lists – Circularly linked lists. Applications of lists.							
<b>UNIT - II</b>	<b>STACKS AND QUEUES</b>	<b>(9)</b>					
Stack ADT – Implementation of Stack using Array and Linked List – Applications of Stack: Evaluating arithmetic expressions – Conversion of Infix to postfix expression. Queue ADT – Implementation of Queue using Array and Linked List – Circular Queue – Applications of Queues.							
<b>UNIT - III</b>	<b>TREES AND GRAPHS</b>	<b>(9)</b>					
Tree ADT – Binary Tree ADT – Binary Tree Traversal – Expression Trees Binary Search Tree – AVL Trees – Graphs and its Types – Breadth First Traversal – Depth First Traversal – Topological Sort – BI Connectivity - B-Tree - B+ Tree.							
<b>UNIT - IV</b>	<b>SEARCHING, HASHING AND SORTING</b>	<b>(9)</b>					
Searching: Linear and Binary Search – Sorting: Bubble Sort – Selection Sort – Insertion Sort – Heap Sort. Hashing: Hash function – Separate Chaining – Open Addressing: Linear Probing, Quadratic Probing and Double Hashing – Rehashing – Extendible Hashing							
<b>UNIT - V</b>	<b>ALGORITHM DESIGN AND ANALYSIS</b>	<b>(9)</b>					
Fundamentals of algorithmic problem solving – Algorithm analysis framework – Asymptotic Notations – Divide and Conquer: Merge Sort-Quick Sort- Greedy Algorithm: Huffman's Code–Dynamic Programming-Traveling Salesman's Problem- Minimum Spanning Tree: Prim's Algorithm – Kruskal's Algorithm – Single Source Shortest Path Algorithm: Dijkstra's Algorithm.							
<b>L=45, SL=45, TOTAL= 90 PERIODS</b>							

  
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**COURSE OUTCOMES:**

At the end of the course, the students will be able to:

COs	Course Outcome	Cognitive Level
CO1	Understand the concepts and implementation of linear data structures such as arrays and linked lists.	Understand
CO2	Implement stacks and queues using arrays and linked lists, and apply them to solve expression problems.	Apply
CO3	Construct and traverse trees and graphs, and apply appropriate tree/graph-based algorithms.	Apply
CO4	Apply suitable searching, sorting, and hashing techniques for efficient data management.	Apply
CO5	Analyze and compare algorithmic approaches like divide and conquer, greedy, and dynamic programming.	Analyze

**TEXT BOOKS:**

1. Mark Allen Weiss, Data Structures and Algorithm Analysis in C, 3rd Edition, Pearson Education, 2007.
2. Cormen, Thomas H., Charles E. Leiserson, Ronald L. Rivest, and Clifford Stein. Introduction to algorithms. MIT press, 2022.

**REFERENCES:**

1. Langsam, Augenstein and Tanenbaum, Data Structures Using C and C++, 2nd Edition, Pearson Education, 2015.
2. Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, Clifford Stein, Introduction to Algorithms", Fourth Edition, Mcgraw Hill/ MIT Press, 2022.
3. Alfred V. Aho, Jeffrey D. Ullman, John E. Hopcroft, Data Structures and Algorithms, 1st edition, Pearson, 2002.
4. Kruse, Data Structures and Program Design in C, 2nd Edition, Pearson Education, 2006.
5. Ellis Horowitz, Sartaj Sahni, and Dinesh Mehta, "Fundamentals of Data Structures in C", 2nd Edition, Universities Press, 2008

**Mapping of COs with POs and PSOs**

COs / POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	3	-	-	-	-	-	-	1	1	1	2	1
CO2	3	3	2	-	-	-	-	-	1	1	1	2	2
CO3	3	3	2	1	-	-	-	-	1	1	1	2	1
CO4	2	2	-	-	-	-	-	-	2	1	1	2	3
CO5	3	2	2	1	-	-	-	-	1	-	2	-	-

1-low, 2-medium, 3-high

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24CST37	JAVA PROGRAMMING	Category	L	T	P	SL	C
		PCC	45	0	0	45	3
<b>(Common To CSE, CSD, CSE(IOT)and IT)</b>							
<b>PREREQUISITE:</b> A basic understanding of programming principles such as variables and loops, paired with good problem-solving abilities, is required. Fundamentals of C programming and object oriented concepts.							
<b>OBJECTIVES:</b> This course aims to introduce the fundamentals of Java programming, including data types, control structures, classes and methods. It enables students to recognize object-oriented concepts such as inheritance, interfaces, packages and exception handling. The course also covers multithreading, file I/O operations, string manipulation, database connectivity using JDBC and collections framework.							
<b>UNIT – I</b>	<b>JAVA FUNDAMENTALS</b>	<b>(9)</b>					
The Java Buzzwords – Data Types – Variables – Arrays – Operators – Control Statements – Class Fundamentals –Declaring Objects – Methods – Method Overloading – Objects as Parameters – Returning Objects – Recursion – this keyword – Garbage Collection.							
<b>UNIT – II</b>	<b>CONSTRUCTORS AND INHERITANCE</b>	<b>(9)</b>					
Constructors – Constructor Overloading – Access Control – static – final – Nested and Inner Class – Inheritance: Basics – Super – Multilevel – Hierarchical – Method Overriding – Abstract class –Final with Inheritance.							
<b>UNIT – III</b>	<b>INTERFACES, PACKAGES AND EXCEPTION HANDLING</b>	<b>(9)</b>					
Interfaces – Default Interface Methods – Static Methods in Interface – Packages – Access Protection – Importing Packages –Exception Handling Fundamentals – Types – Uncaught Exceptions –Try and Catch – Multiple Catch – Nested Try – Throw – Throws – Finally –Wrapper Classes							
<b>UNIT-IV</b>	<b>MULTITHREADED PROGRAMMING AND I/O OPERATIONS</b>	<b>(9)</b>					
Java Thread Model – Main Thread – Creating a Thread – Creating Multiple Threads – isAlive and join Methods – Thread Priorities - Synchronization – Interthread Communication – Suspending, Resuming, and Stopping Threads – Obtaining a Thread’s State – Using Multithreading – I/O Basics – Reading Console Input – Writing Console Output – The PrintWriter Class – Reading and Writing Files – Automatically Closing a File – Scanner class.							
<b>UNIT – V</b>	<b>STRING, DATABASE CONNECTIVITY AND COLLECTIONS</b>	<b>(9)</b>					
String Constructors – String Length – Character Extraction – String Comparison – Searching Strings – Modifying a String – Methods in StringBuffer – JDBC Product Components – JDBC API – JDBC Driver Manager – JDBC Test Suite – JDBC-ODBC Bridge – JDBC Architecture – Establishing Connection – Handling SQL Exceptions – Collections: List – Array List.							
<b>L=45, T=0, P=0, SL=45, TOTAL: 90 PERIODS</b>							



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<b>COURSE OUTCOMES:</b>													
<b>At the end of the course, the students will be able to:</b>													
<b>COs</b>	<b>Course Outcome</b>											<b>Cognitive Level</b>	
CO1	Outline Java concepts involving data types, control structures, classes, methods, and recursion to develop basic programs.											Understand	
CO2	Choose object-oriented concepts to design modular programs using constructors, inheritance and access control											Apply	
CO3	Compute solutions for robust and reusable Java applications using interfaces, packages and exception handling mechanisms											Apply	
CO4	Develop the features of multithreaded programming and input/output operations in Java Programming.											Apply	
CO5	Apply the concepts of string manipulations, database connectivity and collections.											Apply	
<b>TEXT BOOKS:</b>													
1. Herbert Schildt, Dr.Danny Coward, Java - The Complete Reference, McGraw-Hill Education, Thirteenth Edition, 2023.													
2. Cay S. Horstmann, Core Java Volume 1 - Fundamentals, Prentice Hall, Thirteenth Edition, 2024.													
<b>REFERENCES:</b>													
1. Herbert Schildt, Java - A Beginner Guide, Oracle Press, McGraw-Hill Education, Tenth Edition, 2024.													
2. Joshua Bloch, Effective Java: A Programming Language Guide, Addison-Wesley Professional, Fourth Edition, 2023.													
3. Allen B. Downey and Chris Mayfield, Think Java: How to Think Like a Computer Scientist, O'Reilly, Second Edition, 2019.													
4. <a href="https://onlinecourses.nptel.ac.in/noc22_cs47/preview">https://onlinecourses.nptel.ac.in/noc22_cs47/preview</a> .													
5. To practice: <a href="http://www.codingbat.com">www.codingbat.com</a> and <a href="http://www.geeksforgeeks.com">www.geeksforgeeks.com</a> .													
<b>Mapping of COs with POs and PSOs</b>													
<b>COs/ POs</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>	<b>PO7</b>	<b>PO8</b>	<b>PO9</b>	<b>PO10</b>	<b>PO11</b>	<b>PSO1</b>	<b>PSO2</b>
CO1	3	2	-	-	-	-	1	1	1	-	2	2	1
CO2	3	3	2	-	-	-	1	1	1	-	2	2	1
CO3	3	3	2	-	-	-	1	1	1	-	2	2	1
CO4	3	3	2	-	-	-	1	1	1	-	2	2	1
CO5	3	3	2	-	-	-	1	1	1	-	2	2	1
1-low, 2-medium, 3-high													



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Applicable for the students admitted from 2024-2025 onwards

24CDP31	OPERATING SYSTEMS FOR DESIGN LABORATORY	Category	L	T	P	SL	C
		PCC	0	0	45	0	1.5
<b>PREREQUISITE:</b> Students should have the basic knowledge of operating system concepts, process management, synchronization, memory and disk management, along with proficiency in system-level programming (C/C++) and networking fundamentals.							
<b>OBJECTIVES:</b> To gain practical skills in key operating system concepts like process control, synchronization, memory, and disk management. Also, to understand distributed systems and real OS architectures through programming and case studies.							
<b>List of Experiments:</b> <ol style="list-style-type: none"> <li>1. Write a program to demonstrate the creation and termination of a process using system calls.</li> <li>2. Implement and compare the performance of different CPU scheduling algorithms (e.g., FCFS, SJF, Round Robin) under different workloads</li> <li>3. Implement inter process communication using semaphore</li> <li>4. Write a program that demonstrates process deadlock in an operating system. Then, implement a deadlock detection algorithm to resolve the deadlock situation.</li> <li>5. Implement a simple page replacement algorithm (e.g., LRU or FIFO) and simulate the impact of different page sizes on system performance.</li> <li>6. Implement disk scheduling algorithms (e.g., FCFS, SSTF, C-SCAN) and compare their efficiency in terms of head movement and latency.</li> <li>7. Implement Lamson's Access Matrix model for access control in an operating system.</li> <li>8. Develop any client-server based program and demonstrate covert channel</li> <li>9. Implement a distributed mutual exclusion algorithm</li> <li>10. Case study – Windows, Linux kernel, Android</li> </ol>							
<b>P =45 TOTAL: 30 PERIODS</b>							

<b>COURSE OUTCOMES:</b>			
At the end of the course, the students will be able to:			
COs	Course Outcome	Ex. No	Cognitive Level
CO1	Demonstrate process creation, termination, and scheduling using system calls and algorithms.	1	Understand
CO2	Apply synchronization techniques and handle deadlock situations using detection and resolution methods.	2,3,4	Apply
CO3	Apply memory management concepts by simulating page replacement and analyzing disk scheduling algorithms.	5,6	Apply
CO4	Demonstrate access control mechanisms and explore covert channels in client-server environments.	7,8	Apply
CO5	Demonstrate distributed mutual exclusion algorithms and analyze real-world operating system architectures.	9,10	Apply

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**TEXT BOOKS:**

1. Advanced concept in operating system: M. Singhal, N.G. Shivratri, Indian Edition, 2017
2. Operating system internal and design principles: William Stallings, published by Pearson Education, 2018.
3. Operating System Concepts 10Ed Global Edition (Pb 2023). by Abraham Silberschatz.

**REFERENCES:**

1. Operating System Security, Trent Jaeger, Morgan & Claypool Publishers, 2008.
2. The Design of the Unix Operating System, Maurice J Bach, PHI.
3. P.Karthi, "Operating Systems for Design Laboratory", First Edition, K.S.R. College of Engineering, 2025.

**Mapping of COs with POs and PSOs**

COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	2	-	-	1	-	1	1	1	-	2	3	3
CO2	3	3	2	-	1	-	1	1	1	-	2	3	3
CO3	3	3	2	-	1	-	1	1	1	-	2	3	3
CO4	3	3	2	-	1	-	1	1	1	-	2	3	3
CO5	3	3	2	-	1	-	1	1	1	-	2	3	3

1-low, 2-medium, 3-high

**LIST OF EQUIPMENTS (For a Batch of 30 Students)**

Sl.No	Name of the Equipment's	Qty.
1.	Operating Systems: Windows, Linux (Ubuntu, CentOS)	30 Nos.
2.	Programming Tools: Eclipse, C/C++ with GCC and GDB Compiler	30 Nos.
3.	IDEs: IntelliJ IDEA	30 Nos.

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Applicable for the students admitted from 2024-2025 onwards

24CBP36	DESIGN STUDIO – I	Category	L	T	P	SL	C
		PCC	0	0	30	0	1
<b>(Common to CSE, IT, CSE- CS, CSD)</b>							
<b>PREREQUISITE:</b> A basic understanding of problem-solving, logical reasoning, and the principles of design thinking, including empathy and user-centric development.							
<b>OBJECTIVES:</b> To apply design thinking and computational problem-solving principles to develop, prototype, and present innovative software-based and embedded system solutions using hands-on mini projects.							
<b>List of Exercise:</b>							
Ex. No.	Title	Focus Area					
1.	Algorithms & Flowcharts for Everyday Problems	Computational Thinking					
2.	Mini Compiler for Basic Arithmetic	Lexical Analysis					
3.	Simple Chatbot using Rule-Based Logic	NLP & Design Thinking					
4.	Web Form + Backend Logic	UI/UX + APIs					
5.	Gesture-Based Game Interface	ML Lite + Human-Centered Design					
6.	A) Blinking of LED using Tinker cad	IoT Integration					
	B) Interfacing an Ultrasonic sensor using Tinkercad						
7.	A) Weather Monitoring station using wokwi	Embedded System Simulation					
	B) Digital clock using wokwi						
8.	Password Strength Checker	Data Analysis + Computational Thinking					
9.	Autodesk Fusion - Simulation	3D Modeling + Engineering Simulation					
10.	Mini Project: Complete Design Cycle	Ideation → Design → Prototype → Presentation					
<b>P=30, TOTAL: 30 PERIODS</b>							

**LIST OF HARDWARE AND SOFTWARE RESOURCES**

Resources Required for a Batch of 30 Students

S.No	Details of Resource	Quantity Required
1.	Desktop Computers: 30 Nos	30
2.	Operating System: Linux or Windows 7 and above	
3.	Software: Turbo C, Visual Studio, UI/UX Applications, Tinkercad, wokwi, Autodesk.	

  
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**COURSE OUTCOMES:**

At the end of the course, the students will be able:

COs	Course Outcome	Exercise No	Cognitive Level
CO1	Identify and analyze real-world problems through design thinking and abstraction	1,2	Analyze
CO2	Apply computing principles to implement practical, user-centered solutions	3,4,5	Apply
CO3	Construct basic prototypes using software/hardware platforms	6,7	Apply
CO4	Assess the effectiveness of full-stack components or intelligent systems for specific applications.	8,9	Evaluate
CO5	Interpret and present the complete solution effectively by applying each phase of the Design Cycle.	10	Analyze

**TEXT BOOKS:**

- 1) Peter J. Denning, Matti Tedre, "Computational Thinking", MIT Press, first edition, 2019.
- 2) Zhiwei Xu, Jialin Zhang, "Computational Thinking: A Perspective on Computer Science", Springer, first edition, 2021

**REFERENCES:**

- 1) Joshua Ellul, Carl James Debono, "TinkercadNetConnector: Connecting emulated IoT devices to the outside world", SoftwareX (Elsevier), 2022.
- 2) Ahmad Zahari Misnan et al., "Embedded Internet of Things (IoT) for Beginners", Politeknik Muadzam Shah (Malaysia), 2021.
- 3) Cormen, Leiserson, Rivest, Stein, "Introduction to Algorithms (CLRS)", MIT Press, Fourth Edition, 2022.
- 4) Aho, Lam, Sethi, Ullman, "Compilers: Principles, Techniques and Tools", Pearson Education, Second Edition, 2006.
- 5) Abelson, Sussman, "Structure and Interpretation of Computer Programs (SICP)", MIT Press, Second Edition, 1996.

**Mapping of Cos with Pos and PSOs**

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	3	3	2	3	1	-	2	1	-	1	2	3
CO2	3	3	2	-	3	-	-	2	1	-	1	2	3
CO3	3	3	2	-	3	-	-	2	1	-	1	2	3
CO4	3	3	3	3	3	-	-	2	1	-	1	3	3
CO5	3	3	3	2	3	1	1	2	1	-	1	3	3

1-low, 2-medium, 3-high



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Applicable for the students admitted from 2024-2025 onwards

24CBP37	DATA STRUCTURES AND ALGORITHMS LABORATORY	Category	L	T	P	SL	C
		PCC	0	0	45	0	1.5
(Common To CSE-CS, CSD and CSE (IoT) )							
<b>PREREQUISITE:</b> Basic proficiency in writing, compiling, and debugging programs using C, along with logical thinking and understanding of fundamental programming constructs.							
<b>OBJECTIVES:</b> To foster practical skills in developing, testing, and debugging various data structures and algorithms for effective problem-solving in computational tasks.							
<b>List of Exercise:</b> <ol style="list-style-type: none"> <li>1. Array implementation of Stack and Queue ADTs</li> <li>2. Array implementation of List ADT</li> <li>3. Linked list implementation of List, Stack and Queue ADTs</li> <li>4. Applications of List, Stack and Queue ADTs</li> <li>5. Implementation of Binary Trees and operations of Binary Trees</li> <li>6. Implementation of Binary Search Trees</li> <li>7. Implementation of AVL Trees</li> <li>8. Graph representation and Traversal algorithms</li> <li>9. Implementation of searching and sorting algorithms</li> <li>10. Hashing – any two collision techniques</li> <li>11. Implementation of shortest path algorithm</li> </ol> <p>Implementation to find minimum cost spanning tree using Prim's Algorithm</p>							
<b>TOTAL:45PERIODS</b>							

**LIST OF HARDWARE AND SOFTWARE RESOURCES**

Resources Required for a Batch of 30 Students

S.No	Details of Resource	Quantity Required
1.	Desktop Computers: 30 Nos	30
2.	Operating System: Linux or Windows 7 and above,	
3.	Software: Turbo C, C++ (Version :3.0)	

  
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COURSEOUTCOMES: At the end of the course, the students will be able to:			
COs	Course Outcome	Exercise No	Cognitive Level
CO1	Implement linear and non-linear data structure operations	1,2	Apply
CO2	Design, implement, and analyse linear data structures, such as lists, queues, and stacks, according to the needs of different applications	3,4	Analyze
CO3	Design, implement, and analyse efficient tree structures	5,6,7	Analyze
CO4	Model problems as graph problems and implement efficient graph algorithms to solve them	8,11,12	Apply
CO5	Apply sorting, searching, and hashing techniques for efficient data access and manipulation	9,10	Apply

**TEXTBOOKS:**

1. Narasimha Karumanchi, "Data Structures and Algorithms Made Easy", 5th or 6th Edition (2020+), CareerMonk Publications.
2. Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, Clifford Stein, "Introduction to Algorithms" (CLRS), 4th Edition (2022) MIT Press
3. Michael T. Goodrich, Roberto Tamassia, Michael H. Goldwasser, "Data Structures and Algorithms in Python", 1st Edition (2013) (Latest as of 2024), Wiley

**REFERENCES:**

1. Langsam, Augenstein, and Tanenbaum – Data Structures Using C and C++, 2nd Edition, Pearson Education, 2015.
2. Alfred V. Aho, John E. Hopcroft, and Jeffrey D. Ullman – Data Structures and Algorithms, 1st Edition, Pearson, 2002.
3. Kruse, Tondo, and Leung – Data Structures and Program Design in C, 2nd Edition, Pearson Education, 2006.
4. Narasimha Karumanchi – Data Structures and Algorithms Made Easy, 5th Edition, CareerMonk Publications, 2016.
5. S. Sahni – Data Structures, Algorithms, and Applications in C++, 2nd Edition, Universities Press, 2005.

**Mapping of COs with POs and PSOs**

COs / POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	2	2	-	-	-	-	1	1	1	1	2	1
CO2	3	3	-	-	-	-	-	1	1	1	1	1	3
CO3	3	3	3	-	-	-	-	1	1	1	2	1	2
CO4	3	3	2	-	-	-	-	1	1	1	2	3	1
CO5	3	3	2	-	-	-	-	1	1	1	3	3	2

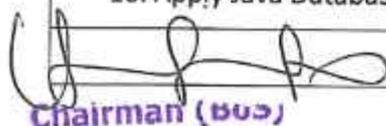
1-Low, 2-Medium, 3-High



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24CSP37	JAVA PROGRAMMING LABORATORY	Category	L	T	P	SL	C
		PCC	0	0	45	0	1.5
<b>(Common To CSE, CSD, CSE(IOT)and IT)</b>							
<b>PREREQUISITE:</b> Students must have basic knowledge on programming principles, such as variables, simple data types, control structures and Object Oriented Programming with problem solving and logical thinking skills.							
<b>OBJECTIVES:</b> This course aims to teach fundamental programming concepts such as arrays, loops, classes and objects to solve specific problems. It covers advanced topics including constructors, inheritance, method overriding, interfaces, packages and exception handling. Additionally, students will gain knowledge in multithreading, file processing, database connectivity and collections for building robust applications.							
<b>List of Experiments:</b>							
<ol style="list-style-type: none"> <li>1. Apply Loop and array operations to develop programs that find the largest and smallest numbers, perform sorting in ascending and descending order, generate the Fibonacci series and check for prime numbers.</li> <li>2. Develop applications using classes and objects to manage student details and employee information.</li> <li>3. Construct a banking application by applying constructors and inheritance for functionalities like deposit and withdrawal.</li> <li>4. Demonstrate method overriding by implementing a credit card processing system that varies behavior across card types.</li> <li>5. Implement systems such as a book store and a banking system using interfaces and packages.</li> <li>6. Apply exception handling techniques to manage errors in applications like online ticket booking and ATM withdrawal systems.</li> <li>7. Design concurrent systems using threading concepts for tasks such as online order processing and hospital patient management.</li> <li>8. Create a file-based application like a simple text editor, to practice file input/output operations.</li> <li>9. Utilize string handling techniques to implement systems for password validation and user profile management.</li> <li>10. Apply Java Database Connectivity (JDBC) to develop student database management.</li> </ol>							
						<b>L=0, T=0, P=45, SL=0, TOTAL: 45 PERIODS</b>	

  
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Applicable for the students admitted from 2024-2025 onwards



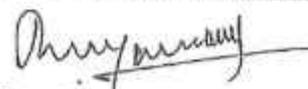
<b>COURSE OUTCOMES:</b>													
<b>At the end of the course, the students will be able to:</b>													
COs	Course Outcome											Ex.No	Cognitive Level
CO1	Apply programming concepts like loops, arrays and object-oriented principles to develop data processing and management applications.											1,2	Apply
CO2	Implement constructors, inheritance and method overriding to design reusable software systems.											3,4	Apply
CO3	Develop modular programs using interfaces and packages, with effective exception handling for runtime errors.											5,6	Apply
CO4	Design concurrent applications using threads and create file-based programs for efficient I/O operations.											7,8	Apply
CO5	Simulate data-driven applications for validation, profile management, and database access using string handling and JDBC											9,10	Apply
<b>REFERENCES:</b>													
1. Herbert Schildt, Dr.Danny Coward, Java - The Complete Reference, McGraw-Hill Education, Thirteenth Edition, 2023.													
2. Cay S. Horstmann, Core Java Volume 1 - Fundamentals, Prentice Hall, Thirteenth Edition, 2024.													
<b>Mapping of COs with POs and PSOs</b>													
COs / POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	3	2	-	1	-	1	-	1	-	2	2	1
CO2	3	3	2	-	1	-	1	-	1	-	2	2	1
CO3	3	3	2	-	1	-	1	-	1	-	2	2	1
CO4	3	3	2	-	1	-	1	-	1	-	2	2	1
CO5	3	3	2	-	1	-	1	-	1	-	2	2	1
1-low, 2-medium, 3-high													
<b>LIST OF EQUIPMENTS (For a Batch of 30 Students)</b>													
SI.No	Name of the Equipment's												Qty.
1.	A computer with a modern processor, RAM and Windows or Linux.												30 Nos.
2.	Programming Tools: Java Development Kit (JDK)												30 Nos.
3.	IDEs: Eclipse, NetBeans, IntelliJ IDEA												30 Nos.

  
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Applicable for the students admitted from 2024-2025 onwards

24SDP39	SOFT SKILLS DEVELOPMENT – III	Category	L	T	P	SL	C
		EEC	0	0	30	0	1
(Common to All Branches)							
<b>OBJECTIVES:</b> To the concept of aptitude and its relevance in various fields. It highlights the need for aptitude skills and emphasizes their importance in academic and career development. It also focuses on building a strong foundation in English grammar to improve communication skills.							
UNIT - I	TIME SPEED AND DISTANCE						(6)
Relationship Between Time Speed and Distance Time Conversion – Relative Speed – Chasing – Problems on Late, Early and Usual Time							
UNIT - II	PROBLEMS ON TRAINS						(6)
Crossing a Static objects – Crossing a Moving Object: Same and Opposite Direction – Time Difference based Problems.							
UNIT - III	BOATS AND STREAM						(6)
Introduction to Boat in Still Water and Current – Down Stream Speed – Upstream Speed – Speed in Still Water – Rate of Stream.							
UNIT - IV	LOGICAL REASONING						(6)
Seating Arrangements: Circular and Linear Arrangements – Inequalities – Assertion & reasoning.							
UNIT - V	VERBAL ABILITY						(6)
Parts of Speech – Sentence Completion – Idioms and Phrases – Reading Comprehension.							
<b>TOTAL: 30 PERIODS</b>							
<b>COURSE OUTCOMES:</b> At the end of the course, the students will be able to:							
COs	Course Outcome						Cognitive Level
CO1	Apply time, speed, and distance concepts to solve problems involving relative speed, time conversion, and punctuality scenarios.						Apply
CO2	Solve problems on trains with object crossing and time differences using concepts of relative speed and direction.						Apply
CO3	Solve problems involving boats and streams using concepts of upstream, downstream, and current speed.						Apply
CO4	Apply logical reasoning to solve problems on seating arrangements, inequalities, and assertion-reasoning statements.						Apply
CO5	Demonstrate understanding of grammar, vocabulary, and comprehension to complete sentences and interpret texts effectively.						Understand

  
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**TEXT BOOKS:**

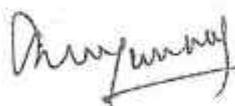
1. R S Aggarwal, "Quantitative Aptitude for Competitive Examinations".
2. Abhijit Guha, "Quantitative Aptitude for Competitive Examinations".
3. Nishit K. Sinha, "Logical Reasoning and Data Interpretation for CAT".
4. R.S. Agarwal, "A Modern Approach to Verbal & Non-Verbal Reasoning".
5. Wren & Martin, "High School English Grammar & Composition".

**REFERENCES:**

1. Arun Sharma, Quantitative Aptitude for CAT, 11e, 2025.
2. Arun Sharma, Logical Reasoning for CAT, 7e, 2025.
3. English for Competitive Examinations – by Edgar Thorpe & Showick Thorpe.
4. <https://prepinsta.com/>.
5. <https://www.geeksforgeeks.org/quantitative-aptitude/?ref=shm>.
6. <https://www.youtube.com/@FeelFreetoLearn/playlists>.

**Mapping of COs with POs and PSOs**

COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	3	2	-	2	-	-	2	-	-	3	-	-
CO2	3	3	2	-	2	-	-	2	-	-	3	-	-
CO3	3	3	2	-	2	-	-	2	-	-	3	-	-
CO4	3	3	2	-	2	-	-	2	-	-	3	-	-
CO5	3	2	-	-	2	-	-	3	3	-	3	-	-
Avg.	3	3	2	-	2	-	-	2	3	-	3	-	-



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24MAT46	NUMERICAL AND COMPUTATIONAL TECHNIQUES	Category	L	T	P	SL	C
		BSC	45	15	0	60	4
<b>SEMESTER - IV</b> ( COMMON TO II B.E. / B.Tech., - AE, BME, CE, CSE, CSD, CS, EEE, IOT,IT, MECH & SFE )							
<b>PREREQUISITE:</b> A fundamental knowledge of algebra, linear algebra, calculus, and differential equations is required for this course.							
<b>OBJECTIVES:</b> To develop the ability to apply numerical methods for solving algebraic and transcendental equations, systems of linear equations, interpolation, numerical differentiation and integration, and initial and boundary value problems.							
<b>UNIT - I</b>	<b>SOLUTIONS OF EQUATIONS AND EIGEN VALUE PROBLEMS</b>						<b>(12)</b>
Solutions to polynomial and transcendental equations - Newton Raphson Method - Solutions to simultaneous linear system of equations by Gauss Elimination Method - Gauss Seidel Method - Eigen value of a matrix by power method.							
<b>UNIT - II</b>	<b>INTERPOLATION AND APPROXIMATION</b>						<b>(12)</b>
Interpolation - Newton's Forward and Backward difference Interpolation Techniques (Equal intervals) - Newton's divided difference method - Lagrange's interpolation and Inverse Lagrange's interpolation methods (Unequal intervals).							
<b>UNIT - III</b>	<b>NUMERICAL DIFFERENTIATION AND INTEGRATION</b>						<b>(12)</b>
Numerical differentiation using Newton's Forward and Backward difference interpolation methods - Numerical integration by Trapezoidal rule - Simpson's $1/3^{rd}$ rule and Simpson's $3/8^{th}$ rule- Double integration using Trapezoidal and Simpson's rules.							
<b>UNIT - IV</b>	<b>INITIAL VALUE PROBLEMS FOR ORDINARY DIFFERENTIAL EQUATIONS</b>						<b>(12)</b>
Ordinary Differential Equations (for solving first order equations) - Taylor's Series Method - Euler's Method - Modified Euler's Method - Fourth order Runge-Kutta method- Milne's Predictor and Corrector Method.							
<b>UNIT - V</b>	<b>BOUNDARY VALUE PROBLEMS IN PARTIAL DIFFERENTIAL EQUATIONS</b>						<b>(12)</b>
Classification of Partial Differential Equations - One dimension heat equation by Crank Nicolson's method - One dimensional wave equation - Two Dimensional Laplace and Poisson equations.							
<b>Lecture = 45, Tutorial = 15, Self Learning = 60; Total = 120 Periods</b>							
<b>COURSE OUTCOMES: At the end of the course, the students will be able to</b>							
COs	Course Outcome						Cognitive Level
CO1	Implement numerical techniques to solve equations, systems of linear equations and Eigen value problems						Apply
CO2	Assess Newton's interpolation methods to select the most suitable technique based on data spacing and the location of the interpolation point.						Analyze
CO3	Apply numerical methods to perform differentiation and integration						Apply
CO4	Apply numerical techniques to obtain approximate solutions of first order ordinary differential equations						Apply
CO5	Analyze and solve partial differential equations of heat and wave equations by using numerical approaches.						Analyze

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CHAIRMAN

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TIRUCHENGODE - 637 215.

**TEXT BOOKS:**

1. Dr. B. S.Grewal, "Numerical Methods in Engineering and Science" Khanna Publishers, New Delhi, 12th edition, 2016.
2. Dr. M.K. Venkataraman, " Numerical Methods in Science and Engineering", National Publishing Company, 4th edition, 2012.

**REFERENCES:**

1. Sukhendu Dey and Shishir Gupta "Numerical Methods", Tata McGraw Hill Publishing Company, 1st edition 2013.
2. V. Gerald 'Applied Numerical Analysis' Pearson Education, 6th edition, 2013.
3. P. Kandasamy, K. Thilagavathy, K. Gunavathy "Numerical Methods", S. Chand Company ,5<sup>th</sup> Edition.
4. S.R.K. Iyengar, R.K.Jain, "Numerical Methods", New Age International Publishers, 1st edition , 2014.
5. Rajasekaran.S, "Numerical Methods in Science and Engineering A Practical Approach", A.H.Wheeler and Company Private Limited, 2016.

**Mapping of COs with POs and PSOs**

COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	3	2	-	-	-	-	2	-	-	2	-	-
CO2	3	3	3	2	-	-	-	2	-	-	2	-	-
CO3	3	3	2	-	-	-	-	2	-	-	2	-	-
CO4	3	3	2	-	-	-	-	2	-	-	2	-	-
CO5	3	3	3	2	-	-	-	2	-	-	2	-	-

1 - Low, 2 - Medium, 3- High.

*R.V.M. Rangarajan*  
31/11/24

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TIRUCHENGODE - 637 215.



24ITT46	DATABASE MANAGEMENT SYSTEMS	Category	L	T	P	SL	C
		PCC	45	-	-	45	3
<b>(Common to CSE ,CSD, CSE(IOT),CSE(CS) &amp; IT)</b>							
<b>OBJECTIVES:</b>							
The objective of this course is to provide an understanding of the basic concepts of database systems, and aims to develop skills in SQL, and also emphasizes normalization techniques and the principles of transaction management, concurrency control, and recovery mechanisms.							
<b>UNIT - I</b>	<b>DATABASE CONCEPTS AND ARCHITECTURE</b>	<b>(9)</b>					
Introduction to Database Systems – Characteristics of DBMS – File System vs DBMS – Data Models – Three– Level Architecture – DBMS Components – Data Independence: Logical & Physical. ER Model: Entities – Attributes – Relationships – Weak Entities – Specialization – Generalization – Aggregation. Relational Model – Relations – Tuples – Attributes – Relational Algebra (select, project, join, union, intersection, difference).							
<b>UNIT - II</b>	<b>SQL</b>	<b>(9)</b>					
SQL Basics and Keys: Primary – Candidate – Super – Foreign Keys. CREATE – DROP – ALTER – INSERT– UPDATE – DELETE – Querying Databases :SELECT queries – WHERE – ORDER BY– GROUP BY – HAVING – DISTINCT– LIKE– IN – BETWEEN – Aggregate operators – NULL Values – Comparison using NULL Values – Joins – INNER– OUTER (LEFT, RIGHT, FULL) – CROSS – Subqueries (Nested & Correlated).							
<b>UNIT - III</b>	<b>ADVANCED SQL</b>	<b>(9)</b>					
Built– in Functions (String, Numeric, Date) – Views – Indexing – PL/SQL Basics – Cursors – Stored Procedures – Functions – Triggers.							
<b>UNIT - IV</b>	<b>SCHEMA REFINEMENT</b>	<b>(9)</b>					
Functional Dependencies – Non– Loss Decomposition Functional Dependencies – First Normal Form – Second Normal Form – Third Normal Form – Dependency Preservation – Boyce/Codd Normal Form – Multi– Valued Dependencies and Fourth Normal Form – Join Dependencies and Fifth Normal Form– Decomposition – Lossless decomposition – Dependency preservation.							
<b>UNIT - V</b>	<b>CONCURRENCY CONTROL AND RECOVERY</b>	<b>(9)</b>					
Transactions: ACID Properties – Schedules and Serializability – Conflict & View Serializability. Concurrency Control Problems – Lost Update – Dirty Read – Unrepeatable Read – Phantom Read – Concurrency Control Techniques: Lock– Based Protocols (2PL, Strict 2PL) – Timestamp Ordering – Deadlocks (Prevention & Detection) – Database Recovery: Types of Failures – Recovery Techniques: Checkpoints – Log Based Recovery.							
<b>L= 45, T=0, P=0, SL=45, TOTAL: 90 PERIODS</b>							

  
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**COURSE OUTCOMES:**

At the end of the course, the students will be able to:

COs	Course Outcome	Cognitive Level
CO1	Describe the fundamental concepts, components, data models and key constraints of database management systems.	Understand
CO2	Develop and execute SQL queries to create, manipulate, and retrieve data efficiently from relational databases.	Apply
CO3	Implement PL / SQL procedures, functions and triggers to manipulate data on the database systems.	Apply
CO4	Apply functional dependencies and normalization techniques to design consistent and optimized relational database schemas.	Apply
CO5	Demonstrate and use the principles of transaction management, concurrency control, and recovery mechanisms in database systems.	Apply

**TEXT BOOKS:**

1. Ramez Elmasri and Shamkant B. Navathe, Fundamentals of Database Systems, Pearson Education, 7th Edition, 2025.
2. Abraham Silberschatz, Henry F. Korth, S. Sudharshan, Henry F. Korth, S. Sudharshan, Database System Concepts, 7th Edition, TataMcGraw Hill, 2021.

**REFERENCES:**

1. Hoffer, Venkataraman & Topi , Modern Database Management , 14<sup>th</sup> Edition, Pearson Education, 2025.
2. C.J.Date, A.Kannan and S.Swamynathan, An Introduction to Database Systems, Pearson Education, 8th Edition, 2012.
3. Raghu Ramakrishnan, Database Management Systems, Tata McGraw Hill, 4th Edition, 2010.
4. [https://onlinecourses.nptel.ac.in/noc22\\_cs91/preview](https://onlinecourses.nptel.ac.in/noc22_cs91/preview).

**Mapping of COs with POs and PSOs**

COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	2	-	-	-	-	-	-	1	-	1	3	-
CO2	3	3	2	-	-	-	-	-	1	-	1	3	-
CO3	3	3	2	-	-	-	-	-	1	-	2	3	-
CO4	3	3	2	-	-	-	-	-	1	-	3	2	-
CO5	3	3	2	-	-	-	-	-	1	-	3	3	-
Avg.	3	3	2	-	-	-	-	-	1	-	2	3	-

1-low, 2-medium, 3-high

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24ITT47	COMPUTER ORGANIZATION AND ARCHITECTURE	Category	L	T	P	SL	C
		PCC	45	0	0	45	3
<b>(Common to CSD &amp; IT)</b>							
<b>PREREQUISITE:</b> Students should have basic knowledge of digital logic, number systems, and computer concepts. They are also expected to possess introductory programming skills to understand instruction execution and hardware software interaction.							
<b>OBJECTIVES:</b> The objective of this course is to enable students to understand the fundamental design and functions of various system components, including processors, memory, and I/O systems, and to learn how to optimize system performance and efficiency through effective hardware and software integration.							
<b>UNIT – I</b>	<b>BASIC STRUCTURE AND ARITHMETIC OPERATIONS</b>	<b>9</b>					
Functional Units – Basic Operational Concepts – Performance – Instruction Set Architecture: Instructions and Instruction sequencing – Addressing Modes – RISC and CISC – Fixed Point and Floating Point Operations.							
<b>UNIT – II</b>	<b>BASIC PROCESSING UNIT</b>	<b>9</b>					
Fundamental Concepts – Hardware Components – Instruction Fetch and Execution Steps – Hardwired Control – Micro Programmed Control – Register organization - Timing and Control Signals - Nano Programming.							
<b>UNIT – III</b>	<b>PIPELINE EXECUTION</b>	<b>9</b>					
Basic Concepts – Pipeline Organization – Instruction Pipeline – Pipelining Hazard – Data Dependencies – Memory Delays – Branch Delays – Resource Limitations – Techniques to handle Pipeline Hazards - Performance Evaluation of Pipelined Processors – Superscalar Operation.							
<b>UNIT – IV</b>	<b>MEMORY AND STORAGE SYSTEM</b>	<b>9</b>					
Basic Concepts – Memory Hierarchy – Characteristics of Memory – Semiconductor Memories - Cache Memory – Virtual Memory – Secondary Storage Devices - Memory Management Techniques, Continuous and Non Continuous Memory Allocations - Fragmentation Management							
<b>UNIT – V</b>	<b>I/O ORGANIZATION</b>	<b>9</b>					
Basic Concepts of I/O Organization - I/O Devices and Peripherals - I/O Interface and Controllers - I/O Addressing Methods - I/O Data Transfer Techniques - Interrupts in I/O Systems - DMA - Interconnection Standards: PCI - SCSI – USB – Ethernet.							
<b>L=45, T=0, P=0, SL=45, TOTAL = 90 PERIODS</b>							

  
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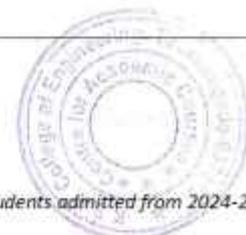
<b>COURSE OUTCOMES:</b>													
<b>At the end of the course, the students will be able to:</b>													
<b>COs</b>	<b>Course Outcome</b>											<b>Cognitive Level</b>	
<b>CO1</b>	Describe computer organization, instruction execution, addressing modes, RISC/CISC architectures, and arithmetic operations for system performance analysis.											Understand	
<b>CO2</b>	Discuss the processor components, instruction cycles, control methods, and fundamental operations related to CPU performance.											Understand	
<b>CO3</b>	Interpret the pipeline organization, instruction sequencing, hazards, and performance evaluation to optimize instruction execution in a processor.											Understand	
<b>CO4</b>	Apply memory hierarchy concepts and management techniques to improve system memory utilization and performance.											Apply	
<b>CO5</b>	Apply I/O interfaces, data transfer methods, and interrupt mechanisms to manage efficient input/output operations.											Apply	
<b>TEXT BOOKS:</b>													
1. Carl Hamacher, Zvonko Vranesic, Safwat Zaky, Naraig Manjikian, Computer Organization and Embedded Systems, McGraw-Hill Education, 6 <sup>th</sup> Edition, 2023.													
2. Morris Mano M, Rajib Mall, Computer System Architecture, Pearson Education, 3 <sup>rd</sup> Revised Edition, 2017.													
<b>REFERENCES:</b>													
1. William Stallings, Computer Organization and Architecture: Designing for Performance, Prentice Hall, United states, 11 <sup>th</sup> Edition, 2022.													
2. David A. Patterson, John L. Hennessy, Computer Organization and Design: The Hardware / Software interface, Morgan Kaufmann (Elsevier), 6 <sup>th</sup> Edition (MIPS Edition), 2020.													
3. John D. Carpinelli, Computer Systems Organization & Architecture, Pearson Education, India, 1 <sup>st</sup> Edition, 2002.													
4. T.K. Ghosh & A. Pal, Computer Organization and Architecture, Tata McGraw-Hill Education (India), WBUT Series edition, 2017.													
<b>Mapping of COs with POs and PSOs</b>													
<b>COs/ POs</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>	<b>PO7</b>	<b>PO8</b>	<b>PO9</b>	<b>PO10</b>	<b>PO11</b>	<b>PSO1</b>	<b>PSO2</b>
<b>CO1</b>	3	2	–	–	–	–	–	–	1	–	–	–	–
<b>CO2</b>	3	2	–	–	–	–	–	–	1	–	–	–	–
<b>CO3</b>	3	2	–	–	–	–	–	–	1	–	–	–	–
<b>CO4</b>	3	3	2	–	–	–	–	–	1	–	–	–	–
<b>CO5</b>	3	3	2	–	–	–	–	–	1	–	–	–	–
<b>Avg.</b>	3	2	2	–	–	–	–	–	1	–	–	–	–
1-low, 2-medium, 3-high													

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24CST46	DESIGN AND ANALYSIS OF ALGORITHMS	Category	L	T	P	SL	C
		PCC	45	0	0	45	3
<b>(Common to CSE, IT, IoT, CSE(CS) and CSD)</b>							
<b>PREREQUISITE</b> Basic knowledge of programming concepts, simple data structures, basic mathematics, and logical problem-solving skills.							
<b>OBJECTIVES:</b> To learn algorithm fundamentals, study time and space complexity and apply common algorithmic techniques to solve computational problems.							
<b>UNIT - I</b>	<b>FUNDAMENTALS OF ALGORITHMS AND ALGORITHM ANALYSIS</b>	<b>(9)</b>					
Notion of Algorithm – Fundamentals of Algorithmic Problem Solving – Analysis Framework – Important Problem Types – Asymptotic Notations: Big O Notation, Omega $\Omega$ Notation and Theta $\Theta$ Notation – Mathematical analysis for Recursive and Non-recursive algorithms.							
<b>UNIT - II</b>	<b>BRUTE FORCE AND DIVIDE-AND-CONQUER</b>	<b>(9)</b>					
Brute Force: String Matching – Closest-Pair and Convex-Hull Problems – Exhaustive Search: Traveling Salesman Problem – Knapsack Problem – Assignment problem. Divide and Conquer: Master Theorem – Merge sort – Quick Sort – Binary search.							
<b>UNIT - III</b>	<b>DYNAMIC PROGRAMMING AND GREEDY TECHNIQUE</b>	<b>(9)</b>					
Dynamic Programming: Warshall's algorithm – Floyd's algorithm – Optimal Binary Search Trees – Multistage Graph – Knapsack Problem. Greedy Technique: Prim's Algorithm – Kruskal's Algorithm – Dijkstra's Algorithm – Huffman Trees.							
<b>UNIT - IV</b>	<b>ITERATIVE IMPROVEMENT AND BACKTRACKING</b>	<b>(9)</b>					
Iterative improvement: Simplex Method – The Maximum-Flow Problem – Maximum Matching in Bipartite Graphs – Stable Marriage Problem. Backtracking: N-Queens problem – Hamiltonian Circuit Problem – Subset Sum Problem.							
<b>UNIT - V</b>	<b>BRANCH AND BOUND ALGORITHMS AND COMPUTATIONAL COMPLEXITY</b>	<b>(9)</b>					
Branch and Bound: Assignment problem – Knapsack Problem – Travelling Salesman Problem. Computational Complexity: P and NP Problems – NP Complete Problems – Approximation Algorithms for NP Hard Problems: Travelling Salesman Problem and Knapsack problem.							
<b>L:45, T:0, P:0, SL:45, TOTAL: 90 PERIODS</b>							
<b>COURSE OUTCOMES:</b> <b>At the end of the course, the students will be able to:</b>							

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Applicable for the students admitted from 2024-2025 onwards \*

COs	Course Outcome	Cognitive Level
CO1	Comprehend the fundamentals of algorithms and analyze their efficiency using asymptotic notations.	Understand
CO2	Employ brute force and divide-and-conquer techniques to solve standard algorithmic problems.	Apply
CO3	Implement dynamic programming and greedy methods to solve optimization problems.	Apply
CO4	Apply iterative improvement and backtracking techniques to solve problems.	Apply
CO5	Demonstrate optimization problems using Branch and Bound and approximation algorithms covering P, NP, and NP-Complete problems.	Apply

**TEXT BOOKS:**

1. Anany Levitin, Introduction to The Design and Analysis of Algorithms, Pearson Education, India, Third Edition, 2017.
2. A.V. Aho, J.E. Hopcroft and J.D. Ullman, The Design and Analysis of Computer Algorithms, Pearson Education Asia, India, Fourth Edition, 2010.

**REFERENCES:**

1. Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, Clifford Stein, Introduction to Algorithms, MIT Press, Fourth Edition, 2022
2. S. Sridhar, Design and Analysis of Algorithms, Oxford University Press, Second Edition, 2023
3. Robert Sedgewick, Philippe Flajolet, An Introduction to the Analysis of Algorithms, Addison-Wesley, USA, Second Edition, 2013.
4. Sara Baase and Allen Van Gelder, Computer Algorithms: Introduction to Design and Analysis, Pearson Education, India, Third Edition, 2010.

**Mapping of COs with POs and PSOs**

COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PSO1	PSO2
CO1	3	2	-	-	-	-	-	-	-	-	1	3	2
CO2	3	3	2	-	-	-	-	-	-	-	1	3	2
CO3	3	3	2	-	-	-	-	-	-	-	1	3	2
CO4	3	3	2	-	-	-	-	-	-	-	1	3	2
CO5	3	3	2	-	-	-	-	-	-	-	1	3	2

1-low, 2-medium, 3-high

  
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24CBI46	ADVANCED JAVA PROGRAMMING	Category	L	T	P	SL	C
		PCC	15	0	90	15	4
<b>(Common to CSE, CSE-CS, CSD, IT, CSE- IoT)</b>							
<b>PREREQUISITE:</b> Basic knowledge of Java programming concepts such as classes, objects, inheritance, and exception handling are required.							
<b>OBJECTIVES:</b> This course provides knowledge of Java Collections, server-side programming, modern Java features, and design patterns. It helps students develop efficient and maintainable Java applications.							
<b>UNIT – I</b>	<b>COLLECTIONS FRAMEWORK- I</b>	<b>(21)</b>					
Java Arrays– Collections Overview – Collections Framework – Collection Interface – Collections and Generic, List, Cursors, Iterators, Vector <span style="float: right;"><b>(Theory-3)</b></span>							
<b>List of Exercise:</b>							
<ol style="list-style-type: none"> <li>Analyze the use of one-dimensional and multi-dimensional arrays by writing a Java program to store, access, and manipulate data elements.</li> <li>Develop a Java program using ArrayList to perform insertion, deletion, and searching operations.</li> <li>Apply the Iterator and ListIterator interfaces in a Java program to traverse and modify elements of a List.</li> <li>Implement a Java program using Vector and show thread-safe operations.</li> <li>Write a Java program to demonstrate Enumeration cursor on a Vector. <span style="float: right;"><b>(Laboratory-18)</b></span></li> </ol>							
<b>UNIT – II</b>	<b>COLLECTIONS FRAMEWORK- II</b>	<b>21</b>					
Set - Basic Set and Extended Set. Comparable and Comparator - Sorting objects, Queue, Map, Concurrent Collections, Streams <span style="float: right;"><b>(Theory-3)</b></span>							
<b>List of Exercise:</b>							
<ol style="list-style-type: none"> <li>Apply HashSet, LinkedHashSet, and TreeSet collections in a Java program to store a set of elements and demonstrate their behavior with respect to insertion order, sorting, and uniqueness.</li> <li>Develop a Java program to sort objects using Comparable and Comparator interfaces.</li> <li>Analyze the behavior of a PriorityQueue by writing a Java program to perform queue operations such as insertion, deletion, and traversal, and observe the element ordering.</li> <li>Implement a Java program using HashMap and TreeMap.</li> <li>Write a Java program to demonstrate Java Streams for filtering and mapping collections. <span style="float: right;"><b>(Laboratory-18)</b></span></li> </ol>							
<b>UNIT – III</b>	<b>SERVER-SIDE PROGRAMMING</b>	<b>21</b>					
Java Regex API - Matcher class - Pattern class - PatternSyntaxException – POSIX Standards JDBC - JDBC Drivers – JDBC Components – DriverManager, Driver, Connection, Statement, ResultSet, Handling SQL Exception - Prepared Statement – Callable Statement – Scrollable ResultSet <span style="float: right;"><b>(Theory-3)</b></span>							
<b>List of Exercise:</b>							
<ol style="list-style-type: none"> <li>Write a Java program using Pattern and Matcher classes to validate email IDs.</li> <li>Construct a Java program that demonstrates the occurrence and handling of PatternSyntaxException in regular expressions.</li> <li>Apply JDBC concepts by writing a Java program to establish connectivity between a Java application and a database.</li> <li>Implement CRUD operations on a database using PreparedStatement.</li> <li>Develop a Java program using Scrollable ResultSet. <span style="float: right;"><b>(Laboratory-18)</b></span></li> </ol>							
<b>UNIT – IV</b>	<b>LAMBDA AND ANNOTATIONS</b>	<b>21</b>					
Wrapper Classes – Autoboxing- Unboxing –Lambda Expressions – Method References – functional Interfaces Javadocs, Annotations – Assertions <span style="float: right;"><b>(Theory-3)</b></span>							
<b>List of Exercise:</b>							
<ol style="list-style-type: none"> <li>Write a Java program to demonstrate wrapper classes with autoboxing and unboxing.</li> <li>Implement lambda expressions for arithmetic operations.</li> <li>Apply method references in a Java program to implement functional interfaces and simplify lambda expressions.</li> </ol>							

4. Develop a Java program using functional interfaces.
5. Apply custom annotations and assertions in a Java program to define metadata and validate program conditions during execution. **(Laboratory-18)**

<b>UNIT – V</b>	<b>DESIGN PATTERNS</b>	<b>21</b>
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Design Patterns - Creational – Structural and Behavioural Design Patterns - Singleton – Factory Method Pattern - Adapter Pattern – Proxy - Iterator, MVC. **(Theory-3)**

**List of Exercise:**

1. Implement the Singleton Design Pattern in Java.
2. Write a Java program using Factory Method Pattern.
3. Build a Java application that demonstrates the use of the Adapter Design Pattern to enable compatibility between incompatible interfaces.
4. Construct a Java application implementing the Proxy Design Pattern using a real-world example to control access to an object.
5. Develop a Java application using the MVC architectural pattern. **(Laboratory-18)**

**COURSE OUTCOMES:**

Upon completion of the course, the students will be able to:

Course Outcome	Description	Bloom's Taxonomy
CO1	Interpret Java Arrays and the Collections Framework, including Generics, Lists, Vectors, and basic traversal methods such as iterators.	Understand
CO2	Use Set, Queue, and Map interfaces with Comparable, Comparator, and streams to solve data processing problems.	Apply
CO3	Construct server-side Java applications that perform database interaction using JDBC and regular expressions.	Apply
CO4	Examine Java features such as lambda expressions, functional interfaces, and annotations to identify their roles and interactions in program design.	Analyze
CO5	Analyze suitable design patterns to achieve reusability, scalability, and maintainability in Java applications.	Analyze

**TEXT BOOKS:**

<b>1</b>	Herbert Schildt, "Java – The Complete Reference", McGraw-Hill Education, 13th Edition, 2023
<b>2</b>	Modern Java in Action by Raoul-Gabriel Urma, Mario Fusco & Alan Mycroft, Manning Publications, 2nd Edition, 2023

**REFERENCES:**

<b>1</b>	Scott Oaks, High-Performance Java: Strategies and Best Practices for Developing High Performance Java Applications, Publisher: Packt Publishing, 1st Edition, 2025
<b>2</b>	Y. Daniel Liang, Introduction to Java Programming and Data Structures, Comprehensive Version, Pearson, 12th Edition, 2024
<b>3</b>	Cay S. Horstmann, Core Java Volume I – Fundamentals, Pearson, 12th Edition, 2024
<b>4</b>	Joshua Bloch, Effective Java, Addison-Wesley, 4th Edition, 2023
<b>5</b>	Paul Deitel & Harvey Deitel, Java: How to Program, Pearson, 12th Edition, 2022

**Mapping of COs with POs and PSOs**

COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	2	–	–	3	–	–	1	1	–	–	3	–
CO2	3	3	2	–	3	–	–	1	1	–	–	3	–
CO3	3	3	2	–	3	–	–	1	1	–	–	3	2
CO4	3	3	3	2	3	–	–	1	1	–	–	3	3
CO5	3	3	3	2	3	–	–	1	1	–	–	3	3

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



24ITP46	DATABASE MANAGEMENT SYSTEMS LABORATORY	Category	L	T	P	SL	C
		PCC	-	-	60	60	2
<b>(Common to CSE ,CSD, CSE(IOT),CSE(CS) &amp; IT)</b>							
<b>OBJECTIVES:</b>							
<p>The objectives of this course focus on SQL-based schema creation, data manipulation, and retrieval using joins, subqueries, and views. It also covers stored procedures, triggers, transactions, normalization, and hands-on SQL mini projects.</p>							
<b>List of Exercise/Experiments:</b>							
<ol style="list-style-type: none"> <li>1. DDL Schema Creation with Primary and Foreign Key Constraints.</li> <li>2. DML Data Insertion, Modification, and Deletion Operations.</li> <li>3. Basic SQL Retrieval Queries.</li> <li>4. Relational JOIN Query Execution.</li> <li>5. Sub query and Nested Query Execution.</li> <li>6. VIEW Creation and Querying.</li> <li>7. Stored Procedure Creation and Execution.</li> <li>8. Transaction Management using BEGIN, COMMIT, and ROLLBACK (TCL).</li> <li>9. Trigger Implementation for Data Validation or Logging.</li> <li>10. Database Authorization using GRANT and REVOKE Privileges (DCL).</li> <li>11. Table Normalization – Apply 1NF, 2NF, and 3NF to Remove Data Redundancy.</li> <li>12. SQL Mini Project – CRUD-based Application Development.</li> </ol> <p>Sample Applications for mini project using SQL :</p> <ul style="list-style-type: none"> <li>● Student Information System</li> <li>● Hospital Management System</li> <li>● Library Management System</li> <li>● Inventory Control System</li> <li>● Bus Ticket Booking System</li> <li>● Employee Attendance &amp; Payroll System</li> <li>● ATM Transaction Tracking System</li> </ul>							
<b>L= 0, T=0, P=60, SL=0, TOTAL: 60 PERIODS</b>							

  
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<b>COURSE OUTCOMES:</b>													
<b>At the end of the course, the students will be able to:</b>													
<b>COs</b>	<b>Course Outcome</b>											<b>Cognitive Level</b>	
<b>CO1</b>	Execute DDL and DML commands to design and manage relational database schemas with different key constraints.											Apply	
<b>CO2</b>	Develop SQL queries to retrieve and manipulate data using joins, sub queries, and views.											Apply	
<b>CO3</b>	Implement advanced SQL concepts such as stored procedures, triggers, transactions, and database authorization.											Apply	
<b>CO4</b>	Apply Normalization concepts in database tables to eliminate redundancy and ensure data consistency.											Apply	
<b>CO5</b>	Develop and deploy applications by SQL for effective database management.											Apply	
<b>Mapping of COs with POs and PSOs</b>													
<b>COs/ POs</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>	<b>PO7</b>	<b>PO8</b>	<b>PO9</b>	<b>PO10</b>	<b>PO11</b>	<b>PSO1</b>	<b>PSO2</b>
<b>CO1</b>	3	3	2	-	2	-	1	-	1	-	1	3	-
<b>CO2</b>	3	3	2	-	3	-	1	-	1	-	1	3	-
<b>CO3</b>	3	3	2	-	3	-	1	-	1	-	1	2	-
<b>CO4</b>	3	3	2	-	3	-	1	-	1	-	1	3	-
<b>CO5</b>	3	3	2	-	3	-	1	-	1	-	1	3	-
<b>Avg.</b>	3	3	2	-	3	-	1	-	1	-	1	3	-
1-low, 2-medium, 3-high													

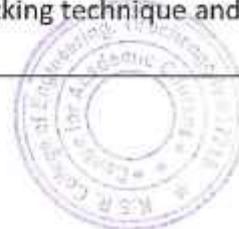
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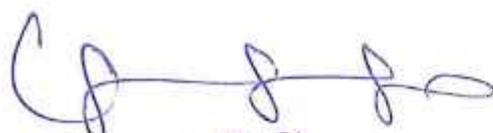
24CSP46	DESIGN AND ANALYSIS OF ALGORITHMS LABORATORY	Category	L	T	P	C
		PCC	0	0	60	2
<b>(Common to CSE, IT, IoT, CSE(CS) and CSD)</b>						
<b>PREREQUISITE</b>						
Students should have a basic understanding of programming concepts, data structures, and mathematical foundations such as logic and discrete mathematics.						
<b>OBJECTIVES:</b>						
To enable students to design, implement and analyze fundamental algorithmic techniques and evaluate their time complexities while solving classical computational problems efficiently.						
<b>List of Exercise/Experiments:</b>						
<ol style="list-style-type: none"> <li>1. Determine the maximum element in a given array and examine its time complexity in best, average, and worst cases using Big-O notation.</li> <li>2. Examine the performance of Linear Search by computing comparison counts for best, average, and worst cases.</li> <li>3. Construct the Binary Search algorithm using the Divide and Conquer strategy and assess its best, average, and worst-case time complexities.</li> <li>4. Apply the Brute Force String Matching technique to locate a pattern in a given text and illustrate the comparison process.</li> <li>5. Formulate a solution for the Traveling Salesman Problem using exhaustive search and demonstrate how all possible tours are explored to find the minimum cost.</li> <li>6. Develop Merge Sort and Quick Sort algorithms using the Divide and Conquer method and analyze their time complexities.</li> <li>7. Solve the 0/1 Knapsack Problem using the Dynamic Programming approach and display the maximum achievable profit.</li> <li>8. Compute all-pairs shortest paths in a weighted graph using Floyd's Algorithm and analyze the path cost updates.</li> <li>9. Apply Warshall's Algorithm to determine the transitive closure of a directed graph and interpret the reachability matrix.</li> <li>10. Derive the Minimum Spanning Tree of a connected graph using Prim's Algorithm and show how the greedy choice ensures minimum cost.</li> <li>11. Design a solution to obtain the shortest path from a source vertex to all other vertices in a weighted graph using Dijkstra's Algorithm.</li> <li>12. Apply the Stable Marriage Problem algorithm to find a stable matching between two equal-sized sets.</li> <li>13. Compute the maximum flow in a given flow network using an appropriate algorithm and determine the maximum possible flow value.</li> <li>14. Demonstrate the N-Queens Problem using the Backtracking technique and list all possible valid solutions.</li> </ol>						

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15. Optimize the Assignment Problem using the Branch and Bound technique and identify the minimum cost assignment.														
<b>L:0, T:0, P:60, SL: 0, TOTAL: 60 PERIODS</b>														
<b>COURSE OUTCOMES:</b>														
At the end of the course, the students will be able to:														
COs	Course Outcome												Cognitive Level	
CO1	Apply fundamental algorithmic concepts and asymptotic notations to analyze the efficiency of algorithms.												Apply	
CO2	Implement classic algorithm design techniques such as brute force, divide and conquer, dynamic programming, greedy, and backtracking methods.												Apply	
CO3	Demonstrate the use of graph algorithms to solve shortest path, minimum spanning tree, and maximum flow problems.												Apply	
CO4	Design optimized solutions for combinatorial and optimization problems using branch and bound and approximation techniques.												Apply	
CO5	Deploy algorithmic solutions by evaluating their time and space complexities to select the most efficient approach for a given problem.												Apply	
<b>TEXT BOOKS:</b>														
1. Anany Levitin, Introduction to The Design and Analysis of Algorithms, Pearson Education, India, Third Edition, 2017.														
2. A.V. Aho, J.E. Hopcroft and J.D. Ullman, The Design and Analysis of Computer Algorithms, Pearson Education Asia, India, Fourth Edition, 2010.														
<b>Mapping of COs with POs and PSOs</b>														
COs/ POs	PO1	PO2	PO3	PO4	PO5	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	3	2	-	1	-	-	-	1	-	-	2	3	2
CO2	3	3	2	-	1	-	-	-	1	-	-	2	3	2
CO3	3	3	2	-	1	-	-	-	1	-	-	2	3	2
CO4	3	3	2	-	1	-	-	-	1	-	-	2	3	2
CO5	3	3	2	-	1	-	-	-	1	-	-	2	3	2
1-low, 2-medium, 3-high														

  
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24CSP47	DESIGN STUDIO - II	Category	L	T	P	SL	C
		PCC	0	0	30	0	1
<b>Common To CSE, CSD, CSE(IOT) and IT</b>							
<b>PREREQUISITE</b>							
Students must have basic knowledge on programming principles, such as variables, simple data types, control structures and Object Oriented Programming with problem solving and logical thinking skills.							
<b>OBJECTIVES:</b>							
Basic knowledge of programming, AI/ML, IoT, databases and cloud platforms is required, along with an understanding of cybersecurity and application domains like agriculture and healthcare.							
<b>List of Problem Statements:</b>							
<ol style="list-style-type: none"> <li>1. Smart Community Health Monitoring and Early Warning System for Water-Borne Diseases in Rural Northeast India.</li> <li>2. Smart Tourist Safety Monitoring &amp; Incident Response System using AI, Geo-Fencing, and Blockchain based Digital ID.</li> <li>3. Low-Cost smart transportation solution for Agri produce from remote farms to nearest motorable road in NER Region.</li> <li>4. Image based breed recognition for cattle and buffaloes of India.</li> <li>5. Image based Animal Type Classification for cattle and buffaloes.</li> <li>6. Development of a Digital Farm Management Portal for implementing Biosecurity measures in Pig and Poultry Farms.</li> </ol>							
<b>L=0, T=0, P=30, SL=0, TOTAL: 30 PERIODS</b>							
<b>COURSE OUTCOMES:</b>							
<b>At the end of the course, the students will be able to:</b>							
COs	Course Outcome	Exper iment	Cognitive Level				
CO1	Demonstrate advanced smart health systems, intelligent tourist safety frameworks, optimized agricultural logistics, and digital farm management solutions, emphasizing their broader societal and technological impact.	1	Apply				
CO2	Apply IoT devices, sensors, geo-fencing, and cloud technologies to build functional prototypes for real-time monitoring and alert systems	2,3	Apply				
CO3	Analyze image-based datasets of cattle and livestock to develop AI/ML models for breed recognition and animal type classification	4	Analyze				



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Applicable for the students admitted from 2024-2025 onwards

CO4	Integrate and analyze AI, blockchain, and cloud platforms to build smart solutions for health surveillance, safety monitoring, and biosecurity management.										5	Create	
CO5	Evaluate the performance, accuracy, reliability, and scalability of developed smart systems using appropriate metrics and validation techniques.										6	Evaluate	
Mapping of COs with POs and PSOs													
COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PSO 1	PSO2
CO1	3	3	2	-	-	-	-	3	3	3	3	-	-
CO2	3	3	2	-	-	-	-	3	3	3	3	-	-
CO3	3	3	3	2	-	-	-	3	3	3	3	-	-
CO4	3	3	3	2	-	-	-	3	3	3	3	-	-
CO5	3	3	3	2	-	-	-	3	3	3	3	-	-
1-low, 2-medium, 3-high													

  
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24SDP49	SOFT SKILLS DEVELOPMENT – IV	Category	L	T	P	SL	C
		EEC	0	0	30	0	1
<b>(Common to All Branches)</b>							
<b>OBJECTIVES:</b>							
To the concept of aptitude and make them aware of its growing importance in academics, competitive exams, and professional life. In addition, it seeks to build a strong foundation in English grammar to improve language and communication skills.							
<b>UNIT - I</b>	<b>TIME AND WORK</b>						(6)
Relationship Between Time and Work – Efficiency Calculation – Wages – Alternate Days – Pipes and Cisterns – Chain Rule.							
<b>UNIT - II</b>	<b>PERMUTATION COMBINATION AND PROBABILITY</b>						(6)
Permutation Based on Words and Numbers – Combination Based on Committee, Balls and Cards – Probability Based on Persons, Balls, Cards, Dice and Coins.							
<b>UNIT - III</b>	<b>SIMPLE INTEREST AND COMPOUND INTEREST</b>						(6)
Introduction to Principal, Interest and Time – Simple Interest Calculation – Compound Interest: Compounded Annually, Half-yearly and quarterly.							
<b>UNIT - IV</b>	<b>LOGICAL REASONING</b>						(6)
Syllogism – Clocks – Calendar.							
<b>UNIT - V</b>	<b>VERBAL ABILITY</b>						(6)
Tenses – Articles – Subject Verb Agreement – Error Spotting – Essay Writing.							
<b>TOTAL: 30 PERIODS</b>							
<b>COURSE OUTCOMES:</b>							
<b>At the end of the course, the students will be able to:</b>							
COs	Course Outcome	Cognitive Level					
CO1	Apply time and work concepts to solve problems on efficiency, wages, alternate days and pipes & cisterns, and chain rule.	Apply					
CO2	Develop problem solving on permutations, combinations, and probability involving words, objects, and standard.	Understand					
CO3	Apply concepts of principal, rate, and time to calculate simple and compound interest under various compounding periods.	Apply					
CO4	Demonstrate logical reasoning to solve problems related to syllogisms, clocks, and calendars effectively.	Understand					
CO5	Demonstrate grammatical accuracy and coherence in writing by applying rules of tenses, articles, subject-verb agreement.	Understand					

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**TEXT BOOKS:**

1. R S Aggarwal, "Quantitative Aptitude for Competitive Examinations".
2. Abhijit Guha, "Quantitative Aptitude for Competitive Examinations".
3. Nishit K. Sinha, "Logical Reasoning and Data Interpretation for CAT".
4. R.S. Aggarwal, "A Modern Approach to Verbal & Non-Verbal Reasoning".
5. Wren & Martin, "High School English Grammar & Composition".

**REFERENCES:**

1. Arun Sharma, Quantitative Aptitude for CAT, 11e, 2025.
2. Arun Sharma, Logical Reasoning for CAT, 7e, 2025.
3. English for Competitive Examinations – by Edgar Thorpe & Showick Thorpe.
4. <https://prepinsta.com/>.
5. <https://www.geeksforgeeks.org/quantitative-aptitude/?ref=shm>.
6. <https://www.youtube.com/@FeelFreetoLearn/playlists>.

**Mapping of COs with POs and PSOs**

COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	3	2	-	2	-	-	2	-	-	3	-	-
CO2	3	2	-	-	2	-	-	2	-	-	3	-	-
CO3	3	3	2	-	2	-	-	2	-	-	3	-	-
CO4	3	2	-	-	2	-	-	2	-	-	3	-	-
CO5	3	2	-	-	2	-	-	3	3	-	3	-	-
Avg.	3	2	2	-	2	-	-	2	3	-	3	-	-

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