KSR College of Engineering

AN AUTONOMOUS INSTITUTION

NAAC ACCREDITED A++ | NBA ACCREDITED PROGRAMMES

25 Years KSRCE 2001 – 2026 Celebrating Academic Excellence

B.E. - COMPUTER SCIENCE AND ENGINEERING (IOT)

REGULATIONS 2024

(Academic Year 2024-25 Onwards)

Curriculum & Syllabus
Semester I to IV

K. S. R. COLLEGE OF ENGINEERING, TIRUCHENGODE

(Autonomous)

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING (IoT)

(REGULATION 2024)

Vision of the Institution

IV	To become a globally renowned institution in Engineering and Management, committed to providing holistic education that fosters research, innovation and sustainable development.

Mission of the Institution

IM1	Deliver value-based quality education through modern pedagogy and experiential learning.
IM2	Enrich Engineering and Managerial Skills through cutting-edge laboratories to meet evolving global demands
IM3	Empower research and innovation by integrating collaboration, social responsibility, and commitment to sustainable development.

Vision of the Department/Programme: Computer Science and Engineering (IoT)

IV	To develop skilled IoT professionals with expertise in intelligent connectivity and sustainable digital ecosystems

Mission of the Department/Programme: Computer Science and Engineering (IoT)

IM1	Provide value-based and industry-aligned education in Computer Science and IoT through innovative pedagogy and modern technologies
IM2	Empower technical and problem-solving skills in the field of IoT through state of art laboratories
IM3	Promote interdisciplinary research and collaboration in emerging technologies for creating sustainable solutions

Programme Educational Objectives (PEOs):

The graduates of the programme will be able to	
PEO1	**Core Competency:** Develop smart, interconnected, and efficient technological solutions by integrating knowledge from computer science and embedded technologies
PEO2	**Professionalism:** Exhibit leadership, ethics, and creative thinking to create sustainable IoT solutions contributing to societal well-being and environmental sustainability
PEO3	**Career Development:** Embrace continuous learning, research, and adaptation to technological advancements to meet the industry and societal needs

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Program Outcomes (POs)

PO1	**Engineering Knowledge:** 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	**Problem Analysis:** Identify, formulate, review research literature and analyze complex engineering problems reaching substantiated conclusions with consideration for sustainable development. (WK1 to WK4)
PO3	**Design/Development of Solutions:** 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	**Conduct Investigations of Complex Problems:** 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	**Engineering Tool Usage:** 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	**The Engineer and The World:** Analyze and evaluate societal and environmental aspects while solving complex engineering problems for its impact on sustainability with reference to economy, health, safety, legal framework, culture and environment. (WK1, WK5, and WK7).
PO7	**Ethics:** Apply ethical principles and commit to professional ethics, human values, diversity and inclusion; adhere to national & international laws. (WK9)
PO8	**Individual and Collaborative Team work:** Function effectively as an individual, and as a member or leader in diverse/multi-disciplinary teams.
PO9	**Communication:** 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	**Project Management and Finance:** 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	**Life-Long Learning:** 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)

Programme Specific Outcomes (PSO's)

PSO1	**Sensors and Data processing:** Integrate diverse sensors into IoT architectures and apply signal conditioning, data processing techniques for effective monitoring, analysis, and control of real-world environments
PSO2	**Algorithm Design and Analysis:** Develop algorithmic strategies for low-latency communication, edge computing, and intelligent decision-making in IoT systems

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

SEMESTER I

S. No.	Course Code	Course Title	Category	Periods / Semester					Credit	Max. Marks		
				L	T	P	SL	Tot		CA	ES	Tot
Induction Programme			-	-	-	-	-	-	-	-	-	-
THEORY COURSES												
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
THEORY COURSES WITH LABORATORY COMPONENT												
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
LABORATORY COURSES												
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
EMPLOYABILITY ENHANCEMENT COURSE												
10	24SSP19	Aptitude and Coding Skills-I	EEC	0	0	30	0	30	1	60	40	100
			TOTAL	**240**	**15**	**180**	**255**	**690**	**23**	**1000**		

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SEMESTER II												
S. No.	Course Code	Course Title	Category	Periods / Semester					Credit	Max. Marks		
				L	T	P	SL	Tot		CA	ES	Tot
THEORY COURSES												
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/ Tamils and Technology	HSMC	15	0	0	15	30	1	40	60	100
THEORY COURSES WITH LABORATORY COMPONENT												
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	50	50	100
LABORATORY COURSES												
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
EMPLOYABILITY ENHANCEMENT COURSE												
9	24SSP29	Aptitude and Coding Skills-II	EEC	0	0	30	0	30	1	60	40	100
MANDATORY COURSE												
10		Mandatory Course - I	MC	0	0	30	0	30	0	-	-	-
TOTAL				**210**	**15**	**210**	**225**	**660**	**21**	**900**		

SEMESTER III												
S. No.	Course Code	Course Title	Category	Periods / Semester					Credit	Max. Marks		
				L	T	P	SL	Tot		CA	ES	Tot
THEORY COURSES												
1	24MAT37	Discrete Mathematical Structures	BSC	45	15	0	60	120	4	40	60	100
2	24CBT36	Data Structures and Algorithms	PCC	45	0	0	45	90	3	40	60	100
3	24CST37	Java Programming	PCC	45	0	0	45	90	3	40	60	100
4	24IOT31	Operating Systems for IoT	PCC	45	0	0	45	90	3	40	60	100
5	24IOT32	Fundamentals of Internet of Things	PCC	45	15	0	60	120	4	40	60	100
LABORATORY COURSES												
6	24CBP37	Data structures and Algorithms Laboratory	PCC	0	0	45	0	45	1.5	60	40	100
7	24CSP37	Java Programming Laboratory	PCC	0	0	45	0	45	1.5	60	40	100

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8	24IOP31	Operating Systems for IoT Laboratory	PCC	0	0	45	0	45	1.5	60	40	100
9	24ECP36	Design Studio - I	PCC	0	0	30	0	30	1	60	40	100
EMPLOYABILITY ENHANCEMENT COURSE												
10	24SDP39	Soft Skills Development- III	EEC	0	0	30	0	30	1	60	40	100
TOTAL				**225**	**30**	**195**	**255**	**675**	**23.5**	**1000**		

SEMESTER IV

S. No.	Course Code	Course Title	Category	Periods / Semester					Credit	Max. Marks		
				L	T	P	SL	Tot		CA	ES	Tot
THEORY COURSES												
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	24CST46	Design and Analysis of Algorithms	PCC	45	0	0	45	90	3	40	60	100
4	24IOT46	Foundations of Data Science	PCC	45	0	0	45	90	3	40	60	100
THEORY COURSES WITH LABORATORY COMPONENT												
5	24CBI46	Advanced Java Programming	PCC	15	0	90	15	120	4	50	50	100
LABORATORY COURSES												
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	24ECP46	Design Studio - II	PCC	0	0	30	0	30	1	60	40	100
EMPLOYABILITY ENHANCEMENT COURSE												
9	24SDP49	Soft Skills Development- IV	EEC	0	0	30	0	30	1	60	40	100
TOTAL				**195**	**15**	**270**	**210**	**690**	**23**	**900**		

SEMESTER V

S. No.	Course Code	Course Title	Category	Periods / Semester					Credit	Max. Marks		
				L	T	P	SL	Tot		CA	ES	Tot
THEORY COURSES												
1	24CST56	Computer Networks	PCC	45	0	0	45	90	3	40	60	100
2	24CST57	Principles of Compiler Design	PCC	45	15	0	60	120	4	40	60	100
3	24IOT56	Artificial Intelligence	PCC	45	0	0	45	90	3	40	60	100
4		Professional Elective – I	PEC	45	0	0	45	90	3	40	60	100

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5		Open Elective – I	OEC	45	0	0	45	90	3	40	60	100
LABORATORY COURSES												
6	24CSP56	Networks Laboratory	PCC	0	0	45	0	45	2	60	40	100
7	24IOP51	Artificial Intelligence Laboratory	PCC	0	0	45	0	45	2	60	40	100
EMPLOYABILITY ENHANCEMENT COURSE												
8	24IOP52	Internship – I*	EEC	0	0	0	30	30	1	100	-	100
9	24IOP53	Industry Oriented Course - I	EEC	0	0	0	0	0	1	100	-	100
10	24CDP54	Seminar Presentation	EEC	0	0	30	0	30	1	100	-	100
MANDATORY COURSE												
11		Mandatory Course - II	MC	15	0	0	0	15	0	100	-	100
TOTAL				**240**	**15**	**120**	**270**	**645**	**23**	**1100**		

***The students should undergo internship during the IV semester summer vacation.**

SEMESTER VI												
S. No.	**Course Code**	**Course Title**	**Category**	**Periods / Semester**					**Credit**	**Max. Marks**		
				L	**T**	**P**	**SL**	**Tot**		**CA**	**ES**	**Tot**
THEORY COURSES												
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	24IOT63	IoT and Cloud Computing	PCC	45	0	0	45	90	3	40	60	100
4		Professional Elective – II	PEC	45	0	0	45	90	3	40	60	100
THEORY COURSES WITH LABORATORY COMPONENT												
5	24IOI61	Essentials of Web Programming	PCC	45	0	30	45	120	4	50	50	100
LABORATORY COURSE												
6	24IOP62	IoT and Cloud Computing Laboratory	PCC	0	0	45	0	45	1.5	60	40	100
EMPLOYABILITY ENHANCEMENT COURSE												
7	24IOP61	Mini Project	EEC	0	0	60	0	60	2	60	40	100
8	24IOP62	Industry Oriented Course - II	OEC	45	0	0	45	90	3	40	60	100
9	24IOP63	Technical Comprehension	EEC	0	0	30	0	30	1	100	-	100
MANDATORY COURSE												
10		Mandatory Course – III	MC	30	0	0	0	30	0	100	-	100
TOTAL				**300**	**0**	**65**	**270**	**735**	**23.5**	**1000**		

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SEMESTER VII												
S. No.	Course Code	Course Title	Category	Periods / Semester					Credit	Max. Marks		
				L	T	P	SL	Tot		CA	ES	Tot
THEORY COURSES												
1	24IOT62	Privacy and Security in IoT	PCC	45	15	0	60	120	4	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		Open Elective – II	OEC	45	0	0	45	90	3	40	60	100
EMPLOYABILITY ENHANCEMENT COURSE												
6	24IOP72	Project Work Phase - I	EEC	0	0	90	0	90	3	60	40	100
7	24IOP73	Internship – II*	EEC	0	0	0	30	30	1	100	-	100
TOTAL				**195**	**15**	**90**	**240**	**540**	**18**	**700**		

***The students should undergo internship during the VI semester summer vacation.**

SEMESTER VIII												
S. No.	Course Code	Course Title	Category	Periods / Semester					Credit	Max. Marks		
				L	T	P	SL	Tot		CA	ES	Tot
EMPLOYABILITY ENHANCEMENT COURSE												
1	24IOP81	Project Work Phase – II	EEC	0	0	240	0	240	8	60	40	100
TOTAL				**0**	**0**	**240**	**0**	**240**	**8**	**100**		
TOTAL CREDITS									**163**			

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.

HUMANITIES, SOCIAL SCIENCE AND MANAGEMENT COURSES (HSMC)												
S. No.	Course Code	Course Title	Semester	Periods / Semester					Credit	Max. Marks		
				L	T	P	SL	Tot		CA	ES	Tot
THEORY COURSES												
1	24ENT19	Professional Communication	I	45	0	0	45	90	3	40	60	100
2	24GET19	தமிழ்மரபு/ Heritage of Tamils	I	15	0	0	15	30	1	40	60	100

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3	24GET29	தமிழரும் தொழில்நுட்பமும்/ Tamils and Technology	II	15	0	0	15	30	1	40	60	100
4	24ENP29	Professional Communication Laboratory	II	0	0	30	0	30	1	60	40	100
5	24GET69	Entrepreneurship Development	VI	45	0	0	45	90	3	40	60	100
6	24GET09	Universal Human Values and Ethics	VI	45	0	0	45	90	3	40	60	100
TOTAL				165	0	30	165	360	12	600		

BASIC SCIENCE COURSES (BSC)

S. No.	Course Code	Course Title	Semester	Periods / Semester					Credit	Max. Marks		
				L	T	P	SL	Tot		CA	ES	Tot
THEORY COURSES												
1	24MAI19	Matrices and Calculus	I	30	15	30	45	120	4	50	50	100
2	24CHI06	Chemistry for Engineers	I	30	0	30	60	120	4	50	50	100
3	24MAI29	Probability and Statistics	II	30	15	30	45	120	4	50	50	100
4	24PHI07	Engineering Physics	II	45	0	30	45	120	4	50	50	100
5	24MAT37	Discrete Mathematical structures	III	45	15	0	60	120	4	40	60	100
6	24MAT46	Numerical and Computational Techniques	IV	45	15	0	60	120	4	40	60	100
TOTAL				225	60	120	315	720	24	600		

ENGINEERING SCIENCE COURSES (ESC)

S. No.	Course Code	Course Title	Semester	Periods / Semester					Credit	Max. Marks		
				L	T	P	SL	Tot		CA	ES	Tot
THEORY COURSES												
1	24EET06	Basics of Electrical and Electronics Engineering	I	45	0	0	45	90	3	40	60	100
2	24ITT16	Programming for Problem Solving	I	45	0	0	45	90	3	40	60	100
3	24ITP16	Programming for Problem Solving Laboratory	I	0	0	30	0	30	1	60	40	100
4	24MEP16	Engineering Graphics Laboratory	I	15	0	30	15	60	2	60	40	100
5	24GEP16	Engineering Experience Laboratory	I	0	0	30	0	30	1	60	40	100
6	24ECI26	Digital Principles and System Design	II	45	0	30	45	120	4	50	50	100
TOTAL				150	0	120	150	420	14	600		

EMPLOYABILITY ENHANCEMENT COURSES (EEC)

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S. No.	Course Code	Course Title	Semester	Periods / Semester					Credit	Max. Marks		
				L	T	P	SL	Tot		CA	ES	Tot
THEORY COURSES												
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	24IOP52	Internship – I*	EEC	0	0	0	30	30	1	100	-	100
6	24IOP53	Industry Oriented Course - I	EEC	0	0	0	0	0	1	100	-	100
8	24CDP53	Seminar Presentation	EEC	0	0	30	0	30	1	100	-	100
9	24IOP61	Mini Project	EEC	0	0	60	0	60	2	60	40	100
10	24IOP62	Industry Oriented Course - II	EEC	45	0	0	45	90	3	40	60	100
11	24IOP63	Technical Comprehension	EEC	0	0	30	0	30	1	100	-	100
12	24IOP72	Project Work Phase - I	EEC	0	0	90	0	90	3	60	40	100
13	24IOP73	Internship – II*	EEC	0	0	0	30	30	1	100	-	100
TOTAL				**45**	**0**	**330**	**105**	**480**	**17**	**1300**		

PROFESSIONAL CORE COURSES (PCC)												
S. No.	Course Code	Course Title	Semester	Periods / Semester					Credit	Max. Marks		
				L	T	P	SL	Tot		CA	ES	Tot
THEORY COURSES												
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	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
6	24IOT31	Operating Systems for IoT	PCC	45	0	0	45	90	3	40	60	100
7	24IOT32	Fundamentals of IoT	PCC	45	0	0	45	90	4	40	60	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
10	24IOP31	Operating Systems for IoT Laboratory	PCC	0	0	45	0	45	1.5	60	40	100
11	24CSP32	Design Studio - I	PCC	0	0	30	0	30	1	60	40	100
12	24ITT46	Database Management Systems	PCC	45	0	0	45	90	3	40	60	100
13	24CST46	Design and Analysis of Algorithms	PCC	45	0	0	45	90	3	40	60	100
14	24IOT46	Foundations of Data Science	PCC	45	0	0	45	90	3	40	60	100

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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	24ECP46	Design Studio - II	PCC	0	0	30	0	30	1	60	40	100
19	24CST56	Computer Networks	PCC	45	0	0	45	90	3	40	60	100
20	24CST57	Principles of Compiler Design	PCC	45	15	0	60	120	4	40	60	100
21	24IOT56	Artificial Intelligence	PCC	45	0	0	45	90	3	40	60	100
22	24CSP56	Networks Laboratory	PCC	0	0	45	0	45	1.5	60	40	100
23	24IOP51	Artificial Intelligence Laboratory	PCC	0	0	45	0	45	1.5	60	40	100
24	24IOT63	IoT and Cloud Computing	PCC	45	0	0	45	90	3	40	60	100
25	24IOI61	Essentials of Web Programming	PCC	45	0	30	45	120	4	50	50	100
26	24IOP63	IoT and Cloud Computing Laboratory	PCC	0	0	45	0	45	1.5	60	40	100
27	24IOT62	Privacy and Security in IoT	PCC	45	15	0	60	120	4	40	60	100
28	24CST76	Standards in Computer Science and Engineering	PCC	15	0	0	15	30	1	100	-	100
TOTAL				**690**	**45**	**600**	**690**	**1980**	**66**	**2800**		

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PROFESSIONAL ELECTIVE COURSES (PEC) : VERTICALS					
VERTICAL-1	**VERTICAL-2**	**VERTICAL-3**	**VERTICAL-4**	**VERTICAL-5**	**VERTICAL-6**
DATA SCIENCE (IOT)	**FULL STACK DEVELOPMENT (CSD)**	**EMERGING TECHNOLOGIES**	**ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING**	**CYBER SECURITY AND DATA PRIVACY**	**INTERNET OF THINGS**
Data Warehousing and Data Mining	Fundamentals of DevOps	UI & UX Design	Neural Networks and Deep Learning	Engineering Secure Software Systems	Adhoc and Wireless Sensor Networks
Distributed Computing	Mobile Computing	Augmented Reality/Virtual Reality	Knowledge Engineering	Cyber Threat Intelligence	Python Programming for IoT
Big Data Analytics	C# and .NET Programming	Computer Graphics for Virtual Reality	Computer Vision	Steganography and Digital Watermarking	Open Source Programming for IoT
Business Intelligence	Software Testing and Automation	Introduction to Robotics	Game Theory	Crypto-Currency and Block chain Technologies	Introduction to Industry 4.0
Data Modelling	Full Stack Framework	Virtualization	AI in Health Care Analytics	Digital and Mobile Forensics	Industrial and Medical IoT
Exploratory Data Analysis	Open Source Technologies	Cloud Service Management	Text and Speech Analysis	Ethical Hacking	IoT and Multimedia Technology
Quantum Computing	Agile Software Development	Modern Web Application Development	Machine Learning for Bioinformatics	Firewalls and Intrusion Detection System	Design of Smart Cities
Scientific and Engineering Data Visualization	Object Oriented Analysis and Design	Android Application Development	Genetic Algorithms	Secure Software Engineering	Applications of IoT in Robotics

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S. No.	Course Code	Course Title	Category	Periods / Semester					Credit	Max. Marks		
				L	T	P	SL	Tot		CA	ES	Tot
VERTICAL 1: DATA SCIENCE												
1	24IOE01	Data Warehousing and Data Mining	PEC	45	0	0	45	90	3	40	60	100
2	24IOE02	Distributed Computing	PEC	45	0	0	45	90	3	40	60	100
3	24IOE03	Big Data Analytics	PEC	45	0	0	45	90	3	40	60	100
4	24IOE04	Business Intelligence	PEC	45	0	0	45	90	3	40	60	100
5	24IOE05	Data Modelling	PEC	45	0	0	45	90	3	40	60	100
6	24IOE06	Exploratory Data Analysis	PEC	45	0	0	45	90	3	40	60	100
7	24IOE07	Quantum Computing	PEC	45	0	0	45	90	3	40	60	100
8	24IOE08	Scientific and Engineering Data Visualization	PEC	45	0	0	45	90	3	40	60	100
VERTICAL 2: FULL STACK DEVELOPMENT												
1	24CSE05	Fundamentals of DevOps	PEC	45	0	0	45	90	3	40	60	100
2	24CSE06	Mobile Computing	PEC	45	0	0	45	90	3	40	60	100
3	24CSE07	C# and .NET Programming	PEC	45	0	0	45	90	3	40	60	100
4	24CSE08	Software Testing and Automation	PEC	45	0	0	45	90	3	40	60	100
5	24CSE09	Full Stack Framework	PEC	45	0	0	45	90	3	40	60	100
6	24CSE10	Open Source Technologies	PEC	45	0	0	45	90	3	40	60	100
7	24CSE11	Agile Software Development	PEC	45	0	0	45	90	3	40	60	100
8	24CSE12	Object Oriented Analysis and Design	PEC	45	0	0	45	90	3	40	60	100
VERTICAL 3: EMERGING TECHNOLOGIES												
1	24CDE01	UI & UX Design	PEC	45	0	0	45	90	3	40	60	100
2	24CDE02	Augmented Reality/Virtual Reality	PEC	45	0	0	45	90	3	40	60	100
3	24CDE03	Computer Graphics for Virtual Reality	PEC	45	0	0	45	90	3	40	60	100
4	24CDE04	Introduction to Robotics	PEC	45	0	0	45	90	3	40	60	100
5	24IOE09	Virtualization	PEC	45	0	0	45	90	3	40	60	100
6	24IOE10	Cloud Service Management	PEC	45	0	0	45	90	3	40	60	100
7	24CDE07	Modern Web Application Development	PEC	45	0	0	45	90	3	40	60	100

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8	24CDE08	Android Application Development	PEC	45	0	0	45	90	3	40	60	100

VERTICAL 4: ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING												
1	24ITE01	Neural Networks and Deep Learning	PEC	45	0	0	45	90	3	40	60	100
2	24ITE02	Knowledge Engineering	PEC	45	0	0	45	90	3	40	60	100
3	24ITE03	Computer Vision	PEC	45	0	0	45	90	3	40	60	100
4	24ITE04	Game Theory	PEC	45	0	0	45	90	3	40	60	100
5	24ITE05	AI in Health Care Analytics	PEC	45	0	0	45	90	3	40	60	100
6	24ITE06	Text and Speech Analysis	PEC	45	0	0	45	90	3	40	60	100
7	24ITE07	Machine Learning for Bioinformatics	PEC	45	0	0	45	90	3	40	60	100
8	24ITE08	Genetic Algorithms	PEC	45	0	0	45	90	3	40	60	100
VERTICAL 5: CYBER SECURITY AND DATA PRIVACY												
1	24IOE11	Engineering Secure Software Systems	PEC	45	0	0	45	90	3	40	60	100
2	24CBE01	Cyber Threat Intelligence	PEC	45	0	0	45	90	3	40	60	100
3	24CBE03	Steganography and Digital Watermarking	PEC	45	0	0	45	90	3	40	60	100
4	24CBE04	Crypto-Currency and Block chain Technologies	PEC	45	0	0	45	90	3	40	60	100
5	24CBE05	Digital and Mobile Forensics	PEC	45	0	0	45	90	3	40	60	100
6	24IOE12	Ethical Hacking	PEC	45	0	0	45	90	3	40	60	100
7	24CBE07	Firewalls and Intrusion Detection System	PEC	45	0	0	45	90	3	40	60	100
8	24CBE08	Secure Software Engineering	PEC	45	0	0	45	90	3	40	60	100
VERTICAL 6: INTERNET OF THINGS												
1	24IOE13	Adhoc and Wireless Sensor Networks	PEC	45	0	0	45	90	3	40	60	100
2	24IOE14	Python Programming for IoT	PEC	45	0	0	45	90	3	40	60	100
3	24IOE15	Open Source Programming for IoT	PEC	45	0	0	45	90	3	40	60	100
4	24IOE16	Introduction to Industry 4.0	PEC	45	0	0	45	90	3	40	60	100
5	24IOE17	Industrial and Medical IoT	PEC	45	0	0	45	90	3	40	60	100

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6	24IOE18	IoT and Multimedia Technology	PEC	45	0	0	45	90	3	40	60	100
7	24IOE19	Design of Smart Cities	PEC	45	0	0	45	90	3	40	60	100
8	24IOE20	Applications of IoT in Robotics	PEC	45	0	0	45	90	3	40	60	100

S. No.	Course Code	Course Title	Category	Periods / Semester					Credit	Max. Marks		
				L	T	P	SL	Tot		CA	ES	Tot
MANAGEMENT ELECTIVES												
1	24MGT01	Total Quality Management	HSMC	45	0	0	45	90	3	40	60	100
2	24MGT02	Principles of Management	HSMC	45	0	0	45	90	3	40	60	100
3	24MGT03	Engineering Economics and financial accounting	HSMC	45	0	0	45	90	3	40	60	100
4	24MGT04	Human Resource Management	HSMC	45	0	0	45	90	3	40	60	100
5	24MGT05	Industrial Management	HSMC	45	0	0	45	90	3	40	60	100

S. No.	Course Code	Course Title	Category	Periods / Semester					Credit	Max. Marks		
				L	T	P	SL	Tot		CA	ES	Tot
MANDATORY COURSE – I ,II & III												
1	24MCP09	Yoga and Stress Management	MC	0	0	30	0	30	**0**	-	-	-
2	24MCT01	Constitution of India	MC	15	0	0	15	30	**0**	100	-	100
3	24MCT02	Environmental Sciences and Sustainability	MC	15	0	0	15	30	**0**	100	-	100
4	24MCT05	Engineering Economics	MC	15	0	0	15	30	**0**	100	-	100
5	24MCT03	Introduction to Gender Studies	MC	15	0	0	15	30	**0**	100	-	100
6	24MCT06	Essence of Indian Traditional Knowledge	MC	15	0	0	15	30	**0**	100	-	100
7	24MCT04	Life Science for Engineers	MC	15	0	0	15	30	**0**	100	-	100
8	24MCT08	Disaster Management	MC	15	0	0	15	30	**0**	100	-	100
9	24MCT07	Industrial Maintenance and Safety Engineering	MC	15	0	0	15	30	**0**	100	-	100

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OPEN ELECTIVE COURSES OFFERED BY OTHER DEPARTMENTS								
S. No.	Dept.	Course Code	Course Name	L	T	P	SL	Credit
1.	AUTO	24AUO01	Basics of Automobile Engineering	45	0	0	45	3
2.		24AUO02	Hybrid Vehicles	45	0	0	45	3
3.	BME	24BMO01	Basics of Biomedical Instrumentation	45	0	0	45	3
4.		24BMO02	Biometric systems	45	0	0	45	3
5.	CIVIL	24CEO01	Smart Buildings	45	0	0	45	3
6.		24CEO02	Climate Change	45	0	0	45	3
7.	CSE	24CSO01	Data Structures and Algorithms using C	45	0	30	45	4
8.		24CSO02	Fundamentals of Java Programming	15	0	90	15	4
9.		24CSO03	Full Stack Framework	45	0	0	45	3
10.		24CSO04	Digital Marketing	45	0	0	45	3
11.	CSE (Cyber Security)	24CBO01	Ethical Hacking	45	0	0	45	3
12.		24CBO02	Digital and Mobile Forensics	45	0	0	45	3
13.		24CBO03	Applied Java Programming	15	0	90	15	4
14.	AIDS	24CSO06	Data Science Fundamentals	45	0	0	45	3
15.		24CSO07	Artificial Intelligence and Machine learning	45	0	0	45	3
16.		24CSO08	Data Exploration and Visualization	45	0	0	45	3
17.	IOT	24IOO01	Industrial Internet of things	45	0	0	45	3
18.		24IOO02	Introduction to Sensors and IoT	45	0	0	45	3
19.	ECE	24ECO01	Drone Technology	45	0	0	45	3
20.		24ECO02	Wearable Devices	45	0	0	45	3
21.		24ECO03	5G /6G Communication	45	0	0	45	3
22.		24ECO04	Embedded IoT	45	0	0	45	3
23.	EEE	24EEO01	Solar and Wind Energy System	45	0	0	45	3
24.		24EEO02	Hydrogen and Hybrid Energy System	45	0	0	45	3
25.		24EEO03	Electric Vehicle Technology	45	0	0	45	3
26.		24EEO04	Energy Conservation and Management	45	0	0	45	3
27.	IT	24ITO01	Introduction to Mobile Application Development	45	0	0	45	3
28.		24ITO02	Introduction to Big Data and Analytics	45	0	0	45	3
29.		24ITO03	Augmented Reality / Virtual Reality	45	0	0	45	3
30.	Mech	24MEO01	3D Printing	45	0	0	45	3
31.		24MEO02	Robotics and Automation	45	0	0	45	3
32.		24MEO03	Lean Manufacturing	45	0	0	45	3
33.	SFE	24SFO01	Occupational health and safety	45	0	0	45	3
34.		24SFO02	Electrical safety	45	0	0	45	3
35.		24SFO03	Building Fire Safety	45	0	0	45	3

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36.		24SFO04	Construction Safety	45	0	0	45	3

OPEN ELECTIVE COURSES OFFERED TO OTHER DEPARTMENT												
S. No.	Course Code	Course Title	Category	Periods / Semester					Credit	Max. Marks		
				L	T	P	SL	Tot		CA	ES	Tot
1	24IOO01	Industrial Internet of things	OEC	45	0	0	45	90	3	40	60	100
2	24IOO02	Introduction to Sensors and IoT	OEC	45	0	0	45	90	3	40	60	100
3	24IOO02	Internet of Things and its Applications	OEC	45	0	0	45	90	3	40	60	100

Summary										
Name of the Programme: B.E Computer science and Engineering (IoT)										
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	18.5	18	14	8.5	5		70	42.94
PEC					3	3	6		12	7.36
OEC					3		3		6	3.68
EEC	1	1	1	1	3	6	4	8	25	15.34
MC		✓			✓				0	0.00
Total	23	21	23.5	23	23	23.5	18	8	163	100.00

Total No. of Credits = 163

Total No. of. Credit for Lateral Entry Students = 119

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24ENT19	PROFESSIONAL COMMUNICATION	Category	L	T	P	SL	C
		HSMC	45	0	0	45	3

(Common to All Branches)

PRE-REQUISITE:

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.

OBJECTIVE:

To equip learners with essential verbal and written communication skills, including technical writing, necessary for academic, professional, and workplace success.

UNIT - I	UNDERSTANDING COMPARISONS AND CONTRASTS	(9)

Reading: Technical brochures, telephone messages, social media messages.
Writing: Emails/letters introducing oneself, Compare and Contrast Essay.
Grammar: Present Tenses, Framing WH and Yes-No questions.
Vocabulary: Portmanteau words, One–word substitutions.

UNIT - II	WRITING REPORTS AND PARAGRAPHS	(9)

Reading: Technical texts, biographies, travelogues, travel & technical blogs.
Writing: Paragraph writing, Short Report on an event/industrial visit.
Grammar: Past Tenses, Active & Passive Voice transformations, Prepositions.
Vocabulary: Word formations using Prefixes & Suffixes.

UNIT - III	DESCRIBING THE PROCESS/PRODUCT	(9)

Reading: Advertisements, gadget reviews, user manuals, news reports.
Writing: Definitions, Instructions, Product/Process description, Checklists.
Grammar: Future Tenses, If clauses, Concord.
Vocabulary: Nominal Compounds, Discourse Markers (connectives & sequence words).

UNIT - IV	TRANSCODING AND RECOMMENDATIONS	(9)

Reading: Newspaper articles, Journal reports.
Writing: Recommendations, Transcoding.(Conversion of non-verbal to verbal information)
Grammar: Articles, Relative pronouns, Modals.
Vocabulary: Collocations, Homonyms.

UNIT - V	SUMMATION AND DESCRIPTION	(9)

Reading: Editorials and Opinion blogs, Company profiles.
Writing: Descriptive/Narrative Essays, Job/Internship Application with Resume.
Grammar: Numerical adjectives, Relative Clauses.
Vocabulary: Cause & Effect Expressions, Homophones.

TOTAL (T:45 , SL:45) = 90 PERIODS

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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 Joevani, 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

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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), AIDS, CSE (IoT), IT, MECH, SFE)

PREREQUISITE:

Basic knowledge of calculus, differential equations, and physics (especially electromagnetism) with strong problem-solving skills for circuit analysis.

OBJECTIVE:

- To introduce the fundamentals of electrical and electronic systems, enabling analysis and application of basic circuits, machines and digital components.

UNIT - I	DC AND AC CIRCUITS	(9)

DC circuits: Electrical quantities – Ohm's law – Kirchhoff's current and voltage laws – Series and parallel resistors – Simple problems.

AC circuits: Waveforms, average value, RMS value, form factor, peak factor, power and power factor – Pure R, L and C – Series RL and RC circuits.

UNIT - II	ELECTRICAL MACHINES	(9)

DC machine: 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.

UNIT - III	ELECTRICAL INSTALLATIONS	(9)

Classification of wiring system – Earthing – Types: pipe earthing, plate earthing, strip earthing – On-line and Off-line UPS – Lamps: Fluorescent tube, LED.

UNIT - IV	ANALOG ELECTRONICS	(9)

PN junction diode and Zener diode: Principle of operation and V-I characteristics – Half and full wave rectifier – Bipolar Junction Transistor: Construction and working.

UNIT - V	DIGITAL ELECTRONICS	(9)

Digital logic gates: NOT, AND, OR, NAND, NOR, EXOR – Digital circuits: half-adder, full-adder, JK and D flip flop – Introduction to Arduino components and IDE.

LECTURE = 45, SELF LEARNING = 45, TOTAL = 90 PERIODS

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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 Ramamoorty 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	-	-

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24ITT16	PROGRAMMING FOR PROBLEM SOLVING	Category	L	T	P	SL	C
		ESC	45	0	0	45	3

(Common to AUTO,BME, CSE, CSE(CS), CSD, CSE(IoT), IT, ECE, EEE,MECH and SFE)

PREREQUISITE:

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.

OBJECTIVES:

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.

UNIT - I	INTRODUCTION TO COMPUTING AND C	(9)

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 Associatively.

UNIT - II	CONTROL STRUCTURES	(9)

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.

UNIT - III	FUNCTIONS AND ARRAY	(9)

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.

UNIT - IV	POINTERS AND STRINGS	(9)

Pointers: Definition – Initialization – Pointer's arithmetic – Pointers to pointers – Pointers and arrays. String: Declaring and initializing string variables – String handling functions and operations.

UNIT - V	STRUCTURE, UNION AND FILE	(9)

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.

L= 45, T=0, P=0, SL=45, TOTAL: 90 PERIODS

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COURSE OUTCOMES:

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

COs	Course Outcome	Cognitive Level
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

TEXT BOOKS:

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.

REFERENCES:

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. https://archive.nptel.ac.in/courses/106/105/106105171/

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	–	–	–	–
CO2	3	3	3	–	–	–	–	1	1	–	–	–	–
CO3	3	3	3	–	–	–	–	1	1	–	–	–	–
CO4	3	3	3	–	–	–	–	1	1	–	–	–	–
CO5	3	3	3	–	–	–	–	1	1	–	–	–	–

1-low, 2-medium, 3-high

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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 செவ்விலயக்கிகியங்கள் – சங்க இலக்கியத்தின் சமயச்சார்பற்ற தன்மை – சங்க இலக்கியத்தில் பகிர்தல் அறம் – திருக்குறளில் மேலாண்மைக் கருத்துக்கள் – தமிழ் காப்பியங்கள், தமிழகத்தில் சமணபௌத்த சமயங்களின் தாக்கம் – பக்தி இலக்கியம், ஆழ்வார்கள் மற்றும் நாயன்மார்கள் – சிற்றிலகியங்கள் 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, ஒயிலாட்டம், தோல்பாவைக் கூத்து, சிலம்பாட்டம், வளரி, புலியாட்டம், தமிழர்களின் விளையாட்டுகள்.

அலகு – IV	தமிழர்களின் திணைக் 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 பிறபகுதிகளில் தமிழ் பண்பாட்டின் தாக்கம் – சுயமரியாதை இயக்கம் – இந்திய மருத்துவத்தில் சித்தமருத்துவத்தின் பங்கு கல்வெட்டுகள் கையெழுத்துப்படிகள் - தமிழ்ப் புத்தகங்கள்களின் அச்சு வரலாறு.

Total (L= 15, SL=15) =30 Periods

Chairman (BoS)

K.S.R. College of Engineering, Tiruchengode – Centre for Academic Courses

பாடம் கற்றத்தின் விளைவுகள்:பாடத்தை வெற்றிகரகமாக கற்று முடித்த பின்பு, மாணவர்களால் முடியும் விளைவுகள்		அறிவாற்றல் நிலை
CO1:	தமிழ்மொழியின் செந்ததன்மை 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-கேகேபிள்ளை (வெளியீடு தமிழ்நாடு பாடநூல் மற்றும் கல்வியில் பணிகள் கழகம்) ,உலகத் தமிழாராய்ச்சி நிறுவனம், சென்னை, 2002
2	கணினித்தமிழ்முனைவர் இல. சுந்தரம், விகடன் பிரசுரம், 2016

Reference Books :

1	கீழடி-வைகை நதிக்கரையில் சங்ககால நகரநாகரிகம்.(தொல்லியல்துறைவெளியீடு)
2	பொருநை – ஆற்றங்கரை 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)

Chairman (BoS)

K.S.R. College of Engineering, Tiruchengode-637215 * Centre for Academic Courses *

24GET19	HERITAGE OF TAMILS	CATEGORY	L	T	P	SL	C
		HSMC	15	0	0	15	1

(Common to all branches)

Prerequisite(s): No prerequisites are needed for enrolling into the course

UNIT - I	LANGUAGE AND LITERATURE	[03]

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.

UNIT - II	HERITAGE - ROCK ART PAINTINGS TO MODERN ART – SCULPTURE	[03]

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.

UNIT - III	FOLK AND MARTIAL ARTS	[03]

Therukoothu, Karagattam, VilluPattu, KaniyanKoothu, Oyillattam, Leather puppetry, Silambattam, Valari, Tiger dance - Sports and Games of Tamils.

UNIT - IV	THINAI CONCEPT OF TAMILS	[03]

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.

UNIT - V	CONTRIBUTION OF TAMILS TO INDIAN NATIONAL MOVEMENT AND INDIAN CULTURE	[03]

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.

Total (L= 15, SL=15) =30 Periods

Course Outcomes: At the end of the course, the student will be able to		Cognitive Level
CO1:	Recognize the extensive literature of Tamil and its classical nature.	Understand
CO2:	Apprehend the heritage of sculpture, painting and musical instruments of ancient people.	Understand
CO3:	Review on folk and martial arts of Tamil people.	Understand
CO4:	Insight thinai concepts, trade and victory of Chozha dynasty.	Understand
CO5:	Realize the contribution of Tamil in Indian freedom struggle, self-esteem movement and siddha medicine.	Understand

Chairman (BoS)

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 Civilzation 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

SEMESTER I - B.E / B.TECH (Common to All Branches)

PREREQUISITE

The Students should have a basic understanding of calculus, matrices, and differential equations to effectively follow the concepts in this course.

OBJECTIVES:

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.

UNIT - I	LINEAR ALGEBRA	(9)

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.

UNIT - II	ORDINARY DIFFERENTIAL EQUATIONS	(9)

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.

UNIT - III	DIFFERENTIAL CALCULUS	(9)

Curvature - Radius of curvature (Cartesian co-ordinates only) – Centre of curvature and Circle of curvature – Involutes and Evolutes (Parabola, Ellipse, Hyperbola and Rectangular hyperbola).

UNIT - IV	FUNCTIONS OF SEVERAL VARIABLES	(9)

Partial derivatives – Euler's theorem for homogenous functions – Taylor's series expansion - Maxima and Minima for functions of two variables – Method of Lagrangian multipliers.

UNIT - V	VECTOR CALCULUS	(9)

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).

List of Exercise/Experiments(MAT LAB):

1. Calculate the characteristic equation and eigenvalues
2. Find the eigenvector and diagonalization of a given matrix.
3. SolvingODE with constant coefficients
4. Detect the solution of ODE with variable coefficients
5. Identifythe radius of curvature
6. Establish theEvolute of curve.
7. Reckon the Taylor's series for functions of two variables.
8. Computethe maxima and minima.
9. Estimatethe directionalderivative, divergence and curl.
10. Determine line integral, surface integral and volume integral.

L = 30 , T = 15 & P = 30 & SL = 45, TOTAL: 120 PERIODS

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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 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, 2nd Edition, 2020.
2.B. S. Grewal, "Higher Engineering Mathematics", Khanna Publishers, New Delhi, 40th Edition, 2020.

REFERENCES:

1. Bali N. P and Manish Goyal, "Engineering Mathematics", Laxmi Publications Pvt Ltd., 7th Edition, 2020.
2.Dass H.K, "Advance Engineering Mathematics", S. Chand and company, 11th Edition, 2014.
3. Jain R.K. and Iyengar S.R.K," Advanced Engineering Mathematics", Narosa Publications, 8th Edition, 2012.
4.Erwin Kreyszig, "Advanced Engineering Mathematics", Wiley India, New Delhi, 10th 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)

24CHI06	CHEMISTRY FOR ENGINEERS	Category	L	T	P	SL	C
		BSC	45	0	30	45	4

(Common to AI&DS, BME, CSE, CSE(CS), CSE(CSD), CSE(IoT), ECE, EEE and IT)

PREREQUISITE

The students must have knowledge about the basic concepts of water parameters, electro chemistry, organic reactions and their applications.

OBJECTIVES:

To equip the leaners to apply the chemical principles and their applications in the engineering fields.

UNIT - I WATER TREATMENT (9)

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).

UNIT - II ELECTROCHEMISTRY AND CORROSION (9)

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).

UNIT - III ENERGY STORAGE DEVICES (9)

Batteries – primary battery – Dry cell, secondary batteries – lead-acid and lithium-ion batteries. Fuel cells – H_2-O_2 fuel cell, solar cells – principle, applications and advantages; Nuclear energy: Light water Nuclear power plant - breeder reactor.

UNIT - IV POLYMER CHEMISTRY (9)

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.

UNIT - V NANO CHEMISTRY AND COMPOSITES (9)

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.

List of Exercise/Experiments:

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_3COOH) with strong base
6. Estimation of Fe^{2+} ion by potentiometric titration
7. Estimation of HCl by p^H- Metry
8. Conductometric precipitation titration using $BaCl_2$-Na_2SO_4

L = 45, P = 30, SL = 45, TOTAL = 120 PERIODS

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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., 12th Edition, 2015.
2. P.C. Jain and Monica Jain, "Engineering Chemistry", Dhanpat Rai Pub. Co., 16th Edition, 2013.
3. Wiley, "Engineering Chemistry", Wiley India Pvt. Ltd., 2nd Edition, 2013.

REFERENCES:

1. Dr. A. Ravikrishnan, "Engineering Chemistry", Srikrishna Hi-tech Publishing Company Pvt. Ltd., 21st 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., 6th 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,3rd 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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24ITP16	PROGRAMMING FOR PROBLEM SOLVING LABORATORY	Category	L	T	P	SL	C
		ESC	0	0	30	0	1

(Common to AUTO,BME, CSE, CSE(CS), CSD, CSE(IoT), IT, ECE, EEE,MECH and SFE)

PREREQUISITE:

Students are expected to have foundational knowledge of basic programming principles. This includes an understanding of variables and data types such as integers, floats, and characters, as well as familiarity with fundamental control structures like conditional statements (if-else) and loops (for, while).

OBJECTIVES:

The lab is designed to provide hands-on experience with fundamental computer applications like MS Word, Excel, PowerPoint, and MS Access. It also aims to develop practical programming skills in C, enabling students to write, debug, and execute programs that incorporate core concepts such as control flow, functions, strings, pointers, and file handling. The lab will help students apply theoretical knowledge to real-world problems, enhancing their problem-solving and programming proficiency.

List of Experiments:

1. Prepare a Bio-data using MS Word with appropriate page, text and table formatting options and send the same to too many recipients using mail merge.
2. Prepare a mark sheet with five subjects for five students in MS Excel File using Formulas, Functions and charts.
3. i) Prepare a Power Point presentation for your organization with varying animation effects using timer.
   ii) Prepare a Student Database in MS Access, manipulate the data and generate report.
4. Design an algorithm and flowchart with example.
5. Program using I/O statements and expressions.
6. Programs using decision-making constructs: if-else, goto, switch-case, break-continue.
7. Loops: for, while, do-while.
8. Arrays: 1D and 2D
9. Functions: passing parameters by (value, reference), Recursion.
10. Strings: operations.
11. Pointers.
12. Structures and File operations.

L=0, T=0, P=30, SL=0, TOTAL: 30 PERIODS

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COURSE OUTCOMES:
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

REFERENCES:

1.Jeff Szuha, "Learn C Programming", Packt Publishing, United Kingdom, Second Edition, 2022.
2.E Balagurusamy, "Programming In Ansi C", McGraw Hill Education, Eigth 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	–	–	–	–
CO2	3	3	2	–	–	–	–	1	1	–	–	–	–
CO3	3	3	2	–	–	–	–	1	1	–	–	–	–
CO4	3	3	2	–	–	–	–	1	1	–	–	–	–
CO5	3	3	2	–	–	–	–	1	1	–	–	–	–

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 and sufficient RAM.	30 Nos.
2.	Microsoft Office Suite (preferably MS Office 2016 or later) including: • MS Word (for document preparation and mail merge) MS Excel (for mark sheet creation, formulas, functions, and charts). • MS PowerPoint (for presentations with animations and timers). • MS Access (for database creation, data manipulation, and report generation). • Email Client (e.g., Outlook or any configured email system) for sending mail merge outputs.	30 Nos.
3.	Turbo C software or any standard C Compiler (e.g., GCC, Code Blocks)	30 Nos.

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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.	9,10	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

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

PREREQUISITE:

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.

OBJECTIVE:

To develop practical skills in basic electrical wiring, electronic interfacing with Arduino and IoT, and fundamental mechanical tools and systems.

LIST OF EXPERIMENTS

GROUP - A (ELECTRICAL)

1. Fluorescent lamp wiring.
2. Stair-case wiring.
3. Residential house wiring using switches, fuse, indicator and lamp.
4. Measurement of Energy in single phase system.

GROUP - B (ELECTRONICS)

1. Study of Electronic Components, Instruments, Internet of Things (IoT) and Arduino IDE.
2. Controlling the Light Emitting Diode (LED) with a push button using Arduino.
3. Interfacing of a Sensor (Ultrasonic, Rain, Voltage, Current & PIR) with Arduino Uno.
4. Controlling of LED through Wi-Fi using ESP8266.

GROUP - C (MECHANICAL)

1. Study of plumbing line sketches for water supply and carpentry tools.
2. Study of welding tools and centrifugal pump.

COURSE OUTCOMES:

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

(Common to All Branches)

OBJECTIVES:

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.

UNIT - I	BASIC OF NUMBER SYSTEMS & FOUNDATION	(6)

Introduction to Number System and its Classification - Divisibility Rules and Problems –Place Value & Face Value - HCF & LCM and its properties.

UNIT - II	BASICS OF SHARE BASED CONCEPTS	(6)

Introduction to Average – Basics of Ratio and proportion – Basics of Partnership–Introduction to Percentage

UNIT - III	LOGICAL REASONING	(4)

Analogies - Alpha and numeric series - Number Series - Coding and Decoding - Direction and distance

UNIT - IV	VERBAL ABILITY	(7)

Introduction to Grammar – Tenses – Parts of Speech – Preposition – Articles – Modal Verbs

UNIT - V	C PROGRAMMING	(7)

C Basics-Control Statements Decision making – Functions – Arrays & Strings – Pointers - User Defined Data Types - Storage Classes - Memory Management - Preprocessor.

TOTAL: 30 PERIODS

COURSE OUTCOMES:

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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TEXT BOOKS:

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,15th Edition, 2016

REFERENCES:

1. https://www.geeksforgeeks.org/quantitative-aptitude/?ref=shm
2. Stephen G. Kochana, Programming in C, 3rd Edition.
3. K. N. King, C Programming: A Modern Approach, 2e, 2008.
4. Aaron M. Tenenbaum, Yedidyah 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. https://www.geeksforgeeks.org/c-programming-language/
7. https://www.geeksforgeeks.org/data-structures/

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	-	-	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

(Common to All Branches)

PREREQUISITE:

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.

OBJECTIVES:

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.

UNIT – I	FUNDAMENTALS OF PYTHON	(9)

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.

UNIT – II	HANDLING STRINGS AND EXCEPTIONS	(9)

Strings – List – Tuples – Dictionaries – Sets – Exception Handling: Built-in Exceptions – User-defined exception – Modules and Packages.

UNIT – III	OBJECT ORIENTED PROGRAMMING CONCEPTS	(9)

Object Oriented Programming basics –Inheritance and Polymorphism – Operator Overloading and Overriding – Get and Set Attribute Values – Name Mangling – Duck Typing – Relationships.

UNIT– IV	FILES AND DATABASES	(9)

File I/O operations – Directory Operations – Reading and Writing in Structured Files: CSV and JSON – Data manipulation using MySQL.

UNIT – V	WEBPROGRAMINGAND GUI USING PYTHON	(9)

Frameworks: Introduction to Django – Django CRUD – Socket Programming – Sending email – UI design: Tkinter – Events – CGI: Introduction to CGI Programming, GET and POST Methods.

L=45, SL=45, TOTAL: 90 PERIODS

COURSE OUTCOMES:

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

COs	Course Outcome	Cognitive Level

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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

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

1-low, 2-medium, 3-high

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24CST21	DESIGN THINKING	Category	L	T	P	SL	C
		PCC	30	0	0	30	2

(COMMON TO AIDS, CSE, CSE(CS), CSE(IOT), CSD and IT)

PRE-REQUISITE

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

OBJECTIVES

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

UNIT - I	FUNDAMENTALS OF DESIGN THINKING	(6)

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.

UNIT - II	STEP 1: THE 'FEEL' STAGE	(6)

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 (LO) – Empathy Map – Case Study: Understanding the Stakeholders.

UNIT - III	STEP 2: THE 'DEFINE' STAGE	(6)

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.

UNIT - IV	STEP 3: THE 'DIVERGENCE' &'CONVERGENCE' STAGE	(6)

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.

UNIT - V	STEP 5: THE 'COMMUNICATION' STAGE	(6)

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.

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L=30, T=0, P=0, TOTAL: 30 PERIODS

COURSE OUTCOMES:

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

COs	Course Outcome	Cognitive Level
CO1	Summarize the key principles of design thinking and their relevance to real-world problem contexts.	Understand
CO2	Interpret the significance of a design mindset in fostering creativity and innovation.	Understand
CO3	Apply design thinking methods effectively at each stage of the problem-solving process.	Apply
CO4	Implement the phases of design thinking to address complex challenges systematically.	Apply
CO5	Execute design thinking techniques and tools to create, test, and refine potential solutions.	Apply

TEXT BOOKS:

1. UnMukt – The Science & Art of Design Thinking, Arun Jain
2. Don Norman, The Design of Everyday Things, MIT Press, 2013
3. Tim Brown, Change by Design: How Design Thinking Transforms Organizations and inspires innovation, Harper Collins Publishers Ltd, New York, First Edition, 2009.

REFERENCES:

1. Chrisitan Mueller-Roterberg, Handbook of Design Thinking – Tips & Tools for how to design thinking, kindle Direct Publishing, First Edition, 2018.
2. Johnny Schneider, Understanding Design Thinking, Lean and Agile, O'Reilly Media, California, First Edition, 2017
3. Roger Martin, The Design of Business, Why Design Thinking is the next competitive advantage, Harvard Business Press, United States, First Edition, 2009.
4. Idris Mootee, Design Thinking for Strategic Innovation, John Wiley & Sons Inc, New Jersey, First Edition,2013.

Mapping of COs with POs and PSOs

COs /	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO 9	PO 10	PO 11	PSO1	PSO2
CO1	3	2	-	-	-	-	1	1	1	-	1		
CO2	2	2	-	-	-	-	1	1	1	-	1		
CO3	3	3	2	-	-	-	1	1	1	-	1		
CO4	3	3	2	-	-	-	1	1	1	-	1		
CO5	3	3	3	-	-	-	1	1	1	-	1		

1-low, 2-medium, 3-high

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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 பானைத் தொழில்நுட்பம்	[03]

சங்ககாலத்தில் நெசவுத் தொழில் – பானைத் 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 அம்மன்ஆலயம் மற்றும் திருமலைநாயக்கர்மஹால் – செட்டிநாட்டுவீடுகள்-பிரிட்டிஷ்காலத்தில் சென்னை இந்தோ-சாரோசெனிக் கட்டிடக் கலை.

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]

அணை,ஏரி,குளங்கள்,மதகு-சோழர்காலகுமிழித்தூம்பின் முக்கியத்துவம்-கால்நடை பராமரிப்பு-கால்நடைகளுக்காக 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 கற்றத்தின் விளைவுகள் : பாடத்தை வெற்றிகரகமாக கற்று முடித்த பின்பு, மாணவர்களால் முடியும் விளைவுகள்		அறிவாற்றல் நிலை
CO1	*சங்ககாலத் தமிழிர்களின் நெசவு மற்றும் பானைவனைதல் தொழில் நுட்பம் குறித்து கற்றுணர்தல்.*	*புரிதல்*
CO2	*சங்ககாலத் தமிழிர்களின் கட்டிட தொழில் நுட்பம் கட்டுமான பொருட்கள் மற்றும் அவற்றை விளகும் தளங்கள் குறித்து அறிவு.*	*புரிதல்*
CO3	*சங்ககாலத் தமிழிர்களின் உலோகத் தொழில், நாணயங்கள் மற்றும் மணிகள் சார்ந்த தொல்லியல் சான்றுகள் பற்றிய அறிவு.*	*புரிதல்*
CO4	*சங்ககாலத் தமிழிர்களின் வேளாண்மை, நீர்ப்பாசன முறைகள் மற்றும் முத்து குளித்தல் குறித்த தெளிவு.*	*புரிதல்*
CO5	*நவீன அறிவியல் தமிழ் மற்றும் கன்னி தமிழ் குறித்த புரிந்துகொள்ளலும் மற்றும் பயன்படுத்தலும்.*	*பகுப்பாய்வு*

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Text Books :	
1	தமிழகவரலாறு- மக்களும் பண்பாடும்- கேகேபிள்ளை (வெளியீடு தமிழ்நாடு பாடநூல் மற்றும் கல்வியில் பணிகள் கழகம்)
2	கணினித்தமிழ் - முனைவர் இல. சுந்தரம் (விகடன் பிரசுரம்)
Reference Books :	
1	கீழடி- வைகை நதிக்கரையில் சங்ககால நகரநாகரிகம்.(தொல்லியல் துறை வெளியீடு)
2	பொருநை – ஆற்றங்கரை 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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24GET29	TAMILS AND TECHNOLOGY	CATEGORY	L	T	P	Sl.	C
		HSMC	15	0	0	15	1

(Common to All Branches)

Prerequisite(s): No prerequisites are needed for enrolling into the course

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 Nadu 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.

Total (L= 15, SL=15) =30 Periods

Course Outcomes: At the end of the course, the student will be able to		*Cognitive Level*
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

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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 Civilzation 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

SEMESTER II - B.E / B.TECH (Common to All Branches)

PREREQUISITE:

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.

OBJECTIVES:

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.

UNIT - I	ONE DIMESIONAL RANDOM VARIABLES	(9)

One dimensional Random Variable - Discrete and continuous random Variables -Expectations - Moment generating functions and their properties - Binomial, Poisson, Uniform and Normal distributions.

UNIT - II	TWO - DIMENSIONAL RANDOM VARIABLES	(9)

Joint distributions – Marginal and conditional distributions – Covariance – Karl Pearson's Coefficient of Correlation - Spearman's Rank Correlation - Regression Analysis.

UNIT - III	TESTING OF HYPOTHESIS	(9)

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.

UNIT - IV	DESIGN OF EXPERIMENTS	(9)

Analysis of variance - One way and two way classifications - Completely Randomized Design - Randomized Block Design - Latin Square Design.

UNIT - V	STATISTICAL QUALITY CONTROL	(9)

Control charts for measurements ($\bar{X}$and R charts) – Control charts for C and P charts – Acceptance sampling for construction of an OC curve.

List of Exercise/Experiments (R Software):

1. Determine the probability by using binomial distribution.
2. Find the probability with the help of normal distribution.
3. Determine the correlation co-efficient between X and Y.
4. Calculate and plot the regression lines.
5. Test the significance of difference between experimental and theoretical values of the data by using chi-square test.
6. Examine the small samples using F distribution.
7. Analyze the data using Randomized Block Design (RBD).
8. Inspect the data using Latin Square Design (LSD).
9. Find the $\bar{X}$ and R charts.
10. Compute c and p charts.

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L = 30 , T = 15 & P = 30 & SL = 45, TOTAL: 120 PERIODS

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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 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, 46th Edition ,2021.

2. Milton. J. S. and Arnold. J.C., "Introduction to Probability and Statistics", Tata McGraw Hill, 4th edition, 2007.

REFERENCES:

1. Devore. J.L., "Probability and Statistics for Engineering and the Sciences", Cengage Learning, New Delhi, 8th 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, 9th Edition, 2010.

4. R.C.Gupta, "Statistical Quality Controls", Khanna Publishers, Delhi, 8th 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

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24PHI07	ENGINEERING PHYSICS	Category	L	T	P	SL	C
		BSc	45	-	30	45	4

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

PREREQUISITE: 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.

OBJECTIVES: 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.

UNIT – I **LASER AND FIBRE OPTICS** **(9)**

Lasers: Principles of spontaneous emission and stimulated emission - Einstein's co-efficient A & B– population inversion – CO_2 laser – semiconductor diode laser – homo – junction & hetero – junction (qualitative analysis only) – applications.

Fibre Optics: 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.

UNIT – II **QUANTUM MECHANICS** **(9)**

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 & time independent) – particle in a box (one dimensional).

UNIT – III **CONDUCTING MATERIALS** **(9)**

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.

UNIT – IV **SEMICONDUCTING MATERIALS** **(9)**

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.

UNIT – V **MAGNETIC AND SUPERCONDUCTING MATERIALS** **(9)**

Magnetic Materials: Introduction – origin of magnetic moment – dia, para and ferromagnetic martials– domain theory of ferro-magnetism – Hysteresis – soft and hard magnetic materials.

Superconducting Materials: Introduction to superconductivity – properties and types of superconductor – application of superconductors: magnetic levitation– SQUIDS– cryotron.

List of exercises/experiments:

1. Determine the thickness of the given thin paper using Air wedge method.
2. Find the acceptance angle and numerical aperture of a given optical fibre.
3. Evaluate the wavelength of semiconductor laser.
4. Estimate the particle size of the lycopodium powder using semiconductor laser
5. Enumerate the thermal conductivity of a bad conductor by Lee's disc method.
6. Compute the band gap of an intrinsic semiconductor.
7. Calculate the width of the CD groove with a help of semiconductor laser.
8. Assess the Hysteresis loss of magnetic materials using B-H curve.

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Dr. R.V.M. RAJARAJAN
CHAIRMAN
BOARD OF STUDIES (S&H)
K.S.R. COLLEGE OF ENGINEERING
TIRUCHENGODE

Lecture: 45, Laboratory: 30, SL:45, TOTAL: 120 PERIODS

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, 11th Edition, 2018.
2. R.K. Gaur & S.L. Gupta, "Engineering Physics", Dhanpat Rai Publication, New Delhi, 7th Edition, 2014.

Reference Books :

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

K.S.R. College of Engineering, Tiruchengode-637215 * Centre for Academic Courses *

24PHI07 - ENGINEERING PHYSICS
I Year B.E (AIDS, BME, CSE, CSE (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

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24ECI26	DIGITAL PRINCIPLES AND SYSTEM DESIGN	Category	L	T	P	SL	C
		PCC	45	0	30	45	4

PREREQUISITE:
Students should have basic knowledge on binary numbers, logic gates, algebra and discrete mathematics.

OBJECTIVE:
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).

UNIT - I	BOOLEAN ALGEBRA AND LOGIC GATES	(9)

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.

UNIT - II	COMBINATIONAL LOGIC	(9)

Combinational Circuits – Analysis and Design Procedures – Adder and Subtractor – Magnitude Comparator – Code Converters – Decoders and Encoders – Multiplexers and Demultiplexers.

UNIT - III	SYNCHRONOUS SEQUENTIAL LOGIC	(9)

Sequential Circuits – Latches and Flip Flops – Analysis and Design Procedures – State Reduction and State. Assignment – Shift Registers – Counters.

UNIT - IV	PROCESSOR DESIGN	(9)

Processor Organization – Design of ALU: Arithmetic Circuits – Logic Circuits – Arithmetic Logic Unit – Status Register – Design of Shifter – Processor Unit.

UNIT - V	SIMPLE COMPUTER DESIGN AND HDL	(9)

Inter Register Transfer – Conditional Control Statements – Instruction Codes – Design of a Simple Computer – Hardware Description Language (HDL) for Combinational Circuits and Sequential Logic Circuits

List of Experiments:

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.

TOTAL(T:45, P:30, SL:45) : 120 PERIODS

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

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

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CO5	Design simple computer architectures and implement using HDL for both combinational and sequential logic circuits	5	Apply

TEXT BOOKS:

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.

REFERENCES:

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

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24ENP29	PROFESSIONAL COMMUNICATION LABORATORY	Category	L	T	P	SL	C
		HSMC	0	0	30	0	1

(Common to All Branches)

OBJECTIVE:

To enhance learners' proficiency in listening, speaking, reading, and writing through structured activities and professional communication practices relevant to academic and workplace settings.

UNIT - I	VERBAL AND CRITICAL REASONING	(6)

Syllogism – Drawing conclusions from given logical statements, **Assertion and Reason** – Judging the link between a claim and its reason, **Verbal Analogies** – Completing word pairs based on relationships, **Statement and Assumption** – Identifying hidden assumptions in statements, **Statement and Conclusion** – Choosing valid conclusions from given data, **Critical Reasoning** – Evaluating arguments for logic and consistency.

UNIT - II	LISTENING	(6)

Listening to Announcement – Understanding key details and context from public messages, **Short Conversation** – Extracting specific information from brief dialogues, **Motivational Speech** – Grasping main ideas, tone, and speaker's intent, **Telephone Conversation** – Comprehending spoken exchanges over the phone.

UNIT - III	SPEAKING	(6)

Talking about Oneself – Sharing personal details clearly and confidently, **Oral-presentation on a General Topic** – Presenting ideas briefly with clarity and structure, **Group Discussion on Current Affairs** – Expressing and support opinions in group settings, **Role Play** – Performing situational conversations using appropriate language, **Mock & HR Interview** – Answering common interview questions with clarity and confidence.

UNIT - IV	READING	(6)

Reading Short Texts – Understanding the main message and key ideas, **Reading for General and Specific Information** – Locating relevant details in various texts, **Case Studies on Problem Solving** – Analyzing real-life scenarios to identify issues and solutions.

UNIT - V	WRITING	(6)

Written communication: Letters (Apology & Complaint) – Writing formal letters using appropriate tone and structure, **E-mails (Appreciation & Permission)** – Composing clear and courteous emails, **Technical Report** – Using standard format for preparing structured technical report, **Agenda / Minutes** – Preparing format for meeting agendas and recording minutes.

TOTAL (P:30) = 30 PERIODS

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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

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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	

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24CSP29	PYTHON PROGRAMMING LABORATORY	Category	L	T	P	SL	C
		ESC	0	0	30	0	1

(Common to All Branches)

PREREQUISITE:

Students must have basic knowledge on programming principles, such as variables, simple data types, control structures, problem solving and logical thinking skills.

OBJECTIVES:

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.

List of Exercise/Experiments:

1. Implementing programs using Strings. (reverse, palindrome, character count, replacing characters)
2. Implementing programs using Functions (GCD of two numbers, Factorial)
3. Scientific problems using conditional statements and loops. (Largest among three numbers, Number series, Number Patterns)
4. Implementing real-time applications using Sets, Dictionaries (Sorting, Searching, Remove Duplicates)
5. Implementing real-time/technical applications using Lists, Tuples. (Swapping two elements, Reversing a List / Sorting Tuples)
6. Create a Python program to demonstrate polymorphism with inheritance. (Single, Multilevel Inheritance, Hierarchical)
7. Implement a simple calendar in python program without using the calendar module using string array or list.
8. Write a program to demonstrate the user-defined exception handling mechanism in Python.
9. Design and implement a graphical user interface to perform any arithmetic operation.
10. Implementing a web application with MySQL database integration for CRUD operations (Flask / Django Framework)

L=0, T=0, P=30, TOTAL: 30 PERIODS

COURSE OUTCOMES:

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

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COs	Course Outcome	Experiments	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		
CO2	3	3	2	-	-	-	1	-	1	-	2		
CO3	3	3	2	-	-	-	1	-	1	-	2		
CO4	3	3	2	-	-	-	1	-	1	-	2		
CO5	3	3	2	-	-	-	1	-	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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24SSP29	APTITUDE AND CODING SKILLS –II	Category	L	T	P	SL	C
		EEC	0	0	30	0	1

(Common to All Branches)

OBJECTIVES:

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.

UNIT - I	NUMBERS AND SHARE BASED CONCEPTS	(6)

Problems on Numbers – Unit Digits – Squares and Cubes – Remainder Theorem – Averages - Ratio Proportions and Partnership – Percentage – Profit and Loss.

UNIT - II	BASICS OF WORK BASED CONCEPTS	(6)

Introduction to time and work –Introduction to Time, Speed and Distance, Problems on Trains.

UNIT - III	LOGICAL REASONING	(4)

Blood Relations – Ranking and Ordering – Inequalities – Cause and Effect.

UNIT - IV	VERBAL ABILITY	(7)

Yes or No and "WH" Questions – Conjunctions – Count / Uncounted Nouns – Direct and Indirect Speech – Active and Passive Voice.

UNIT - V	PYTHON PROGRAMMING FUNDAMENTALS	(7)

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.

TOTAL: 30 PERIODS

COURSE OUTCOMES:

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

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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TEXT BOOKS:

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. Allen B. Downey, Think Python: How to Think like a Computer Scientist, 2nd Edition, O'Reilly Publishers, 2016
5. Karl Beecher, Computational Thinking: A Beginner's Guide to Problem Solving and Programming, 1st Edition, BCS Learning & Development Limited, 2017.

REFERENCES:

1. Paul Deitel and Harvey Deitel, Python for Programmers, Pearson Education, 1st Edition, 2021.
2. Martin C. Brown, Python: The Complete Reference, 4th Edition, Mc-Graw Hill, 2018.
3. https://www.python.org/

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	-	-	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

SEMESTER III - (Common to CSE, CSE(CS), CSD, CSE(IoT) & IT)

PREREQUISITE:

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.

OBJECTIVES:

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.

UNIT - I	PROPOSITIONAL CALCULUS	[12]

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.

UNIT - II	PREDICATE CALCULUS	[12]

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.

UNIT - III	SET THEORY AND FUNCTIONS	[12]

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.

UNIT - IV	GRAPH THEORY	[12]

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.

UNIT - V	COMBINATORICS	[12]

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.

L = 45,T = 15, SL = 60, TOTAL = 120 PERIODS

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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

TEXT BOOKS:

1.Trembly J.P, and Manohar R, "Discrete Mathematical Structures with Applications to Computer Science", Tata McGraw–Hill Publishing Co. Ltd, New Delhi, 43rd Re-print 2014.
2. Venkatraman M.K, Sridharan. N and Chandrasekaran N. "Discrete Mathematics", 'The National Publishing Company', Chennai, 2014.

REFERENCES:

1. Kenneth. H. Rosen, "Discrete Mathematics and its Applications", Tata McGraw Hill P.Co, 2013, 7th 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", 5th 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, 3rd Edition, 2010.
6. https://www.youtube.com/watch?v=DmCltf8ypks

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	-	-	-	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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24CBT36	DATA STRUCTURES AND ALGORITHMS	Category	L	T	P	SL	C
		PCC	45	0	0	45	3

(Common To CSE-CS, CSD and CSE (IoT))

PREREQUISITE:

Basic knowledge of programming concepts in C.

OBJECTIVES:

To enable students to design, implement, and analyze efficient data structures and algorithms for optimized problem-solving with attention to time and space complexity.

UNIT – I	BASICS OF DATA STRUCTURES	(9)

Abstract Data Types (ADTs) – List ADT – Array-based implementation – Linked list implementation – Singly linked lists – Doubly linked lists – Circularly linked lists. Applications of lists.

UNIT - II	STACKS AND QUEUES	(9)

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.

UNIT - III	TREES AND GRAPHS	(9)

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.

UNIT - IV	SEARCHING, HASHING AND SORTING	(9)

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

UNIT - V	ALGORITHM DESIGN AND ANALYSIS	(9)

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.

L=45, SL=45,TOTAL= 90 PERIODS

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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

(Common To CSE, CSD, CSE(IOT) and IT)

PREREQUISITE:

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.

OBJECTIVES:

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.

UNIT – I	JAVA FUNDAMENTALS	(9)

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.

UNIT – II	CONSTRUCTORS AND INHERITANCE	(9)

Constructors – Constructor Overloading – Access Control – static – final – Nested and Inner Class – Inheritance: Basics – Super – Multilevel – Hierarchical – Method Overriding – Abstract class –Final with Inheritance.

UNIT – III	INTERFACES, PACKAGES AND EXCEPTION HANDLING	(9)

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

UNIT–IV	MULTITHREADED PROGRAMMING AND I/O OPERATIONS	(9)

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.

UNIT – V	STRING, DATABASE CONNECTIVITY AND COLLECTIONS	(9)

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.

L=45, T=0, P=0, SL=45, TOTAL: 90 PERIODS

COURSE OUTCOMES:

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

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COs	Course Outcome	Cognitive Level
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

TEXT BOOKS:

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.

REFERENCES:

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. https://onlinecourses.nptel.ac.in/noc22_cs47/preview.
5. To practice: www.codingbat.com and www.geeksforgeeks.com .

Mapping of COs with POs and PSOs

COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO11	PSO 1	PSO2
CO1	3	2	-	-	-	-	1	1	1	-	2	1	2
CO2	3	3	2	-	-	-	1	1	1	-	2	1	2
CO3	3	3	2	-	-	-	1	1	1	-	2	2	2
CO4	3	3	2	-	-	-	1	1	1	-	2	2	2
CO5	3	3	2	-	-	-	1	1	1	-	2	2	2

1-low, 2-medium, 3-high

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24IOT31	OPERATING SYSTEMS FOR IoT	Category	L	T	P	SL	C
		PCC	45	0	0	45	3

PREREQUISITE: Basic knowledge of in operating system principles.

OBJECTIVES: A basic understanding of operating system principles such as process management, storage management, I/O and file system managements.

Unit - I	OPERATING SYSTEM OVERVIEW	[9]

Computer System Overview-Basic Elements - Instruction Execution - Interrupts - Memory Hierarchy - Cache Memory - Direct Memory Access -Multiprocessor and Multicore Organization - Operating System Overview- Objectives and Functions - Evolution of Operating System - Computer System Organization Operating System Structure and Operations - System Calls - System Programs - OS Generation and System Boot.

Unit – II	PROCESS MANAGEMENT	[11]

Processes - Process Concept - Process Scheduling - Operations on Processes - Inter-process Communication - CPU Scheduling - Scheduling Criteria - Scheduling Algorithms- Multiple - Processor Scheduling - Real Time Scheduling - Threads - Overview - Multithreading Models - Threading Issues - Process Synchronization - The Critical-Section Problem – Synchronization Hardware - Mutex Locks - Semaphores - Classic Problems of Synchronization - Critical Regions - Monitors - Deadlock – System Model – Deadlock Characterization - Methods for Handling Deadlocks - Deadlock Prevention - Deadlock Avoidance - Deadlock Detection - Recovery from Deadlock.

Unit – III	STORAGE MANAGEMENT	[9]

Main Memory – Background, Swapping, Contiguous Memory Allocation - Paging - Segmentation - Segmentation with Paging - 32- and 64-Bit Architecture Examples - Virtual Memory – Background - Demand Paging – Page Replacement - Allocation - Thrashing - Allocating Kernel Memory – OS Examples.

Unit – IV	FILE SYSTEMS AND I/O SYSTEMS	[9]

Mass Storage System – Overview of Mass Storage Structure - Disk Structure - Disk Scheduling and Management - Swap Space Management - File-System Interface - File Concept - Access Methods - Directory Structure – Directory Organization - File System Mounting - File Sharing and Protection - File System Implementation- File System Structure - Directory Implementation - Allocation Methods - Free Space Management - Efficiency and Performance - Recovery - I/O Systems – I/O Hardware - Application I/O Interface - Kernel I/O Subsystem - Streams - Performance.

Unit - V	VIRTUAL MACHINES AND MODERN OS	[7]

Virtual Machines – History, Benefits and Features, Building Blocks, Types of Virtual Machines and their Implementations, Virtualization and Operating-System Components; Modern operating system overview: Cloud operating Systems and IoT Operating systems.

L=45, SL=45, TOTAL= 90 PERIODS

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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 basic concepts and functions of the operating system.	Understanding
CO2	Analyze various scheduling algorithms.	Analyze
CO3	Compare and contrast various memory management schemes.	Understanding
CO4	Understand the functionality of file and I/O systems.	Analyze
CO5	Understand the virtual machine and IoT operating systems.	Understanding

TEXT BOOKS:

1. Abraham Silberschatz, Peter Baer Galvin and Greg Gagne, "Operating System Concepts", 10th Edition, John Wiley and Sons Inc., 2018.
2. Andrew S Tanenbaum, "Modern Operating Systems", Pearson, 5th Edition,2022 New Delhi.

REFERENCES:

1. William Stallings, "Operating Systems – Internals and Design Principles",7th Edition, Prentice Hall, 2011.
2. Ramez Elmasri, A. Gil Carrick, David Levine, "Operating Systems – A Spiral Approach", Tata McGraw Hill Edition, 2010.
3. Harvey M. Deitel, "Operating Systems", Third Edition, Pearson Education, 2004.
4. https://nptel.ac.in/courses/106/106/106106144/

Mapping of COs with POs and PSOs

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

1-low, 2-medium, 3-high

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24IOT32	FUNDAMETALS OF INTERNET OF THINGS	Category	L	T	P	SL	C
		PCC	45	15	0	60	4

PREREQUISITE:

Basic knowledge of in Digital Principles.

OBJECTIVES:

To enable students to equip with the knowledge and skills to understand, design, and implement connected devices and systems

UNIT - I	BASICS OF NETWORKING AND EMERGENCE OF IoT	[9]

Basics of Networking: Introduction, Network Types, Layered network models- Emergence of IoT: Introduction, Evolution of IoT, Enabling IoT and the Complex Interdependence of Technologies, IoT Networking Components

Unit – II	IOT SENSING AND ACTUATION	[9]

IoT Sensing and Actuation: Introduction, Sensors, Sensor Characteristics, Sensorial Deviations, Sensing Types, Sensing Considerations, Actuators, Actuator Types, Actuator Characteristics.

Unit – III	IOT PROCESSING TOPOLOGIES AND TYPES	[9]

Data Format, Importance of Processing in IoT, Processing Topologies, IoT Device Design and Selection Considerations, Processing Offloading.

Unit – IV	ASSOCIATED IOT TECHNOLOGIES	[9]

Cloud Computing: Introduction, Virtualization, Cloud Models, Service-Level Agreement in Cloud Computing, Cloud Implementation, Sensor-Cloud: Sensors-as-a-Service.

Unit - V	IOT CASE STUDIES AND FUTURE TRENDS	[9]

Agricultural IoT – Introduction and Case Studies -Vehicular IoT – Introduction, Healthcare IoT – Introduction, Case Studies, IoT Analytics – Introduction.

L=60, SL=60, TOTAL= 120 PERIODS

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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 basics of Networking.	Understanding
CO2	Understand the basic concepts of IoT Sensing and Actuation.	Understanding
CO3	Understand the IoT Processing Topologies and Types	Understanding
CO4	Implement the associated IoT Technologies.	Apply
CO5	Implement IoT in real time scenario.	Apply

TEXT BOOKS:

1. Sudip Misra, Anandarup Mukherjee, Arijit Roy, "Introduction to IoT", Cambridge University Press 2021.
2. S. Misra, C. Roy, and A. Mukherjee, 2020. Introduction to Industrial Internet of Things and Industry 4.0. CRC Press

REFERENCES:

1. Vijay Madisetti and Arshdeep Bahga, "Internet of Things (A Hands-on-Approach)",1st Edition, VPT, 2014..
2. Francis daCosta, "Rethinking the Internet of Things: A Scalable Approach to Connecting Everything", 1st Edition, Apress Publications, 2013.
3. Pethuru Raj and Anupama C.Raman, "The Internet of Things: Enabling Technologies and Use Cases, CRC Press
4. https://nptel.ac.in/noc/courses/noc19/SEM1/noc19-cs31/

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

1-low, 2-medium, 3-high

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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))

PREREQUISITE:

Basic proficiency in writing, compiling, and debugging programs using C, along with logical thinking and understanding of fundamental programming constructs.

OBJECTIVES:

To foster practical skills in developing, testing, and debugging various data structures and algorithms for effective problem-solving in computational tasks.

ListofExercise:

1. Array implementation of Stack and Queue ADTs
2. Array implementation of List ADT
3. Linked list implementation of List, Stack and Queue ADTs
4. Applications of List, Stack and Queue ADTs
5. Implementation of Binary Trees and operations of Binary Trees
6. Implementation of Binary Search Trees
7. Implementation of AVL Trees
8. Graph representation and Traversal algorithms
9. Implementation of searching and sorting algorithms
10. Hashing – any two collision techniques
11. Implementation of shortest path algorithm

Implementation to find minimum cost spanning tree using Prim's Algorithm

TOTAL:45PERIODS

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:
Attheendofthecourse,thestudents willbeableto:

COs	CourseOutcome	Excecise No	CognitiveLevel
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

(Common To CSE, CSD, CSE(IOT) and IT)

PREREQUISITE:

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.

OBJECTIVES:

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.

List of Experiments:

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.
2. Develop applications using classes and objects to manage student details and employee information.
3. Construct a banking application by applying constructors and inheritance for functionalities like deposit and withdrawal.
4. Demonstrate method overriding by implementing a credit card processing system that varies behavior across card types.
5. Implement systems such as a book store and a banking system using interfaces and packages.
6. Apply exception handling techniques to manage errors in applications like online ticket booking and ATM withdrawal systems.
7. Design concurrent systems using threading concepts for tasks such as online order processing and hospital patient management.
8. Create a file-based application like a simple text editor, to practice file input/output operations.
9. Utilize string handling techniques to implement systems for password validation and user profile management.
10. Apply Java Database Connectivity (JDBC) to develop student database management.

L=0, T=0, P=45, SL=0, TOTAL: 45 PERIODS

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COURSE OUTCOMES:

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

COs	Course Outcome	Experiment	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

REFERENCES:

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.

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	-	1	-	1	-	1	-	2	2	3
CO2	3	3	2	-	1	-	1	-	1	-	2	2	3
CO3	3	3	2	-	1	-	1	-	1	-	2	2	3
CO4	3	3	2	-	1	-	1	-	1	-	2	2	3
CO5	3	3	2	-	1	-	1	-	1	-	2	2	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.	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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24IOP31	OPERATING SYSTEMS FOR IoT LABORATORY	Category	L	T	P	SL	C
		PCC	0	0	45	0	1.5

PREREQUISITE:

Basic proficiency in writing, compiling, and debugging programs using C, along with logical thinking and understanding of fundamental programming constructs.

OBJECTIVES:

To foster practical skills in developing, testing, and debugging various scheduling algorithms, Memory allocation methods for effective problem-solving in computational tasks.

List of Exercise:

1. Installation of Windows operating system
2. Illustrate UNIX commands and Shell Programming
3. Process Management using System Calls: Fork, Exit, Getpid, Wait, Close
4. Write C programs to implement the various CPU Scheduling Algorithms
5. Illustrate the inter-process communication strategy
6. Implement mutual exclusion by Semaphore
7. Write C programs to avoid Deadlock using Banker's Algorithm
8. Write a C program to implement Deadlock Detection Algorithm
9. Write a C program to implement Threading
10. Implement the paging Technique using C program
11. Write C programs to implement the following Memory Allocation Methods
    a. First Fit b. Worst Fit c. Best Fit
12. Write C programs to implement the various Page Replacement Algorithms
13. Write C programs to implement the various File Organization Techniques
14. Implement the following File Allocation Strategies using C programs
    a. Sequential b. Indexed c. Linked
15. Write C programs for the implementation of various disk scheduling algorithms
16. Install any guest operating system like Linux using VMware.

TOTAL: 45 PERIODS

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COURSE OUTCOMES:

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

COs	Course Outcome	Exercise No	Cognitive Level
CO1	Define and implement UNIX Commands.	1,2,3	Apply
CO2	Compare the performance of various CPU Scheduling Algorithms	4,5,6	Analyze
CO3	Compare and contrast various Memory Allocation Methods	7,8,9,10,11	Analyze
CO4	Define File Organization and File Allocation Strategies	12,13, 14	Apply
CO5	Implement various Disk Scheduling Algorithms	15	Apply

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

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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24ECP36	DESIGN STUDIO – I	Category	L	T	P	SL	C
		ESC	0	0	30	0	1

(Common to BME, CSE (IoT), ECE, EEE)

PREREQUISITE:

Basic understanding of design thinking principles, including empathy, problem identification, and user-cantered design, is essential for engaging in the Design Studio.

OBJECTIVE:

To apply design thinking and system design principles to develop, prototype, and present user-cantered electronic solutions through hands-on projects.

Identification of components

Ex: 1 Resistor colour coding, Capacitors etc

Ex: 2: Soldering Practice

Realizing the functionality of components

Ex: 3: Connecting LED with fixed resister, variable resistors

Ex: 4: LED Go- No Go using Diode

Ex: 5: Multiple LED Circuit

Ex: 6: Switch on LED using Transistor

Ex: 7: Electronic LED Lantern

Ex: 8: Light Detector

Ex: 9: IC555 LED Flasher / Beeper

Ex: 10: LED Blinking

Ex: 11: Autodesk Fusion - Simulation

Prototyping

Ex: 11: Mini project

(Choose the problem and apply Design Thinking Concepts - empathy, Define, Ideation, Prototype to solve the problem)

TOTAL(P:30) : 30 PERIODS

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

COs	Course Outcome	Cognitive Level
CO1	To identify and interpret the characteristics of basic electronic components such as resistors, capacitors, diodes, LEDs, transistors, and LDRs through visual inspection and standard coding schemes.	Analyze
CO2	To experience hands-on training in soldering techniques and assembling electronic circuits using discrete components on breadboards and PCBs.	Apply
CO3	To understand the working principles of passive and active components by constructing basic circuits and observing their electrical behavior under different conditions.	Apply
CO4	To design and implement functional circuits including switching, blinking, and multiple output systems using fundamental electronics	Create
CO5	To document and effectively communicate the design process, implementation, and outcomes of a project through formal reporting and presentations.	Evaluate

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

1 - Low, 2 - Medium, 3 - High

C. Guru
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24SDP39	SOFT SKILLS DEVELOPMENT – III	Category	L	T	P	SL	C
		EEC	0	0	30	0	1

(Common to All Branches)

OBJECTIVES:

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.

TOTAL: 30 PERIODS

COURSE OUTCOMES:

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

SEMESTER - IV

(COMMON TO II B.E. / B.Tech., - AE, BME, CE, CSE, CSD, CS, EEE, IOT,IT, MECH & SFE)

PREREQUISITE:

A fundamental knowledge of algebra, linear algebra, calculus, and differential equations is required for this course.

OBJECTIVES:

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.

UNIT - I	SOLUTIONS OF EQUATIONS AND EIGEN VALUE PROBLEMS	(12)

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.

UNIT - II	INTERPOLATION AND APPROXIMATION	(12)

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).

UNIT - III	NUMERICAL DIFFERENTIATION AND INTEGRATION	(12)

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.

UNIT - IV	INITIAL VALUE PROBLEMS FOR ORDINARY DIFFERENTIAL EQUATIONS	(12)

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.

UNIT - V	BOUNDARY VALUE PROBLEMS IN PARTIAL DIFFERENTIAL EQUATIONS	(12)

Classification of Partial Differential Equations - One dimension heat equation by Crank Nicolson's method - One dimensional wave equation - Two Dimensional Laplace and Poisson equations.

Lecture = 45, Tutorial = 15, Self Learning = 60; Total = 120 Periods

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

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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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 PublishingCompany, 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 ,5th 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.

31/12/25

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24ITT46	DATABASE MANAGEMENT SYSTEMS	Category	L	T	P	SL	C
		PCC	45	-	-	45	3

(Common to CSE ,CSD, CSE(IOT),CSE(CS) & IT)

OBJECTIVES:

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.

UNIT - I	DATABASE CONCEPTS AND ARCHITECTURE	(9)

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).

UNIT - II	SQL	(9)

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).

UNIT - III	ADVANCED SQL	(9)

Built– in Functions (String, Numeric, Date) – Views – Indexing – PL/SQL Basics – Cursors – Stored Procedures – Functions – Triggers.

UNIT - IV	SCHEMA REFINEMENT	(9)

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.

UNIT - V	CONCURRENCY CONTROL AND RECOVERY	(9)

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.

L= 45, T=0, P=0, SL=45, TOTAL: 90 PERIODS

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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 , 14th 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.

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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24CST46	DESIGN AND ANALYSIS OF ALGORITHMS	Category	L	T	P	SL	C
		PCC	45	0	0	45	3

(Common to CSE, IT, IoT, CSE(CS) and CSD)

PREREQUISITE

Basic knowledge of programming concepts, simple data structures, basic mathematics and logical problem-solving skills.

OBJECTIVES:

To learn algorithm fundamentals, study time and space complexity and apply common algorithmic techniques to solve computational problems.

UNIT – I	FUNDAMENTALS OF ALGORITHMS AND ALGORITHM ANALYSIS	(9)

Notion of Algorithm – Fundamentals of Algorithmic Problem Solving – Analysis Framework- – Important Problem Types – Asymptotic Notations: Big O Notation, Omega Ω Notation and Theta Θ Notation – Mathematical analysis for Recursive and Non-recursive algorithms.

UNIT – II	BRUTE FORCE AND BACKTRACKING	(9)

Brute Force: String Matching – Closest Pair – Exhaustive Search: Traveling Salesman Problem. Backtracking: Path traversal in Maze – Word Puzzle – N-Queens problem – Knights Tour – Hamiltonian Circuit Problem – Subset Sum Problem.

UNIT – III	DYNAMIC PROGRAMMING	(9)

Dynamic Programming: Memoization and Tabulation – Factorial, Fibonacci, Climbing Stairs Problem, BestSum, Knapsack Problem.

UNIT – IV	GREEDY TECHNIQUE AND DIVIDE AND CONQUER	(9)

Greedy Technique: Coin Change Problem – Activity Selection – Job scheduling – Huffman coding – Optimal File Merge problem. Divide and Conquer: Master Theorem – Merge sort – Binary search – Max-Min – Heap Sort – Median of sorted arrays – Median of Two sorted arrays – Strassan's matrix multiplication.

UNIT – V	BRANCH AND BOUND AND NP HARD PROBLEM	(9)

Branch and Bound: Job Assignment Problem – Job Sequencing –Traveling Salesman Problem – 0/1 Knapsack Problem. NP Complete and NP Hard Problems: Basic concepts – Non-Deterministic Algorithms – P, NP, NP Complete and NP-Hard Classes.

L:45, T:0, P:0, SL:45, TOTAL: 90 PERIODS

COURSE OUTCOMES:

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

COs	Course Outcome	Cognitive Level

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CO1	Comprehend the fundamental concepts of algorithms and analyze their efficiency using asymptotic notations.	Understand
CO2	Demonstrate brute force and backtracking techniques for solving computational problems.	Apply
CO3	Develop dynamic programming solutions using memoization and tabulation techniques.	Apply
CO4	Employ greedy and divide-and-conquer strategies to solve sorting, searching and optimization problems.	Apply
CO5	Implement branch and bound techniques to solve optimization problems and classify problems based on computational complexity.	Apply

TEXT BOOKS:

1. Anany Levitin, Introduction to The Design and Analysis of Algorithms, Pearson Education, India, Third Edition, 2017.
2. S.Sridhar, Design and Analysis of Algorithms, Oxford University Press, Second Edition, 2015

REFERENCES:

1. Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, Clifford Stein, Introduction to Algorithms, MIT Press, Fourth Edition, 2022
2. Rajesh K Shukla, Analysis and Design of Algorithms-A Beginner's Approach, Wiley publisher Kindle Edition,2015
3. Robert Sedgewick, Philippe Flajolet, An Introduction to the Analysis of Algorithms, Addison-Wesley, USA, Second Edition, 2013.
4. Introduction to Algorithms, Thomas H. Cormen, Charles E. Leiserson, Ronal L. Rivest, Clifford Stein, 3rd Edition, 2009.

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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24IOT46	FOUNDATIONS OF DATA SCIENCE	Category	L	T	P	SL	C
		OEC	45	0	0	45	3

PREREQUISITE: Nil

OBJECTIVE :

- To understand the data science fundamentals and describe the data and relationship between the data science process.

Unit - I	INTRODUCTION	[9]

Data Science: Benefits and uses – facets of data – Data Science Process: Overview – Defining research goals – Retrieving data – Data preparation – Exploratory Data analysis – build the model– presenting findings and building applications – Data Mining – Data Warehousing – Basic Statistical descriptions of Data

Unit – II	DESCRIBING DATA	[9]

Types of Data – Types of Variables -Describing Data with Tables and Graphs –Describing Data with Averages – Describing Variability – Normal Distributions and Standard (z) Scores

Unit – III	DESCRIBING RELATIONSHIPS	[9]

Correlation –Scatter plots –correlation coefficient for quantitative data –computational formula for correlation coefficient – Regression –regression line –least squares regression line – Standard error of estimate – interpretation of r2 –multiple regression equations – regression towards the mean

Unit – IV	PYTHON LIBRARIES FOR DATA WRANGLING	[9]

Basics of Numpy arrays –aggregations –computations on arrays –comparisons, masks, boolean logic – fancy indexing – structured arrays – Data manipulation with Pandas – data indexing and selection – operating on data – missing data – Hierarchical indexing – combining datasets – aggregation and grouping – pivot tables.

Unit - V	DATA VISUALIZATION	[9]

Importing Matplotlib – Line plots – Scatter plots – visualizing errors – density and contour plots – Histograms – legends – colors – subplots – text and annotation – customization – three-dimensional plotting – Geographic Data with Base map – Visualization with Seaborn

L=45, SL= 45, Total : 90 Periods

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COURSE OUTCOMES: At the end of the course, the student will be able to		Cognitive Level
CO1:	understand the data science fundamentals and process.	understand
CO2:	learn to describe the data for the data science process	Analyze
CO3:	learn to describe the relationship between data.	Analyze
CO4:	utilize the Python libraries for Data Wrangling	Apply
CO5:	present and interpret data using visualization libraries in Python	Apply

TEXT BOOKS:

1. David Cielen, Arno D. B. Meysman, and Mohamed Ali, "Introducing Data Science", Manning Publications, 2016. (Unit I)
2. Robert S. Witte and John S. Witte, "Statistics", Eleventh Edition, Wiley Publications, 2017. (Units II and III)
3. Jake VanderPlas, "Python Data Science Handbook", O'Reilly, 2016. (Units IV and V)

REFERENCES:

1. Allen B. Downey, "Think Stats: Exploratory Data Analysis in Python", Green Tea Press,2014.

NPTEL LINKS:

1. nptel.ac.in/courses/106106179
2. nptel.ac.in/courses/106106212

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	1	2	2				1	1	2	2	2
CO2:	2	1		1	1				2	1	2	3	1
CO3:	2	2	1	2	2				1	2	2	2	3
CO4:	2	2	2	1	2				1	1	3	3	2
CO5:	3	1	1	2	2				1	1	2	2	2

1 – Low, 2- Medium, 3- High

24CBI46	ADVANCED JAVA PROGRAMMING	Category	L	T	P	SL	C
		PCC	15	0	90	15	4

(Common to CSE, CSE-CS, CSD, IT, CSE- IoT)

PREREQUISITE:

Basic knowledge of Java programming concepts such as classes, objects, inheritance, and exception handling are required.

OBJECTIVES:

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.

UNIT – I	COLLECTIONS FRAMEWORK- I	(21)

Java Arrays– Collections Overview – Collections Framework – Collection Interface – Collections and Generic, List, Cursors, Iterators, Vector **(Theory-3)**

List of Exercise:

1. Analyze the use of one-dimensional and multi-dimensional arrays by writing a Java program to store, access, and manipulate data elements.
2. Develop a Java program using ArrayList to perform insertion, deletion, and searching operations.
3. Apply the Iterator and ListIterator interfaces in a Java program to traverse and modify elements of a List.
4. Implement a Java program using Vector and show thread-safe operations.
5. Write a Java program to demonstrate Enumeration cursor on a Vector. **(Laboratory-18)**

UNIT – II	COLLECTIONS FRAMEWORK- II	21

Set - Basic Set and Extended Set. Comparable and Comparator - Sorting objects, Queue, Map, Concurrent Collections, Streams **(Theory-3)**

List of Exercise:

1. 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.
2. Develop a Java program to sort objects using Comparable and Comparator interfaces.
3. 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.
4. Implement a Java program using HashMap and TreeMap.
5. Write a Java program to demonstrate Java Streams for filtering and mapping collections. **(Laboratory-18)**

UNIT – III	SERVER-SIDE PROGRAMMING	21

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 **(Theory-3)**

List of Exercise:

1. Write a Java program using Pattern and Matcher classes to validate email IDs.
2. Construct a Java program that demonstrates the occurrence and handling of PatternSyntaxException in regular expressions.
3. Apply JDBC concepts by writing a Java program to establish connectivity between a Java application and a database.
4. Implement CRUD operations on a database using PreparedStatement.
5. Develop a Java program using Scrollable ResultSet. **(Laboratory-18)**

UNIT – IV	LAMBDA AND ANNOTATIONS	21

Wrapper Classes – Autoboxing- Unboxing –Lambda Expressions – Method References – functional Interfaces Javadocs, Annotations – Assertions **(Theory-3)**

List of Exercise:

1. Write a Java program to demonstrate wrapper classes with autoboxing and unboxing.
2. Implement lambda expressions for arithmetic operations.
3. Apply method references in a Java program to implement functional interfaces and simplify lambda expressions.

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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)**

UNIT – V	DESIGN PATTERNS	21

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:

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

REFERENCES:

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

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24ITP46	DATABASE MANAGEMENT SYSTEMS LABORATORY	Category	L	T	P	SL	C
		PCC	-	-	60	60	2

(Common to CSE ,CSD, CSE(IOT),CSE(CS) & IT)

OBJECTIVES:

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.

List of Exercise/Experiments:

1. DDL Schema Creation with Primary and Foreign Key Constraints.
2. DML Data Insertion, Modification, and Deletion Operations.
3. Basic SQL Retrieval Queries.
4. Relational JOIN Query Execution.
5. Sub query and Nested Query Execution.
6. VIEW Creation and Querying.
7. Stored Procedure Creation and Execution.
8. Transaction Management using BEGIN, COMMIT, and ROLLBACK (TCL).
9. Trigger Implementation for Data Validation or Logging.
10. Database Authorization using GRANT and REVOKE Privileges (DCL).
11. Table Normalization – Apply 1NF, 2NF, and 3NF to Remove Data Redundancy.
12. SQL Mini Project – CRUD-based Application Development.

Sample Applications for mini project using SQL :

- Student Information System
- Hospital Management System
- Library Management System
- Inventory Control System
- Bus Ticket Booking System
- Employee Attendance & Payroll System
- ATM Transaction Tracking System

L= 0, T=0, P=60, SL=0, TOTAL: 60 PERIODS

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COURSE OUTCOMES:

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

COs	Course Outcome	Cognitive Level
CO1	Execute DDL and DML commands to design and manage relational database schemas with different key constraints.	Apply
CO2	Develop SQL queries to retrieve and manipulate data using joins, sub queries, and views.	Apply
CO3	Implement advanced SQL concepts such as stored procedures, triggers, transactions, and database authorization.	Apply
CO4	Apply Normalization concepts in database tables to eliminate redundancy and ensure data consistency.	Apply
CO5	Develop and deploy applications by SQL for effective database management.	Apply

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	–	1	–	1	–	1	3	–
CO2	3	3	2	–	3	–	1	–	1	–	1	3	–
CO3	3	3	2	–	3	–	1	–	1	–	1	2	–
CO4	3	3	2	–	3	–	1	–	1	–	1	3	–
CO5	3	3	2	–	3	–	1	–	1	–	1	3	–
Avg.	3	3	2	–	3	–	1	–	1	–	1	3	–

1-low, 2-medium, 3-high

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24CSP46	DESIGN AND ANAYSIS OF ALGORITHMS LABORATORY	Category	L	T	P	C
		PCC	0	0	60	2

(Common to CSE, IT, IoT, CSE(CS) and CSD)

PREREQUISITE

Students should have a basic understanding of programming concepts, data structures and mathematical foundations such as logic and discrete mathematics.

OBJECTIVES:

To enable students to design, implement and analyze fundamental algorithmic techniques and evaluate their time complexities while solving classical computational problems efficiently.

List of Exercise/Experiments:

1. Implement an algorithm to determine the maximum element in a given array and analyze its best, average, and worst-case time complexities using Big-O notation.
2. Examine the performance of the Linear Search algorithm by computing the number of comparisons in best, average, and worst cases.
3. Apply the Brute Force String Matching technique to locate a given pattern in a text and illustrate the comparison process.
4. Execute the Backtracking technique to solve the Rat in a Maze problem and print all possible paths.
5. Design a backtracking algorithm to solve the Knight's Tour Problem.
6. Demonstrate the N-Queens problem using Backtracking and list all valid solutions.
7. Construct a Backtracking-based solution for the Subset Sum problem and print all feasible subsets.
8. Generate Factorial and Fibonacci numbers using Dynamic Programming with Memoization and Tabulation.
9. Solve the Climbing Stairs problem using the Dynamic Programming approach.
10. Determine the maximum achievable profit for the 0/1 Knapsack problem using Dynamic Programming.
11. Evaluate the Best Sum problem using Dynamic Programming techniques.
12. Compute the minimum number of coins required for the Coin Change problem using a Greedy strategy.
13. Select the maximum number of non-conflicting activities using the Greedy approach

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for the Activity Selection problem.

14. Sort a given list of elements using Merge Sort based on the Divide and Conquer technique and analyze its time complexity.
15. Optimize the Job Assignment problem using the Branch and Bound technique to obtain the minimum cost.

L:0, T:0, P:60, SL: 0, TOTAL: 60 PERIODS

COURSE OUTCOMES:

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

COs	Course Outcome	Experiments	Cognitive Level
CO1	Implement fundamental algorithmic concepts to analyze and solve basic algorithms.	1,2,3	Apply
CO2	Demonstrate brute force and backtracking techniques to solve combinatorial and search problems.	4,5,6	Apply
CO3	Design dynamic programming solutions to solve optimization and counting problems.	7,8,9	Apply
CO4	Construct greedy and divide-and-conquer algorithms to solve optimization and sorting problems.	10,11,12	Apply
CO5	Optimize solutions for complex problems using branch and bound techniques efficiently.	13,14,15	Apply

TEXT BOOKS:

1. Anany Levitin, Introduction to The Design and Analysis of Algorithms, Pearson Education, India, Third Edition, 2017.
2. S.Sridhar, Design and Analysis of Algorithms, Oxford University Press, Second Edition, 2015

Mapping of COs with POs and PSOs

COs/ POs	PO1	PO2	PO3	PO4	PO5	PO5	PO6	PO7	PO8	PO 9	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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24ECP46	DESIGN STUDIO II	Category	L	T	P	SL	C
		ESC	0	0	30	0	1

PREREQUISITE: NIL

OBJECTIVES:

To equip students with Design Thinking competencies for addressing real-world challenges aligned with Smart India Hackathon (SIH) themes by fostering empathy, creativity, innovation, and multidisciplinary teamwork, while enabling effective project execution, documentation, and presentation through experiential learning and faculty mentorship.

GENERAL GUIDELINES

1. Students will form teams of 3 members.
2. Each team must select a problem statement from Smart India Hackathon or institute-approved innovation challenges.
3. A faculty mentor will guide each team throughout the semester.
4. Teams must maintain a Design Studio Logbook recording research, ideas, design iterations, feedback and reflections.
5. Projects must follow the Design Thinking Framework: Empathize → Define → Ideate → Prototype → Implement → Communicate.
6. Each phase will include review checkpoints to ensure progress.
7. Final deliverables include Design Process Portfolio, Functional Prototype or Software Demonstration, SIH Submission Document and Reflection Report.

MODULE STRUCTURE

Module 1 – Empathize (Weeks 1–2)

- Understanding SIH domains and societal challenge areas
- Identifying user needs, stakeholders and contexts
- Conducting field studies, surveys and interviews
- Developing empathy maps, personas and user journey maps

Module 2 – Define (Weeks 3–4)

- Synthesizing findings from user research
- Identifying core pain points and opportunity areas
- Framing clear, actionable problem statements
- Establishing project goals, boundaries and success metrics

Module 3 – Ideate (Weeks 5–6)

- Generating diverse ideas through brainstorming and design heuristics
- Sketching and conceptual visualization
- Evaluating ideas based on feasibility, desirability and viability
- Selecting optimal solution paths through mentor feedback and peer review

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Module 4 – Prototype (Weeks 7–8)

- Creating low and medium-fidelity prototypes (hardware, software, hybrid)
- Implementing iterative design improvements
- Conducting usability testing with target users
- Refining prototypes based on functional and experiential feedback

Module 5 – Implement (Weeks 9)

- Developing functional or deployable prototypes
- Integrating technical components (IoT, AI, software modules, sensors, etc.)
- Performing real-time validation, data collection and testing
- Ensuring robustness, scalability and sustainability

Module 6 – Communicate (Week 10)

- Preparing final presentations, poster displays and demo videos
- Showcasing design process and prototype outcomes
- Crafting compelling stories and narratives for SIH jury and stakeholders
- Reflecting on design journey, team collaboration and ethical learnings

TOTAL (P - 30) : 30 PERIODS

COURSE OUTCOMES:

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

COs	Course Outcome	Cognitive Level
CO1	Empathize with users and identify critical pain points through research, observation and engagement.	Analyze
CO2	Define precise and actionable problem statements based on design insights and contextual understanding.	Analyze
CO3	Generate creative ideas, evaluate them systematically and conceptualize innovative solutions.	Create
CO4	Build, test and refine prototypes using iterative design and implementation practices.	Apply
CO5	Communicate design solutions effectively through storytelling, visual presentation and demonstrations.	Apply

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	3	3	3	3	3	3	3
CO2	-	3	3	3	-	3	3	3	-	3	3	3	3
CO3	3	3	3	3	3	3	3	3	3	3	3	3	3
CO4	3	3	3	3	3	3	3	3	-	3	3	3	3
CO5	2	3	3	3	3	3	3	3	3	3	3	3	3
Avg.	1.6	3	3	3	1.8	3	3	3	1.8	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

(Common to All Branches)

OBJECTIVES:

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.

UNIT - I	TIME AND WORK	(6)

Relationship Between Time and Work – Efficiency Calculation – Wages – Alternate Days – Pipes and Cisterns – Chain Rule.

UNIT - II	PERMUTATION COMBINATION AND PROBABILITY	(6)

Permutation Based on Words and Numbers – Combination Based on Committee, Balls and Cards – Probability Based on Persons, Balls, Cards, Dice and Coins.

UNIT - III	SIMPLE INTEREST AND COMPOUND INTERST	(6)

Introduction to Principal, Interest and Time – Simple Interest Calculation – Compound Interest: Compounded Annually, Half-yearly and quarterly.

UNIT - IV	LOGICAL REASONING	(6)

Syllogism – Clocks – Calendar.

UNIT - V	VERBAL ABILITY	(6)

Tenses – Articles – Subject Verb Agreement – Error Spotting – Essay Writing.

TOTAL: 30 PERIODS

COURSE OUTCOMES:

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

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. 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
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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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