KSR College of Engineering

AN AUTONOMOUS INSTITUTION

NAAC ACCREDITED A++ | NBA ACCREDITED PROGRAMMES

25 Years KSRCE 2001 – 2026 Celebrating Academic Excellence

B.E. - SAFETY AND FIRE ENGINEERING

REGULATIONS 2024

(Academic Year 2024-25 Onwards)

Curriculum & Syllabus
Semester I to IV

K.S.R. COLLEGE OF ENGINEERING: TIRUCHENGODE - 637 215
(Autonomous)
DEPARTMENT OF SAFETY AND FIRE ENGINEERING
B.E. - Safety and Fire Engineering (REGULATIONS 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

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

Vision of the Department

DV	To produce recognized Safety and Fire Engineers with pioneering innovative solutions to enhance safety and promote sustainable development.

Mission of the Department

DM 1	Impart quality education through student-centered teaching approaches.
DM 2	Equip students with the cutting-edge knowledge and skills to address the emerging safety challenges.
DM 3	Enhance research and innovation in Safety and Fire Engineering, fostering a culture of safety and sustainability.

Program Educational Objectives (PEOs) B.E. - Safety and Fire Engineering

The graduates of the Programme will be able to	
PEO 1	**Core Competency:** Leverage engineering expertise in fire safety, occupational health, and risk management to provide sustainable solutions for Potential hazards.
PEO 2	**Professionalism:** Graduates will demonstrate leadership, ethics and teamwork in managing emergency response systems and workplace safety.
PEO 3	**Career Development:** Graduates will undertake higher studies, research and professional development to meet industry demands in Fire and Safety Engineering.

Chairman (BoS)

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

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. (WK1to 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)
Program Specific Outcomes (PSOs)	
PSO1	**Occupational Health and Industrial Safety:** Identify, assess, and control workplace hazards using risk analysis, safety audit techniques, and legal compliance frameworks to ensure occupational health and safety in various industries.
PSO2	**Fire Protection Systems Design:** Apply principles of fire dynamics, combustion and implement effective fire protection and suppression systems in residential, commercial, and industrial environments.

Chairman (BoS)

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

SEMESTER I

S.No.	Course Code	Course Title	Category	Periods / Week					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.	24MET16	Engineering Drawing	PCC	60	0	0	60	120	4	40	60	100
3.	24ITT16	Programming for Problem Solving	ESC	45	0	0	45	90	3	40	60	100
4.	24GET19	தமிழர் மரபு / 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.	24PHI06	Applied Physics	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.	24GEP17	Manufacturing Practices Laboratory	ESC	0	0	30	0	30	1	60	40	100
EMPLOYABILITY ENHANCEMENT COURSE												
9.	24SSP19	Aptitude and Coding Skills - I	EEC	0	0	30	0	30	1	60	40	100
			TOTAL	**255**	**15**	**150**	**255**	**660**	**22**	**900**		

Chairman (BoS)

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

SEMESTER II												
S.No.	Course Code	Course Title	Category	Periods / Week					Credit	Max. Marks		
				L	T	P	SL	Tot		CA	ES	Tot
THEORY COURSES												
1.	24CST29	Python Programming	ESC	45	0	0	45	90	3	40	60	100
2.	24MET26	Design Thinking	PCC	30	0	0	30	60	2	40	60	100
3.	24EET06	Basics of Electrical and Electronics Engineering	ESC	45	0	0	45	90	3	40	60	100
4.	24GET29	தமிழரும் தொழில் நுடபமும் / Tamils and Technology	HSMC	15	0	0	15	30	1	40	60	100
THEORY COURSES WITH LABORATORY COMPONENT												
5.	24MAI29	Probability and Statistics	BSC	30	15	30	45	120	4	50	50	100
6.	24CHI07	Applied Chemistry	BSC	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	ESC	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.	24MCP09	Mandatory Course - I	MC	0	0	30	0	30	0	-	-	-
			TOTAL	**210**	**15**	**180**	**225**	**630**	**20**	**900**		

SEMESTER III												
S.No.	Course Code	Course Title	Category	Periods / Week					Credit	Max. Marks		
				L	T	P	SL	Tot		CA	ES	Tot
THEORY COURSES												
1.	24MAT36	Optimization Techniques	BSC	45	15	0	60	120	4	40	60	100
2.	24SFT31	Principles of Safety Management	PCC	45	0	0	45	90	3	40	60	100
3.	24SFT32	Safety in Engineering Industry	PCC	45	0	0	45	90	3	40	60	100
4.	24SFT33	Fundamentals of Industrial Safety	PCC	45	0	0	45	90	3	40	60	100
5.	24SFT36	Manufacturing Processes	PCC	45	0	0	45	90	3	40	60	100
6.	24MET37	Fluid Mechanics and Machinery	PCC	45	0	0	45	90	3	40	60	100
LABORATORY COURSES												
7.	24SFP36	Manufacturing Processes Laboratory	PCC	0	0	45	0	45	1.5	60	40	100
8.	24MEP36	Fluid Mechanics and Machinery Laboratory	PCC	0	0	45	0	45	1.5	60	40	100
9.	24MEP37	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	**270**	**15**	**150**	**285**	**720**	**24**	**1000**		

Inplant Training * - The Students Should Undergo Inplant training during the II Semester Summer Vacation.

Chairman (BoS)

SEMESTER IV													
S.No.	Course Code	Course Title	Category	Periods / Week					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.	24MET46	Strength of Materials	PCC	45	0	0	45	90	3	40	60	100
3.	24SFT41	Safety in Construction	PCC	45	0	0	45	90	3	40	60	100
4.	24SFT42	Safety in Rail and Road Transport	PCC	45	0	0	45	90	3	40	60	100
5.	24SFT43	Chemical Process Safety	PCC	45	0	0	45	90	3	40	60	100
6.	24GET09	Universal Human Values and Ethics	HSMC	45	0	0	45	90	3	40	60	100
LABORATORY COURSES												
7.	24MEP46	Strength of Materials Laboratory	PCC	0	0	45	0	45	1.5	60	40	100
8.	24SFP41	Safety Engineering Laboratory	PCC	0	0	45	0	45	1.5	60	40	100
9.	24MEP47	Design Studio - II	PCC	0	0	30	0	30	1	60	40	100
EMPLOYABILITY ENHANCEMENT COURSE												
10.	24SDP49	Soft Skills Development -IV	EEC	0	0	30	0	30	1	60	40	100
11.	24SFP42	Seminar Presentation	EEC	0	0	30	0	30	1	100	-	100
			TOTAL	**270**	**15**	**180**	**285**	**750**	**25**	**1100**		

SEMESTER V												
S.No.	Course Code	Course Title	Category	Periods / Week					Credit	Max. Marks		
				L	T	P	SL	Tot		CA	ES	Tot
THEORY COURSES												
1.	24SFT51	Planning and Design of Fire Protection Systems	PCC	45	0	0	45	90	3	40	60	100
2.	24SFT52	Occupational Health and First Aid	PCC	45	0	0	45	90	3	40	60	100
3.	24SFT53	Fire Engineering Fundamentals	PCC	45	0	0	45	90	3	40	60	100
4.	24SFT54	Chemical Technology and Reaction Engineering	PCC	45	0	0	45	90	3	40	60	100
5.		Professional Elective – I	PEC	45	0	0	45	90	3	40	60	100
6.		Professional Elective – II	PEC	45	0	0	45	90	3	40	60	100
LABORATORY COURSES												
7.	24SFP51	Occupational Health and First Aid Laboratory	PCC	0	0	45	0	45	1.5	60	40	100
8.	24SFP52	Fire Engineering Laboratory	PCC	0	0	45	0	45	1.5	60	40	100
EMPLOYABILITY ENHANCEMENT COURSE												
9.	24SFP53	Internship – I *	EEC	0	0	0	0	0	1	100	-	100
10.	24SFP54	Industrial Oriented Course-I	EEC	0	0	0	0	0	1	100	-	100
MANDATORY COURSE												
11.		Mandatory Course - II	MC	30	0	0	0	30	0	100	-	100
			TOTAL	**300**	**0**	**90**	**270**	**660**	**23**	**1100**		

Internship – I *- The Students Should Undergo Internship during the IV Semester Summer Vacation.

Chairman (BoS)

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

SEMESTER VI

S.No.	Course Code	Course Title	Category	Periods / Week					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.	24SFT61	Legal Aspects of Safety, Health & Environment	PCC	45	0	0	45	90	3	40	60	100
3.	24SFT62	Environmental Safety	PCC	45	0	0	45	90	3	40	60	100
4.		Professional Elective – III	PEC	45	0	0	45	90	3	40	60	100
5.		Professional Elective – IV	PEC	45	0	0	45	90	3	40	60	100
LABORATORY COURSES												
6.	24SFP61	Fire Safety Training Laboratory	PCC	0	0	45	0	45	1.5	60	40	100
7.	24SFP62	Environmental Safety Laboratory	PCC	0	0	45	0	45	1.5	60	40	100
EMPLOYABILITY ENHANCEMENT COURSES												
8.	24SFP63	Mini Project	EEC	0	0	60	0	60	2	60	40	100
9.	24SDP69	Technical comprehension	EEC	0	0	30	0	30	1	60	40	100
10	24SFP64	Industrial Oriented Course-II	EEC	0	0	0	0	0	1	100	-	100
MANDATORY COURSE												
11.		Mandatory Course - III	MC	30	0	0	0	30	0	100	-	100
			TOTAL	**255**	**0**	**180**	**225**	**660**	**22**	**1100**		

SEMESTER VII

S.No.	Course Code	Course Title	Category	Periods / Week					Credit	Max. Marks		
				L	T	P	SL	Tot		CA	ES	Tot
THEORY COURSES												
1.	24GET79	Project Management	HSMC	45	0	0	45	90	3	40	60	100
2.	24SFT71	Principles of Industrial Management	PCC	45	0	0	45	90	3	40	60	100
3.	24SFT72	Structural Fire Safety	PCC	45	0	0	45	90	3	40	60	100
4.	24MET73	Standards in Mechanical Engineering	EEC	15	0	15	0	30	1	100	-	100
5.		Professional Elective – V	PEC	45	0	0	45	90	3	40	60	100
6.		Professional Elective – VI	PEC	45	0	0	45	90	3	40	60	100
7.		Open Elective	OEC	45	0	0	45	90	3	40	60	100
LABORATORY COURSES												
8.	24SFP71	Emergency Life Support Laboratory	PCC	0	0	30	0	30	1	60	40	100
EMPLOYABILITY ENHANCEMENT COURSE												
9.	24SFP72	Project Phase - I	EEC	0	0	60	0	60	2	60	40	100
10.	24SFP73	Internship – II*	EEC	0	0	0	0	0	1	100	-	100
		TOTAL		**285**	**0**	**105**	**270**	**660**	**23**	**1000**		

Internship – II*- The Students Should Undergo Internship during the VI Semester Summer Vacation.

SEMESTER VIII

S.No.	Course Code	Course Title	Category	Periods / Week					Credit	Max. Marks		
				L	T	P	SL	Tot		CA	ES	Tot
EMPLOYABILITY ENHANCEMENT COURSE												
1.	24SFP81	Project Phase – II	EEC	0	0	240	0	240	8	60	40	100
		TOTAL		**0**	**0**	**240**	**0**	**240**	**8**	**100**		
								TOTAL CREDITS		**167**		

TOTAL NUMBER OF CREDITS TO BE EARNED FOR AWARD OF THE DEGREE = 167

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.

Chairman (BoS)

VERTICAL-I	VERTICAL-II	VERTICAL-III	VERTICAL-IV	VERTICAL-V	VERTICAL-VI
Hazard Management and Safety Standard	**Fire Safety Systems**	**Radiation Safety**	**Safety in Industries**	**Environmental Safety Engineering**	**Occupational Health, Hygiene &Ergonomics**
Hazard Analysis and Risk Assessment	Fire Engineering	Radiation Protection	Plant Layout and Material Handling	Environmental Impact Assessment	Work Study and Ergonomics
Industrial Engineering	Life Safety In Building Fire	Heat and Mass Transfer	Safety in Chemical Industry	Environmental Protection and Waste Management	First Aid and Emergency Procedures
Safety Management	Fire Fighting and Safety Equipment	Power Plant Engineering	Safety in Powder handling	Air and Water Pollution control	Industrial Ecology
Advanced Safety Engineering and Management	Fire Risk Analysis and Accident Investigation	Food and Industrial Bio Safety	Safety in mines	Rescue Equipment and Techniques	Industrial Safety, Health and Environment Acts
Hazard Control in Manufacturing Industry	Fire Dynamics	Nuclear Safety and Radioactive Materials	Safety in Petroleum Industries	Atmospheric Ground and Ocean Dispersion	Human Factors Engineering
Fire Safety Codes and Standardization	Explosive Technology and Safety	Nuclear Engineering and Safety	Safety in Textile Industry	Global Warming & Climate Change	Safety In Health Care Management

Chairman (BoS)

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

	K.S.R. COLLEGE OF ENGINEERING (Autonomous) (Approved by AICTE & Affiliated to Anna University) Accredited by NAAC "A++" Grade K.S.R. Kalvi Nagar, Tiruchengode – 637 215	CURRICULUM UG R – 2024
Department	Department of Safety and Fire Engineering	
Programme	B.E – Safety and Fire Engineering	

List of Electives

VERTICAL I : Hazard Management and Safety Standard

S.No.	Course Code	Course Name	Specialization	Category	Periods / Week					Credit	Maximum Marks		
					L	T	P	SL	Tot	C	CA	ES	Total
1.	24SFE01	Hazard Analysis and Risk Assessment	S1	PEC	45	0	0	45	90	3	40	60	100
2.	24SFE02	Industrial Engineering	S1	PEC	45	0	0	45	90	3	40	60	100
3.	24SFE03	Safety Management	S1	PEC	45	0	0	45	90	3	40	60	100
4.	24SFE04	Advanced Safety Engineering and Management	S1	PEC	45	0	0	45	90	3	40	60	100
5.	24SFE05	Hazard Control in Manufacturing Industry	S1	PEC	45	0	0	45	90	3	40	60	100
6.	24SFE06	Fire Safety Codes and Standardization	S1	PEC	45	0	0	45	90	3	40	60	100

VERTICAL 2 : Fire Safety Systems

S.No.	Course Code	Course Name	Specialization	Category	Periods / Week					Credit	Maximum Marks		
					L	T	P	SL	Tot	C	CA	ES	Total
1.	24SFE07	Fire Engineering	S2	PEC	45	0	0	45	90	3	40	60	100
2.	24SFE08	Life Safety In Building Fire	S2	PEC	45	0	0	45	90	3	40	60	100
3.	24SFE09	Fire Fighting and Safety Equipment	S2	PEC	45	0	0	45	90	3	40	60	100
4.	24SFE10	Fire Risk Analysis and Accident Investigation	S2	PEC	45	0	0	45	90	3	40	60	100
5.	24SFE11	Fire Dynamics	S2	PEC	45	0	0	45	90	3	40	60	100
6.	24SFE12	Explosive Technology and Safety	S2	PEC	45	0	0	45	90	3	40	60	100

Chairman (BoS)

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

VERTICAL 3 : Radiation Safety														
S.No.	Course Code	Course Name	Specialization	Category	Periods / Week					Credit	Maximum Marks		
					L	T	P	SL	Tot	C	CA	ES	Total
1.	24SFE13	Radiation Protection	S3	PEC	45	0	0	45	90	3	40	60	100
2.	24SFE14	Heat and Mass Transfer	S3	PEC	45	0	0	45	90	3	40	60	100
3.	24SFE15	Power Plant Engineering	S3	PEC	45	0	0	45	90	3	40	60	100
4.	24SFE16	Food and Industrial Bio Safety	S3	PEC	45	0	0	45	90	3	40	60	100
5.	24SFE17	Nuclear Safety and Radioactive Materials	S3	PEC	45	0	0	45	90	3	40	60	100
6.	24SFE18	Nuclear Engineering and Safety	S3	PEC	45	0	0	45	90	3	40	60	100

VERTICAL 4 : Safety in Industries													
S.No.	Course Code	Course Name	Specialization	Category	Periods / Week					Credit	Maximum Marks		
					L	T	P	SL	Tot	C	CA	ES	Total
1.	24SFE19	Plant Layout and Material Handling	S4	PEC	45	0	0	45	90	3	40	60	100
2.	24SFE20	Safety in Chemical Industry	S4	PEC	45	0	0	45	90	3	40	60	100
3.	24SFE21	Safety in Powder handling	S4	PEC	45	0	0	45	90	3	40	60	100
4.	24SFE22	Safety in mines	S4	PEC	45	0	0	45	90	3	40	60	100
5.	24SFE23	Safety in Petroleum Industries	S4	PEC	45	0	0	45	90	3	40	60	100
6.	24SFE24	Safety in Textile Industry	S4	PEC	45	0	0	45	90	3	40	60	100

Chairman (BoS)

VERTICAL 5 : Environmental Safety Engineering													
S.No.	Course Code	Course Name	Specialization	Category	Periods / Week					Credit	Maximum Marks		
					L	T	P	SL	Tot	C	CA	ES	Total
1.	24SFE25	Environmental Impact Assessment	S5	PEC	45	0	0	45	90	3	40	60	100
2.	24SFE26	Environmental Protection and Waste Management	S5	PEC	45	0	0	45	90	3	40	60	100
3.	24SFE27	Air and Water Pollution control	S5	PEC	45	0	0	45	90	3	40	60	100
4.	24SFE28	Rescue Equipment and Techniques	S5	PEC	45	0	0	45	90	3	40	60	100
5.	24SFE29	Atmospheric Ground and Ocean Dispersion	S5	PEC	45	0	0	45	90	3	40	60	100
6.	24SFE30	Global Warming & Climate Change	S5	PEC	45	0	0	45	90	3	40	60	100

VERTICAL 6: Occupational Health, Hygiene &Ergonomics													
S.No.	Course Code	Course Name	Specialization	Category	Periods / Week					Credit	Maximum Marks		
					L	T	P	SL	Tot	C	CA	ES	Total
1.	24SFE41	Work Study and Ergonomics	S6	PEC	45	0	0	45	90	3	40	60	100
2.	24SFE42	First Aid and Emergency Procedures	S6	PEC	45	0	0	45	90	3	40	60	100
3.	24SFE45	Industrial Ecology	S6	PEC	45	0	0	45	90	3	40	60	100
4.	24SFE46	Industrial Safety, Health and Environment Acts	S6	PEC	45	0	0	45	90	3	40	60	100
5.	24SFE47	Human Factors Engineering	S6	PEC	45	0	0	45	90	3	40	60	100
6.	24SFE48	Safety In Health Care Management	S6	PEC	45	0	0	45	90	3	40	60	100

Chairman (BoS)

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

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

MANAGEMENT ELECTIVES												
S.No.	Course Code	Course Title	Category	Periods / Week					Credit	Max. Marks		
				L	T	P	SL	Tot		CA	ES	Tot
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

Chairman (BoS)

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

OPEN ELECTIVES								
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 Storage 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	Fundamentals of Big Data Analytics	45	0	0	45	3
29.		24ITO03	Augmented Reality / Virtual Reality(AR/VR)	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
36.		24SFO04	Construction Safety	45	0	0	45	3

Chairman (BoS)

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

SUMMARY										
Name of the Programme: B.E Safety and fire Engineering										
CATEGORY	I	II	III	IV	V	VI	VII	VIII	TOTAL CREDITS	%
HSMC	4	2	-	3	-	3	3	-	15	08.98
BSC	8	8	4	4	-	-	-	-	24	14.37
ESC	5	7	-	-	-	-	-	-	12	07.19
PCC	4	2	19	16	15	9	7	-	72	43.11
PEC	-	-	-	-	6	6	6	-	18	10.78
OEC	-	-	-	-	-	-	3	-	3	01.80
EEC	1	1	1	2	2	4	4	8	23	13.77
MC	-	✓	-	-	✓	✓	-	-	-	-
Total	**22**	**20**	**24**	**25**	**23**	**22**	**23**	**8**	**167**	**100**

Chairman (BoS)

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

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

Chairman (BoS)

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

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

Chairman (BoS)

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

24MET16	ENGINEERING DRAWING	Category	L	T	P	SL	C
		PCC	60	0	0	60	4

(Common to AE,ME & SFE)

PREREQUISITE:

Student must have the basic knowledge of geometry, trigonometry and algebra, along with an introduction to fundamental engineering concepts.

OBJECTIVES:

The aim of this course is to help students learn how to draw and understand engineering objects using basic drawing methods.

UNIT - I	PLANE CURVES	12

Introduction on drafting instruments, BIS conventions and specifications, Lettering and Dimensioning-Conics-Construction of ellipse, parabola and hyperbola by eccentricity method -Construction of cycloid-Construction of involutes-Drawing of tangents and normal to the above curves.

UNIT - II	PROJECTION OF POINTS, LINES AND PLANE SURFACES	12

Projection of points and straight lines located in the first quadrant inclined to both the planes - Determination of true lengths and true inclinations - Projection of polygonal surface and circular lamina inclined to any one reference plane.

UNIT - III	PROJECTION OF SOLIDS	12

Projection of simple solids like prisms, pyramids, cylinder and cone when the axis is inclined to one reference plane by change of position method.

UNIT - IV	SECTION OF SOLIDS AND DEVELOPMENT OF SURFACES	12

Sectioning of above solids in simple vertical position by cutting planes inclined to one reference plane and perpendicular to the other- Obtaining true shape of section. Development of lateral surfaces of simple and truncated solids-Prisms, pyramids, cylinders and cones.

UNIT - V	ORTHOGRAPHIC VIEWS AND ISOMETRIC PROJECTIONS	12

Introduction - Free hand sketching of multiple views from pictorial views of objects. Principle of Isometric projection – isometric projection of simple solids and truncated solids of prism, pyramid, cylinder and cone.

L:60,SL:60 TOTAL: 120 PERIODS

Chairman (BoS)

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

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

COs	Course Outcome	Cognitive Level
CO1	Construct various plane curves like ellipse, parabola, cycloid, and involute using standard methods.	Understand
CO2	Develop orthographic projections of points, lines, and plane surfaces inclined to reference planes.	Apply
CO3	Construct projections of simple solids with axes inclined to a plane using change of position method.	Apply
CO4	Develop sectional views and true shapes of surfaces of solids for fabrication.	Apply
CO5	Apply the principles of orthographic and isometric projection to sketch multiple views and isometric representations.	Apply

TEXT BOOKS:

1. Natarajan, K.V., A text book of Engineering Graphics, Dhanalakshmi Publishers, Chennai, 2020.
2. Kumar, M.S., Engineering Graphics, D.D. Publications, 2019.

REFERENCES:

1. Venugopal & Prabhu Raja, V., Engineering Graphics, New Age International (P) Limited, 2009.
2. Bhatt, N.D., Engineering Drawing, Charotar Publishing House, Fifty Third Edition, 2020.
3. Shah, B., and Rana, B.C., Engineering Drawing, Pearson Education ,2009.
4. Gopalakrishna, K.R., Engineering Drawing (Vol.I & II), Subhas Publications, 2017.
5. Basant Agarwal and Agarwal C.M., Engineering Drawing, Tata McGraw Hill Publishing Company Limited, 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	2	-	-	-	-	-	1	-	-	-	1	1
CO2	3	3	2	-	-	-	-	1	-	-	-	2	1
CO3	3	3	2	-	-	-	-	1	-	-	-	2	1
CO4	3	3	2	-	-	-	-	1	-	-	-	2	1
CO5	3	3	2	-	-	-	-	1	-	-	-	2	1

1-low, 2-medium, 3-high

Chairman (BoS)

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

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

Chairman (BoS)

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

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:

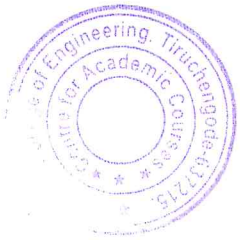
1. Yashavant Kanetkar, "Let Us C: Authentic guide to C programming language", BPB Publication, 19th Edition, 2022.
2. Robert C. Seacord, "Effective C", No Starch Press, 2020.
3. E Balagurusamy, "Programming In Ansi C", McGraw Hill Education, Eighth Edition, 2019.
4. Ashok N.Kamathane, 'Computer Programming, 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

Chairman (BoS)



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-637215. 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)

K.S.R. College of Engineering, Tiruchengode-637 215. Centre for Academic Courses

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)

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

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

Chairman (BoS)

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

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)

24PHI06	APPLIED PHYSICS	Category	L	T	P	SL	C
		BSc	45	-	30	45	4

(Common to CE, ME & SFE)

PREREQUISITE: The students must have knowledge about basic concepts of sound, light, arrangement of atoms in crystalline solids, modern engineering materials, magnetic and super conducting materials and their applications.

OBJECTIVES: To provide a comprehensive understanding of the principles, properties and applications of acoustics, ultrasonics, lasers, crystalline structures, new engineering materials, magnetic materials and superconductors in modern Science and technology.

UNIT – I **ACOUSTICS AND ULTRASONICS** **(9)**

Acoustics–Introduction – classification of sound – characteristics of musical sound – loudness – Weber – Fechner law – decibel – absorption co-efficient – reverberation – reverberation time – Sabine's formula: growth and decay (derivation) – factors affecting acoustics of buildings and their remedies. Ultrasonics – production – Piezoelectric method – properties – velocity measurement: acoustical grating – applications – SONAR, NDT – ultrasonic flaw detection technique.

UNIT – II **LASER TECHNOLOGY** **(9)**

Introduction – principle of spontaneous emission and stimulated emission – Einstein's co-efficient A & B(derivation) – population inversion, pumping – types of laser – CO_2 laser and semiconductor diode laser– homo – junction and hetero – junction (qualitative analysis only) – industrial applications: lasers in welding, heat treatment and cutting – holography (construction and reconstruction of images).

UNIT – III **CRYSTAL PHYSICS** **(9)**

Introduction to crystalline and amorphous solids – lattice and unit cell – seven crystal systems and Bravais lattices – atomic radius – co-ordination number – packing factor of SC, BCC, FCC and HCP structures–Miller indices(hkl) – d-spacing in cubic lattice – crystal imperfections – point, line and surface defects.

UNIT – IV **MODERN ENGINEERING MATERIALS** **(9)**

New engineering materials: Metallic glasses – preparation, properties and applications – shape memory alloys (SMA) – characteristics, properties of Ni-Ti alloy – applications. Smart materials – smart fluids –Electrorheological fluids (ERF)–Magnetorheological fluids (MRF) – effect of temperature in fluids and its 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. Calculate the velocity of ultrasonic waves and compressibility of the given liquid using ultrasonic interferometer.
2. Determine the thickness of the given thin paper using Air wedge method.
3. Compute the width of the CD groove with a help of semiconductor laser.
4. Find the band gap of a Germanium/ Silicon crystal.
5. Evaluate the wavelength of an InP / GaAs crystal laser.
6. Measure the Young's modulus of a given beam using non – uniform bending method.
7. Enumerate the viscosity of a given liquid by Poiseuille's method.
8. Assess the Hysteresis loss of magnetic materials using B-H curve.

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	Apply acoustics and ultrasonics principles to determine sound quality in building and implement ultrasonic methods in practical applications.	Apply
CO2	Interpret the laser principles, types and explain specific application based on their desirable requisite.	Understand
CO3	Compute seven crystal systems, interplanar spacing in simple cubic lattice, atomic packing factor for SC, BCC, FCC & HCP and crystal imperfections.	Apply
CO4	Discuss the properties and applications of metallic glasses, SMAs, smart fluids and recognize the behavior of ERF and MRF under temperature effects.	Understand
CO5	Illustrate the principles governing magnetic materials, superconductors, including their classification, properties and applications.	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, 17thEdition, 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, 7 th 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	3	2	-	-	-	1	2	2	-	2	-	-
CO2	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

24PHI06 - APPLIED PHYSICS
I Year B.E (CE, ME & SFE)
Requirements for a batch of 30 students
Regulation (2024)

S.No.	Description of Equipment	Quantity required
1.	Ultrasonic interferometer. (with accessories)	5 Nos
2.	Air wedge apparatus. (with traveling microscope and accessories)	5 Nos
3.	Width of the groove of CD using laser. (with accessories)	5 Nos
4.	Band gap apparatus. (with accessories)	5 Nos
5.	Wavelength of semiconductor laser beam. (with accessories)	5 Nos
6.	Non- uniform Bending apparatus. (with accessories)	5 Nos
7.	Poiseuille's method apparatus. (with accessories)	5 Nos
8.	B-H curve apparatus. (with accessories)	5 Nos

BoS chairman

Chairman (BoS)

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

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:

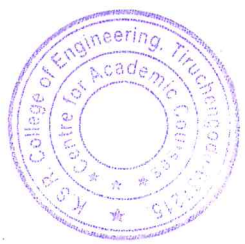
Students are expected to have foundational knowledge of basic programming principles. This includes an understanding of variables and data types such as integers, floats, and characters, as well as familiarity with fundamental control structures like conditional statements (if-else) and loops (for, while).

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

Chairman (BoS)

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.

Chairman (BoS)

College of Engineering, Tiruchengode-637215. Centre for Academic Courses

24GEP17	MANUFACTURING PRACTICES LABORATORY	Category	L	T	P	SL	C
		ESC	0	0	30	0	1

(Common to AE, CE, MECH & SFE)

PREREQUISITE:

Students must have a basic knowledge on the topics from Civil works and Mechanical Engineering such as Plumbing, Carpentry, Welding, and Machining and Electrical & Electronics basic components.

OBJECTIVES:

Develop basic practical skills in plumbing, carpentry, welding, machining, sheet metal, and electrical work. Students gain hands-on experience with tools, materials, and techniques used in civil, mechanical, and electrical fields.

List of Exercise/Experiments:

GROUP A (CIVIL) (12)

PLUMBING WORK

1. Preparing plumbing line sketches
2. Connecting various basic pipe fittings like valves, taps, coupling, unions, reducers, Elbows and other components which are commonly used in household.

CARPENTRY WORK

3. Sawing and planning work
4. Making joints like T-Joint, Mortise joint and Tenon joint and Dovetail joint.

GROUP B (MECHANICAL) (14)

WELDING WORK

5. Welding of Butt Joints, Lap Joints, and Tee Joints using arc welding.

BASIC MACHINING WORK

6. Simple Facing and Turning operation using centre lathe.
7. Drilling and Tapping using drilling machine

SHEET METAL WORK

8. Making of a square tray.

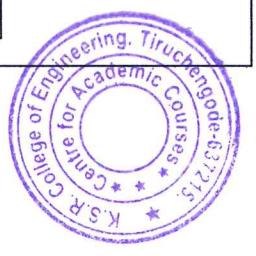
GROUP C (ELECTRICAL & ELECTRONICS) (04)

9. Study of Ceiling Fan and Iron Box
10. Study of logic gates AND, OR, EX-OR and NOT.

LIST OF EQUIPMENT (for a batch of 30 Students)

S.No.	Name of the Equipment	Quantity
1	Carpentry tools and its accessories	15 sets
2	Plumbing tools and its accessories	15sets
3	Arc Welding equipment and its accessories	5 sets
4	Centre Lathe with its accessories	2 No's
5	Pillar type drilling machine	1 No
6	Foundry tools and its accessories	5 set

Chairman (BoS)



P:30 TOTAL: 30 PERIODS

COURSE OUTCOMES:

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

COs	Course Outcome	Exp. No.	Cognitive Level
CO1	Develop pipe line plan, lay and connect various pipe fittings used in common house hold plumbing work.	1 & 2	Apply
CO2	Develop joints in wood materials used in common household wood work	3 & 4	Apply
CO3	Construct various joints in steel plates using arc welding work	5	Apply
CO4	Apply lathe and drilling machine for turning, drilling, tapping and sheet metal work.	6 , 7 & 8	Apply
CO5	Illustrate the key components and basic functions of a ceiling fan, iron box and logic gates.	9 & 10	Understand

REFERENCES:

1. Dr. V. Ramesh Babu. Engineering Practices Laboratory Manual, VRB Publishers, Revised Edition 2019-2020.
2. S Gowri & T Jeyapoovan Engineering Practices Lab Manual, Vikas Publishing, 5th Edition.

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

1-low, 2-medium, 3-high

Chairman (BoS)

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

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

Chairman (BoS)

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

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	-	-

Chairman (BoS)

K.S.R. College of Engineering, Tiruchengode-637 215. Centre for Academic Courses

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	WEBPROGRAMING AND 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

Chairman (BoS)

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:

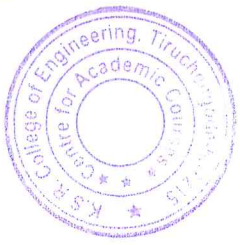
1. Robert Oliver, "Python Quick Start Guide: The Simplified Beginner's Guide to Python Programming Using Hands-On Projects and Real-World Applications", Clyde Bank Media LLC,1st Edition, 2023
2. Allen B. Downey, "Think Python", O'Reilly Media, 2nd Edition, 2016.
3. David Beazley, Brian K. Jones, "Python 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

Chairman (BoS)



24MET26	DESIGN THINKING	Category	L	T	P	SL	C
		PCC	30	0	0	30	2

PREREQUISITE

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:

Understand the concepts and principles of Design Thinking, and recognize the importance of cultivating a Design Mindset. Apply Design Thinking methods and tools at every stage of the problem-solving process.

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 (L0) – 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

L:30 SL:30 TOTAL: 60 PERIODS

Chairman (BoS)

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

COs	Course Outcome	Cognitive Level
CO1	Demonstrate an understanding of Design Thinking concepts and principles by explaining their relevance in real-world contexts.	Understanding
CO2	Articulate the significance of a Design Mindset and its impact on creative problem-solving.	Understanding
CO3	Apply Design Thinking methods effectively at each stage of the problem-solving process.	Applying
CO4	Identify and implement the phases of Design Thinking to address complex challenges systematically.	Applying
CO5	Use a variety of Design Thinking tools to develop innovative solutions and refine ideas through iteration.	Applying

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

1-low, 2-medium, 3-high

Chairman (BoS)

24EET06	BASICS OF ELECTRICAL AND ELECTRONICS ENGINEERING	Category	L	T	P	SL	C
		ESC	45	0	0	45	3

(Common to AE, BME, CSE, CSE (CS), CSD, CSE (IoT), IT, MECH, SFE)

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)

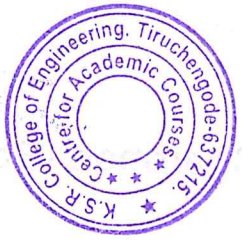
PN junction diode and Zener diode: Principle of operation and V-I characteristics – Half and full wave rectifier – Bipolar Junction Transistor: Construction and working.

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

Chairman (BoS)



COURSE OUTCOMES:

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

COs	Course Outcome	Bloom's Taxonomy Level
CO1	Interpret the fundamental concepts of electrical circuits to solve the DC and AC circuit problems.	Understand
CO2	Elaborate the construction and working principles of DC machines, induction motors and transformers.	Understand
CO3	Describe the wiring systems, earthing techniques and the functionality of UPS and lighting systems.	Understand
CO4	Identify the operation and characteristics of PN junction, Zener diode and BJT.	Understand
CO5	Illustrate the functionality of digital logic gates, adders, flip-flops and Arduino components.	Understand

TEXT BOOKS:

1. Kothari D.P and Nagrath I.J, "Basic Electrical and Electronics Engineering", Second Edition, McGraw Hill, Uttar Pradesh, 2020.
2. Bhattacharya S.K, "Basic Electrical and Electronics Engineering", Pearson Education, Delhi, Second Edition, 2017.

REFERENCES:

1. Jain V.K, Amitabh Bajaj, "Design of Electrical Installation", University Science Press, New Delhi, 2016.
2. 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	-	-

Chairman (BoS)

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

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*

Chairman (BoS)

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

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)													

Chairman (BoS)

K.S.R. College of Engineering, Tiruchengode - 637 215 Centre for Academic Courses

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

Chairman (BoS)

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

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)													

Chairman (BoS)

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

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)

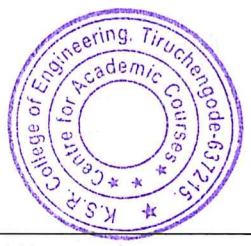
Analysis of variance - One way and two way classifications - Completely Randomized Design - Randomized Block Design - Latin Square Design.

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. Findthe$\bar{X}$ and R charts.
10. Compute c and p charts.



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

Chairman (BoS)

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, 4thedition, 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

Chairman (BoS)

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

24CHI07	APPLIED CHEMISTRY	Category	L	T	P	SL	C
		BSC	45	0	30	45	4

(Common to AE, CE, MECH and SFE)

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	PHASE RULE & LUBRICANTS	(9)

Phase rule: Introduction, definition of terms with examples. One component system – water system; Reduced phase rule; Two component system: lead-silver system. Lubricants – definition – function – characteristics – properties – viscosity index, flash and fire points, cloud and pour points, oiliness; Solid lubricants – graphite and MoS_2.

UNIT - V	ADVANCED ENGINEERING MATERIALS	(9)

Abrasives – Moh's scale of hardness – types – natural [Diamond] – synthetic [SiC]; Refractories – characteristics – classifications [Acidic, basic and neutral refractories] – properties – refractoriness – RUL – porosity – thermal spalling; Nano materials – CNT– synthesis [CVD, laser evaporation, pyrolysis] – applications of nano materials.

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

Chairman (BoS)

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	Choose the Engineering materials through the concept of phase rule and lubricants.	Understand
CO5	Classify the manufacturing processes of advanced engineering materials and its uses.	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.

Chairman (BoS)

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

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

Chairman (BoS)

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

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

Chairman (BoS)

Lab Requirement for a batch of 30 Students

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

Chairman (BoS)

K.S.R. College of Engineering, Tiruchengode-637 215. Centre for Academic Courses

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:

Chairman (BoS)

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

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	PO9	PO10	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)

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

Chairman (BoS)

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

Chairman (BoS)

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

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	-	-

Chairman (BoS)

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

24MAT36	OPTIMIZATION TECHNIQUES	Category	L	T	P	SL	C
		BSC	45	15	0	60	4

SEMESTER III - (Common to AE,CE,ME and SFE)

PREREQUISITE:

A fundamental knowledge of linear algebra, calculus, and basic problem-solving techniques in engineering mathematics is required to understand and apply optimization methods effectively.

OBJECTIVES:

To equip students with a comprehensive understanding of optimization methods and their practical implementation in engineering decision-making. The course emphasizes applications in transportation and assignment problems, project scheduling, inventory management, sequencing, and replacement models across diverse engineering fields.

UNIT - I	LINEAR PROGRAMMING PROBLEM	[12]

Introduction - scope and role of Operations Research - limitations of Operations Research - Linear Programming Problem (LPP) - Formulation of linear programming problem - Optimum solution by Graphical Method - Simplex Method by using slack variable only.

UNIT - II	TRANSPORTATION AND ASSIGNMENT PROBLEM	[12]

Transportation Models - Balanced and unbalanced cases - Initial Basic feasible solution by North West Corner Rule, Least Cost Method and Vogel's approximation method. Check for optimality by Modified method.

Assignment Models (Minimizing and Maximizing Cases) - Balanced and Unbalanced Cases - Solution by Hungarian method.

UNIT - III	NETWORK ANALYSIS	[12]

Network - Fulkerson's rule - construction of a Network - Critical Path Method (CPM) - optimistic, pessimistic and most likely time estimates – Project Evaluation and Review Technique (PERT) analysis excluding cost considerations.

UNIT - IV	INVENTORY MODELS	[12]

Types of Inventory - Deterministic inventory models - EOQ models with and without shortages - Quantity discount model – Price breaks - Probabilistic inventory model.

UNIT - V	REPLACEMENT MODELS AND SEQUENCING	[12]

Replacement Policy for Equipment which deteriorates gradually – Items that deteriorate with time and the value of money – Replacement of items that fails suddenly – Individual replacement problems only Sequencing problem - assumptions - processing of 'n' jobs with 2 machines, 'n' jobs with 'm' machines.

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

Chairman (BoS)

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

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

COs	Course Outcome	Cognitive Level
CO1	Apply linear programming techniques for effective decision-making in uncertain situation.	Apply
CO2	Apply transportation and assignment models to achieve cost efficiency and profit enhancement.	Apply
CO3	Apply Fulkerson's rule to design project networks and solve them using Critical Path Method CPM and PERT.	Apply
CO4	Develop solutions using deterministic and probabilistic inventory models, including EOQ with and without shortages and price break models.	Apply
CO5	Solve replacement problems involving equipment and determine sequencing problems in scheduling of jobs to the machines.	Apply

TEXT BOOKS:

1. P.K. Gupta and Man Mohan "Problems in Operations Research", S. Chand and Co, 14th edition, 2016.
2. Hiller F.S, Liberman G.J, Introduction to Operations Research, 10th Edition McGraw Hill, 2017.

REFERENCES:

1. Taha H.A, "Operation Research", Pearson Education sixth edition, 2016.
2. Hira and Gupta "Problems in Operations Research", S. Chand and Co, 2015.
3. ND Vohra, Quantitative Techniques in Management, Tata McGraw Hill, 4th Edition, 2011.
4. J. K. Sharma, Operations Research Theory and Applications, Macmillan, 5th Edition, 2012
5. Wayne. L. Winston, "Operations Research applications and algorithms", Thomson learning, 10th edition 2016.
6. https://en.wikipedia.org/wiki/Resource_management

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

Chairman (BoS)

24SFT31	PRINCIPLES OF SAFETY MANAGEMENT	Category	L	T	P	SL	C
		PCC	45	0	0	45	3

Semester III (SAFETY AND FIRE ENGINEERING)

PREREQUISITE:

Student should have a solid understanding of general workplace safety principles, hazard identification and risk assessment.

OBJECTIVES:

To achieve an understanding of principles of safety management with implementing safety auditing and safety promotion and training.

UNIT – I	CONCEPTS AND TECHNIQUES	(9)

History of Safety movement –general concepts of management – line and staff functions for safety-budgeting for safety-safety policy. Incident Recall Technique (IRT), disaster control, job safety analysis, safety survey, safety inspection, safety sampling.

UNIT – II	SAFETY AUDIT – INTRODUCTION	(9)

Components of safety audit, types of audit, non-conformity reporting (NCR), audit checklist and report – review of inspection– perusal of accident and safety records, formats – implementation of audit indication - check list – identification of unsafe acts of workers and unsafe conditions in the shop floor.

UNIT – III	ACCIDENT INVESTIGATION AND REPORTING	(9)

Concept of an accident, reportable and non-reportable accidents, reporting to statutory authorities – principles of accident prevention – accident investigation and analysis – records for accidents, documentation of accidents – domino sequence – supervisory role – role of safety committee –cost of accident.

UNIT – IV	SAFETY PERFORMANCE MONITORING	(9)

ANSI (Z16.1) Recommended practices for compiling and measuring work injury experience – permanent total disabilities, permanent partial disabilities, temporary total disabilities - Calculation of accident indices, frequency rate, severity rate, frequency severity incidence, incident rate, accident rate, safety "t" score, safety activity rate – problems.

UNIT – V	SAFETY EDUCATION AND TRAINING	(9)

Importance of training - identification of training needs-training methods – communication - role of government agencies and private consulting agencies in safety training – creating awareness, awards, celebrations, safety posters, safety displays, safety pledge, safety incentive scheme, safety campaign – Domestic Safety and Training.

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

COURSE OUTCOMES:

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

COs	Course Outcome	Cognitive Level
CO1	Describe the history and evolution of the safety movement, and its key management functions.	Understand
CO2	Identify the key components and types of safety audits, role of audit checklists, formats, reports, and non-conformity reporting.	Understand
CO3	Explain the legal requirements for accident reporting to statutory authorities	Understand

Chairman (BoS)

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

	and the principles of accident prevention.	
CO4	Describe the concept of Frequency-Severity Incidence and its relevance in safety performance measurement.	Understand
CO5	Explain the importance of safety training, methods for identifying training needs, and the role of government and private agencies in safety programs.	Understand

TEXT BOOKS:

1. Niklas Möller ,Handbook of Safety Principles ,Wiley, 2018.
2. Jason Roy, Industrial Hazard Control & Safety Management Study McGraw-Hill Company, 2022.

REFERENCES:

1. Spellman. Safety Engineering: Principles and Practices, Bernan Press, 2018.
2. Charles Yoe , Principles of Risk Analysis: Decision Making Under Uncertainty, CRC Press, 2019.
3. Louis Bevoc , Behavior Based Safety in Manufacturing, Wiley, 2017.
4. Industrial Safety – I, National Institute of Labour Education and Management.
5. Industrial Safety – II,National Institute of Labour Education and Management.

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

1-low, 2-medium, 3-high

Chairman (BoS)

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

24SFT32	SAFETY IN ENGINEERING INDUSTRY	Category	L	T	P	SL	C
		PCC	45	0	0	45	3

Semester III (SAFETY AND FIRE ENGINEERING)

PREREQUISITE:

Basics of Safety Engineering.

OBJECTIVES:

To enable students to understand and apply safety principles in the operation, maintenance and inspection of machinery and processes in engineering industries.

UNIT - I	SAFETY IN METAL WORKING MACHINERY AND WOOD WORKING MACHINES	(9)

General safety rules, principles, maintenance, Inspections of turning machines, boring machines, milling machine, planning machine and grinding machines, CNC machines, Wood working machinery, types, safety principles, electrical guards - saws, types and its Hazards and risk.

UNIT - II	SAFETY IN MAINTENANCE OF MACHINES	(9)

Basic Principle of Machine guarding - machine guarding, types, fixed guard, interlock guard, automatic guard, trip guard, electron eye, positional control guard, fixed guard fencing - Two hand operation control - guard construction- guard opening. Selection and suitability: lathe - drilling - boring - milling – grinding- shaping, sawing - shearing - presses- forge hammer - flywheels - shafts-couplings - gears- Pulleys and belts-benefits of good guarding systems.

UNIT - III	SAFETY IN WELDING AND GAS CUTTING	(9)

Gas welding and oxygen cutting, resistances welding, arc welding and cutting, common hazards, personal protective equipment, training, safety precautions in brazing, soldering and metalizing - Portable tools inspection- explosive welding, selection, care and maintenance of the associated equipment and instruments - safety in generation, distribution and handling of industrial gases - color coding -leak detection- Pipe line Safety- storage and handling of gas cylinders.

UNIT - IV	SAFETY IN COLD FORMING AND HOT WORKING OF METALS	(9)

Cold working, power presses, point of operation, safe guarding, auxiliary mechanisms, feeding and cutting mechanism, NIP guards, Two hand control, foot operated presses, power press electric controls, power press set up and die Removal, inspection and maintenance -metal shears-press brakes. Hot working safety in forging, hot rolling mill operation, hazards and control measures. Safety in gas furnace operation, cupola, crucibles, ovens, foundry health hazards, work environment - Material handling in foundries.

UNIT - V	SAFETY IN FINISHING, INSPECTION AND TESTING	(9)

Heat treatment operations, electro plating, paint shops, safety in inspection and testing, dynamic balancing, hydro testing, valves, boiler drums and headers, pressure vessels, air leak test, steam testing, safety in radiography, personal monitoring devices, radiation hazards, Health and welfare measures in engineering industry.

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

Chairman (BoS)

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

COURSE OUTCOMES:

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

COs	Course Outcome	Cognitive Level
CO1	Describe the general safety rules, principles, and procedures for the maintenance and inspection of metal and woodworking machinery.	Understand
CO2	Apply safety concepts in the design, operation, and maintenance of various industrial machines.	Apply
CO3	Explain common hazards in welding and cutting operations, and outline the required personal protective equipment and safety precautions.	Understand
CO4	Describe safety procedures in cold and hot metal working processes including press and furnace operations.	Understand
CO5	Identify safety practices in finishing processes, inspection, and testing methods in engineering industries.	Understand

TEXT BOOKS:

1. Krishnan, N.V. – Safety Management in Industry, Jaico Publishing House, 2021 (Latest reprint, ISBN: 978-8172240295)

2. C. Ray Asfahl & David W. Rieske – Industrial Safety and Health Management, Pearson Publishier,7th Edition (2018)

REFERENCES:

1.National Safety Council – Accident Prevention Manual for Business & Industry: Engineering & Technology, 14th Edition (2015)

2. Roger L. Brauer Safety and Health for Engineers - Wiley Publishers, 4th Edition.

3. Safety in Industry N.V. Krishnan Jaico Publishery House, 1996.

4. Indian Boiler acts and Regulations, Government of India.

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

1-low, 2-medium, 3-high

Chairman (BoS)

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

24SFT33	FUNDAMENTALS OF INDUSTRIAL SAFETY	Category	L	T	P	SL	C
		PCC	45	0	0	45	3

Semester III (SAFETY AND FIRE ENGINEERING)

PREREQUISITE:

The typical prerequisites are a basic understanding of workplace Hazards, environments, safety principles, and potentially some prior knowledge of relevant laws and regulations.

OBJECTIVES:

To provide learners with a comprehensive understanding of industrial safety principles, hazard identification, risk management, and regulatory compliance to ensure safe and healthy working environments in industrial settings.

UNIT – I	SAFETY TERMINOLOGIES	(9)

Risk – Accident types - Hazard-Types of Hazards- Hazard Triangle - Risk-Hierarchy of Hazards Control Measures- Safety performance measurement - Leading indicator, lagging Indicators - Flammability- Toxicity Time-weighted Average (TWA) - Threshold Limit Value (TLV) - Short Term Exposure Limit (STEL)- Immediately dangerous to life or health (IDLH)- ALARP- acute and chronic Effects- Routes of Chemical Entry-Personnel Protective Equipment- Health and Safety Policy.

UNIT – II	SAFETY ACTIVITIES	(9)

Toolbox Talk- Role of safety Committee- Responsibilities of Safety Officers and Safety Representatives- Safety Training and Safety Incentives- Safety Culture – Safety Inspection - Mock Drills- On-site Emergency Action Plan- Off-site Emergency Action Plan- Safety poster and Display- Human Error Assessment.

UNIT – III	WORKPLACE HAZARDS	(9)

Hazard Category – Noise, vibration, radiation, mental ill-health, violence at work, substance abuse at work, Work related upper-limb disorders (ergonomics, workstation design etc), manual handling, load handling equipment, Hazardous substances, Health, welfare and work environment; working at height, confined spaces, lone working, slips and trips, movement of people and vehicles in the workplace, work-related driving, Work equipment and machinery, Fire, Electricity.

UNIT – IV	HAZARD IDENTIFICATION TECHNIQUES	(9)

Preliminary Hazard Analysis-Failure mode and Effects Analysis- Hazard and Operability (HAZOP) - Fault Tree Analysis- Event Tree Analysis Qualitative and Quantitative - Risk Assessment - Root cause analysis- Fish Bone Analysis - What-If Analysis- and Hazard Identification and Risk Assessment.

UNIT – V	COST ANALYSIS IN SAFETY	(9)

Computation of Costs- Utility of Cost data. Plant safety inspection, types, inspection procedure. Safety sampling techniques. Job safety analysis (JSA), Safety surveys, and Safety audits. Safety Inventory Technique.

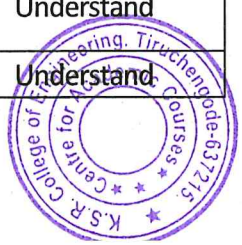
L=45, SL=45, TOTAL = 90 PERIODS

COURSE OUTCOMES:

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

COs	Course Outcome	Cognitive Level
CO1	Assess the safety performance using leading and lagging indicators, and incorporate ALARP principles into risk management decisions.	Understand
CO2	Explain the responsibilities of safety committees, safety officers, and safety	Understand

Chairman (BoS)



	representatives within an organizational safety framework.	
CO3	Identify workplace hazards and recommend appropriate control measures for physical, chemical, ergonomic, and psychosocial risks.	Understand
CO4	Apply hazard identification and risk assessment methods such as FMEA, HAZOP, and Root Cause Analysis to evaluate safety risks.	Apply
CO5	Apply safety sampling techniques for hazard identification and risk evaluation, and interpret sampling data.	Apply

TEXT BOOKS:

1. Dr. K.U. Mistry Fundamentals of Industrial Safety and Health (Vol 1 & 2) Siddarth publications 4th Edition, 2022.
2. Anupama Prashar Industrial Safety & Environment S.K. Kataria & Sons, 2nd Edition, 2025.

REFERENCES:

1. Prof. Sunil S. Rao & R.K. Jain Industrial Safety, Health and Environment Management Systems, Khanna Publishers, Latest Print 2024.
2. John Ridley & John Channing (2008) Safety at Work: Routledge; 8th edition (5 November 2013).
3. Dan Petersen, Techniques of Safety Management: A System Approach, Amer Society of Safety Engineers, 4th edition 2003.
4. Pravin M. Pathak & Jayant P. Khairnar Industrial Safety Management: Safety, Health & Environment Management, Notion Press Publishers, 2022.
5. NPTEL Course Industrial Safety Engineering.

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

1-low, 2-medium, 3-high

Chairman (BoS)

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

24SFT36	MANUFACTURING PROCESSES	Category	L	T	P	SL	C
		PCC	45	0	0	45	3

Semester III (Common to SFE & AUTO)

PREREQUISITE:

The prerequisites for studying or working in Manufacturing Processes typically involve a combination of technical knowledge, hands-on skills, and an understanding of fundamental engineering principles.

OBJECTIVES:

To understand and apply various manufacturing techniques to efficiently produce high-quality products while optimizing cost, time, and resources.

UNIT - I	CASTING	(9)

Casting types, procedure to make sand mould, special moulding processes: - CO2moulding; shell moulding, investment moulding, permanent mould casting, pressure die casting, centrifugal casting, continuous casting,-casting defects.

UNIT - II	WELDING	(9)

Welding: - Introduction, Weldability, Types of welding, Gas welding, Arc welding - Submerged arc, TIG, MIG. Resistance welding, Solid state welding, Electron beam welding, Laser beam welding, Weld defects, Inspection of welded joints.

UNIT - III	MACHINING	(9)

General principles (with schematic diagrams only) of working and commonly performed operations in the following machines: Lathe - Abrasive jet machining - Ultrasonic machining - Electric discharge machining - Electro chemical machining - Plasma arc machining - Electron beam machining and Laser beam machining.

UNIT - IV	FORMING AND SHAPING OF PLASTICS	(9)

Types of plastics - Moulding of Thermoplastics: - Working principles and typical applications of - Injection moulding - Plunger and screw machines - Blow moulding - Rotational moulding- Extrusion - Processing of Thermosets: - Working principles and typical applications - Compression moulding.

UNIT - V	METAL FORMING AND POWDER METALLURGY	(9)

Hot and cold forming - Forging - Rolling - Extrusion - Spinning - Wire drawing, Powder Metallurgy - Steps - Sintering - Merits - Demerits and applications - Types of dies - Progressive and combination die.

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

COURSE OUTCOMES:

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

COs	Course Outcome	Cognitive Level
CO1	Classify different types of casting processes and explain their applications in manufacturing various components.	Understand
CO2	Describe the principles and applications of resistance welding, solid-state welding, electron beam welding, and laser beam welding.	Understand
CO3	Illustrate the working mechanisms of advanced machining processes such as EDM, ECM, and Ultrasonic machining, emphasizing their applications.	Understand
CO4	Apply the properties and processing methods of thermoplastics and thermosets using various moulding techniques.	Apply
CO5	Explain the sequential steps of powder metallurgy, with a specific focus on the sintering process.	Understand

Chairman (BoS)

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

TEXT BOOKS:

1. A Text Book of Workshop Technology: Manufacturing Processes, S. Chand Publisher, 16th Edition, 2021.
2. Hajra Choudhury, Elements of Workshop Technology, Vol. I and II, Media Promoters and Publishers Pvt. Ltd., Mumbai, 16th Edition, 2023.

REFERENCES:

1. Harshit K. Dave & Dumitru Nedelcu (eds.), Advances in Manufacturing Processes: Select Proceedings of RAM 2020, Lecture Notes in Mechanical Engineering series, 1st Edition, December 2021.
2. N. Khurmi & R. S. Khurmi, Textbook of Workshop Technology: Manufacturing Processes, S. Chand, 16th Edition, May 1, 2021.
3. Dr. Mohd. Parvez & Dr. Pallav Gupta, Manufacturing Processes, IP Innovative Publication, 1st Edition, June 15, 2021.
4. Mikell P. Groover, Introduction to Manufacturing Processes, Wiley Publication, 2nd Edition (2023).

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

1-low, 2-medium, 3-high

Chairman (BoS)

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

24MET37	FLUID MECHANICS AND MACHINERY	Category	L	T	P	SL	C
		PCC	45	0	0	45	3

(Common to MECH , AUTO & SFE)

PREREQUISITE: Mathematics, Physics and Engineering Mechanics

OBJECTIVES:

This course aims to provide a fundamental understanding of fluid properties, flow characteristics, and pressure measurement techniques. It also covers flow through pipes, and the working principles and performance of pumps and turbines.

UNIT - I	FLUID PROPERTIES AND FLUID STATICS	(9)

Fluid properties: Properties of fluids - Mass density – Specific weight – Specific volume – Specific gravity – Viscosity – Compressibility – Surface tension – Capillarity – Vapor pressure.

Fluid Statics: Hydrostatic law - pressure variation in static fluid - simple and differential manometers.

UNIT - II	FLUID KINEMATICS AND FLUID DYNAMICS	(9)

Fluid Kinematics: Types of fluid flow - stream lines, streak line and path line – velocity potential and steam function (Description only). Continuity equation – continuity equation in cartesian coordinates.

Fluid Dynamics: Euler's momentum equation, Bernoulli's equation-application of Bernoulli's equation and its applications - orifice, venturimeter

UNIT - III	FLOW THROUGH PIPES	(9)

Laminar flow through circular pipes - Hagen Poiseuille equation - turbulent flow through circular pipes - Darcy Weisbach equation – friction factor – Moody diagram – Major and Minor losses - pipes in series and in parallel.

UNIT - IV	PUMPS	(9)

Classification of pumps - Centrifugal pumps – working principle – Heads and efficiencies – work done by impeller - pump characteristics – pumps connected in series and parallel, Reciprocating pumps – working principle - Indicator diagram – air vessels – work saved by air vessels – Rotary pumps – principle – construction and working.

UNIT - V	HYDRAULIC TURBINES	(9)

Classification of hydraulic turbines – Pelton wheel, Francis turbine, Kaplan turbine, velocity triangles – Working Principle – work done by water on the runner – Efficiencies – Draft tube – specific speed – performance curves for turbines.

L: 45 SL:45: TOTAL: 90 PERIODS

Chairman (BoS)

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

COURSE OUTCOMES:

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

COs	Course Outcome	Cognitive Level
CO1	Explain the fundamental properties and fluid flow measurements in fluids.	Understand
CO2	Apply the concepts of fluid kinematics and dynamics of various types of fluid flow problems.	Apply
CO3	Apply the principles for fluid in flow through pipes for real world problem.	Apply
CO4	Explain the working and performance characteristics of various pumps.	Understand
CO5	Illustrate the working principles and characteristics of impulse and reaction turbines.	Understand

TEXT BOOKS:

1. Dr. R.K. Bansal, "Fluid Mechanics and Hydraulic Machines", Laxmi Publications, 11th edition 2023.
2. Er. R.K. Rajput, "Fluid Mechanics and Hydraulic Machines", S. Chand Publications, 6th edition, **2015.**

REFERENCES:

1. Cengel Y. A. & Cimbala J., "Fluid Mechanics -Fundamentals and Applications", McGraw Hill 3rd Edition, 2013.
2. Ramamrutham. S, "Fluid Mechanics, Hydraulics and Fluid Machines", Dhanpat Rai & Sons, Delhi, 2014.
3. Rathakrishnan. E, Fluid Mechanics - An Introduction , PHI Learning, Delhi, India, 3rd Edition, 2012.
4. Jain A. K. "Fluid Mechanics", Khanna Publishers, 2010.
5. Modi P.N. and Seth, S.M. "Hydraulics and Fluid Mechanics", Standard Book House, New Delhi, 2004.

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

1-low, 2-medium, 3-high

Chairman (BoS)

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

24SFP36	MANUFACTURING PROCESSES LABORATORY	Category	L	T	P	SL	C
		PCC	0	0	45	0	1.5

Semester III (Common to SFE & AUTO)

PREREQUISITE:

A Manufacturing Processes Laboratory typically involves hands-on experimentation and practical application of the principles learned in theory. To successfully engage in laboratory activities, students or professionals should have certain foundational knowledge and skills.

OBJECTIVES:

To impart practical skills in basic machining operations including turning, shaping, drilling, milling, and grinding using conventional machine tools, thereby enabling students to interpret manufacturing drawings and produce simple mechanical components with precision.

List of Experiments:

1. LATHE

1.1. Facing, plain turning and step turning.
1.2. Facing, plain turning and Taper turning
1.3. Facing, plain turning and knurling operation.
1.4. Facing, plain turning and Thread cutting operation.

2. SHAPER

2.1. Machining to make a cube.

3. DRILLING

3.1. Drilling multiple holes at a given pitch circle on a plate.
3.2. Drilling, reaming and tapping.

4. MILLING

4.1. Plain milling

5. GRINDING

5.1. Cylindrical Grinding
5.2. Surface Grinding

P=45, TOTAL: 45 PERIODS

COURSE OUTCOMES:

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

COs	Course Outcome Statement	Exp.No.	Cognitive Level
CO1	Perform basic lathe operations such as facing, turning, taper turning, knurling, and thread cutting with proper tool selection and parameter setup.	1,2,3,4	Understand
CO2	Demonstrate the ability to shape and finish a work piece to specific dimensions using a shaper machine.	5	Apply
CO3	Execute accurate drilling operations, including multi-hole patterns, reaming, and tapping with correct feed and speed settings.	6,7	Apply
CO4	Operate milling machines to perform plain milling and understand milling tool configurations.	8	Apply
CO5	Apply surface and cylindrical grinding processes to achieve desired surface finish and dimensional accuracy.	9,10	Apply

M. [signature]
Chairman (BoS)

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

REFERENCES:

1. Manufacturing Processes – II Lab Manual, Arul R. & Veerakumar S., November 2020 (1st Edition).
2. N. Khurmi & R. S. Khurmi, Textbook of Workshop Technology: Manufacturing Processes, S. Chand, 16th Edition, 1 May 2021, ISBN 9788121908689.

Mapping of COs with POs and PSOs

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

1-low, 2-medium, 3-high

List of Equipment required (for a batch of 30 students)

S.No.	Name of the Equipment's	Quantity required
1.	Centre Lathe with accessories	7 Nos
2.	Horizontal Milling Machine	1 No
3.	Vertical Milling Machine	1 No
4.	Surface Grinding Machine	1 No
5.	Cylindrical Grinding Machine	1 No
6.	Shaper	2 Nos
7.	Radial Drilling Machine	1 No

Chairman (BoS)

K.S.R. College of Engineering, Tiruchengode-637 215. Centre for Academic Courses

24MEP36	FLUID MECHANICS AND MACHINERY LABORATORY	Category	L	T	P	SL	C
		PCC	0	0	45	0	1.5

(Common to MECH , AUTO & SFE)

PREREQUISITE: Mathematics, Physics and Engineering Mechanics

OBJECTIVES:

To provide practical exposure in measuring fluid flow parameters and evaluating the performance of pumps, turbines, and flow meters, thereby reinforcing theoretical fluid mechanics concepts.

List of Exercise/Experiment:

1. Determination of the Coefficient of discharge of given Orifice meter.
2. Determination of the Coefficient of discharge of given Venturi meter.
3. Determination of friction factor for a given set of pipes.
4. Determination of the coefficient of discharge of given Rota meter.
5. Performance test on Gear pump.
6. Performance test on Centrifugal pump.
7. Performance test on Submersible pump.
8. Performance test on Reciprocating pump.
9. Study on Pelton wheel turbine.
10. Study on Francis turbine.

LIST OF EQUIPMENT (for a batch of 30 Students)

S.No.	Name of the Equipment	Quantity
1.	Orifice meter.	1 No.
2.	Venturi meter.	1 No.
3.	Friction factor for a given set of pipes.	1 No.
4.	Rota meter.	1 No.
5.	Gear pump.	1 No.
6.	Centrifugal pump.	1 No.
7.	Submersible pump.	1 No.
8.	Reciprocating pump.	1 No.
9.	Pelton wheel turbine.	1 No.
10.	Kaplan/Francis turbine.	1 No.

P:45 TOTAL: 45 PERIODS

Chairman (BoS)

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

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

COs	Course Outcome	Exp. No.	Cognitive Level
CO1	Determine the coefficient of discharge for an orifice meter by conducting flow measurements under controlled conditions.	1 & 2	Apply
CO2	Determine the coefficient of discharge for various flow meters through experimental procedures.	4	Apply
CO3	Conduct a performance test on various pumps and compute discharge, head, and efficiency under varying conditions.	5, 6, 7 & 8	Apply
CO4	Calculate the friction factor and other flow parameters in pipe systems using experimental data.	3	Apply
CO5	Explain the experimental findings with technical justification for pelton and Kaplan turbines.	9 & 10	Understand

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

1-low, 2-medium, 3-high

Chairman (BoS)

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

24MEP37	DESIGN STUDIO – I	Category	L	T	P	SL	C
		ESC	0	0	30	0	1

(Common to AUTO, MECH, SFE)

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 understand and implement the complete product development cycle including problem identification, concept development, CAD modeling, simulation, and prototyping through hands-on mechanical design projects.

Laboratory Modules & Exercises

Ex. No	Title	Focused Area
1.	Study of Basic Design Studio	Design Thinking Exploration
2.	Problem Identification	Real-world Mechanical problem statement through observation and empathy-based research.
3.	Material Selection	Evaluate and identify appropriate materials based on functional, economic, and environmental considerations.
4.	Concept Sketching	Students draw the free hand sketch of orthographic and isometric views of multiple concept ideas.
5.	CAD Modeling Basics (Fusion 360^0)	Introduction to simple 3D CAD modeling for parts and assemblies using Fusion 360.
6.	Simulation (Fusion 360^0)	Conduct basic structural or thermal simulation on designed components.
7.	Proof Of Concept (POC)	Ideation →Material Specification → Design → Simulation → Presentation
8.	Report Generation	Findings → Analysis → Progress →Results
		P:30 TOTAL: 30 PERIODS

Chairman (BoS)

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

COs	Course Outcome	Cognitive Level
CO1	Analyze real-world mechanical problems through structured problem statements.	Analyze
CO2	Select appropriate materials based on functional and design constraints.	Apply
CO3	Develop orthographic and isometric design sketches.	Apply
CO4	Design the mechanical components and assemblies using CAD software (Fusion 360).	Create
CO5	Evaluate the manufacturing processes for prototype development.	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	2	-	2	1	-	-	2	2	3	2
CO2	3	3	2	2	-	2	1	-	-	2	2	3	2
CO3	3	3	2	3	-	2	1	-	-	2	2	3	2
CO4	3	3	3	3	2	2	1	-	-	2	2	3	2
CO5	3	3	3	3	3	2	1	-	-	2	2	3	2

1 Low, 2 Medium, 3 High

Chairman (BoS)

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

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.

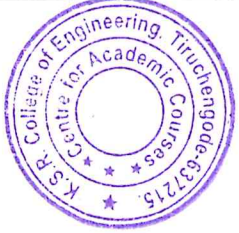
TOTAL: 30 PERIODS

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

Chairman (BoS)



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	-	-

Chairman (BoS)

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

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

Dr. R.V.M. RANGARAJAN
CHAIRMAN
BOARD OF STUDIES (S&H)
K.S.R. COLLEGE OF ENGINEERING
TIRUCHENGODE - 637 215.

TEXT BOOKS:

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

Dr. R.V.M. RANGARAJAN
CHAIRMAN
BOARD OF STUDIES (S&H)
K.S.R. COLLEGE OF ENGINEERING
TIRUCHENGODE - 637 215.

24MET46	STRENGTH OF MATERIALS (Common to ME,AE & SFE)	Category	L	T	P	SL	C
		PCC	45	0	0	45	3

PREREQUISITE: Basic Mechanics

OBJECTIVES:

The course aims to impart understanding and application of fundamental concepts in solid mechanics, including stress, strain, and deformation behavior, beam analysis, column behavior, torsion, and biaxial stress analysis, enabling students to analyze and design mechanical components and structures.

UNIT - I	STRESS, STRAIN, DEFORMATION OF SOLIDS	(09)

Rigid and Deformable bodies – Strength, Stiffness and Stability – concept of Stress and strain; stress strain diagrams, Tensile, Compressive and Shear stresses – Deformation of simple and compound bars under axial load – Elastic constants and their relationships – Strain energy – Strain energy in uniaxial loads.

UNIT - II	BEAMS - LOADS AND STRESSES	(09)

Types of beams: Supports and Loads – Shear force and Bending Moment diagrams for different loadings in Cantilever, Simply supported – Stresses in beams – Theory of simple bending – Stress variation along the length and in the beam section – Effect of shape of beam section on stress induced.

UNIT - III	COLUMNS AND DEFLECTION OF BEAMS	(09)

Columns – End conditions – Equivalent length of a column – Euler equation – Slenderness ratio – Rankin formula for columns-Failure theory- Elastic curve of Neutral axis of the beam under normal loads – Evaluation of beam deflection and slope: Double integration method, Macaulay Method.

UNIT - IV	TORSION IN CIRCULAR SHAFTS	(09)

Analysis of torsion of circular bars – Shear stress distribution – Bars of Solid and hollow circular section – Stepped shaft – Twist and torsion stiffness – Compound shafts – Fixed and simply supported shafts – Application to close-coiled helical springs.

UNIT - V	ANALYSIS OF STRESSES IN TWO DIMENSIONS	(09)

Thin cylindrical and spherical shells – Deformation in thin cylindrical and spherical shells – Biaxial stresses at a point – Stresses on inclined plane – Principal planes and stresses – Mohr's circle for biaxial stresses – Maximum shear stress.

L45: SL:45 TOTAL: 90 PERIODS

COURSE OUTCOMES:

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

COs	Course Outcome	Cognitive Level
CO1	Illustrate the fundamental concepts of stress, strain, and deformation of solids in different load conditions.	Understand
CO2	Calculate stresses in beams using the theory of simple bending, and determine stress variation along the length and cross-section.	Apply
CO3	Apply the concepts of columns to determine end conditions, equivalent length, slenderness ratio, and use Euler's and Rankine's formulas for	Apply
CO4	Determine shear stress distribution and torsional effects in circular shafts, including solid, hollow, stepped, and compound shafts.	Apply
CO5	Apply stress analysis concepts to determine principal stresses, maximum shear stress, and stresses on inclined planes in thin shells and biaxial stress problems.	Apply

Chairman (BoS)

TEXT BOOKS:

1. Dr .R,K Bansal ,Strength of materials, Laxmi publications, sixth Edition, 2015
2. Strength of materials by R.Subramanian, Oxford university press, New Delhi 2008.

REFERENCES:

1 Nash W.A, Theory and problems in Strength of Materials, Schaum Outline Series, McGraw-Hill Book Co, New York, Fourth Edition,1998.

2 Kazimi S.M.A, Solid Mechanics, Tata McGraw-Hill Publishing Co., New Delhi, Third Edition,2004

3 Ryder G.H, Strength of Materials, Macmillan India Ltd., Third Edition, 2002

4 Popov E.P, Engineering Mechanics of Solids, Prentice-Hall of India, New Delhi, Third Edition, 2004

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

1-low, 2-medium, 3-high

Chairman (BoS)

24SFT41	SAFETY IN CONSTRUCTION	Category	L	T	P	SL	C
		PCC	45	0	0	45	3

Semester IV (SAFETY AND FIRE ENGINEERING)

PREREQUISITE:

Understanding of construction processes, materials, and site operations.

OBJECTIVES:

To introduce the fundamentals of construction industry safety, including safety planning, human factors, and the responsibilities of various stakeholders.

UNIT – I	INTRODUCTION TO CONSTRUCTION INDUSTRY	(9)

Safety aspects of construction planning-Personal Protective Equipment's(PPE)- Human factors in construction safety management. Roles of various groups in ensuring safety in construction industry.

UNIT – II	SAFETY IN VARIOUS CONSTRUCTION OPERATIONS	(9)

Excavation- under- water works- under-pinning & shoring- Ladders & Scaffolds - Tunneling- Blasting- Demolition- Pneumatic caissons- confined Space- Temporary Structures. Indian Standards on construction safety- National Building Code Provisions on construction safety.

UNIT – III	SAFETY IN MATERIAL HANDLING AND EQUIPMENTS	(9)

Storage & stacking of construction materials, Safety in the use of construction equipment's- Vehicles, Cranes, Tower Cranes, Lifting gears, Hoists & Lifts, Wire Ropes, Pulley blocks, Temporary power supply, Mixers, Conveyors, Pneumatic and hydraulic tools in construction ,Electrical safety, portable tools, welding, gas cutting.

UNIT – IV	CONTRACT CONDITIONS ON SAFETY	(9)

Health provisions under contract conditions, Welfare measures for contract workers, Social Security provisions in contract safety, Insurance provisions in contract conditions, Application of ergonomics for construction safety.

UNIT – V	CONTRACT LABOUR ACT AND CENTRAL RULES	(9)

Buildings and other Construction Workers (RE & CS) Act and Central Rules, Safety Provisions under BOCW act and rules, registration and Licensing provisions, safety, health, welfare and social security provisions.

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

COURSE OUTCOMES:

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

COs	Course Outcome	Cognitive Level
CO1	Describe the importance of safety planning, human factors, and the roles of different groups in ensuring safety in the construction industry.	Understand
CO2	Classify the hazards in various construction operations such as excavation, scaffolding, tunneling, demolition, and temporary structures, and apply relevant Indian Standards and NBC provisions for safety.	Understand

Chairman (BoS)

K.S.R. College of Engineering, Tiruchengode-637 215. Centre for Academic Courses

CO3	Interpret safe practices in the handling, storage, and operation of construction materials and equipment including cranes, hoists, lifting gears, electrical tools, and pneumatic/hydraulic systems.	Understand
CO4	Illustrate contract conditions related to health, welfare, social security, insurance, and ergonomics for improving safety performance in construction projects.	Understand
CO5	Show the legal provisions of the Contract Labour Act and the BOCW (RE & CS) Act relating to licensing, safety, health, welfare, and social security at construction sites.	Understand

TEXT BOOKS:

1. Hudson, R.,"Construction hazard and Safety Hand book", Butter Worth's, 1985.
2. Raymond Elliot Levitt, Nancy Morse Samelson, "Construction Safety Management", McGraw Hill, London,1987.

REFERENCES:

1. Davies, V. J., and Tomasin, K., Construction safety handbook. Thomas Telford Publishing, London,1996.
2. Ratay, R. T. Handbook of temporary structures in construction, McGraw Hill, London,2nd Edition,1996.
3. Jnathea D.Sime, "Safety in the Build Environment", London, 1988.
4. Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Act, and Central Rules.R.T. Ratay, Handbook of Temporary Structures in Construction, Mc Graw-Hill,1996.

Mapping of COs with POs and PSOs

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

1-low, 2-medium, 3-high

Chairman (BoS)

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

24SFT42	SAFETY IN RAIL AND ROAD TRANSPORT	Category	L	T	P	SL	C
		PCC	45	0	0	45	3

Semester IV (SAFETY AND FIRE ENGINEERING)

PREREQUISITE:

Understanding construction materials, surveying basics, and structural components.

OBJECTIVES:

To provide fundamental knowledge on railway permanent way components, including rails, sleepers, ballast, and their functional requirements.

UNIT – I	RAILWAY ENGINEERING	(9)

Permanent way - components. Rails- Functions, requirements, defects, rail joints and fastenings, check and guard rails, coning of wheels, creep of rails. Sleepers - functions, requirements, types, density. Ballast- functions, requirements types.

UNIT – II	GEOMETRIC DESIGN	(9)

Horizontal curves, Super- elevation, Negative super elevation in branches, Length of transition curves- Grade compensation on curves, Widening of Gauge on curves.

UNIT – III	RAILWAY OPERATION CONTROL	(9)

Points and crossings- Design features of a turn out –Types of Railway track- Points- Details of Station Yards and Marshalling Yards- Signaling and interlocking- Principles of track circuiting- Control of train movement by absolute block system- Automatic block system- Centralized traffic control Systems.

UNIT – IV	CLASSIFICATION OF HIGHWAYS	(9)

Historical development of road construction- Typical cross section of roads - Definition of various cross- sectional elements- Requirements & factors controlling alignment of roads – Basic Geometric designs.

UNIT – V	TRAFFIC ENGINEERING	(9)

Traffic characteristics- various traffic studies and their applications – Traffic Regulations and Controls- Traffic Control devices- Traffic signals- Signage's- Classification of signals- carriage- way markings- Traffic islands- Highway intersections- Principles of highway lighting.

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

COURSE OUTCOMES:

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

COs	Course Outcome	Cognitive Level
CO1	Classify the components of the railway permanent way, including rails, sleepers, and ballast, along with their functions and requirements.	Understand
CO2	Clarify the principles of geometric design of railways such as horizontal curves, super-elevation, transition curves, grade compensation, and gauge widening.	Understand

Chairman (BoS)

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

CO3	Illustrate railway operation control systems including points and crossings, station yards, signaling, interlocking, track circuiting, and train movement control mechanisms.	Understand
CO4	Describe the classification, development, and basic geometric design elements of highways, including alignment factors and cross-sectional components.	Understand
CO5	Interpret and apply the principles of traffic engineering, including traffic characteristics, traffic studies, control devices, signals, markings, intersections, and highway lighting.	Understand

TEXT BOOKS:

1. S.C. Rangwala, Railway Engineering, Charotar Book Distributors, 2012.
2. L.R. Kadiyali, Traffic Engineering and Transport Planning, Khanna Publishers, New Delhi, 2004.

REFERENCES:

1. S.K. Khanna and C.E.G. Justo, Highway Engineering, Nem Chand & Brothers,9th Edition,2016.
2. Railway Engineering by B.L Gupta, Amit Gupta,2nd Edition,2009.
3. Martin Rogers & Bernard Enright — 4th Edition (Indian Adaptation), Wiley India,4th Edition,2011.
4. R. Srinivasan, Harbour, Dock and Tunnel Engineering, Charotar Publishing House Pvt. Ltd,7th Edition,2013.

Mapping of COs with POs and PSOs

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

1-low, 2-medium, 3-high

Chairman (BoS)

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

24SFT43	CHEMICAL PROCESS SAFETY	Category	L	T	P	SL	C
		PCC	45	0	0	45	3

Semester IV (SAFETY AND FIRE ENGINEERING)

PREREQUISITE:

Understanding of chemical properties, reactions, and material compatibility.

OBJECTIVES:

To Understand safe storage and handling procedures for hazardous chemicals and industrial gases, including relief systems, disposal methods, and laboratory safety practices.

UNIT – I	SAFETY IN THE STORAGE AND HANDLING OF CHEMICALS AND GASES	(9)

Types of storage-general considerations for storage layouts- atmospheric venting, pressure and temperature relief - relief valve- storage and handling of hazardous chemicals and industrial gases, safe disposal methods, reaction with other chemicals, hazards during transportation - pipe line transport - safety in chemical laboratories- PPE's used in chemical laboratory and confined space.

UNIT – II	CHEMICAL REACTION HAZARDS	(9)

Hazardous inorganic and organic reactions and processes, Reactivity as a process hazard, Detonations, Deflagrations, and Runaways, Assessment and Testing strategies, Self – heating hazards of solids, Explosive potential of chemicals, Structural groups and instability of chemicals, Thermochemical screening,

UNIT – III	SAFETY IN THE DESIGN OF CHEMICAL PROCESS PLANTS	(9)

Design Principles & Process Development- Process Documentation: Flow diagrams, Piping and Instrumentation Diagrams (P&ID).- Operational Considerations: Batch vs. continuous operation, equipment scale-up, and specifications.- Safety in Design: Reliability, inherent safety, engineered safety, safety during start-up and shutdown- Testing & Inspection: Non-destructive testing, pressure and leak testing, pressure vessel standards, inspection of boilers and reaction vessels- Emergency preparedness & Control Devices.

UNIT – IV	SAFETY IN THE OPERATION OF CHEMICAL PROCESS PLANTS	(9)

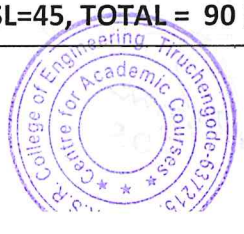
Properties of chemicals - Material Safety Data Sheets - the various properties and formats used - methods available for property determination. Operational activities and hazards –standard operating procedures - safe operation of pumps, compressors, heaters, column, reactors, pressure vessels, storage vessels, piping systems - effects of pressure, temperature, Flow rate and humidity on operations - corrosion and control measures- condition monitoring – control valves –threshold limits- safety valves- pressure reducing valves, drains, bypass valves, inert gases. Chemical splashes, eye irrigation and automatic showers.

UNIT – V	SAFETY AND ANALYSIS	(9)

Safety and reliability concepts- quantification of basic events, system safety quantification, Human error analysis, Accident investigation and analysis, OSHAS 18001 and ISO 45001, Occupational Health and Safety Management Systems(OHSMS).

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

Chairman (BoS)



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

COs	Course Outcome	Cognitive Level
CO1	Outline the mechanisms of runaway reactions, explosive potential, structural instability of chemicals, and thermochemical screening methods used for hazard evaluation.	Understand
CO2	Illustrate design principles, flow diagrams, P&IDs, scale-up considerations, and inherent/engineered safety concepts for safe chemical process plant design and startup/shutdown procedures.	Understand
CO3	Interpret safe operating procedures for pumps, compressors, heaters, reactors, columns, piping systems, and storage vessels by considering effects of pressure, temperature, flow rate, and corrosion.	Understand
CO4	Estimate chemical properties using Material Safety Data Sheets (MSDS) and explain emergency handling measures such as spill control, eye irrigation, and safety showers.	Understand
CO5	Observe accident scenarios using safety vs. reliability concepts, quantify basic safety events, evaluate human error, and carry out accident investigation using system safety analysis techniques	Understand

TEXT BOOKS:

1. Maurice Jones. A, Fire Protection Systems, Jones & Bartlett Publishers, Second Edition, 2015.
2. David A Crowl & Joseph F Louvar, Chemical Process Safety, Pearson Publication, Third Edition,2014.

REFERENCES:

1. Ron Hirst, Underdowns Practical Fire Precautions, Gower Publishing Company Ltd., England, 1989.
2. Dennis P. Nolan, Handbook of Fire and Explosion Protection Engineering, Principles for Oil, Gas, Chemical and Related Facilities, Saudi Aramco, Gulf Professional Publishing,1st Edition,2011.
3. Daniel E. Della -Giustina, Fire and Safety Management Hand Book,2nd Edition 2014.
4. NFPA Fire Protection Hand Book and Relevant IS codes,20th Edition,2014.

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

1-low, 2-medium, 3-high

Chairman (BoS)

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

24GET09	UNIVERSAL HUMAN VALUES AND ETHICS	Category	L	T	P	SL	C
		HSMC	45	0	0	45	3

(Common to All Branches)

OBJECTIVES:

To understand the concept of Universal Human Values and discuss theoretical and practical implications of UHV. To relate the use of harmony in the family and society and classify the harmony in the nature methods. To construct effective human values in personal and professional in life.

UNIT - I	INTRODUCTION TO VALUE EDUCATION	(09)

Right Understanding, Relationship and Physical Facility, Holistic Development and the Role of Education - Understanding Value Education - Sharing about Oneself - Self-exploration as the Process for Value Education- Continuous Happiness and Prosperity – the Basic Human Aspirations - Exploring Human Consciousness - Happiness and Prosperity – Current Scenario - Method to Fulfil the Basic Human Aspirations - Exploring Natural Acceptance.

UNIT - II	HARMONY IN THE HUMAN BEING	(09)

Understanding Human being as the Co-existence of the Self and the Body - Distinguishing between the Needs of the Self and the Body - Exploring the difference of Needs of Self and Body – The Body as an Instrument of the Self - Understanding Harmony in the Self - Exploring Sources of Imagination in the Self - Harmony of the Self with the Body - Programme to ensure self- regulation and Health - Exploring Harmony of Self with the Body.

UNIT - III	HARMONY IN THE FAMILY AND SOCIETY	(09)

Harmony in the Family – the Basic Unit of Human Interaction - 'Trust' – the Foundational Value in Relationship-Exploring the Feeling of Trust - 'Respect' – as the Right Evaluation -Exploring the Feeling of Respect - Other Feelings, Justice in Human-to-Human Relationship- Understanding Harmony in the Society - Vision for the Universal Human Order – Exploring Systems to fulfil Human Goal.

UNIT - IV	HARMONY IN THE NATURE/EXISTENCE	(09)

Understanding Harmony in the Nature – Interconnectedness, self-regulation and Mutual Fulfilment among the Four Orders of Nature - Exploring the Four Orders of Nature – Realizing Existence as Co-existence at All Levels - The Holistic Perception of Harmony in Existence -Exploring Co-existence in Existence.

UNIT - V	IMPLICATIONS OF THE HOLISTIC UNDERSTANDING- A LOOK AT PROFESSIONAL ETHICS	(09)

Natural Acceptance of Human Values - Definitiveness of (Ethical) Human Conduct – Exploring Ethical Human Conduct - A Basis for Humanistic Education, Humanistic Constitution and Universal Human Order- Competence in Professional Ethics - Exploring Humanistic Models in Education- Holistic Technologies, Production Systems and Management Models -Typical Case Studies- Strategies for Transition towards Value-based Life and Profession - Exploring Steps of Transition towards Universal Human Order.

TOTAL (L:45, SL:45): 90PERIODS

Chairman (BoS)

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

COs	Course Outcome	Cognitive Level
CO1	Interpret the concepts of Universal Human Values.	Understand
CO2	Summarize both theoretical and practical implications of Universal Human Values.	Understand
CO3	Understand how the feeling of trust develops through honesty, care, and consistent behavior.	Understand
CO4	Explains how viewing existence as a whole helps us understand harmony among humans, nature, and systems.	Understand
CO5	Relate human values in both personal and professional life.	Understand

TEXT BOOKS:

1. R R Gaur, R Asthana, G P Bagaria, A Foundation Course in Human Values and Professional Ethics, 2nd Revised Edition, Excel Books, New Delhi, 2019.
2. A.N. Tripathi, Human Values, New Age Intl. Publishers, New Delhi, 2004.

REFERENCES:

1. R.R Gaur, R Sangal, G P Bagaria, A foundation course in Human Values and professional Ethics – Teachers Manual, Excel books, New Delhi, 2010.
2. B L Bajpai, 2004, Indian Ethos and Modern Management, New Royal Book Co., Lucknow, Reprinted 2008.
3. Frankl, Viktor E. Yes to Life In spite of Everything, Penguin Random House, London, 2019.
4. Van Zomeren, M., & Dovidio, J. F. The Oxford Handbook of the Human Essence (Eds.), New York Oxford University Press, 2018.
5. https://fdp-si.aicte-india.org/UHVII.php
6. https://nptel.ac.in/courses/109104068

Mapping of COs with POs and PSOs

COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO 9	PO10	PO11	PSO1	PSO2
CO1	-	-	-	-	-	2	-	-	-	-	2	-	-
CO2	-	-	-	-	-	-	2	-	-	-	-	-	-
CO3	-	-	-	-	-	3	-	-	-	-	-	-	-
CO4	-	-	-	-	-	-	3	-	-	-	2	-	-
CO5	-	-	-	-	-	3	-	2	-	-	-	-	-

V. SANTHI
Chairman (BoS)

24MEP46	STRENGTH OF MATERIALS LABORATORY (Common to ME,AE & SFE)	Category	L	T	P	SL	C
		PCC	0	0	45	0	1.5

OBJECTIVES:

The objective of this subject is to help students understand the mechanical behaviour of materials under different loads and determine key properties such as strength, hardness, toughness, and elasticity through standard tests, while developing practical skills in using testing machines and interpreting experimental results for engineering applications.

List of Exercise/Experiments:

1. Tension test on a mild steel rod.
2. Double shear test on Mild steel rods.
3. Torsion test on mild steel rod.
4. Deflection test on beams.
5. Impact test on metal specimen – izod test
6. Impact test on metal specimen – charpy test
7. Hardness test on metals - Brinnell Hardness Number.
8. Hardness test on metals - Rockwell Hardness Number.
9. Compression test on open coil helical spring.
10. Tension test on closed coil helical spring.

LIST OF EQUIPMENT (for a batch of 30 Students)

S.No.	Name of the Equipment	Quantity
1.	Universal Testing Machine	1
2.	Brinnell Hardness Testing Machine	1
3.	Rockwell Hardness Testing Machine	1
4.	Deflection Test apparatus	1
5.	Torsion Testing Machine	1
6.	Spring Testing Machine	1
7.	Impact Testing Machine	1

P:45 TOTAL: 45 PERIODS

Chairman (BoS)

K.S.R. College of Engineering (Autonomous) Centre for Academic Courses

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

COs	Course Outcome	Exp. no.	Cognitive Level
CO1	Determine mechanical properties such as Young's modulus, yield strength, and ultimate tensile strength	1 & 2	Apply
CO2	Calculate the shear modulus, maximum shear stress, and angle of twist of a mild steel rod under torsion.	3&4	Apply
CO3	Analyze impact strength and hardness characteristics of engineering materials.	5&6	Apply
CO4	Interpret experimental results to assess material behavior under various loads.	7 & 8	Apply
CO5	Apply experimental findings to engineering design and material selection.	9 & 10	Apply

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	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

Chairman (BoS)

24SFP41	SAFETY ENGINEERING LABORATORY	Category	L	T	P	SL	C
		PCC	0	0	45	0	1.5

Semester IV (SAFETY AND FIRE ENGINEERING)

PREREQUISITE:

Understanding of common industrial processes, workplace layouts, and general engineering practices.

OBJECTIVES:

To Enable students to assess the safety performance of industries by analyzing accident records and classifying accidents based on standard criteria.

List of Experiments:

1. Study of Personal protective equipment.
2. Assessment of the safety performance of an industry and classification of accidents.
3. Safety assessment of a construction site.
4. Environmental impact assessment and environmental audit.
5. Accident Reporting - Exercises.
6. Job safety analysis - Exercises.
7. Safety audit - Exercises, e.g., Labs, workshops, academic, administrative and residential buildings.
8. Calculation of cost of accidents.
9. Preparation of work permits.
10. Preparation of a training Unit on any topic of safety for a target audience.

List of Equipment:

Sl.No	Name of the Equipment	Quantity Required
1	PPE set	1 Nos.
2	Noise level meter	1 Nos.
3	Lux meter	1 Nos.
4	Respirable dust sampler	1 Nos.
5	First Aid kit	1 Nos.
6	Fire Extinguisher set	1 Nos.

P=45, TOTAL= 45 PERIODS

COURSE OUTCOMES:

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

COs	Course Outcome Statement	Exp.No.	Cognitive Level
CO1	Describe the purpose, types, and proper usage of Personal Protective Equipment (PPE) in industrial environments and classifying different types of industrial accidents.	1,2	Understand
CO2	Apply safety conditions at a construction site and identify potential hazards and conduct environmental audits to ensure compliance with standards.	3,4	Apply

Chairman (BoS)

College of Engineering, Tiruchengode-637215 Centre for Academic Courses

CO3	Make systematic accident reports using appropriate reporting formats and recommending suitable control measures.	5,6	Apply
CO4	Conduct safety audits in labs, workshops, and institutional buildings and Calculate direct and indirect costs of accidents	7,8	Apply
CO5	Prepare appropriate work permits (hot work, confined space, electrical, excavation, etc.) based on job requirements and develop and structure a safety training module .	9,10	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	-	-	1	-	-	2	1	-	2	3	1
CO2	3	3	2	-	1	-	-	2	1	-	2	3	1
CO3	3	3	2	-	1	-	-	2	1	-	2	3	1
CO4	3	3	2	-	1	-	-	2	1	-	2	3	1
CO5	3	3	2	-	1	-	-	2	1	-	2	3	1

1-low, 2-medium, 3-high

Chairman (BoS)

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

24MEP47	DESIGN STUDIO - II	Category	L	T	P	SL	C
		PCC	0	0	30	0	1

Common to AE, ME & SFE

PREREQUISITE

Design Studio–II builds on fundamental engineering and design concepts. Design process for translating user needs into design requirements and conceptual solutions is essential for effective participation in studio-based design, prototyping, and evaluation activities.

OBJECTIVES:

- Integrate mechanical engineering fundamentals such as materials, manufacturing processes, mechanics, and ergonomics into conceptual and detailed product design.
- Develop proficiency in CAD tools for creating 3D models, assemblies, and engineering drawings suitable for manufacturing.
- Generate and evaluate multiple design concepts using systematic methods such as brainstorming, morphological analysis, and decision matrices.
- Design and develop functional prototypes using appropriate materials, processes, and rapid prototyping techniques.
- Perform basic engineering analysis and validation to assess functionality, safety, manufacturability, and sustainability of the designed system.

List of Exercise/Experiments:

1. Material Selection.
2. Selection of Experimentation Methods Using Weightage Analysis.
3. Prototype Creation.
4. Product Assembly.
5. Product Testing.
6. Report Submission.

P:30 TOTAL: 30 PERIODS

COURSE OUTCOMES:

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

COs	Course Outcome	Cognitive Level
CO1	Select appropriate engineering materials for a given product based on functional, mechanical, economic, and sustainability requirements.	Apply
CO2	Develop functional prototypes by applying design concepts, manufacturing methods, and rapid prototyping techniques	Apply
CO3	Assemble product components accurately by integrating mechanical systems, tolerances, and assembly principles.	Apply
CO4	Evaluate product performance through systematic testing and interpret results to suggest design improvements.	Analyze
CO5	Prepare and present a comprehensive design report documenting the design process, analysis, results, and conclusions.	Evaluate

REFERENCES:

1. https://www.youtube.com/watch?v=602zbkf8RN4
2. https://www.youtube.com/watch?v=CRa9djnZRu0
3. https://www.youtube.com/watch?v=3KsRjnn83T0

Chairman (BoS)

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	-	-	-	-	-	-	3	2
CO2	3	3	2	-	2	-	-	-	2	-	-	3	3
CO3	3	3	2	-	2	-	-	-	2	-	-	3	3
CO4	3	3	3	2-	2	-	-	-	-	-	-	2	2
CO5	3	3	3	3	2	-	-	2	2	3	2	-	-
1-low, 2-medium, 3-high													

Chairman (BoS)

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

Chairman (BoS)

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

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	2	-	-	2	-	-	2	-	-	3	-	-
CO3	3	3	2	-	2	-	-	2	-	-	3	-	-
CO4	3	2	-	-	2	-	-	2	-	-	3	-	-
CO5	3	2	-	-	2	-	-	3	3	-	3	-	-
Avg.	3	2	2	-	2	-	-	2	3	-	3	-	-

Chairman (BoS)

K.S. College of Engineering, Thuchengodu-637215. Centre for Academic Courses

24SFP42	SEMINAR PRESENATION	Category	L	T	P	SL	C
		EEC	0	0	30	0	1

OBJECTIVES:

To explore the fundamental principles of verbal and non-verbal communication, and to develop active and empathetic listening, speaking, and writing skills, while exposing students to emerging technologies, research, products, algorithms, and services.

Guidelines:

- Each student shall select a seminar topic in the area of engineering/technology, preferably based on recent technological trends and developments beyond the prescribed syllabus.
- Each student shall prepare and deliver a seminar presentation using appropriate audio-visual aids for a duration of 10 minutes.
- Seminar presentations shall be conducted for two periods per week. Each student shall present a minimum of two seminars during the semester.
- Each seminar presentation carries 50 marks. The total marks allotted for the seminar component are 100 and the evaluation shall be carried out internally.

TOTAL: 30 PERIODS

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

COs	Course Outcome	Cognitive Level
CO1	Describe a selected contemporary topic in the relevant engineering field based on a systematic literature survey.	Understand
CO2	Summarize and organize technical information from credible sources for seminar preparation.	Understand
CO3	Apply appropriate presentation tools and visual aids to prepare seminar materials.	Apply
CO4	Demonstrate effective oral communication skills while presenting technical content.	Apply
CO5	Apply subject knowledge to respond to questions during seminar discussions.	Apply

Chairman (BoS)

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

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

Assessment Weightage

Presentation Skills	Technical Knowledge	Viva Voce	Total
30	20	10	50

Maximum marks - 50				
S. No	Assessment	Excellent (90-100%)	Good (75-89%)	Average (50-74%)
1.	Presentation Skills (20)	Delivers with open and closure remarks with appropriate body language and direct eye contact	Delivers with open and closure remarks with appropriate body language and consistent eye contact.	Delivers with open and closure remarks with poor body language and consistent eye contact
		Complete the presentation and well-presented within specified time	Completed the Presentation and well-presented beyond the time limit	Completed the Presentation and well presented with in minimum span of time
2.	Technical Knowledge (20)	Demonstrated and answered all questions with detailed elaboration	Demonstrated and answered majority of questions with detailed elaboration	Demonstrated and answered most of questions with detailed elaboration
3.	Viva-Voce (10)	Responded to all the queries with valid explanations	Responded to majority of the queries with valid explanations	Responded to few queries with valid explanations

Chairman (BoS)

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