KSR College of Engineering

AN AUTONOMOUS INSTITUTION

NAAC ACCREDITED A++ | NBA ACCREDITED PROGRAMMES

25 Years KSRCE 2001 – 2026 Celebrating Academic Excellence

B.E. - MECHANICAL ENGINEERING

REGULATIONS 2024

(Academic Year 2025-26 Onwards)

Curriculum & Syllabus
Semester I and II

K.S.R. COLLEGE OF ENGINEERING: TIRUCHENGODE - 637 215

(Autonomous)

DEPARTMENT OF MECHANICAL ENIGNEERING

(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.

IM3 Empower research and innovation by integrating collaboration, social responsibility, and commitment to sustainable development.

Vision of the Department / Programme: (Mechanical Engineering)

DV To develop globally competent mechanical engineers driving technological advancement through sustainable research and socially responsible innovation.

Mission of the Department / Programme: (Mechanical Engineering)

DM 1 Impart industry-focused, value-based education through innovative teaching methods and practical exposure

DM 2 Deliver competitive technical education using cutting-edge infrastructure and modern learning environments.

DM 3 Promote a culture of innovation, research, and ethical responsibility through collaborative efforts for sustainable progress.

Programme Educational Objectives (PEOs) : (Mechanical Engineering)

The graduates of the programme will be able to

PEO 1 **Core Competency**: Graduates will analyse, design, and implement sustainable Engineering solutions in diverse engineering domains addressing the needs of society.

PEO 2 **Professionalism:** Graduates will exhibit impactful leadership and teamwork across diverse cultural and disciplinary environments, contributing positively to the engineering profession.

PEO 3 **Career Development:** Graduates will engage in continuous learning through higher education and research innovations to adapt to emerging technologies and career advancements.

Chairman (BoS)

PROGRAMME OUTCOMES (POs) AND PROGRAMME SPECIFIC OUTCOMES (PSOs)

Programme Outcomes (POs)	
PO1	**Engineering Knowledge:** Apply knowledge of mathematics, natural science, computing, engineering fundamentals and an engineering specialization as specified in WK1 to WK4 respectively to develop to the solution of complex engineering problems.
PO2	**Problem Analysis:** Identify, formulate, review research literature and analyze complex engineering problems reaching substantiated conclusions with consideration for sustainable development. (WK1 to WK4)
PO3	**Design/Development of Solutions:** Design creative solutions for complex engineering problems and design/develop systems/components/processes to meet identified needs with consideration for the public health and safety, whole-life cost, net zero carbon, culture, society and environment as required. (WK5)
PO4	**Conduct Investigations of Complex Problems:** Conduct investigations of complex engineering problems using research-based knowledge including design of experiments, modelling, analysis & interpretation of data to provide valid.conclusions. (WK8).
PO5	**Engineering Tool Usage:** Create, select and apply appropriate techniques, resources and modern engineering & IT tools, including prediction and modelling recognizing their limitations to solve complex engineering problems. (WK2 and WK6).
PO6	**The Engineer and The World:** Analyze and evaluate societal and environmental aspects while solving complex engineering problems for its impact on sustainability with reference to economy, health, safety, legal framework, culture and environment. (WK1, WK5, and WK7).
PO7	**Ethics:** Apply ethical principles and commit to professional ethics, human values, diversity and inclusion; adhere to national & international laws. (WK9)
PO8	**Individual and Collaborative Team work:** Function effectively as an individual, and as a member or leader in diverse/multi-disciplinary teams.
PO9	**Communication:** Communicate effectively and inclusively within the engineering community and society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations considering cultural, language, and learning differences.
PO10	**Project Management and Finance:** Apply knowledge and understanding of engineering management principles and economic decision-making and apply these to one's own work, as a member and leader in a team, and to manage projects and in multidisciplinary environments.
PO11	**Life-Long Learning:** Recognize the need for, and have the preparation and ability for i) independent and life-long learning ii) adaptability to new and emerging technologies and iii) critical thinking in the broadest context of technological change. (WK8)
Programme Specific Outcomes (PSOs)	
PSO1	**Mechanical System Design and Analysis:** Apply fundamental principles of mechanics, thermodynamics, and materials science to design, analyze, and optimize mechanical components and systems.
PSO2	**Manufacturing and Automation:** Utilize modern manufacturing techniques, automation, and computer-aided tools to develop efficient and sustainable production processes.

Chairman (BoS)

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

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

SEMESTER I

S. No.	Course Code	Course Title	Category	Periods / Semester					Credit	Max. Marks		
				L	T	P	SL	Tot		CA	ES	Tot
Induction Programme			-	-	-	-	-	-	-	-	-	-
THEORY COURSES												
1	24ENT19	Professional Communication	HSMC	45	0	0	45	90	**3**	40	60	100
2	24MET16	Engineering Drawing	PCC	30	0	60	30	120	**4**	40	60	100
3	24GET19	□□□□□□ □□□□ / Heritage of Tamils	HSMC	15	0	0	15	30	**1**	40	60	100
THEORY COURSES WITH LABORATORY COMPONENT												
4	24MAI19	Matrices and Calculus	BSC	45	0	30	45	120	**4**	50	50	100
5	24MEI11	CAD Fundamentals	BSC	45	0	30	45	120	**4**	50	50	100
6	24PHI06	Applied Physics	BSC	45	0	30	45	120	**4**	50	50	100
LABORATORY COURSES												
7	24GEP17	Manufacturing Practices Laboratory	ESC	0	0	30	0	30	**1**	60	40	100
EMPLOYABILITY ENHANCEMENT COURSE												
8	24SDP19	Soft Skills Development -I	EEC	0	0	30	0	30	**1**	60	40	100
MANDATORY COURSE												
9	24MCP09	Yoga for Stress Management	MC	0	0	30	0	30	**0**	-	-	-
			TOTAL	225	0	240	225	690	**22**	**800**		

SEMESTER II

S. No.	Course Code	Course Title	Category	Periods / Semester					Credit	Max. Marks		
				L	T	P	SL	Tot		CA	ES	Tot
THEORY COURSES												
1	24MET26	Design Thinking	PCC	30	0	0	30	60	**2**	40	60	100
2	24EET06	Basics of Electrical and Electronics Engineering	ESC	45	0	0	45	90	**3**	40	60	100
3	24GET29	தமிழரும் தொழில் நுட்பமும் / Tamils and Technology	HSMC	15	0	0	15	30	**1**	40	60	100

Chairman (BoS)

THEORY COURSES WITH LABORATORY COMPONENT												
4	24MAI29	Probability and Statistics	BSC	45	0	30	45	120	**4**	50	50	100
5	24CBI26	Python Programming	ESC	45	0	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
EMPLOYABILITY ENHANCEMENT COURSE												
8	24SDP29	Soft Skills Development -II	EEC	0	0	30	0	30	**1**	60	40	100
			TOTAL	225	0	210	225	600	**20**	**800**		

SEMESTER III												
S. No.	**Course Code**	**Course Title**	**Category**	**Periods / Semester**					**Credit**	**Max. Marks**		
				L	**T**	**P**	**SL**	**Tot**		**CA**	**ES**	**Tot**
THEORY COURSES												
1	24MAT36	Optimization Techniques	BSC	45	15	0	60	120	**4**	40	60	100
2	24MET31	Engineering Thermodynamics	PCC	45	0	0	45	90	**3**	40	60	100
3	24MET32	Manufacturing Technology -I	PCC	45	0	0	45	90	**3**	40	60	100
4	24MET33	Engineering Materials and Metallurgy	PCC	45	0	0	45	90	**3**	40	60	100
5	24MET36	Engineering Mechanics	PCC	45	15	0	60	120	**4**	40	60	100
6	24MET37	Fluid Mechanics and Machinery	PCC	45	0	0	45	90	**3**	40	60	100
LABORATORY COURSES												
7	24MEP31	Manufacturing Technology 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	30	150	300	750	**25**	**1000**		

SEMESTER IV												
S. No.	**Course Code**	**Course Title**	**Category**	**Periods / Semester**					**Credit**	**Max. Marks**		
				L	**T**	**P**	**SL**	**Tot**		**CA**	**ES**	**Tot**
THEORY COURSES												
1	24MAT46	Numerical and Computational Techniques	BSC	45	15	0	60	120	**4**	40	60	100
2	24MET46	Strength of Materials	PCC	45	0	0	45	90	**3**	40	60	100
3	24MET41	Manufacturing Technology-II	PCC	45	0	0	45	90	**3**	40	60	100
4	24MET42	Machine Drawing	PCC	60	0	0	60	120	**4**	40	60	100
5	24GET09	Universal Human Values and Ethics	HSMC	45	0	0	45	90	**3**	40	60	100
6	24MET43	Thermal Engineering	PCC	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	24MEP41	Thermal 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	24MEP42	Seminar Presentation	EEC	0	0	30	0	30	**1**	100	-	100
TOTAL				285	15	180	300	780	**26**	**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	24MET51	Design of Machine Elements	PCC	45	15	0	60	120	**4**	40	60	100
2	24MET52	Metrology and Measurements	PCC	45	0	0	45	90	**3**	40	60	100
3	24MET53	Theory of Machines	PCC	45	15	0	60	120	**4**	40	60	100
4		Professional Elective – I	PEC	45	0	0	45	90	**3**	40	60	100
5		Professional Elective – II	PEC	45	0	0	45	90	**3**	40	60	100
6		Open Elective	OEC	45	0	0	45	90	**3**	40	60	100
LABORATORY COURSES												
7	24MEP51	Metrology and Measurements Laboratory	PCC	0	0	45	0	45	**1.5**	60	40	100
8	24MEP52	Dynamics Laboratory	PCC	0	0	45	0	45	**1.5**	60	40	100
EMPLOYABILITY ENHANCEMENT COURSE												
9	24MEP53	Internship – I *	EEC	0	0	0	0	0	**1**	100	-	100
10	24MEP54	Industrial Oriented Course -1	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	30	90	300	720	**25**	**1100**		

*** - Students should undergo internship during the IV semester summer vacation**

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	24MET61	Heat and Mass Transfer	PCC	45	15	0	60	120	**4**	40	60	100
3	24MET62	Design of Transmission systems	PCC	45	0	0	45	90	**3**	40	60	100
4	24MET63	Computer Aided Manufacturing	PCC	45	0	0	45	90	**3**	40	60	100
5		Professional Elective – III	PEC	45	0	0	45	90	**3**	40	60	100
LABORATORY COURSES												
6	24MEP61	Heat and Mass Transfer Laboratory	PCC	0	0	45	0	45	**1.5**	60	40	100
7	24MEP62	CAD/CAM Laboratory	PCC	0	0	45	0	45	**1.5**	60	40	100
EMPLOYABILITY ENHANCEMENT COURSES												
8	24MEP63	Mini Project	EEC	0	0	45	0	45	**1.5**	60	40	100
9	24MEP64	Industrial Oriented Course -2	EEC	0	0	0	0	0	**1**	100	-	100
MANDATORY COURSE												
10		Mandatory Course – III	MC	30	0	0	0	30	**0**	100	-	100
TOTAL				255	15	135	240	645	**21.5**	**1000**		

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	24MET71	Mechatronics	PCC	45	0	0	45	90	**3**	40	60	100
3	24MET72	Maintenance Engineering	PCC	45	0	0	45	90	**3**	40	60	100
4	24MET73	Standards in Mechanical Engineering	PCC	15	0	0	15	30	**1**	100	-	100
5		Professional Elective – IV	PEC	45	0	0	45	90	**3**	40	60	100
6		Professional Elective – V	PEC	45	0	0	45	90	**3**	40	60	100
LABORATORY COURSES												
7	24MEP71	Mechatronics Laboratory	PCC	0	0	45	0	45	**1.5**	60	40	100
EMPLOYABILITY ENHANCEMENT COURSE												
8	24MEP72	Project Phase – I	EEC	0	0	60	0	60	**2**	60	40	100
TOTAL				240	0	105	240	585	**19.5**	**800**		

SEMESTER VIII												
S. No.	Course Code	Course Title	Category	Periods / Week					Credit	Max. Marks		
				L	T	P		Tot		CA	ES	Tot
EMPLOYABILITY ENHANCEMENT COURSE												
1	24MEP81	Project Phase – II	EEC	0	0	240	0	240	**8**	60	40	100
TOTAL				0	0	240	0	240	**8**	**100**		
TOTAL CREDITS									**167**			

Chairman (BoS)

HUMANITIES, SOCIAL SCIENCE AND MANAGEMENT COURSES (HSMC)													
S. No.	Course Code	Course Title	Semester	Periods / Week					C	Max. Marks		
				L	T	P	SL	Tot		CA	ES	Tot
1	24ENT19	Professional Communication	I	45	0	0	45	90	3	40	60	100
2	24GET19	□□□□□□ □□□□ / Heritage of Tamils	I	15	0	0	15	30	1	40	60	100
3	24GET29	தமிழரும் தொழில் நுட்பமும் / Tamils and Technology	II	15	0	0	15	30	1	40	60	100
4	24ENP29	Professional Communication Laboratory	II	0	0	30	0	30	1	60	40	100
5	24GET09	Universal Human Values and Ethics	IV	45	0	0	45	90	3	40	60	100
6	**24GET69**	**Entrepreneurship Development**	VI	45	0	0	45	90	3	40	60	100
7	**24GET79**	**Project Management**	VII	45	0	0	45	90	3	40	60	100
		TOTAL		**210**	**0**	**30**	**210**	**450**	**15**			

BASIC SCIENCE COURSES (BSC)												
S. No.	Course Code	Course Title	Semester	Periods / Week					Credit	Max. Marks		
				L	T	P	SL	Tot		CA	ES	Tot
1	24MAI19	Matrices and Calculus	I	30	15	30	45	120	4	50	50	100
2	24PHI06	Applied Physics	I	45	0	30	45	120	4	50	50	100
3	24MAI29	Probability and Statistics	II	45	0	30	45	120	4	50	50	100
4	24CHI07	Applied Chemistry	II	45	0	30	45	120	4	50	50	100
5	24MAT36	Optimization Techniques	III	45	15	0	60	120	4	40	60	100
6	24MAT46	Numerical and Computational Techniques	IV	45	15	0	60	120	4	40	60	100
		TOTAL		**255**	**45**	**120**	**300**	**720**	**24**			

ENGINEERING SCIENCES COURSES(ESC)												
S. No.	Course Code	Course Title	Semester	Periods / Week					Credit	Max. Marks		
				L	T	P	SL	Tot		CA	ES	Tot
1	24ITT16	Programming for Problem Solving	I	45	0	0	45	90	3	40	60	100
2	24ITP16	Programming for Problem Solving Laboratory	I	0	0	30	0	30	1	60	40	100
3	24GEP17	Manufacturing Practices Laboratory	I	0	0	30	0	30	1	60	40	100
4	24CST29	Python Programming	II	45	0	0	45	90	3	40	60	100
5	24EET06	Basics of Electrical and Electronics Engineering	II	45	0	0	45	90	3	40	60	100
6	24CSP29	Python Programming Laboratory	II	0	0	30	0	30	1	60	40	100
		TOTAL		**135**	**0**	**90**	**135**	**360**	**12**			

Chairman (BoS)

EMPLOYABILITY ENHANCEMENT COURSES (EEC)												
S. No.	Course Code	Course Title	Semester	Periods / Week					C	Max. Marks		
				L	T	P	SL	Tot		CA	ES	Tot
1	24SSP19	Aptitude and Coding Skills-I	I	0	0	30	0	30	1	60	40	100
2	24SSP29	Aptitude and Coding Skills-II	II	0	0	30	0	30	1	60	40	100
3	24SDP39	Aptitude and Coding Skills-III	III	0	0	30	0	30	1	60	40	100
4	24SDP49	Aptitude and Coding Skills-IV	IV	0	0	30	0	30	1	60	40	100
5	24MEP53	Internship – I	V	0	0	0	0	0	1	100	-	100
6	24MEP54	Industrial Oriented Course -1	V	0	0	0	0	0	1	100	-	100
7	24MEP63	Mini Project	VI	0	0	45	0	45	1.5	60	40	100
8	24MEP64	Industrial Oriented Course -2	VI	0	0	0	0	0	1	100	-	100
9	24MEP72	Project Phase - I	VII	0	0	60	0	60	2	60	40	100
10	24MEP81	Project Phase – II	VIII	0	0	240	0	240	8	60	40	100
			TOTAL	0	0	465	0	465	18.5			

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.

PROFESSIONAL ELECTIVE COURSES: VERTICALS

VERTICAL 1	VERTICAL 2	VERTICAL 3	VERTICAL 4	VERTICAL 5
PRODUCT AND PROCESS DEVELOPMENT	ROBOTICS AND AUTOMATION	MODERN MOBILITY SYSTEMS	THERMAL ENGINEERING	PRODUCTION ENGINEERING
Value Engineering	Sensors and instrumentation	Automotive Materials, Design and Testing	Gas Dynamics and Jet Propulsion	Flexible Manufacturing Systems
3D Printing	Robotics	Thermal Management of Batteries and Fuel cells	Refrigeration and Air Conditioning	Non Traditional Machining Processes
Non Destructive Testing and Evaluation	Drone Technologies	Conventional and Futuristic vehicle Technology	Power Plant Engineering	Casting and Welding Processes
Process Planning and Cost Estimation	Smart mobility and Intelligent Vehicles	Advanced Vehicle Engineering	Advanced Internal Combustion Engineering	Hydraulic and Pneumatic Systems
Ergonomics In Design	Micro-Electromechanical Systems	Automobile Engineering	Turbo Machines	Design of Jigs, Fixtures and Press Tools
Product Design and Development	Electrical Drives and Actuators	Vehicle Health Monitoring	Nuclear Engineering	Composite Materials

Chairman (BoS)

PROFESSIONAL ELECTIVE COURSES: VERTICALS

VERTICAL 1 : PRODUCT AND PROCESS DEVELOPMENT											
S. No.	Course Code	Course Title	Periods / Week					C	Max. Marks		
			L	T	P	SL	Tot		CA	ES	Tot
1	24MEE01	Value Engineering	45	0	0	45	90	3	40	60	100
2	24MEE02	3D Printing	45	0	0	45	90	3	40	60	100
3	24MEE03	Non Destructive Testing and Evaluation	45	0	0	45	90	3	40	60	100
4	24MEE04	Process Planning and Cost Estimation	45	0	0	45	90	3	40	60	100
5	24MEE05	Ergonomics In Design	45	0	0	45	90	3	40	60	100
6	24MEE06	Product Design and Development	45	0	0	45	90	3	40	60	100
VERTICAL 2: ROBOTICS AND AUTOMATION											
S. No.	Course Code	Course Title	Periods / Week					C	Max. Marks		
			L	T	P	SL	Tot		CA	ES	Tot
1	24MEE07	Sensors and instrumentation	45	0	0	45	90	3	40	60	100
2	24MEE08	Robotics	45	0	0	45	90	3	40	60	100
3	24MEE09	Drone Technologies	45	0	0	45	90	3	40	60	100
4	24MEE10	Smart mobility and Intelligent Vehicles	45	0	0	45	90	3	40	60	100
5	24MEE11	Micro-Electromechanical Systems	45	0	0	45	90	3	40	60	100
6	24MEE12	Electrical Drives and Actuators	45	0	0	45	90	3	40	60	100
VERTICAL 3: MODERN MOBILITY SYSTEMS											
S. No.	Course Code	Course Title	Periods / Week					C	Max. Marks		
			L	T	P	SL	Tot		CA	ES	Tot
1	24MEE13	Automotive Materials, Design and Testing	45	0	0	45	90	3	40	60	100
2	24MEE14	Renewable powered Off Highway Vehicles and Emission control Technology	45	0	0	45	90	3	40	60	100
3	24MEE15	Conventional and Futuristic vehicle Technology	45	0	0	45	90	3	40	60	100
4	24MEE16	Advanced Vehicle Engineering	45	0	0	45	90	3	40	60	100
5	24MEE17	Automobile Engineering	45	0	0	45	90	3	40	60	100
6	24MEE18	Vehicle Health Monitoring	45	0	0	45	90	3	40	60	100
VERTICAL 4 :THERMAL ENGINEERING											
S. No.	Course Code	Course Title	Periods / Week					C	Max. Marks		
			L	T	P	SL	Tot		CA	ES	Tot
1	24MEE19	Gas Dynamics and Jet Propulsion	45	0	0	45	90	3	40	60	100
2	24MEE20	Refrigeration and Air Conditioning	45	0	0	45	90	3	40	60	100
3	24MEE21	Power Plant Engineering	45	0	0	45	90	3	40	60	100
4	24MEE22	Unconventional Energy Sources	45	0	0	45	90	3	40	60	100
5	24MEE23	Design of Pressure Vessels	45	0	0	45	90	3	40	60	100
6	24MEE24	Turbo Machines	45	0	0	45	90	3	40	60	100

Chairman (BoS)

VERTICAL 5: PRODUCTION ENGINEERING												
S. No.	Course Code	Course Title	Periods / Week					C	Max. Marks		
			L	T	P	SL	Tot		CA	ES	Tot
1	24MEE25	Flexible Manufacturing Systems	45	0	0	45	90	**3**	40	60	100
2	24MEE26	Maintenance Engineering	45	0	0	45	90	**3**	40	60	100
3	24MEE27	CAD/CAM	45	0	0	45	90	**3**	40	60	100
4	24MEE28	Hydraulic and Pneumatic Systems	45	0	0	45	90	**3**	40	60	100
5	24MEE29	Design of Jigs, Fixtures and Press Tools	45	0	0	45	90	**3**	40	60	100
6	24MEE30	Composite Materials	45	0	0	45	90	**3**	40	60	100

OPEN ELECTIVE COURSES												
S. No.	Dept.	Course Code	Course Name	Periods / Week					C	Max. Marks		
				L	T	P	SL	T		CA	ES	T
1.	AUTO	24AUO01	Basics of Automobile Engineering	45	0	0	45	90	3	40	60	100
2.		24AUO02	Hybrid Vehicles	45	0	0	45	90	3	40	60	100
3.	BME	24BMO01	Basics of Biomedical Instrumentation	45	0	0	45	90	3	40	60	100
4.		24BMO02	Biometric systems	45	0	0	45	90	3	40	60	100
5.	CIVIL	24CEO01	Smart Buildings	45	0	0	45	90	3	40	60	100
6.		24CEO02	Climate Change	45	0	0	45	90	3	40	60	100
7.	CSE	24CSO01	Data structures using C	45	0	30	45	120	4	40	60	100
8.		24CSO02	Fundamentals of Java Programming	15	0	90	15	120	4	40	60	100
9.		24CSO03	Full Stack Framework	45	0	0	45	90	3	40	60	100
10.		24CSO04	Digital Marketing	45	0	0	45	90	3	40	60	100
11.	CSE (Cyber Security)	24CBO01	Ethical Hacking	45	0	0	45	90	3	40	60	100
12.		24CBO02	Digital and Mobile Forensics	45	0	0	45	90	3	40	60	100
13.		24CBO03	Applied Java Programming	15	0	90	15	120	4	40	60	100
14.	AIDS	24CSO06	Data Science Fundamentals	45	0	0	45	90	3	40	60	100
15.		24CSO07	Artificial Intelligence and Machine learning	45	0	0	45	90	3	40	60	100

Chairman (BoS)

16.		24CSO08	Data Exploration and Visualization	45	0	0	45	90	3	40	60	100
17.	IOT	24IOO01	Industrial Internet of things	45	0	0	45	90	3	40	60	100
18.		24IOO02	Introduction to Sensors and IoT	45	0	0	45	90	3	40	60	100
19.	ECE	24ECO01	Drone Technology	45	0	0	45	90	3	40	60	100
20.		24ECO02	Wearable Devices	45	0	0	45	90	3	40	60	100
21.		24ECO03	5G /6G Communication	45	0	0	45	90	3	40	60	100
22.		24ECO04	Embedded IoT	45	0	0	45	90	3	40	60	100
23.	EEE	24EEO01	Solar and Wind Energy System	45	0	0	45	90	3	40	60	100
24.		24EEO02	Hydrogen and Hybrid Energy System	45	0	0	45	90	3	40	60	100
25.		24EEO03	Electric Vehicle Technology	45	0	0	45	90	3	40	60	100
26.		24EEO04	Energy Conservation and Management	45	0	0	45	90	3	40	60	100
27.	IT	24ITO01	Introduction to Mobile Application Development	45	0	0	45	90	3	40	60	100
28.		24ITO02	Introduction to Big Data and Analytics	45	0	0	45	90	3	40	60	100
29.		24ITO03	Augmented Reality / Virtual Reality	45	0	0	45	90	3	40	60	100
30.	Mech	24MEO01	3D Printing	45	0	0	45	90	3	40	60	100
31.		24MEO02	Robotics and Automation	45	0	0	45	90	3	40	60	100
32.		24MEO03	Lean Manufacturing	45	0	0	45	90	3	40	60	100
33.	SFE	24SFO01	Occupational health and safety	45	0	0	45	90	3	40	60	100
34.		24SFO02	Electrical safety	45	0	0	45	90	3	40	60	100
35.		24SFO03	Building Fire Safety	45	0	0	45	90	3	40	60	100
36.		24SFO04	Construction Safety	45	0	0	45	90	3	40	60	100

Chairman (BoS)

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

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

Summary										
Name of the Programme: B.E Mechanical Engineering										
CATEGORY	I	II	III	IV	V	VI	VII	VIII	TOTAL CREDITS	%
HSMC	4	2	-	3	-	3	3	-	15	8.98
BSC	8	8	4	4	-	-	-	-	24	14.37
ESC	5	7	-	-	-	-	-	-	12	07.19
PCC	4	2	20	17	14	15	8.5	-	80.5	48.20
PEC	-	-	-	-	6	3	6	-	15	8.98
OEC	-	-	-	-	3	-	-	-	3	1.80
EEC	1	1	1	1	1	2.5	2	8	17.5	10.48
MC	✓	-	-	-	✓	✓	-	-	-	-
Total	22	20	25	25	24	23.5	19.5	8	167	100

Chairman (BoS)

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-637 215. Centre for Academic Courses

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

(Common to AE,ME & SF)

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

1-low, 2-medium, 3-high

Chairman (BoS)

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

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 – குமரிமுனையில் 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)

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

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

Chairman (BoS)

24MAI19	MATRICES AND CALCULUS	Category	L	T	P	SL	C
		BSC	45	0	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 – Legendre's linear differential 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 – Taylor's series expansion – Jacobians - 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 solenoid vector fields – Green's theorem in plane, Gauss divergence theorem and Stoke's theorem (Cube, Cuboid and Rectangular Paralleopiped only).

List of Experiments(R Software):

1. Calculate the characteristic equation and eigen values.
2. Find the eigenvector and diagonalization of a given matrix.
3. Solving ODE with constant coefficients.
4. Detect the solution of ODE with variable coefficients.
5. Identify the radius of curvature.
6. Reckon the Taylor's series for functions of two variables.
7. Estimate the divergence and curl.

* Alternative weeks : Tutorial and Laboratory

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

Chairman (BoS)

K.S. 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 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/

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	-	-

1-low, 2-medium, 3-high

LIST OF EQUIPMENTS (For a Batch of 30 Students)

S.No.	Name of the Equipments	Quantity
1.	A computer with Intel (R) Core (TM) i3 – 2130 CPU @ 3.40GHZ processor and 4 GB RAM – DDR3.	30 Nos.
2.	R software (Open source)	30 Nos.

Chairman (BoS)

24MEI11	CAD FUNDAMENTALS	Category	L	T	P	SL	C
		PEC	45	0	30	45	4

Department of Mechanical Engineering

Prerequisites:
Introductory knowledge of mechanical components and CAD terminology

OBJECTIVES:
To introduce students the fundamentals of CAD tools, user interface, and data management.

UNIT - I	INTRODUCTION TO DATA COLLABORATION AND MANAGEMENT	9

Account creation and verification, Tool overview, and navigation to user interface- data storage, open, close, and saving a file. Import and export project files, navigation through workspaces, data collaboration and customizing of the tool bars.

UNIT - II	INTRODUCTION TO 2D MODELING	9

Create a new file, create and edit a sketch; create and edit a 2D model.

UNIT - III	INTRODUCTION TO 2D ASSEMBLY MODELLING	9

Introduction to Assembly Modelling – Creating a new assembly file, inserting and managing components, applying assembly constraints, generating sectioned views, editing and Hatching parts, and BOM.

UNIT - IV	INTRODUCTION TO TECHNICAL DRAWING	9

Explode a 2D model for a drawing, create a drawing sheet and views, add geometry and dimensions to a drawing, add text and symbols, place an exploded view, Edit a title block.

UNIT - V	INTRODUCTION TO PARAMETRIC SKETCHING	9

Create parameter-based sketches, Sketch splines and slots, Sketch text. Create a 3D mechanical link, add sketch Canvas images, create 3D model solid trigger, Manage physical materials and appearances.

List of Exercise/Experiments:

1. Create and verify a CAD account, user interface, customize toolbars, and navigate workspaces
2. Open, save, import/export project files, and collaborate by sharing and commenting on designs.
3. Create a new CAD project, draw and modify a 2D sketch
4. Creating simple and complex entities.
5. Create a drawing sheet of a 2D model with multiple views, geometrical dimensions, text, symbols, exploded view and title block.
6. Create a 2D view of the given diagram using Auto CAD.
7. Create a parameter-based sketch with dimensional constraints, and add splines, slots, and sketch text to demonstrate complex 2D geometry.
8. Create a 3D model mechanical component using solid tools like extrude, revolve, and sweep.

LIST OF EQUIPMENT (for a batch of 30 Students)

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

L:45,P:30 & SL:45 TOTAL: 120 PERIODS

Chairman (BoS)

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

COURSE OUTCOMES:

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

Course Outcome	Description	Bloom's Taxonomy Level
CO1	Illustrate CAD accounts, navigate the tool interface and collaborate on design data	Understand
CO2	Develop 2D sketches and models for standard mechanical components	Apply
CO3	Develop 2D parts, generate section views and BOMs	Apply
CO4	Construct detailed technical drawings with dimensions, text, symbols, and title blocks	Apply
CO5	Apply parametric design principles to create complex sketches and 3D models with material and appearance properties	Apply

TEXT BOOKS:

1. Bhatt N.D. and Panchal V.M., "Engineering Drawing", Charotar Publishing House, Gujarat, 54rd edition, 2023.
2. Autodesk Fusion 360 Black Book (V 2.0.15293) – Part 1 by Gaurav Verma and Matt Weber

REFERENCES:

1. Autodesk Fusion 360 Black Book (V 2.0.12670) – Part 2 by Gaurav Verma and Matt Weber.
2. Autodesk Fusion 360 – The Master Guide by Samar Malik.
3. Parametric Modeling with Autodesk Fusion 360 by Randy H. Shih
4. AUTODESK FUSION 360 EXERCISES: 200 Practice drawings for Fusion 360 by Sachidanand Jha.
5. Autodesk Fusion 360: A Tutorial Approach – 2nd edition by Prof. Sham Tickoo , Purdue University, Northwest , USA

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

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

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

Dr. R.V.M. RAMARAJAN
CHAIRMAN
BOARD OF STUDIES (CSE)
K.S.R. COLLEGE OF ENGINEERING
TIRUCHENGODE - 637 215.

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, 7th Edition, 2015.

Mapping of COs with POs and PSOs

COs / POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO 1	PSO 2
CO1	3	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-637 215. 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)

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

P:30 TOTAL: 30 PERIODS

Chairman (BoS)

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

1-low, 2-medium, 3-high

Chairman (BoS)

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

24SDP19	SOFT SKILLS DEVELOPMENT – I	Category	L	T	P	SL	C
		EEC	0	0	30	0	1

(Common to All Branches)

OBJECTIVES:

To introduce students to the fundamental concepts of aptitude, emphasizing its relevance in academic pursuits and career advancement. It also focuses on developing proficiency in verbal reasoning, which enhances the students' problem-solving abilities and critical thinking skills.

UNIT - I	NUMBER SYSTEM	(6)

Introduction to Number System and its Classification – Divisibility Rules and Problems – Remainder Theorem – HCF & LCM and its properties.

UNIT - II	NUMBERS	(6)

Introduction to Digits, Place value, Face value and Fractions – BODMAS Rule and Simplifications – Unit Digit, Squares and Cubes.

UNIT - III	AVERAGES	(6)

Introduction to Averages, Sum of Observations and Number of Observation – Average of Consecutive Numbers – Weighted Average – Change in Average – Averages in Real-life Scenarios.

UNIT - IV	LOGICAL REASONING	(6)

Analogies – Alphabet Series and Number Series – Directions and Distance.

UNIT - V	VERBAL ABILITY	(6)

Reading Comprehension – Synonyms and Antonyms – Sentence Formation – Paragraph Formation.

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, and understand the concepts of HCF and LCM.	Understand
CO2	Solve problems using face and place value, fractions, BODMAS and number properties.	Apply
CO3	Apply concepts of averages, to analyse and solve real-life and quantitative aptitude problems effectively.	Apply
CO4	Resolve problems with series & direction based logical reasoning.	Apply
CO5	Interpret passages to demonstrate reading comprehension, and explain the structure of correct sentence and paragraph formation.	Understand

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. 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. Edgar Thorpe & Showick Thorpe, "English for Competitive Examinations".

REFERENCES:

1. Arun Sharma, Quantitative Aptitude for CAT, 11e, 2025.
2. Arun Sharma, Logical Reasoning for CAT, 7e, 2025.
3. Wren & Martin, High School English Grammar & Composition.
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	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

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)

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	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	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1
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)

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

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–மாநிரி 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)

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)

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)

24MAI29	PROBABILITY AND STATISTICS	Category	L	T	P	SL	C
		BSC	45	0	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.

List of 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. Examine the small samples using F distribution.
5. Inspect the data using Latin Square Design (LSD).
6. Find the $\bar{X}$ Charts.
7. Compute the R Charts.

* Alternative weeks : Tutorial and Laboratory

L = 45 , * P = 15 & *T = 15, 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 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	P O 9	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

LIST OF EQUIPMENTS (For a Batch of 30 Students)

S.No.	Name of the Equipments	Quantity
1.	A computer with Intel (R) Core (TM) i3 – 2130 CPU @ 3.40GHZ processor and 4 GB RAM – DDR3.	30 Nos.
	R software (Open source)	30 Nos.

Chairman (BoS)

24CBI26	PYTHON PROGRAMMING	Category	L	T	P	SL	C
		PCC	45	0	30	45	4

(Common to ECE, EEE, Mech, Civil, SFE, BME)

PREREQUISITE:

Basic knowledge of programming concepts such as variables, data types, and control statements. Logical problem-solving ability and basic mathematical understanding are recommended.

OBJECTIVES:

The course helps the students to understand Python basics, write and debug programs, work with functions, files, and data structures, and use exception handling, NumPy, and Pandas for data analysis.

UNIT – I	BASICS OF PYTHON PROGRAMMING	(15)

Introduction – Python Interpreter – Interactive and Script mode – Values and types – Variables – Operators – Expressions – Statements – Precedence of operators – Multiple assignments – Comments – Input function – Print function – Formatting numbers and strings – Implicit/Explicit type conversion. **(Theory-9)**

List of Exercise:

1. Write a Python program to demonstrate values, types, variables, operators, expressions, multiple assignments, and operator precedence.
2. Develop a Python program to read user input and display formatted output using format () and f- strings.
3. Construct a Python program to perform implicit and explicit type conversion and demonstrate comments. **(Laboratory-6)**

UNIT – II	CONTROL STATEMENTS AND STRINGS	(15)

Conditional (if), alternative (if-else), chained conditional (if-elif-else). Iteration-while, for, infinite loop, break, continue, pass, else. Strings-String slices, immutability, string methods and operations.**(Theory-9)**

List of Exercise:

1. Construct a Python program using conditional statements (if, if-else, if-elif-else).
2. Develop a Python program demonstrating loop control statements using for, while, break, continue, pass, and infinite loop.
3. Write a Python program to perform string slicing, demonstrate immutability, and apply string methods. **(Laboratory-6)**

UNIT – III	FUNCTIONS AND FILES	(15)

Functions – Introduction – Inbuilt functions – User-defined functions – Passing parameters: positional, default, keyword arguments – Return values – Local and global scope – Recursion – Lambda functions. Files – Text files – Reading and writing files. **(Theory-9)**

List of Exercise:

1. Write a Python program demonstrating positional, keyword, and default arguments with return values.
2. Construct a Python program using recursion and lambda functions.
3. Develop a Python program to create, write, and read text files. **(Laboratory-6)**

UNIT – IV	DATA STRUCTURES: LISTS, TUPLES, SETS, DICTIONARIES	(15)

Lists – Creating lists – List operations – List methods – Mutability – List functions – Searching and sorting. Tuples – Tuple assignment – Operations on tuples – Lists and tuples – Tuple as return value. Sets – Creating sets – Set operations. Dictionaries – Operations and methods – Nested dictionaries. **(Theory-9)**

List of Exercise:

1. Write a Python program to create and manipulate lists including searching and sorting.
2. Develop a Python program to demonstrate set and tuple operations.
3. Construct a Python program using dictionaries and nested dictionaries. **(Laboratory-6)**

UNIT – V	EXCEPTIONS HANDLING, NUMPY AND PANDAS	(15)

Chairman (BoS)

Exceptions – Errors and Exceptions – Handling exception – Built-in and User-defined exceptions. NumPy – Introduction – Computations using NumPy functions – Computation on arrays – Aggregation – Indexing and Sorting. Pandas – Introduction and Basic concepts – DataFrames – Data handling. **(Theory-9)**

List of Exercise:

1. Write a Python program to demonstrate exception handling including built-in and user-defined exceptions.
2. Develop a Python program using NumPy to perform computations, aggregations, indexing, and sorting.
3. Apply Pandas DataFrame operations to create, update, filter, and describe datasets.

(Laboratory-6)

COURSE OUTCOMES:

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

Course Outcome	Description	Bloom's Taxonomy
CO1	Illustrate fundamental Python programming constructs such as variables, operators, expressions, and control statements.	Understand
CO2	Demonstrate Python conditional statements, loops, and string operations for basic program logic.	Apply
CO3	Develop Python programs using functions, recursion, and file handling concepts.	Apply
CO4	Apply Python data structures including lists, sets, tuples, and dictionaries to solve problems.	Apply
CO5	Use to exception handling and perform data manipulation NumPy and Pandas.	Apply

TEXT BOOKS:

1	Eric Matthes, "Python Crash Course: A Hands-On, Project-Based Introduction to Programming", No Starch Press, 3rd Edition, 2025
2	Reema Thareja, "Python Programming Using Problem Solving Approach", Oxford University Press, 3rd Edition, 2025

REFERENCES:

1	Wes McKinney, "Python for Data Analysis: Data Wrangling with pandas, NumPy, and Jupyter", O'Reilly Media, 3rd Edition, 2022
2	Allen B. Downey, "Think Python: How to Think Like a Computer Scientist", Green Tea Press, 2nd Edition, 2016
3	Robert Sedgewick, Kevin Wayne, Robert Dondero, "Introduction to Programming in Python: An Interdisciplinary Approach", Pearson Education / Addison-Wesley Professional, 1st Edition, 2016
4	David Beazley & Brian K. Jones, "Python Cookbook: Recipes for Mastering Python 3", O'Reilly Media, 3rd Edition, 2024
5	Luciano Ramalho, "Fluent Python: Clear, Concise, and Effective Programming", O'Reilly Media, 2nd Edition, 2022

Mapping of COs with POs and PSOs

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

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

Chairman (BoS)

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

3

24SDP29	SOFT SKILLS DEVELOPMENT – II	Category	L	T	P	SL	C
		EEC	0	0	30	0	1

(Common to All Branches)

OBJECTIVES:

To introduce students to the basics of aptitude, helping them understand its core concepts and real-world applications. A key focus is placed on developing proficiency in verbal reasoning, which supports improved problem-solving and analytical thinking. Additionally, the course works toward building a strong foundation in English grammar to enhance language accuracy and communication skills.

UNIT - I	PERCENTAGE	(6)

Concept of Percentage – Successive Percentage – Increasing and Decreasing Percentage – Population – Depreciation.

UNIT - II	PROFIT AND LOSS	(6)

Concepts of Cost Price, Selling Price, Profit and Loss – Profit Percentage – Loss Percentage – Problems on Dishonest Seller.

UNIT - III	RATIO PROPORTIONS AND PARTNERSHIP	(6)

Introduction and Ratio Calculation – Mean Proportion – Share Calculation Based on Ratio – Ages – Partnership.

UNIT - IV	LOGICAL REASONING	(6)

Coding and Decoding – Blood Relations – Ranking and Ordering.

UNIT - V	VERBAL ABILITY	(6)

Sentence Improvement – Ordering of Sentence – Cloze Test – Spellings.

TOTAL: 30 PERIODS

COURSE OUTCOMES:

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

COs	Course Outcome	Cognitive Level
CO1	Apply percentage concepts to solve problems on growth, depreciation, and population change effectively.	Apply
CO2	Apply concepts of profit, loss, and pricing to analyse transactions, including cases of dishonest selling.	Apply
CO3	Demonstrate proficiency in applying ratio, proportion, and partnership principles	Apply
CO4	Solve the problems on coding-decoding, blood relations, and ranking using logical reasoning techniques	Apply
CO5	Improve the sentence structure, logical sequencing, contextual understanding, and spelling accuracy for effective communication.	Understand

Chairman (BoS)

K.S. College of Engineering Tiruchengodu-637215 Centre for 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. Edgar Thorpe & Showick Thorpe, "English for Competitive Examinations".

REFERENCES:

1. Arun Sharma, Quantitative Aptitude for CAT, 11e, 2025.
2. Arun Sharma, Logical Reasoning for CAT, 7e, 2025.
3. Wren & Martin, High School English Grammar & Composition.
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	2	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. Centre for Academic Courses