



KSR College of
Engineering

AN AUTONOMOUS INSTITUTION



NAAC
ACCREDITED **A++**

NBA
ACCREDITED
PROGRAMMES



B.E. - AUTOMOBILE ENGINEERING

REGULATIONS 2024

(Academic Year 2024-25 Onwards)

**Curriculum & Syllabus
Semester I to IV**





K.S.R. COLLEGE OF ENGINEERING
An Autonomous Institution
Approved by AICTE and Affiliated to Anna University, Chennai
Accredited by NAAC ('A++' Grade)

Department Department of Automobile Engineering
Programme B.E – Automobile Engineering

Vision of the Institution

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

Mission of the Institution

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

Vision of the Department

DV To provide quality education, facilitate research and innovation to meet the global demand in automotive industries and society.

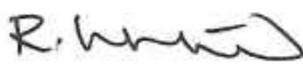
Mission of the Department

- DM 1** Impart quality education through flexible curriculum and higher learning.
- DM 2** Provide training through automotive industrial collaboration for global needs.
- DM 3** Enhance research and innovation for sustainable environment.

Program Educational Objectives (PEOs)

The graduates of the programme will be able to

- PEO 1** **Core Competency:** Apply technical knowledge in automobile engineering field.
- PEO 2** **Professionalism:** Impart inter-disciplinary skills and innovations for challenges emerging in automobile sector.
- PEO 3** **Career Development:** Enrich knowledge, communication, professional ethics and leadership skills.


Chairman (BoS)



Program Outcomes (POs)	
	Engineering Graduates will be able to:
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.
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.
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.
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.
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.
PO7	Ethics: Apply ethical principles and commit to professional ethics, human values, diversity and inclusion; adhere to national & international laws.
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.
Program Specific Outcomes (PSOs)	
PSO1	Professional competency: Design and analyze automotive components, electrical and electronic systems.
PSO2	Troubleshoot Skills: Develop as a professional in maintenance and service of automotive systems.

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Curriculum
UG
R - 2024

Department Department of Automobile Engineering

Programme B.E. Automobile 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.	24ITT16	Programming for Problem Solving	ESC	45	0	0	45	90	3	40	60	100
4.	24GET19	தமிழர் மரபு / Heritage of Tamils	HSMC	15	0	0	15	30	1	40	60	100
THEORY COURSES WITH LABORATORY COMPONENT												
5.	24MA119	Matrices and Calculus	BSC	30	15	30	45	120	4	50	50	100
6.	24PHI06	Applied Physics	BSC	45	0	30	45	120	4	50	50	100
LABORATORY COURSES												
7.	24ITP16	Programming for Problem Solving Laboratory	ESC	0	0	30	0	30	1	60	40	100
8.	24GEP17	Manufacturing Practices Laboratory	ESC	0	0	30	0	30	1	60	40	100
EMPLOYABILITY ENHANCEMENT COURSE												
9.	24SSP19	Aptitude and Coding Skills - I	EEC	0	0	30	0	30	1	60	40	100
TOTAL				210	15	210	225	660	22	900		

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SEMESTER II												
S. No.	Course Code	Course Title	Category	Periods / Semester					Credit	Max. Marks		
				L	T	P	SL	Tot		CA	ES	Tot
THEORY COURSES												
1.	24CST29	Python Programming	ESC	45	0	0	45	90	3	40	60	100
2.	24MET26	Design Thinking	PCC	30	0	0	30	60	2	40	60	100
3.	24EET06	Basic Electrical and Electronics Engineering	ESC	45	0	0	45	90	3	40	60	100
4.	24GET29	தமிழரும் தொழில்நுட்பமும் / Tamils and Technology	HSMC	15	0	0	15	30	1	40	60	100
THEORY COURSES WITH LABORATORY COMPONENT												
5.	24MAI29	Probability and Statistics	BSC	30	15	30	45	120	4	50	50	100
6.	24CHI07	Applied Chemistry	BSC	45	0	30	45	120	4	50	50	100
LABORATORY COURSES												
7.	24ENP29	Professional Communication Laboratory	HSMC	0	0	30	0	30	1	60	40	100
8.	24CSP29	Python Programming Laboratory	ESC	0	0	30	0	30	1	60	40	100
9.	24AUP21	Computer Aided Drawing Laboratory	PCC	0	0	30	0	30	1	60	40	100
EMPLOYABILITY ENHANCEMENT COURSE												
10.	24SSP29	Aptitude and Coding Skills - II	EEC	0	0	30	0	30	1	60	40	100
MANDATORY COURSE												
11.	24MCP09	Mandatory Course - I	MC	0	0	30	0	30	0	-	-	-
TOTAL				210	15	210	225	660	21	1000		

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.	24AUT31	Automotive Thermal Engineering	PCC	45	0	0	45	90	3	40	60	100
3.	24AUT32	Automotive Chassis	PCC	45	0	0	45	90	3	40	60	100
4.	24MET36	Engineering Mechanics	PCC	45	15	0	60	120	4	40	60	100
5.	24MET37	Fluid Mechanics and Machinery	PCC	45	0	0	45	90	3	40	60	100
6.	24SFT36	Manufacturing Processes	PCC	45	0	0	45	90	3	40	60	100
LABORATORY COURSES												
7.	24MEP36	Fluid Mechanics and Machinery Laboratory	PCC	0	0	45	0	45	1.5	60	40	100
8.	24SFP36	Manufacturing Processes 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		

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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.	24GET09	Universal Human Values	HSMC	45	0	0	45	90	3	40	60	100
3.	24AUT41	Engines and Transmission Systems	PCC	45	0	0	45	90	3	40	60	100
4.	24AUT42	Vehicle Body Engineering	PCC	45	0	0	45	90	3	40	60	100
5.	24MET46	Strength of Materials	PCC	45	0	0	45	90	3	40	60	100
6.		Professional Elective - I	PEC	45	0	0	45	90	3	40	60	100
LABORATORY COURSES												
7.	24AUP41	Automotive Components Laboratory	PCC	0	0	45	0	45	1.5	60	40	100
8.	24MEP46	Strength of Materials 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.	24AUP42	Seminar Presentation	EEC	0	0	30	0	30	1	100	-	100
11.	24SDP49	Soft Skills Development - IV	EEC	0	0	30	0	30	1	60	40	100
TOTAL				270	15	180	285	750	25	1100		

SEMESTER V												
S. No.	Course Code	Course Title	Category	Periods / Semester					Credit	Max. Marks		
				L	T	P	SL	Tot		CA	ES	Tot
THEORY COURSES												
1.	24AUT51	Mechanics of Machines	PCC	45	15	0	60	120	4	40	60	100
2.	24AUT52	Automotive Fuels and Lubricants	PCC	45	0	0	45	90	3	40	60	100
3.	24AUT53	Automotive Electrical and Electronics	PCC	45	0	0	45	90	3	40	60	100
4.	24AUT54	Automotive Vehicle Safety	PCC	45	0	0	45	90	3	40	60	100
5.		Professional Elective - II	PEC	45	0	0	45	90	3	40	60	100
THEORY COURSES WITH LABORATORY COMPONENT												
6.	24AUI51	Automotive Engine and Chassis Components Design	PCC	45	0	30	45	120	4	50	50	100
LABORATORY COURSES												
7.	24AUP51	Automotive Fuels and Lubricants Laboratory	PCC	0	0	45	0	45	1.5	60	40	100
8.	24AUP52	Automotive Electrical and Electronics Laboratory	PCC	0	0	45	0	45	1.5	60	40	100
EMPLOYABILITY ENHANCEMENT COURSE												
9.	24AUP53	Industry Oriented Course - I	EEC	0	0	0	0	0	1	100	-	100
10.	24AUP54	Internship - I*	EEC	0	0	0	0	0	1	100	-	100
MANDATORY COURSE												
11.		Mandatory Course - II	MC	30	0	0	0	30	0	100	-	100
TOTAL				300	15	120	285	720	25	1100		

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

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SEMESTER VI												
S. No.	Course Code	Course Title	Category	Periods / Semester					Credit	Max. Marks		
				L	T	P	SL	Tot		CA	ES	Tot
THEORY COURSES												
1.	24GET69	Entrepreneurship Development	HSMC	45	0	0	45	90	3	40	60	100
2.	24AUT61	Vehicle Maintenance and Testing	PCC	45	0	0	45	90	3	40	60	100
3.		Professional Elective – III	PEC	45	0	0	45	90	3	40	60	100
4.		Professional Elective – IV	PEC	45	0	0	45	90	3	40	60	100
5.		Open Elective – I	OEC	45	0	0	45	90	3	40	60	100
LABORATORY COURSES												
6.	24AUP61	Vehicle Maintenance and Reconditioning Laboratory	PCC	0	0	45	0	45	1.5	60	40	100
7.	24AUP62	Engine Performance and Emission Testing Laboratory	PCC	0	0	45	0	45	1.5	60	40	100
EMPLOYABILITY ENHANCEMENT COURSES												
8.	24AUP63	Industry Oriented Course - II	EEC	0	0	0	0	0	1	100	-	100
9.	24AUP64	Mini Project	EEC	0	0	60	0	60	2	60	40	100
MANDATORY COURSE												
10.		Mandatory Course - III	MC	30	0	0	0	30	0	100	-	100
TOTAL				255	0	150	225	630	21	1000		
SEMESTER VII												
S. No.	Course Code	Course Title	Category	Periods / Semester					Credit	Max. Marks		
				L	T	P	SL	Tot		CA	ES	Tot
THEORY COURSES												
1.	24GET79	Project Management	HSMC	45	0	0	45	90	3	40	60	100
2.	24AUT71	Electric and Hybrid Vehicles	PCC	45	0	0	45	90	3	40	60	100
3.	24AUT72	Intelligent Vehicles Technology	PCC	45	0	0	45	90	3	40	60	100
4.	24AUT73	Standards in Automobile Engineering	PCC	15	0	0	15	30	1	100	-	100
5.		Professional Elective – V	PEC	45	0	0	45	90	3	40	60	100
6.		Professional Elective – VI	PEC	45	0	0	45	90	3	40	60	100
EMPLOYABILITY ENHANCEMENT COURSE												
7.	24AUP71	Project Work Phase - I	EEC	0	0	60	0	60	2	60	40	100
TOTAL				240	0	60	240	540	18	700		
SEMESTER VIII												
S. No.	Course Code	Course Title	Category	Periods / Semester					Credit	Max. Marks		
				L	T	P	SL	Tot		CA	ES	Tot
EMPLOYABILITY ENHANCEMENT COURSE												
1.	24AUP81	Project Work Phase – II	EEC	0	0	240	0	240	8	60	40	100
TOTAL				0	0	240	0	240	8	100		
TOTAL CREDITS									165			
TOTAL NUMBER OF CREDITS TO BE EARNED FOR AWARD OF THE DEGREE = 165												
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.												

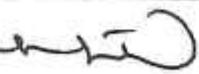
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HUMANITIES, SOCIAL SCIENCE AND MANAGEMENT COURSES (HSMC)												
S. No.	Course Code	Course Title	Semester	Periods / Semester					Credit	Max. Marks		
				L	T	P	SL	Tot		CA	ES	Tot
1.	24ENT19	Professional Communication	I	45	0	0	45	90	3	40	60	100
2.	24GET19	Heritage of Tamils	I	15	0	0	15	30	1	40	60	100
3.	24GET29	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	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 / Semester					Credi	Max. Marks		
				L	T	P	SL	Tot		t	CA	ES
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	30	15	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				240	60	120	300	720	24			

ENGINEERING SCIENCE COURSES(ESC)												
S. No.	Course Code	Course Title	Semester	Periods / Semester					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.	24CST26	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			

R. 
 Chairman (BoS)



EMPLOYABILITY ENHANCEMENT COURSES (EEC)												
S. No.	Course Code	Course Title	Semester	Periods / Semester					Credit	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	Soft Skills Development - III	III	0	0	30	0	30	1	60	40	100
4.	24SDP49	Soft Skills Development - IV	IV	0	0	30	0	30	1	60	40	100
5.	24AUP42	Seminar Presentation	IV	0	0	30	0	30	1	100	-	100
6.	24AUP53	Industry Oriented Course - I	V	0	0	0	0	0	1	100	-	100
7.	24AUP54	Internship - I*	V	0	0	0	0	0	1	100	-	-
8.	24AUP63	Industry Oriented Course - II	VI	0	0	0	0	0	1	100	-	100
9.	24AUP64	Mini Project	VI	0	0	60	0	60	2	60	40	100
10.	24AUP71	Project Work Phase - I	VII	0	0	60	0	60	2	60	40	100
11.	24AUP81	Project Work Phase - II	VIII	0	0	240	0	240	8	60	40	100
TOTAL				0	0	510	0	510	20			

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PROFESSIONAL CORE COURSES (PCC)

S. No.	Course Code	Course Title	Semester	Periods / Semester					Credit	Max. Marks		
				L	T	P	SL	Tot		CA	ES	Tot
1.	24MET16	Engineering Drawing	I	30	0	60	30	120	4	40	60	100
2.	24MET26	Design Thinking	II	30	0	0	30	60	2	40	60	100
3.	24AUP21	Computer Aided Drawing Laboratory	II	0	0	30	0	30	1	60	40	100
4.	24AUT31	Automotive Thermal Engineering	III	45	0	0	45	90	3	40	60	100
5.	24AUT32	Automotive Chassis	III	45	0	0	45	90	3	40	60	100
6.	24MET36	Engineering Mechanics	III	45	15	0	60	120	4	40	60	100
7.	24MET37	Fluid Mechanics and Machinery	III	45	0	0	45	90	3	40	60	100
8.	24SFT36	Manufacturing Processes	III	45	0	0	45	90	3	40	60	100
9.	24MEP36	Fluid Mechanics and Machinery Laboratory	III	0	0	45	0	45	1.5	60	40	100
10.	24SFP36	Manufacturing Processes Laboratory	III	0	0	45	0	45	1.5	60	40	100
11.	24MEP37	Design Studio - I	III	0	0	30	0	30	1	60	40	100
12.	24AUT41	Engines and Transmission Systems	IV	45	0	0	45	90	3	40	60	100
13.	24AUT42	Vehicle Body Engineering	IV	45	0	0	45	90	3	40	60	100
14.	24MET46	Strength of Materials	IV	45	0	0	45	90	3	40	60	100
15.	24AUP41	Automotive Components Laboratory	IV	0	0	45	0	45	1.5	60	40	100
16.	24MEP46	Strength of Materials Laboratory	IV	0	0	45	0	45	1.5	60	40	100
17.	24MEP47	Design Studio - II	IV	0	0	30	0	30	1	60	40	100
18.	24AUT51	Mechanics of Machines	V	45	15	0	60	120	4	40	60	100
19.	24AUT52	Automotive Fuels and Lubricants	V	45	0	0	45	90	3	40	60	100
20.	24AUT53	Automotive Electrical and Electronics	V	45	0	0	45	90	3	40	60	100
21.	24AUT54	Automotive Vehicle Safety	V	45	0	0	45	90	3	40	60	100
22.	24AUI51	Automotive Engine and Chassis Components Design	V	45	0	30	45	120	4	50	50	100
23.	24AUP51	Automotive Fuels and Lubricants Laboratory	V	0	0	45	0	45	1.5	60	40	100
24.	24AUP52	Automotive Electrical and Electronics Laboratory	V	0	0	45	0	45	1.5	60	40	100
25.	24AUT61	Vehicle Maintenance and Testing	VI	45	0	0	45	90	3	40	60	100
26.	24AUP61	Vehicle Maintenance and Reconditioning Laboratory	VI	0	0	45	0	45	1.5	60	40	100
27.	24AUP62	Engine Performance and Emission Testing Laboratory	VI	0	0	45	0	45	1.5	60	40	100
28.	24AUT71	Electric and Hybrid Vehicles	VII	45	0	0	45	90	3	40	60	100
29.	24AUT72	Intelligent Vehicles Technology	VII	45	0	0	45	90	3	40	60	100
30.	24AUT73	Standards in Automobile Engineering	VII	15	0	0	15	30	1	100	-	100
TOTAL				795	45	540	840	2220	74			

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VERTICAL-1	VERTICAL-2	VERTICAL-3	VERTICAL-4	VERTICAL-5	VERTICAL-6
Thermal Engineering	Manufacturing Engineering	Automotive Design	Automotive Integrated Technology	Automotive Management	Electric Vehicle
Advanced Theory of I.C. Engines	Material Science and Metallurgy	Finite Element Analysis	Fuel Cells and Applications	Engine and Vehicle Management System	Electric Two and Three Wheeler
Automotive Pollution and Control	Automotive Fabrication Processes	Vehicle Dynamics	Vehicle Control Systems	Transport Management	Battery Technology
Alternative Fuels and Energy Systems	Additive Manufacturing	Vehicle Architecture	Special Purpose Vehicles	Vehicle Dealership Management	Motors and Drives
Automotive Air-Conditioning	Lean Manufacturing	Robotics and Automation	Automotive Instrumentation	Ergonomics in Automotive Design	Sensors and Actuators
Combustion Thermodynamics and Heat Transfer	Computer Aided Manufacturing	Drone Technologies	Autonomous Vehicle Technology	Noise, Vibration and Harshness	Electric Vehicle Maintenance
Advanced Internal Combustion Engines	Production Planning and Control	Automotive Aerodynamics	Artificial Intelligence for Automobiles	Value Engineering	Connected Cars and ADAS



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K.S.R. COLLEGE OF ENGINEERING (Autonomous)
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K.S.R. Kalvi Nagar, Tiruchengode – 637 215

CURRICULUM
UG
R – 2024

Department Department of Automobile Engineering

Programme B.E – Automobile Engineering

List of Electives

VERTICAL-1: Thermal Engineering

Sl.No.	Course Code	Course Name	Specialization	Category	Periods / Semester				Credit	Maximum Marks		
					L	T	P	SL		C	CA	ES
1.	24AUE01	Advanced Theory of I.C. Engines	S1	PEC	45	0	0	45	3	40	60	100
2.	24AUE02	Automotive Pollution and Control	S1	PEC	45	0	0	45	3	40	60	100
3.	24AUE03	Alternative Fuels and Energy Systems	S1	PEC	45	0	0	45	3	40	60	100
4.	24AUE04	Automotive Air-Conditioning	S1	PEC	45	0	0	45	3	40	60	100
5.	24AUE05	Combustion Thermodynamics and Heat Transfer	S1	PEC	45	0	0	45	3	40	60	100
6.	24AUE06	Advanced Internal Combustion Engines	S1	PEC	45	0	0	45	3	40	60	100

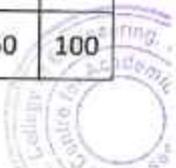
VERTICAL-2: Manufacturing Engineering

Sl.No.	Course Code	Course Name	Specialization	Category	Periods / Semester				Credit	Maximum Marks		
					L	T	P	SL		C	CA	ES
1.	24AUE07	Material Science and Metallurgy	S2	PEC	45	0	0	45	3	40	60	100
2.	24AUE08	Automotive Fabrication Processes	S2	PEC	45	0	0	45	3	40	60	100
3.	24AUE09	Additive Manufacturing	S2	PEC	45	0	0	45	3	40	60	100
4.	24AUE10	Lean Manufacturing	S2	PEC	45	0	0	45	3	40	60	100
5.	24AUE11	Computer Aided Manufacturing	S2	PEC	45	0	0	45	3	40	60	100
6.	24AUE12	Production Planning and Control	S2	PEC	45	0	0	45	3	40	60	100

VERTICAL-3: Automotive Design

Sl.No.	Course Code	Course Name	Specialization	Category	Periods / Semester				Credit	Maximum Marks		
					L	T	P	SL		C	CA	ES
1.	24AUE13	Finite Element Analysis	S3	PEC	45	0	0	45	3	40	60	100
2.	24AUE14	Vehicle Dynamics	S3	PEC	45	0	0	45	3	40	60	100
3.	24AUE15	Vehicle Architecture	S3	PEC	45	0	0	45	3	40	60	100
4.	24AUE16	Robotics and Automation	S3	PEC	45	0	0	45	3	40	60	100
5.	24AUE17	Drone Technologies	S3	PEC	45	0	0	45	3	40	60	100
6.	24AUE18	Automotive Aerodynamics	S3	PEC	45	0	0	45	3	40	60	100

R. [Signature]
 Chairman (B.E.)



VERTICAL-4: Automotive Integrated Technology													
Sl.No.	Course Code	Course Name	Specialization	Category	Periods / Semester				Credit	Maximum Marks			
					L	T	P	SL		C	CA	ES	Total
1.	24AUE19	Fuel Cells and Applications	S4	PEC	45	0	0	45	3	40	60	100	
2.	24AUE20	Vehicle Control Systems	S4	PEC	45	0	0	45	3	40	60	100	
3.	24AUE21	Special Purpose Vehicles	S4	PEC	45	0	0	45	3	40	60	100	
4.	24AUE22	Automotive Instrumentation	S4	PEC	45	0	0	45	3	40	60	100	
5.	24AUE23	Autonomous Vehicle Technology	S4	PEC	45	0	0	45	3	40	60	100	
6.	24AUE24	Artificial Intelligence for Automobiles	S4	PEC	45	0	0	45	3	40	60	100	

VERTICAL-5: Automotive Management													
Sl.No.	Course Code	Course Name	Specialization	Category	Periods / Semester				Credit	Maximum Marks			
					L	T	P	SL		C	CA	ES	Total
1.	24AUE25	Engine and Vehicle Management System	S5	PEC	45	0	0	45	3	40	60	100	
2.	24AUE26	Transport Management	S5	PEC	45	0	0	45	3	40	60	100	
3.	24AUE27	Vehicle Dealership Management	S5	PEC	45	0	0	45	3	40	60	100	
4.	24AUE28	Ergonomics in Automotive Design	S5	PEC	45	0	0	45	3	40	60	100	
5.	24AUE29	Noise, Vibration and Harshness	S5	PEC	45	0	0	45	3	40	60	100	
6.	24AUE30	Value Engineering	S5	PEC	45	0	0	45	3	40	60	100	

VERTICAL-6: Electric Vehicle													
Sl.No.	Course Code	Course Name	Specialization	Category	Periods / Semester				Credit	Maximum Marks			
					L	T	P	SL		C	CA	ES	Total
1.	24AUE31	Electric Two and Three Wheeler	S6	PEC	45	0	0	45	3	40	60	100	
2.	24AUE32	Battery Technology	S6	PEC	45	0	0	45	3	40	60	100	
3.	24AUE33	Motors and Drives	S6	PEC	45	0	0	45	3	40	60	100	
4.	24AUE34	Sensors and Actuators	S6	PEC	45	0	0	45	3	40	60	100	
5.	24AUE35	Electric Vehicle Maintenance	S6	PEC	45	0	0	45	3	40	60	100	
6.	24AUE36	Connected Cars and ADAS	S6	PEC	45	0	0	45	3	40	60	100	

R. [Signature]
Chairman (BoS)

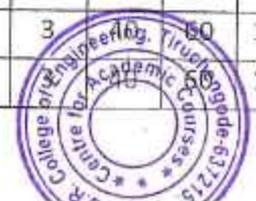


MANDATORY COURSE – I, II & III												
S. No.	Course Code	Course Title	Category	Periods / Semester					Credit	Max. Marks		
				L	T	P	SL	Tot		CA	ES	Tot
1.	24MCP09	Yoga for Stress Management	MC	0	0	0	0	0	0	-	-	-
2.	24MCT01	Constitution of India	MC	60	0	0	0	60	0	100	-	100
3.	24MCT02	Environmental Science and Sustainability	MC	60	0	0	0	60	0	100	-	100
4.	24MCT03	Introduction to Gender Studies	MC	60	0	0	0	60	0	100	-	100
5.	24MCT04	Life Science for Engineers	MC	60	0	0	0	60	0	100	-	100
6.	24MCT05	Industrial Safety	MC	60	0	0	0	60	0	100	-	100
7.	24MCT06	Essence of Indian Knowledge System	MC	60	0	0	0	60	0	100	-	100
8.	24MCT07	Elements of Literature	MC	60	0	0	0	60	0	100	-	100
9.	24MCT08	Disaster Management	MC	60	0	0	0	60	0	100	-	100

List of Open Elective

S. No.	Dept.	Course Code	Course Name	L	T	P	SL	Credit	CA	ES	Tot
1.	AUTO	24AUO01	Basics of Automobile Engineering	45	0	0	45	3	40	60	100
2.		24AUO02	Hybrid Vehicles	45	0	0	45	3	40	60	100
3.	BME	24BMO01	Basics of Biomedical Instrumentation	45	0	0	45	3	40	60	100
4.		24BMO02	Biometric systems	45	0	0	45	3	40	60	100
5.	CIVIL	24CEO01	Smart Buildings	45	0	0	45	3	40	60	100
6.		24CEO02	Climate Change	45	0	0	45	3	40	60	100
7.	CSE	24CSO01	Data structures and Algorithms using C	45	0	30	45	4	50	50	100
8.		24CSO02	Fundamentals of Java Programming	15	0	90	15	4	50	50	100
9.		24CSO03	Full Stack Development	45	0	0	45	3	40	60	100
10.		24CSO04	Digital Marketing	45	0	0	45	3	40	60	100
11.	CSE (Cyber Security)	24CB001	Ethical Hacking	45	0	0	45	3	40	60	100
12.		24CB002	Digital and Mobile Forensics	45	0	0	45	3	40	60	100
13.		24CB003	Applied Java Programming	15	0	90	15	4	50	50	100
14.	AIDS	24CSO06	Data Science Fundamentals	45	0	0	45	3	40	60	100
15.		24CSO07	Artificial Intelligence and Machine learning	45	0	0	45	3	40	60	100
16.		24CSO08	Data Exploration and Visualization	45	0	0	45	3	40	60	100
17.	IOT	24IOO01	Industrial Internet of things	45	0	0	45	3	40	60	100
18.		24IOO02	Introduction to Sensors and IoT	45	0	0	45	3	40	60	100
19.	ECE	24ECO01	Drone Technology	45	0	0	45	3	40	60	100
20.		24ECO02	Wearable Devices	45	0	0	45	3	40	60	100
21.		24ECO03	5G /6G Communication	45	0	0	45	3	40	60	100

P. V. V. V.
Chairman (BoS)



22.		24ECO04	Embedded IoT	45	0	0	45	3	40	60	100
23.	EEE	24EE001	Solar and Wind Energy System	45	0	0	45	3	40	60	100
24.		24EE002	Hydrogen and Hybrid Energy System	45	0	0	45	3	40	60	100
25.		24EE003	Electric Vehicle Technology	45	0	0	45	3	40	60	100
26.		24EE004	Energy Conservation and Management	45	0	0	45	3	40	60	100
27.	IT	24ITO01	Introduction to Mobile Application Development	45	0	0	45	3	40	60	100
28.		24ITO02	Introduction to Big Data and Analytics	45	0	0	45	3	40	60	100
29.		24ITO03	Augmented Reality / Virtual Reality	45	0	0	45	3	40	60	100
30.	Mech	24MEO01	3D Printing	45	0	0	45	3	40	60	100
31.		24MEO02	Robotics and Automation	45	0	0	45	3	40	60	100
32.		24MEO03	Lean Manufacturing	45	0	0	45	3	40	60	100
33.	SFE	24SFO01	Occupational health and safety	45	0	0	45	3	40	60	100
34.		24SFO02	Electrical safety	45	0	0	45	3	40	60	100
35.		24SFO03	Building Fire Safety	45	0	0	45	3	40	60	100
36.		24SFO04	Construction Safety	45	0	0	45	3	40	60	100

Summary										
Name of the Programme: B.E Automobile Engineering										
CATEGORY	I	II	III	IV	V	VI	VII	VIII	TOTAL CREDITS	%
HSMC	4	2	-	3	-	3	3	-	15	9.09
BSC	8	8	4	4	-	-	-	-	24	14.54
ESC	5	7	-	-	-	-	-	-	12	7.27
PCC	4	3	20	13	20	6	7	-	73	44.24
PEC	-	-	-	3	3	6	6	-	18	10.9
OEC	-	-	-	-	-	3	-	-	3	1.81
EEC	1	1	1	2	2	3	2	8	20	12.12
MC	-	✓	-	-	✓	✓	-	-	-	-
Total	22	21	25	25	25	21	18	8	165	100

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

Anurag
Chairman (BOS)



COURSE OUTCOMES:

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

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

TEXT BOOKS:

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

REFERENCES:

1. Dr. K.N. Shoba, and Dr. Lourdes 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.

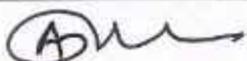
Mapping of COs with POs and PSOs													
COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	-	-	-	-	-	-	-	2	3	-	3	-	-
CO2	-	-	-	-	-	-	-	2	3	-	3	-	-
CO3	-	-	-	-	-	-	-	2	3	-	3	-	-
CO4	-	-	-	-	-	-	-	2	3	-	3	-	-
CO5	-	-	-	-	-	-	-	2	3	-	3	-	-

1-Low, 2-Medium, 3-High


Chairman (BoS)



24MET16	ENGINEERING DRAWING	Category	L	T	P	SL	C
		PCC	30	0	60	30	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 = 30, P = 60, SL = 30, 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	Construct various plane curves like ellipse, parabola, cycloid, and involute using standard methods.	Understand
CO2	Develop orthographic projections of points, lines, and plane surfaces inclined to reference planes.	Apply
CO3	Construct projections of simple solids with axes inclined to a plane using change of position method.	Apply
CO4	Develop sectional views and true shapes of surfaces of solids for fabrication.	Apply
CO5	Apply the principles of orthographic and isometric projection to sketch multiple views and isometric representations.	Apply

TEXT BOOKS:

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

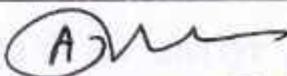
REFERENCES:

1. Venugopal&Prabhu Raja, V., Engineering Graphics, New Age International (P) Limited, 2009.
2. Bhatt, N.D., Engineering Drawing, Charotar Publishing House, Fifty Third Edition, 2020.
3. Shah, B., and Rana, B.C., Engineering Drawing, Pearson Education ,2009.
4. Gopalakrishna, K.R., Engineering Drawing (Vol.I& II), Subhas Publications, 2017.
5. Basant Agarwal and Agarwal C.M., Engineering Drawing, Tata McGraw Hill Publishing Company Limited, 2019.

Mapping of COs with POs and PSOs

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

1-low, 2-medium, 3-high


Chairman (BoS)



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

S. G. G. H.
Chairman (BoS)



COURSE OUTCOMES:			
At the end of the course, the students will be able to:			
COs	Course Outcome	Experiment	Cognitive Level
CO1	Apply the basic concept of MS word, Excel, Power Point presentation and MS Access.	1,2,3,4	Apply
CO2	Develop the program using the concept of control statements.	5,6,7	Apply
CO3	Demonstrate the use of functions and arrays in Programming.	8,9	Apply
CO4	Apply the concepts of pointers and strings.	10,11	Apply
CO5	Develop the program using the files and structure operations.	12	Apply

REFERENCES:

1. Jeff Szuha, "Learn C Programming", Packt Publishing, United Kingdom, Second Edition, 2022.
2. E Balagurusamy, "Programming In Ansi C", McGraw Hill Education, Eighth Edition, 2019.

Mapping of COs with POs and PSOs

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

1-low, 2-medium, 3-high

LIST OF EQUIPMENTS (For a Batch of 30 Students)

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

S. [Signature]
Chairman (BoS)



24GET19	தமிழர்மரபு	CATEGORY	L	T	P	SL	C
		HSMC	15	0	0	15	1
(அனைத்து துறைகளுக்கும் பொதுவானது)							
முன்கூட்டிய துறைசார் அறிவு : தேவை இல்லை							
அலகு - I	மொழி மற்றும் இலக்கியம்						[03]
இந்திய மொழிக் குடும்பங்கள் - திராவிட மொழிகள் - தமிழ் ஒரு செம்மொழி - தமிழ் செவ்வியக்கிகியங்கள் - சங்க இலக்கியத்தின் சமயச்சார்பற்ற தன்மை - சங்க இலக்கியத்தில் பகிர்தல் அறம் - திருக்குறளில் மேலாண்மைக் கருத்துக்கள் - தமிழ் காப்பியங்கள், தமிழகத்தில் சமணபௌத்த சமயங்களின் தாக்கம் - பக்தி இலக்கியம், ஆழ்வார்கள் மற்றும் நாயன்மார்கள் - சிற்றிலகியங்கள் தமிழில் நவீன இலக்கியத்தின் வளர்ச்சி - தமிழ் இலக்கியவளர்ச்சியில் பாரதியார் மற்றும் பாரதிதாசன் ஆகியோரின் பங்களிப்பு.							
அலகு - II	மரபு - பாறை ஓவியங்கள் முதல் நவீன ஓவியங்கள் வரை - சிற்பக் கலை						[03]
நடுகல் முதல் நவீன சிற்பங்கள் வரை - ஐம்பொன் சிலைகள் - பழங்குடியினர் மற்றும் அவர்கள் தயாரிக்கும் கைவினைப் பொருட்கள், பொம்மைகள் - தேர் செய்யும் கலை - சுடுமண் சிற்பங்கள் - நாட்டுப்புறத் தெய்வங்கள் - குமரிமுனியில் திருவள்ளுவர் சிலை - இசை கருவிகள் - மிருதங்கம், பறை, வீணை, யாழ், நாதஸ்வரம் - தமிழர்களின் சமூகபொருளாதார வாழ்வில் கோவில்களின் பங்கு.							
அலகு - III	நாட்டுப் புறக் கலைகள் மற்றும் வீர விளையாட்டுக்கள்						[03]
தெருக்கூத்து, கரகாட்டம், வில்லுப்பாட்டு, கணியான் கூத்து, ஓயிலாட்டம், 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 பிற்பகுதிகளில் தமிழ் பண்பாட்டின் தாக்கம் - சுயமரியாதை இயக்கம் - இந்திய மருத்துவத்தில் சித்தமருத்துவத்தின் பங்கு கல்வெட்டுகள் கையெழுத்துப்படிக்கள் - தமிழ்ப் புத்தகங்கள்களின் அச்ச வரலாறு.							
Total (L= 15, SL=15)=30 Periods							

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பாடம் கற்றத்தின் விளைவுகள்: பாடத்தை வெற்றிகரமாக கற்று முடித்த பின்பு, மாணவர்களால் முடியும் விளைவுகள்		அறிவாற்றல் நிலை
CO1:	தமிழ்மொழியின் செந்தன்மை 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	பொருறை - 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

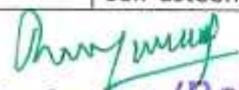
COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	-	-	-	-	-	3	3	-	2	-	3	-	-
CO2	-	-	-	-	-	3	3	-	2	-	3	-	-
CO3	-	-	-	-	-	3	3	-	2	-	3	-	-
CO4	-	-	-	-	-	3	3	-	2	-	3	-	-
CO5	-	-	-	-	-	3	3	-	2	-	3	-	-
Avg.	-	-	-	-	-	3	3	-	2	-	3	-	-

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

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24GET19	HERITAGE OF TAMILS	CATEGORY	L	T	P	SL	C
		HSMC	15	0	0	15	1
(Common to all branches)							
<i>Prerequisite(s): No prerequisites are needed for enrolling into the course</i>							
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	


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

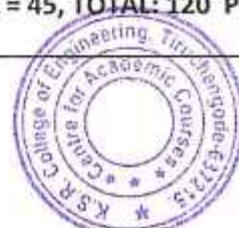
Mapping of COs with POs and PSOs													
COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	-	-	-	-	-	3	3	-	2	-	3	-	-
CO2	-	-	-	-	-	3	3	-	2	-	3	-	-
CO3	-	-	-	-	-	3	3	-	2	-	3	-	-
CO4	-	-	-	-	-	3	3	-	2	-	3	-	-
CO5	-	-	-	-	-	3	3	-	2	-	3	-	-
Avg.	-	-	-	-	-	3	3	-	2	-	3	-	-
1: Slight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

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

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COURSE OUTCOMES:

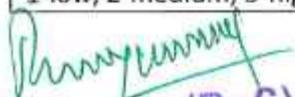
At the end of the course, the students will be able to:

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

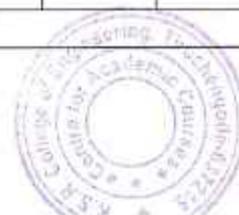
TEXT BOOKS:1. Ravish R Singh and Mukul Bhatt, "Engineering Mathematics – I", Mc-Graw Hill Publications, New Delhi, 2nd Edition, 2020.2. B. S. Grewal, "Higher Engineering Mathematics", Khanna Publishers, New Delhi, 40th Edition, 2020.**REFERENCES:**1. Bali N. P and Manish Goyal, "Engineering Mathematics",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

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

1-low, 2-medium, 3-high



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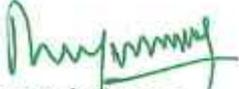
24PHI06	APPLIED PHYSICS	Category	L	T	P	SL	C
		BSc	45	-	30	45	4
(Common to CE, ME & SFE)							
PREREQUISITE: The students must have knowledge about basic concepts of sound, light, arrangement of atoms in crystalline solids, modern engineering materials, magnetic and super conducting materials and their 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 materials – 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							



Dr. R. V. S. Srinivasan
CHAIRMAN

KSRCE – Curriculum and Syllabi (R 2024)
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, 11 th Edition, 2018.													
2. R.K. Gaur & S.L. Gupta, "Engineering Physics", Dhanpat Rai Publication, New Delhi, 7 th Edition, 2014.													
Reference Books :													
1. R. Murugesan and Kiruthiga Sivaprasath, "Modern Physics", S. Chand & Company, New Delhi, 17 th Edition, 2014.													
2. V. Rajendran, "Engineering Physics", Tata McGraw-Hill, New Delhi, 1 st Edition, 2011.													
3. S.O. Pillai, "Solid State Physics", New Age Publication, Chennai, 10 th Edition, 2023.													
4. Arthur Beiser, Shobhit Mahajan, S. Rai Choudhury, "Concepts of Modern Physics", McGraw-Hill, New Delhi, 7 th Edition, 2015.													
Mapping of COs with POs and PSOs													
COs / POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO 1	PSO 2
CO1	3	3	2	-	-	-	1	2	2	-	2	-	-
CO2	3	2	-	-	-	-	1	2	2	-	2	-	-
CO3	3	3	2	-	-	-	1	2	2	-	2	-	-
CO4	3	2	-	-	-	-	1	2	2	-	2	-	-
CO5	3	2	-	-	-	-	1	2	2	-	2	-	-
Avg.	3	2	-	-	-	-	1	2	2	-	2	-	-
1-low, 2-medium, 3-high													


 BoS chairman
Chairman (BoS)



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

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24ITP16	PROGRAMMING FOR PROBLEM SOLVING LABORATORY	Category	L	T	P	SL	C
		ESC	0	0	30	0	1

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

PREREQUISITE:

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

OBJECTIVES:

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

List of Experiments:

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

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

S. Gargax
Chairman (BoS)



COURSE OUTCOMES:

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

COs	Course Outcome	Experiment	Cognitive Level
CO1	Apply the basic concept of MS word, Excel, Power Point presentation and MS Access.	1,2,3,4	Apply
CO2	Develop the program using the concept of control statements.	5,6,7	Apply
CO3	Demonstrate the use of functions and arrays in Programming.	8,9	Apply
CO4	Apply the concepts of pointers and strings.	10,11	Apply
CO5	Develop the program using the files and structure operations.	12	Apply

REFERENCES:

1. Jeff Szuha, "Learn C Programming", Packt Publishing, United Kingdom, Second Edition, 2022.
2. E Balagurusamy, "Programming In Ansi C", McGraw Hill Education, Eighth Edition, 2019.

Mapping of COs with POs and PSOs

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

1-low, 2-medium, 3-high

LIST OF EQUIPMENTS (For a Batch of 30 Students)

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

S. Aravindhan
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 planing 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

AM
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:

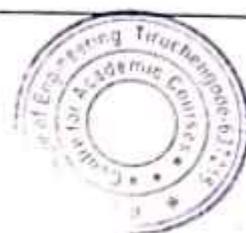
1. Dr. V. Ramesh Babu. Engineering Practices Laboratory Manual, VRB Publishers, Revised Edition 2019-2020.
2. S Gowri & T Jeyapoovan Engineering Practices Lab Manual, Vikas Publishing, 5th Edition.

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

1-low, 2-medium, 3-high


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

Anupama
Chairman (BoS)



TEXT BOOKS:													
<ol style="list-style-type: none"> 1. R S Aggarwal, Quantitative Aptitude for Competitive Examinations. 2. R.S. Aggarwal, A Modern Approach to Verbal & Non-Verbal Reasoning 3. Wren & Martin, High School English Grammar & Composition 4. Brian W. Kernighan and Dennis Ritchie, The C Programming Language 2e, Pearson Education, 2015. 5. Yashavant Kanetkar, The C Programming Language 2e, BPB publications, 15th Edition, 2016 													
REFERENCES:													
<ol style="list-style-type: none"> 1. https://www.geeksforgeeks.org/quantitative-aptitude/?ref=shm 2. Stephen G. Kochana, Programming in C, 3rd Edition. 3. K. N. King, C Programming: A Modern Approach, 2e, 2008. 4. Aaron M. Tenenbaum, Yedidyah Langsam, and Moshe J. Augenstein, Data Structures Using C, Pearson Education-India, 1990. 5. Robert L. Kruse and Bruce P. Leung, Data Structures and Program Design in C, Pearson Education 2007. 6. https://www.geeksforgeeks.org/c-programming-language/ 7. https://www.geeksforgeeks.org/data-structures/ 													
Mapping of COs with POs and PSOs													
COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	2	-	-	2	-	-	2	-	-	3	-	-
CO2	3	3	2	-	2	-	-	2	-	-	3	-	-
CO3	3	3	2	-	2	-	-	2	-	-	3	-	-
CO4	3	3	2	-	2	-	-	2	-	-	3	-	-
CO5	3	3	2	-	2	-	-	2	-	-	3	-	-
Avg.	3	3	3	-	2	-	-	2	-	-	3	-	-


Chairman (BoS)



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


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COURSE OUTCOMES:

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

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

TEXT BOOKS:

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

REFERENCES:

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

Mapping of COs with POs and PSOs

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

1-low, 2-medium, 3-high


Chairman (BOS)



24MET26	DESIGN THINKING	Category	L	T	P	SL	C
		PCC	30	0	0	30	2
(Common to Mech, Auto & SFE)							
PRE-REQUISITE Students are expected to have an empathetic mindset to help them understand users, a curious mindset to explore and questions assumptions, a collaborative mindset for interdisciplinary teamwork, an iterative approach for refining ideas and creativity to generate innovative solutions							
OBJECTIVES: 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							


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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 Mind set and its impact on creative problem-solving.	Understanding
CO3	Apply Design Thinking methods effectively at each stage of the problem-solving process.	Applying
CO4	Identify and implement the phases of Design Thinking to address complex challenges systematically.	Applying
CO5	Use a variety of Design Thinking tools to develop innovative solutions and refine ideas through iteration.	Applying

TEXT BOOKS:

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

REFERENCES:

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

Mapping of COs with POs and PSOs

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

1-low, 2-medium, 3-high



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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 – Kirchoff'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 phasetransformer: 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 Dflip flop – Introduction to Arduino components and IDE.							
L = 45, SL = 45, TOTAL = 90 PERIODS							

[Signature]
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COURSE OUTCOMES:

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

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

TEXT BOOKS:

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

REFERENCES:

- 1 Jain V.K, Amitabh Bajaj, "Design of Electrical Installation", University Science Press, New Delhi, 2016.
- 2 Ramamoorthy M, Chandra Sekhar O, "Electrical Machines", PHI Learning Pvt. Ltd, Delhi, 2018.
- 3 Christopher Siu, "Electronic Devices, Circuits, and Applications", Springer International Publishing, 2022.
- 4 Kothari D.P, Dhillon J.S, "Digital Circuits & Design", First Edition, Pearson, Delhi, 2015.

Mapping of COs with POs and PSOs

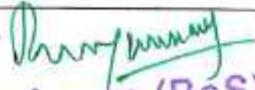
COs/ POs	PO1	PO2	PO3	PO4	PO5	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	2	-	-	-	-	-	-	1	1	-	2	1	-
CO2	3	2	-	-	-	-	-	-	1	1	-	2	1	-
CO3	3	2	-	-	-	-	-	-	1	1	-	2	1	-
CO4	3	2	-	-	-	-	-	-	1	1	-	2	1	-
CO5	3	2	-	-	-	-	-	-	1	1	-	2	1	-


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24GET29	தமிழரும் தொழில் நுட்பமும்	CATEGORY	L	T	P	SL	C
		HSMC	15	0	0	15	1
(அனைத்து துறைகளுக்கும் பொதுவானது)							
முன் கூட்டிய துறைசார் அறிவு : தேவை இல்லை							
அலகு - I	நெசவு மற்றும் பாணைத் தொழில்நுட்பம்						[03]
சங்ககாலத்தில் நெசவுத் தொழில் - பாணைத் தொழில்நுட்பம் கருப்பு சிவப்பு பாண்டங்கள்-பாண்டுகளில் கீறல் குறியீடுகள்							
அலகு - II	வடிவமைப்பு மற்றும் கட்டிடத் தொழில்நுட்பம்						[03]
சங்ககாலத்தில் வடிவமைப்பு மற்றும் கட்டுமானங்கள் & சங்க காலத்தில் வீட்டுப் பொருட்களில் வடிவமைப்பு - சங்க காலத்தில் கட்டுமானப் பொருட்களும் நடுகல்லும்-சிலப்பதிகாரத்தில் மேடை அமைப்பு பற்றிய விவரங்கள்-மாமல்லபுரச் சிற்பங்களும், கோவில்களும்-சோழர்காலத்துப் பெருங்கோயில்கள் மற்றும் பிற வழிபாட்டுத் தலங்கள்-நாயக்கர் காலக்கோயில்கள்-மாதிரி கட்டமைப்புகள் பற்றி அறிதல், மதுரை மீனாட்சி அம்மன்ஆலயம் மற்றும் திருமலைநாயக்கர்மஹால் - செட்டிநாட்டுவீடுகள்-பிரிட்டிஷ்காலத்தில் சென்னை இந்தோ-சாரோசெனிக் கட்டிடக்கலை.							
அலகு - III	உற்பத்தித் தொழில்நுட்பம்						[03]
கப்பல் கட்டும் கலை-உலோகவியல்-இரும்புத்தொழிற்சாலை-இரும்பை உருக்குதல், எஃகு-வரலாற்றுச்சான்றுகளாக செம்பு மற்றும் தங்கநாணயங்கள்-நாணயங்கள் அச்சடித்தல்-மணி உருவாக்கும் தொழிற்சாலைகள்-கல் மணிகள்-கண்ணாடி மணிகள்-சுடு மண்மணிகள்-சங்குமணிகள்-எலும்புத்துண்டுகள்-தொல்லியல் சான்றுகள்-சிலப்பதிகாரத்தில் மணிகளின் வகைகள்.							
அலகு - IV	வேளாண்மை மற்றும் நீர்ப் பாசனத் தொழில்நுட்பம்						[03]
அணை, ஏரி, குளங்கள், மதகு-சோழர்காலகுமிழித்தாம்பின் 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 கணிவித்தமிழ்						[03]
அறிவியல் தமிழின் வளர்ச்சி- கணிவித்தமிழ் 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 வெற்றிகரமாக கற்று முடித்த பின்பு, மாணவர்களால் முடியும் விளைவுகள்		அறிவாற்றல் நிலை
CO1	சங்ககாலத் தமிழிர்களின் நெசவு மற்றும் பாணைவனைதல் தொழில் நுட்பம் குறித்து கற்றுணர்ந்தல்.	புரிதல்
CO2	சங்ககாலத் தமிழிர்களின் கட்டிட தொழில் நுட்பம் கட்டுமான பொருட்கள் மற்றும் அவற்றை விளக்கும் 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 புரிந்துகொள்ளும் மற்றும் பயன்படுத்தலும்.	பகுப்பாய்வு


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Text Books :	
1	தமிழகவரலாறு- மக்களும் பண்பாடும்- கேகேபிள்ளை (வெளியீடு தமிழ்நாடு பாடநூல் மற்றும் கல்வியில் பணிகள் கழகம்)
2	கணினித்தமிழ்- முனைவர் இல. சுந்தரம் (விகடன் பிரசுரம்)
Reference Books :	
1	கீழடி- வைகை நதிக்கரையில் சங்ககால நகரநாகரிகம்.(தொல்லியல் துறை வெளியீடு)
2	பொருறை - 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)													

Aravindan

Chairman (BoS)



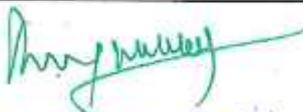
24GET29	TAMILS AND TECHNOLOGY	CATEGORY	L	T	P	SL	C
		HSMC	15	0	0	15	1
(Common to All Branches)							
<i>Prerequisite(s): No prerequisites are needed for enrolling into the course</i>							
UNIT - I	WEAVING AND CERAMIC TECHNOLOGY	[03]					
Weaving Industry during Sangam Age – Ceramic technology – Black and Red Ware Potteries (BRW) – Graffiti on Potteries.							
UNIT - II	DESIGN AND CONSTRUCTION TECHNOLOGY	[03]					
Designing and Structural construction House & Designs in household materials during Sangam Age – Building materials and Hero stones of Sangam age – Details of Stage Constructions in Silappathikaram– Sculptures and Temples of Mamallapuram– Great Temples of Cholas and other worship places – Temples of Nayaka Period – Type study (Madurai Meenakshi Temple) – ThirumalaiNayakar Mahal –Chetti 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:							Cognitive Level
At the end of the course, the student will be able to							
CO1	Understand the weaving and ceramic technology of ancient Tamil People nature.						Understand
CO2	Comprehend the construction technology, building materials in sangam Period and case studies.						Understand
CO3	Infer the metal process, coin and beads manufacturing with relevant archeological evidence						Understand
CO4	Realize the agriculture methods, irrigation technology and pearl diving.						Understand
CO5	Apply the knowledge of scientific Tamil and Tamil computing.						Apply

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

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


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24MAI29	PROBABILITY AND STATISTICS	Category	L	T	P	SL	C
		BSC	30	15	30	45	4

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 DIMENSIONAL RANDOM VARIABLES	(9)
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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)
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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)
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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)
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Analysis of variance - One way and two way classifications - Completely Randomized Design - Randomized Block Design - Latin Square Design.

UNIT - V	STATISTICAL QUALITY CONTROL	(9)
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Control charts for measurements (\bar{X} and R charts) – Control charts for C and P charts – Acceptance sampling for construction of an OC curve.

List of Exercise/Experiments (R Software):

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



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

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COURSE OUTCOMES:

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

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

TEXT BOOKS:

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

REFERENCES:

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

Mapping of COs with POs and PSOs

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

1-low, 2-medium, 3-high

Dr. Anurag
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 learners 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 ₃ COOH) 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 ₂ SO ₄							
L = 45, P = 30, SL = 45, TOTAL = 120 PERIODS							

COURSE OUTCOMES:

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

COs	Course Outcome	Cognitive Level
CO1	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 as 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.

Dr. Arun Kumar
Chairman (BoS)



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							

Shreejany
Chairman (BoS)



List of Experiments:

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

COURSE OUTCOMES:

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

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

TEXT BOOKS:

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

REFERENCES:

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

Mapping of COs with POs and PSOs

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

1-Low, 2-Medium, 3-High

Anurag
Chairman (BoS)



Lab Requirement for a batch of 30 Students

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

Murugan
Chairman (BoS)



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


Chairman (BoS)



COURSE OUTCOMES:

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

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

REFERENCES:

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

Mapping of COs with POs and PSOs

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

1-low, 2-medium, 3-high

LIST OF EQUIPMENTS (For a Batch of 30 Students)

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

Chairman (BoS)



24AUP21	COMPUTER AIDED DRAWING LABORATORY	Category	L	T	P	SL	C
		PCC	0	0	30	0	1

PREREQUISITE:

Computer Aided Drawing requires a good grasp of basic geometry and algebra in understanding and applying dimensions and measurements in AutoCAD software. Knowing to work with 2D shapes and structures will be crucial as AutoCAD is heavily used for creating and manipulating 2D designs. Depending on the type of CAD software, understanding both 2D and 3D design principles might be necessary. For specific types of CAD applications (like mechanical engineering or architectural design), a foundational knowledge in these areas can be useful.

OBJECTIVES:

To equip students with the knowledge and practical skills required to create, interpret, and modify engineering drawings using computer-aided design software, enhancing the ability to visualize, model, and communicate technical concepts effectively in both 2D and 3D formats.

List of Exercise/Experiments:

1. Study of drawing tools, commands and coordinate systems in 2D software.
2. Creation of simple figures.
3. Creation of Title Block.
4. Orthographic projections of pictorial views.
5. Plan of a simple residential building.
6. Construction of simple truss.
7. Creation of drawings with multiple commands.
8. Sectional drawings.
9. Isometric projection of simple solids.
10. Drafting the 2D multi-view drawings from 3D model.

P = 30, TOTAL = 30 PERIODS

COURSE OUTCOMES:

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

COs	Course Outcome	Exp. No.	Cognitive Level
CO1	Recall the drawing tools and commands and produce two dimensional objects in CAD software.	1	Understand
CO2	Perceive the creation of simple figures and title block.	2,3	Understand
CO3	Acquire the knowledge of orthographic projection and creation of plan of simple civil structures.	4,5,6	Understand
CO4	Portray the intricate drawings with multiple commands and sectional views.	7,8	Apply
CO5	Develop isometric projection and acquire drafts of 3D model.	9,10	Apply

R. V. ...
Chairman (BOS)



REFERENCES:

1. Bhatt. N. D., Engineering Drawing, Charotar Publishing House, Fifty Third Edition, 2014.
2. <https://bietsikar.ac.in/documents/9877270014CAD%20LAB%20MANUAL.pdf>

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

1-low, 2-medium, 3-high

Lab requirement for a batch of 30 students

S.No.	Description of Equipment / Software	Quantity Required
1.	Hardware Intel Core i5 – 2400 CPU 4 GB RAM / 246 GB SSD OS: Windows 10	30
2.	Software AutoCAD	30

R. [Signature]
Chairman (BOS)



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

Anupama
Chairman (BoS)



TEXT BOOKS:													
1. R S Aggarwal, Quantitative Aptitude for Competitive Examinations.													
2. R.S. Aggarwal, A Modern Approach to Verbal & Non-Verbal Reasoning.													
3. Wren & Martin, High School English Grammar & Composition													
4. Allen B. Downey, Think Python: How to Think like a Computer Scientist, 2 nd Edition, O'Reilly Publishers, 2016													
5. Karl Beecher, Computational Thinking: A Beginner's Guide to Problem Solving and Programming, 1 st Edition, BCS Learning & Development Limited, 2017.													
REFERENCES:													
1. Paul Deitel and Harvey Deitel, Python for Programmers, Pearson Education, 1 st Edition, 2021.													
2. Martin C. Brown, Python: The Complete Reference, 4 th Edition, Mc-Graw Hill, 2018.													
3. https://www.python.org/													
Mapping of COs with POs and PSOs													
COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	2	-	-	2	-	-	2	-	-	3	-	-
CO2	3	3	2	-	2	-	-	2	-	-	3	-	-
CO3	3	3	2	-	2	-	-	2	-	-	3	-	-
CO4	3	3	2	-	2	-	-	2	-	-	3	-	-
CO5	3	3	2	-	2	-	-	2	-	-	3	-	-
Avg.	3	3	3	-	2	-	-	2	-	-	3	-	-

Shreyas
Chairman (BoS)



24MAT36	OPTIMIZATION TECHNIQUES	Category	L	T	P	SL	C
		BSC	45	15	0	60	4
SEMESTER III - (Common to AE,CE,ME and SFE)							
PREREQUISITE: A fundamental knowledge of linear algebra, calculus, and basic problem-solving techniques in engineering mathematics is required to understand and apply optimization methods effectively.							
OBJECTIVES: To equip students with a comprehensive understanding of optimization methods and their practical implementation in engineering decision-making. The course emphasizes applications in transportation and assignment problems, project scheduling, inventory management, sequencing, and replacement models across diverse engineering fields.							
UNIT - I	LINEAR PROGRAMMING PROBLEM						[12]
Introduction - scope and role of Operations Research - limitations of Operations Research - Linear Programming Problem (LPP) - Formulation of linear programming problem - Optimum solution by Graphical Method - Simplex Method by using slack variable only.							
UNIT - II	TRANSPORTATION AND ASSIGNMENT PROBLEM						[12]
Transportation Models - Balanced and unbalanced cases - Initial Basic feasible solution by North West Corner Rule, Least Cost Method and Vogel's approximation method. Check for optimality by Modified method. Assignment Models (Minimizing and Maximizing Cases) - Balanced and Unbalanced Cases - Solution by Hungarian method.							
UNIT - III	NETWORK ANALYSIS						[12]
Network - Fulkerson's rule - construction of a Network - Critical Path Method (CPM) - optimistic, pessimistic and most likely time estimates – Project Evaluation and Review Technique (PERT) analysis excluding cost considerations.							
UNIT - IV	INVENTORY MODELS						[12]
Types of Inventory - Deterministic inventory models - EOQ models with and without shortages - Quantity discount model – Price breaks - Probabilistic inventory model.							
UNIT - V	REPLACEMENT MODELS AND SEQUENCING						[12]
Replacement Policy for Equipment which deteriorates gradually – Items that deteriorate with time and the value of money – Replacement of items that fails suddenly – Individual replacement problems only Sequencing problem - assumptions - processing of 'n' jobs with 2 machines, 'n' jobs with 'm' machines.							
L = 45, T = 15, SL = 60, TOTAL = 120 PERIODS							

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Chairman (BoS)



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

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

TEXT BOOKS:

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

REFERENCES:

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

Mapping of COs with POs and PSOs

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

1-Low, 2-Medium, 3-High

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Chairman (BoS)



24AUT31	AUTOMOTIVE THERMAL ENGINEERING	Category	L	T	P	SL	C
		PCC	45	0	0	45	3
(Use of Standard and approved Mollier Chart, Refrigeration Table, Heat and mass Transfer data book permitted)							
PREREQUISITE: A basic understanding of Engineering Physics, and Mathematics is essential for studying Thermal Engineering, as it involves the principles of heat transfer, energy conversion, and the behavior of working fluids in thermal systems.							
OBJECTIVES: To Impart knowledge on the law of thermodynamics in analysing the performance of thermal devices. To analyze different cyclic processes involved in the IC engines and apply the thermodynamic concepts into various thermal application like IC engines and Refrigeration and Air conditioning systems. To build up necessary background for understanding the physical behavior of various modes of heat transfer.							
UNIT I	LAWS OF THERMODYNAMICS						(9)
System - thermodynamic equilibrium - state, property, process, cycle - Zeroth law of thermodynamics - energy, work, heat - first law of thermodynamics, PMM I - Application of first law of thermodynamics to closed and open systems - steady flow process - application of steady flow energy equation. Statements of second law of thermodynamics, PMM II, heat engine, heat pump, refrigerator, carnot cycle, carnot theorem, Clausius inequality, entropy, temperature.							
UNIT II	AIR STANDARD CYCLES AND REFERIGERATION						(9)
Air standard cycles - Otto, Diesel, Dual - work output, efficiency and MEP calculations. Refrigeration, Vapour compression system, Vapour absorption system, desirable properties of an ideal refrigerant.							
UNIT III	CONDUCTION						(9)
Basic Concepts - Mechanism of Heat Transfer - Conduction - General Differential equation of Heat Conduction - Fourier Law of Conduction - One Dimensional Steady State Heat Conduction - Conduction through Plane Wall, Cylinders.							
UNIT IV	CONVECTION						(9)
Basic Concepts -Types of Convection - Forced Convection - External Flow - Flow over Plates, Cylinders - Free Convection - Flow over Vertical Plate, Horizontal Plate, Cylinders.							
UNIT V	RADIATION						(9)
Basic Concepts, Laws of Radiation - Stefan Boltzman Law, Kirchoff Law - Black Body Radiation - Grey body radiation - Radiation Shields.							
L = 45, SL = 45, TOTAL = 90 PERIODS							

R. White
Chairman (BoS)



COURSE OUTCOMES:		
At the end of the course, the students will be able to:		
COs	Course Outcome	Cognitive Level
CO1	Interpret the laws of thermodynamics to open and closed systems under steady state conditions.	Understand
CO2	Perceive and contrast between various types of Air Standard Cycles and refrigeration cycles	Understand
CO3	Pertain heat conduction equations to different surface configurations under steady state	Apply
CO4	Apply free and forced convective heat transfer correlations to internal and external flows through/over various surface configurations and solve problems	Apply
CO5	Persevere laws for Radiation to radiative heat transfer between different types of surfaces to solve problems	Apply

TEXT BOOKS:

1. Nag P.K, Engineering Thermodynamics, Tata McGraw-Hill Education, New Delhi, Sixth Edition, 2022.
2. Holman J.P, Heat and Mass Transfer, Tata McGraw Hill Education, New Delhi, Tenth Edition, 2022.

REFERENCES:

1. Yunus A. Cengel and Michael A. Boles, Thermodynamics, Tata McGraw-Hill Education, New Delhi, Eighth Edition, 2019.
2. Rajput R.K, A Text Book of Engineering Thermodynamics, Laxmi Publications (P) Ltd, New Delhi, Fifth Edition, 2021.
3. Sachdeva R.C, Fundamentals of Engineering Heat and Mass Transfer, Fifth Edition, New Age International Pvt. Ltd., New Delhi, India 2017.
4. Kothandaraman.C.P, Fundamentals of Heat and Mass Transfer, New Age International Pvt. Ltd, New Delhi, Fourth Edition, 2019.

Mapping of COs with POs and PSOs

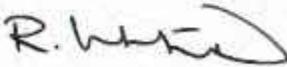
COs/ POs	PO1	PO2	PO3	PO4	PO5	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	2	-	-	-	-	-	1	1	-	1	2	-	3
CO2	3	2	-	-	-	-	-	1	1	-	1	2	-	3
CO3	3	3	-	-	-	-	-	1	1	-	1	2	-	3
CO4	3	3	2	-	-	-	-	1	1	-	1	2	-	3
CO5	3	3	2	-	-	-	-	1	1	-	1	2	-	3

1-low, 2-medium, 3-high

R. White
Chairman (BoS)



24AUT32	AUTOMOTIVE CHASSIS	Category	L	T	P	SL	C
		PCC	45	0	0	45	3
PREREQUISITE: -							
OBJECTIVES: To prepare students to understand the basics of various vehicle frames, axles, steering, suspension, and braking systems used in automobiles.							
UNIT I	FRAMES AND FRONT AXLE						(9)
Types of chassis layout with reference to power plant locations and drives, vehicle frames and its types, unitized frame, constructional details and materials, testing of vehicle frames. Types of front axles, Stub axles, function, materials and Maintenance.							
UNIT II	STEERING SYSTEM						(9)
Steering geometry: castor, camber, king pin inclination, toe-in. Ackerman's and Davis Steering Mechanisms, Steering Linkages, different types of steering gear boxes, Slip Angle, Over-Steer and Under-Steer, Reversible and Irreversible Steering, Power Steering-Electric and Hydraulic.							
UNIT III	PROPELLER SHAFT, FINAL DRIVE AND AXLES						(9)
Effect of driving thrust and torque reactions, Hotchkiss drive, torque tube drive and radius rods, Propeller shaft, universal joints, different types of final drive, differential principle, construction details of differential unit. Construction of rear axles, fully floating, three quarter floating and semi floating rear axles, rear axle housing, construction of different types of axle housings and multi axle vehicles.							
UNIT IV	SUSPENSION SYSTEM AND TYRES						(9)
Requirement of Suspension System and its types. Constructional details and characteristics of Single Leaf, Multi-Leaf, Coil Springs and Torsion bar, Rubber and Pneumatic Suspension Spring Systems, Independent Suspension System, Shock Absorbers. Wheels and Rims, Types of Tyres and their constructional details.							
UNIT V	BRAKING SYSTEMS						(9)
Need for Brake systems, Stopping Distance, Braking Torque, Time and Braking Efficiency, Constructional details of drum brakes and disc brakes, theory of braking, concept of dual brake system, parking brake, hydraulic brake system, Power-Assisted system, Pneumatic Braking System, ABS, EBD, Combi braking system, retarded engine brakes and eddy retarders.							
L = 45, SL = 45, TOTAL = 90 PERIODS							

R. 
Chairman (BoS)



COURSE OUTCOMES:

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

COs	Course Outcome	Cognitive Level
CO1	Outline the construction details of various automotive chassis frame layouts and front axles	Understand
CO2	Summarize the functions of the steering system and the steering gearbox used in vehicles.	Understand
CO3	Classify the different types of drivelines and drives used in automobiles.	Understand
CO4	Elucidate the construction and working of suspension systems and tyres.	Understand
CO5	Relate the working principles of brakes to the functions of their subsystems.	Understand

TEXT BOOKS:

1. Heldt. P.M, Automotive Chassis, Chilton Co., New York, First Edition, 1990.
2. K.K.Ramalingam, Automobile Engineering, Scitech Publications (India) Pvt. Ltd, Chennai, Second Edition, 2011.

REFERENCES:

1. Newton K, Steeds W and Garret T.K, Motor Vehicles, Butterworth-Heinemann, London, Thirteenth Edition, 2000.
2. Heinz Hazler, Advanced Vehicle Technology, Butterworth-Heinemann, London, Second Edition, 2005.
3. Crouse W.H, Automotive Chassis and Body, Tata McGraw-Hill Inc, New York, Fifth Edition, 1976.
4. Giri. N.K., Automotive Mechanics, Khanna Publishers, New Delhi, Eighth Edition, 2008

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

1-low, 2-medium, 3-high

R. [Signature]
Chairman (BoS)



24MET36	ENGINEERING MECHANICS	Category	L	T	P	SL	C
		PCC	45	15	0	60	4
(Common to MECH & AUTO)							
PREREQUISITE: Engineering physics							
OBJECTIVES: This course is to introduce the fundamental principles of mechanics, including statics and dynamics of particles and rigid bodies. Students understand force systems, equilibrium, friction, properties of surfaces, and motion.							
UNIT - I	STATICS OF PARTICLES						12
Introduction – Laws of Mechanics – Lami's theorem, Parallelogram and Triangular Law of forces – Vectorial representation of forces – Classification of system of forces – Resolution and Composition of forces – Equilibrium of a particle – Forces in space – Equilibrium of a particle in space – Principle of transmissibility.							
UNIT - II	STATICS OF RIGID BODY						12
Free body diagram – Beam, Support and Load – Requirement of Stable Equilibrium – Moments and Couples – Varignon's Theorem – Equilibrium of Rigid bodies in Two Dimensions – Equilibrium of Rigid bodies in Three Dimensions.							
UNIT - III	PROPERTIES OF SURFACES AND SOLIDS						12
Introduction – Centroid or Centre of Gravity – Centroid of Sections – Centroid for a Rectangular, Right-Angled Circle, Semicircle and Quarter Circle - Areas and Centroids for standard Simple Sections – Centroid of Compound Sections .							
UNIT - IV	FRICTION						12
Introduction – Direction of a Frictional Force – Static and Dynamic Friction – Law of Coulomb Friction – Wedge Friction – Ladder Friction – Rolling Resistance.							
UNIT - V	DYNAMICS OF PARTICLES						12
Displacements, Velocity and acceleration, their relationship – Relative motion – Curvilinear motion - Newton's laws of motion – Work Energy Equation– Impulse and Momentum – Impact of elastic bodies.							
L = 45, T = 15, SL = 45, Total = 120 Periods							

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COURSE OUTCOMES:

On successful completion of the course, the student will be able to:

COs	Course Outcome	Cognitive Level
CO1	Apply the Lami's theorem, force laws, and vector methods to solve problems involving particle equilibrium and force systems in space.	Apply
CO2	Construct free body diagrams and compute support reactions to determine the equilibrium of rigid bodies in two and three dimensions.	Apply
CO3	Build centroids of simple and composite sections using geometric and mathematical methods.	Apply
CO4	Analyze the effects of static and dynamic friction in mechanical systems wedge, ladder, and rolling contact.	Analyze
CO5	Apply the principles of dynamics to solve problems involving motion, energy, momentum, and impact.	Apply

TEXT BOOKS:

1. M.S. Palanichamy , S. Nagan . Engineering Mechanics -Statics and Dynamics, Tata Mcgraw-Hill, Third Edition, 2004.
- 2.Natesan, S.C., Engineering Mechanics Statics and Dynamics, Umesh Publications, Naisarak, Delhi,2005.

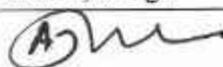
REFERENCES:

1. Beer F.P. and Johnson Jr. E.R., Vector Mechanics for Engineers, Vol. I Statics and Vol. II Dynamics, McGraw-Hill International, 12th Edition, 2019
- 2.Rajasekaran, S. and Sankarasubramanian, G., Engineering Mechanics Statics and Dynamics, Vikas Publishing House Pvt. Ltd., Third Edition, 2005.
- 3.Irving H. Shames and Krishna Mohan Rao. G., Engineering Mechanics - Statics and Dynamics, Pearson Education, Fourth Edition, 2006.
- 4.Hibbeller, R.C. and Ashok Gupta, Engineering Mechanics: Statics and Dynamics, Pearson Education, Eleventh Edition, 2010.

Mapping of COs with POs and PSOs

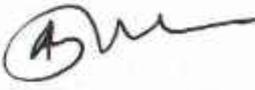
COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	3	2	-	-	-	-	2	1	-	1	1	-
CO2	3	3	2	-	-	-	-	2	1	-	1	1	-
CO3	3	3	2	-	-	-	-	2	1	-	1	1	-
CO4	3	3	3	2	-	-	-	2	1	-	1	1	-
CO5	3	3	2	-	-	-	-	2	1	-	1	1	-

1-low, 2-medium, 3-high


Chairman (BoS)



24MET37	FLUID MECHANICS AND MACHINERY	Category	L	T	P	SL	C
		PCC	45	0	0	45	3
(Common to MECH , AUTO&SFE)							
PREREQUISITE: Mathematics, Physics and Engineering Mechanics							
OBJECTIVES: This course aims to provide a fundamental understanding of fluid properties, flow characteristics, and pressure measurement techniques. It also covers flow through pipes, and the working principles and performance of pumps and turbines.							
UNIT - I	FLUID PROPERTIES AND FLUID STATICS	(9)					
Fluid properties: Properties of fluids - Mass density – Specific weight – Specific volume – Specific gravity – Viscosity – Compressibility – Surface tension – Capillarity – Vapor pressure. Fluid Statics: Hydrostatic law - pressure variation in static fluid - simple and differential manometers.							
UNIT - II	FLUID KINEMATICS AND FLUID DYNAMICS	(9)					
Fluid Kinematics: Types of fluid flow - stream lines, streak line and path line – velocity potential and stream function (Description only). Continuity equation – continuity equation in cartesian coordinates. Fluid Dynamics: Euler’s momentum equation, Bernoulli’s equation-application of Bernoulli’s equation and its applications - orifice, venturimeter							
UNIT - III	FLOW THROUGH PIPES	(9)					
Laminar flow through circular pipes - Hagen Poiseuille equation - turbulent flow through circular pipes - Darcy Weisbach equation – friction factor – Moody diagram – Major and Minor losses - pipes in series and in parallel.							
UNIT - IV	PUMPS	(9)					
Classification of pumps - Centrifugal pumps – working principle – Heads and efficiencies – work done by impeller - pump characteristics – pumps connected in series and parallel, Reciprocating pumps – working principle - Indicator diagram – air vessels – work saved by air vessels – Rotary pumps – principle – construction and working.							
UNIT - V	HYDRAULIC TURBINES	(9)					
Classification of hydraulic turbines – Pelton wheel, Francis turbine, Kaplan turbine, velocity triangles – Working Principle – work done by water on the runner – Efficiencies – Draft tube – specific speed – performance curves for turbines.							
L = 45, SL = 45, TOTAL = 90 PERIODS							


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COURSE OUTCOMES:

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

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

TEXT BOOKS:

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

REFERENCES:

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

Mapping of COs with POs and PSOs

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

1-low, 2-medium, 3-high


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

**Semester III
(Common to SFE & AUTO)**

PREREQUISITE:

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

OBJECTIVES:

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

UNIT - I	CASTING	(9)
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Casting types, procedure to make sand mould, special moulding processes: - CO₂ moulding; shell moulding, investment moulding, permanent mould casting, pressure die casting, centrifugal casting, continuous casting, - casting defects.

UNIT - II	WELDING	(9)
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Welding: - Introduction, Weldability, Types of welding, Gas welding, Arc welding - Submerged arc, TIG, MIG. Resistance welding, Solid state welding, Electron beam welding, Laser beam welding, Weld defects, Inspection of welded joints.

UNIT - III	MACHINING	(9)
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General principles (with schematic diagrams only) of working and commonly performed operations in the following machines: Lathe - Abrasive jet machining - Ultrasonic machining - Electric discharge machining - Electro chemical machining - Plasma arc machining - Electron beam machining and Laser beam machining.

UNIT - IV	FORMING AND SHAPING OF PLASTICS	(9)
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Types of plastics - Moulding of Thermoplastics: - Working principles and typical applications of - Injection moulding - Plunger and screw machines - Blow moulding - Rotational moulding- Extrusion - Processing of Thermosets: - Working principles and typical applications - Compression moulding.

UNIT - V	METAL FORMING AND POWDER METALLURGY	(9)
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Hot and cold forming - Forging - Rolling - Extrusion - Spinning - Wire drawing, Powder Metallurgy - Steps - Sintering - Merits - Demerits and applications - Types of dies - Progressive and combination die.

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

COURSE OUTCOMES:

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

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

M. P. B...
Chairman (BoS)



TEXT BOOKS:

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

REFERENCES:

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

Mapping of COs with POs and PSOs

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

1-low, 2-medium, 3-high


Chairman



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

(Common to MECH, AUTO & ISE)

PREREQUISITE: Mathematics, Physics and Engineering Mechanics

OBJECTIVES:

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

List of Exercise/Experiment:

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

LIST OF EQUIPMENT (for a batch of 30 Students)

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

P:45 TOTAL: 45 PERIODS

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COURSE OUTCOMES:

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

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

Mapping of COs with POs and PSOs

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

1-low, 2-medium, 3-high

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

Semester III
(Common to SFE & AUTO)

PREREQUISITE:

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

OBJECTIVES:

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

List of Experiments:

1. LATHE

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

2. SHAPER

- 2.1. Machining to make a cube.

3. DRILLING

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

4. MILLING

- 4.1. Plain milling

5. GRINDING

- 5.1. Cylindrical Grinding
- 5.2. Surface Grinding

P=45, TOTAL = 45 PERIODS

COURSE OUTCOMES:

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

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

M. S. Srinivasan
Chairman (BoS)



REFERENCES:

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

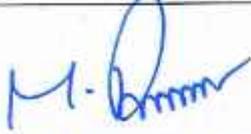
Mapping of COs with POs and PSOs

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

1-low, 2-medium, 3-high

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

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


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24MEP37	DESIGNSTUDIO-I	Category	L	T	P	SL	C
		ESC	0	0	30	0	1

(Common to AUTO, MECH, SFE)

PREREQUISITE:

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

OBJECTIVE:

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

Laboratory Modules & Exercises

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

P:30 TOTAL:30PERIODS


Chairman (BOS)



COURSE OUTCOMES:

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

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

Mapping of COs with POs and PSOs

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

1 □ Low, 2 □ Medium, 3 □ High

Chairman (BoS)

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


Chairman (BoS)



TEXT BOOKS:

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

REFERENCES:

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

Mapping of COs with POs and PSOs

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

Anurag

Chairman (BoS)



24MAT46	NUMERICAL AND COMPUTATIONAL TECHNIQUES	Category	L	T	P	SL	C
		BSC	45	15	0	60	4

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

PREREQUISITE:

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

OBJECTIVES:

To develop the ability to apply numerical methods for solving algebraic and transcendental equations, systems of linear equations, interpolation, numerical differentiation and integration, and initial and boundary value problems.

UNIT - I	SOLUTIONS OF EQUATIONS AND EIGEN VALUE PROBLEMS	(12)
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Solutions to polynomial and transcendental equations - Newton Raphson Method - Solutions to simultaneous linear system of equations by Gauss Elimination Method - Gauss Seidel Method - Eigen value of a matrix by power method.

UNIT - II	INTERPOLATION AND APPROXIMATION	(12)
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Interpolation - Newton's Forward and Backward difference Interpolation Techniques (Equal intervals) - Newton's divided difference method - Lagrange's interpolation and Inverse Lagrange's interpolation methods (Unequal intervals).

UNIT - III	NUMERICAL DIFFERENTIATION AND INTEGRATION	(12)
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Numerical differentiation using Newton's Forward and Backward difference interpolation methods - Numerical integration by Trapezoidal rule - Simpson's $1/3^{\text{rd}}$ rule and Simpson's $3/8^{\text{th}}$ rule- Double integration using Trapezoidal and Simpson's rules.

UNIT - IV	INITIAL VALUE PROBLEMS FOR ORDINARY DIFFERENTIAL EQUATIONS	(12)
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Ordinary Differential Equations (for solving first order equations) - Taylor's Series Method - Euler's Method - Modified Euler's Method - Fourth order Runge-Kutta method- Milne's Predictor and Corrector Method.

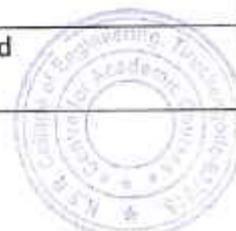
UNIT - V	BOUNDARY VALUE PROBLEMS IN PARTIAL DIFFERENTIAL EQUATIONS	(12)
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Classification of Partial Differential Equations - One dimension heat equation by Crank Nicolson's method - One dimensional wave equation - Two Dimensional Laplace and Poisson equations.

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

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

COs	Course Outcome	Cognitive Level
CO1	Implement numerical techniques to solve equations, systems of linear equations and Eigen value problems	Apply
CO2	Assess Newton's interpolation methods to select the most suitable technique based on data spacing and the location of the interpolation point.	Analyze
CO3	Apply numerical methods to perform differentiation and integration	Apply
CO4	Apply numerical techniques to obtain approximate solutions of first order ordinary differential equations	Apply
CO5	Analyze and solve partial differential equations of heat and wave equations by using numerical approaches.	Analyze



TEXT BOOKS:

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

REFERENCES:

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

Mapping of COs with POs and PSOs

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

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

R.V.M. Rangarajan
31/11/20

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



24GET09	UNIVERSAL HUMAN VALUES AND ETHICS	Category	L	T	P	SL	C
		HSMC	45	0	0	45	3
(Common to All Branches)							
OBJECTIVES:							
To understand the concept of Universal Human Values and discuss theoretical and practical implications of UHV. To relate the use of harmony in the family and society and classify the harmony in the nature methods. To construct effective human values in personal and professional in life.							
UNIT - I	INTRODUCTION TO VALUE EDUCATION	(09)					
Right Understanding, Relationship and Physical Facility, Holistic Development and the Role of Education - Understanding Value Education - Sharing about Oneself - Self-exploration as the Process for Value Education- Continuous Happiness and Prosperity – the Basic Human Aspirations - Exploring Human Consciousness - Happiness and Prosperity – Current Scenario - Method to Fulfil the Basic Human Aspirations - Exploring Natural Acceptance.							
UNIT - II	HARMONY IN THE HUMAN BEING	(09)					
Understanding Human being as the Co-existence of the Self and the Body - Distinguishing between the Needs of the Self and the Body - Exploring the difference of Needs of Self and Body – The Body as an Instrument of the Self - Understanding Harmony in the Self - Exploring Sources of Imagination in the Self - Harmony of the Self with the Body - Programme to ensure self- regulation and Health - Exploring Harmony of Self with the Body.							
UNIT - III	HARMONY IN THE FAMILY AND SOCIETY	(09)					
Harmony in the Family – the Basic Unit of Human Interaction - 'Trust' – the Foundational Value in Relationship-Exploring the Feeling of Trust - 'Respect' – as the Right Evaluation -Exploring the Feeling of Respect - Other Feelings, Justice in Human-to-Human Relationship- Understanding Harmony in the Society - Vision for the Universal Human Order – Exploring Systems to fulfil Human Goal.							
UNIT - IV	HARMONY IN THE NATURE/EXISTENCE	(09)					
Understanding Harmony in the Nature – Interconnectedness, self-regulation and Mutual Fulfilment among the Four Orders of Nature - Exploring the Four Orders of Nature – Realizing Existence as Co-existence at All Levels - The Holistic Perception of Harmony in Existence -Exploring Co-existence in Existence.							
UNIT - V	IMPLICATIONS OF THE HOLISTIC UNDERSTANDING- A LOOK AT PROFESSIONAL ETHICS	(09)					
Natural Acceptance of Human Values - Definitiveness of (Ethical) Human Conduct – Exploring Ethical Human Conduct - A Basis for Humanistic Education, Humanistic Constitution and Universal Human Order- Competence in Professional Ethics - Exploring Humanistic Models in Education- Holistic Technologies, Production Systems and Management Models -Typical Case Studies- Strategies for Transition towards Value-based Life and Profession - Exploring Steps of Transition towards Universal Human Order.							
TOTAL (L:45, SL:45): 90PERIODS							


 Santhosh
 Chairman (BoS)



COURSE OUTCOMES:

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

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

TEXT BOOKS:

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

REFERENCES:

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

Mapping of COs with POs and PSOs

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

Santhya
V. SANTHYA
Chairman (BoS)



24AUT41	ENGINES AND TRANSMISSION SYSTEMS	Category	L	T	P	SL	C
		PCC	45	0	0	45	3
PREREQUISITE: NIL							
OBJECTIVE: This course is aimed to cover the basic and fundamental knowledge in automotive engines, their working principle and engines energy efficient systems. It also covers the operating principles of different clutches, gears, manual and automatic transmission systems used in automotive.							
UNIT - I	ENGINE FUNDAMENTALS AND INDUCTION SYSTEM	(9)					
Engine types and their operation- classifications – terminology - four stroke and two stroke cycle - engine components, working principle and materials - engine operating parameters. Carburetors - requirements - working principles. Requirements and objective of injection system - types of injection - Jerk and distributor type pumps, common rail direct injection - electronic fuel injection - types of injection nozzle. Spray characteristics.							
UNIT - II	IGNITION SYSTEM AND COMBUSTION OF FUELS	(9)					
Ignition system- function and types - ignition control mechanism for speed and load - electronic ignition system. Combustion in SI engine - stages of combustion- flame propagation- abnormal combustion- combustion chambers. CI Engine - Importance of air motion - swirl, squish and tumble - stages of combustion. Delay period. Knock formation in CI engines. Direct and indirect injection combustion chambers for diesel combustion.							
UNIT - III	SUPER AND TURBO CHARGER, LUBRICATION AND COOLING SYSTEM	(9)					
Necessity and limitation of supercharging. Types of supercharger and turbocharger. Intercooler. Effect of supercharging on engine performance. Variable geometry and variable nozzle turbocharger. E-Turbocharger. Lubricating system – function - types - lubricant requirements. Cooling system – function - types.							
UNIT - IV	CLUTCH AND GEAR BOX	(9)					
Requirement of transmission system, different types of clutches, principle & construction of diaphragm clutch, single and multi-plate clutches. Need and objectives of gear box. Construction and operation of sliding mesh, constant mesh and synchromesh gearboxes. Performance characteristics in different speeds.							
UNIT - V	HYDRODYNAMIC AND AUTOMATIC TRANSMISSION	(9)					
Fluid Coupling - principle - constructional details. Torque capacity. Performance characteristics. Polyphase fluid coupling. Torque Converter – principle - constructional details, performance characteristics. Need for automatic transmission, four speed longitudinally mounted automatic transmission - Continuously Variable Transmission (CVT) - Types - Operations of a typical CVT - Dual Clutch Transmission (DCT).							
L = 45, SL = 45, TOTAL = 90 PERIODS							

R. Venkatesh
Chairman (DCC)



COURSE OUTCOMES:

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

COs	Course Outcome	Cognitive Level
CO1	Select the engines for a vehicle with required features.	Understand
CO2	Recognize the suitable ignition and injection system for an engine.	Understand
CO3	Summarize the super and turbocharger along with lubrication and cooling system for engine efficiency improvement.	Understand
CO4	Ascertain the various clutches and gear boxes used in automotive.	Understand
CO5	Propose a suitable transmission system for a vehicle based on the requirement.	Understand

TEXT BOOKS:

- 1 Ganesan. V, Internal Combustion Engines, Tata McGraw Hill Education, New Delhi, Fourth Edition, 2017.
- 2 Mathur M.L. and Sharma R.P, A Course in Internal Combustion Engines, Dhanpat Rai and sons, New Delhi, 2016.
- 3 Harald Naunheimer, Bernd Bertsche, Joachim Ryborz, Wolfgang Novak, Automotive Transmissions, Springer, Berlin, Heidelberg, Second Edition, 2011

REFERENCES:

- 1 Heinz Heisler, Advanced Vehicle Technology, 2nd Edition, 2002, Butterworth-Heinemann.
- 2 Ramalingam K.K, Automobile Engineering, Scitech Publications (India) Pvt. Ltd, Chennai, 2011.
- 3 John B. Heywood, Internal Combustion Engine Fundamentals, Tata McGraw Hill Education, New Delhi, 2017.
- 4 Crouse W. H., Anglin D.L., Automotive Transmission and Power Trains Construction, McGraw Hill, 1976.

Mapping of COs with POs and PSOs

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

R. [Signature]
Chairman (BoS)



24AUT42	VEHICLE BODY ENGINEERING	Category	L	T	P	SL	C	
		PCC	45	0	0	45	3	
PREREQUISITE: NIL								
OBJECTIVE: The objective is to provide knowledge about various vehicle body types, structures, materials, and manufacturing processes, while emphasizing key aspects such as aerodynamics, crashworthiness, ergonomics, and safety standards. The course aims to develop the ability to understand vehicle bodies for strength, safety, durability, comfort, styling, manufacturability, and cost-effectiveness.								
UNIT - I	CAR BODY							(9)
Car body terminology – Types: Hatch back, Sedan, Estate, SUV, MPV, Limousine, Convertibles, Racing and Sports car – Visibility: driver's visibility, test for visibility, Methods of improving visibility and space in cars – Driver seat design – Car Body Construction - Various panels in car bodies. Safety: Safety design, safety equipment for cars.								
UNIT - II	BUS BODY							(9)
Types: Based on distance travelled: mini bus, town, mofussil, luxury coach. Based on capacity of the bus: single deck, double deck, Split level and articulated bus. Constructional details: Frame, integral and double skin construction - bus body terminology, bus body layout: Floor height, engine location, entrance and exit location, seating dimensions - types of metal section used - safety aspect of bus body.								
UNIT - III	COMMERCIAL VEHICLE BODY							(9)
Different types of commercial vehicle bodies - light commercial vehicle body types - construction details of flat platform body, tipper body and tanker body - dimensions of driver's seat in relation to controls - driver's cabin design. Indian automotive standards (AIS, BIS), safety requirements in commercial vehicle body design.								
UNIT - IV	BODY MATERIALS, TRIM AND MECHANISMS							(9)
Steel sheet, timber, plastics, fibre-reinforced plastics, properties of materials. Corrosion - anticorrosion methods - selection of paint - modern painting process in details - body trim items - body mechanisms.								
UNIT - V	VEHICLE AERODYNAMICS							(9)
Aerodynamics – concept, objectives, Forces and Moments – types and effects on vehicle body, body optimization techniques for minimum drag and lift. Wind tunnel testing – concept – types - test setup - testing process - flow visualization techniques, airflow management test – measurement of various forces and moments by using wind tunnel balance.								
L = 45, SL = 45, TOTAL = 90 PERIODS								

R. 
Chairman (Boo,



COURSE OUTCOMES:		
Upon completion of the course, the students will be able to:		
COs	Course Outcome	Cognitive Level
CO1	Contrast with different aspects of car body and its types.	Understand
CO2	Summarize the vehicle body regulations to build the bus body.	Understand
CO3	Perceive commercial vehicle body and ergonomic design.	Understand
CO4	Recognize various body materials, trim items and mechanisms.	Understand
CO5	Discern the roles of various aerodynamic forces, moments and its measuring instruments.	Understand

TEXT BOOKS:

- 1 John Fenton, Handbook of Automotive Construction and Design Analysis, John Wiley & Sons, New York, Fourth Edition, 2014.
- 2 Powloski, J., Vehicle Body Engineering, Business Books Ltd., London, Second Edition, 1998.

REFERENCES:

- 1 Giles. G.J., Body construction and design, Iliffe Books Butterworth & Co., London, Second Edition, 1991.
- 2 John Fenton, Vehicle Body layout and analysis, Mechanical Engg Publication Ltd., London, First Edition, 1992.
- 3 Dieler Anselm., The passenger car body, SAE International, USA, Fourth Edition, 2000.
- 4 Joseph Katz., Automotive Aerodynamics, Wiley Publications, New Jersey, USA, 2016

Mapping of COs with POs and PSOs

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

R. [Signature]
Chairman (BoS)



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

PREREQUISITE: Basic Mechanics

OBJECTIVES:

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

UNIT - I	STRESS, STRAIN, DEFORMATION OF SOLIDS	(09)
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Rigid and Deformable bodies – Strength, Stiffness and Stability – concept of Stress and strain; stress strain diagrams, Tensile, Compressive and Shear stresses – Deformation of simple and compound bars under axial load – Elastic constants and their relationships – Strain energy – Strain energy in uniaxial loads.

UNIT - II	BEAMS - LOADS AND STRESSES	(09)
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Types of beams: Supports and Loads – Shear force and Bending Moment diagrams for different loadings in Cantilever, Simply supported – Stresses in beams – Theory of simple bending – Stress variation along the length and in the beam section – Effect of shape of beam section on stress induced.

UNIT - III	COLUMNS AND DEFLECTION OF BEAMS	(09)
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Columns – End conditions – Equivalent length of a column – Euler equation – Slenderness ratio – Rankin formula for columns-Failure theory- Elastic curve of Neutral axis of the beam under normal loads – Evaluation of beam deflection and slope: Double integration method, Macaulay Method.

UNIT - IV	TORSION IN CIRCULAR SHAFTS	(09)
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Analysis of torsion of circular bars – Shear stress distribution – Bars of Solid and hollow circular section – Stepped shaft – Twist and torsion stiffness – Compound shafts – Fixed and simply supported shafts – Application to close-coiled helical springs.

UNIT - V	ANALYSIS OF STRESSES IN TWO DIMENSIONS	(09)
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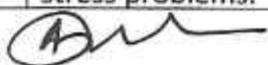
Thin cylindrical and spherical shells – Deformation in thin cylindrical and spherical shells – Biaxial stresses at a point – Stresses on inclined plane – Principal planes and stresses – Mohr's circle for biaxial stresses – Maximum shear stress.

L45: SL:45 TOTAL: 90 PERIODS

COURSE OUTCOMES:

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

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


Chairman (BoS)



TEXT BOOKS:

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

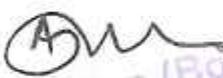
REFERENCES:

- 1 Nash W.A, Theory and problems in Strength of Materials, Schaum Outline Series, McGraw-Hill Book Co, New York, Fourth Edition,1998.
- 2 Kazimi S.M.A, Solid Mechanics, Tata McGraw-Hill Publishing Co., New Delhi, Third Edition,2004
- 3 Ryder G.H, Strength of Materials, Macmillan India Ltd., Third Edition, 2002
- 4 Popov E.P, Engineering Mechanics of Solids, Prentice-Hall of India, New Delhi, Third Edition, 2004

Mapping of COs with POs and PSOs

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

1-low, 2-medium, 3-high


Chairman (BOS)



24AUP41	AUTOMOTIVE COMPONENTS LABORATORY	Category	L	T	P	SL	C
		PCC	0	0	45	0	1.5

PREREQUISITE:NIL

OBJECTIVES:

The objective of the Automotive Components Laboratory is to familiarize students with the construction, function, and operation of major automobile systems and components through hands-on experiments and practical inspection. The lab aims to develop the ability to identify, dismantle and assemble automotive components such as the engine, transmission, brakes, steering, and suspension.

List of Exercise/Experiments:

1. Study of different chassis layout.
2. Measuring the dimensions of light and heavy commercial vehicle frame.
3. Dismantling and assembling of rack and pinion steering system.
4. Dismantling and assembling of power steering system.
5. Examine the components of a drum brake, measure the brake shoe thickness and drum diameter, and check for wear or damage.
6. Dismantling and assembling of clutch.
7. Identification of major components of synchromesh gearbox, and inspection of different components for wear, cracks and dimensions.
8. Categorize the main components of a differential, count the gear teeth, calculate the gear ratio, and check the gears for wear or damage.
9. Inspect the components of a front axle, check for wear or damage, and measure key dimensions for alignment and proper functioning.
10. Dismantling and assembling of rear axle.

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

R. V. V. V.

Chairman (B.O.,)



COURSE OUTCOMES:

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

COs	Course Outcome	Experiments	Cognitive Level
CO1	Study and measure the chassis layout of light and heavy commercial vehicle.	1,2	Understand
CO2	Dismantle and assemble steering box.	3,4	Apply
CO3	Examine the various components of brake and clutch.	5,6	Apply
CO4	Inspect the components of gear box and differential.	7,8	Apply
CO5	Dismantle and assemble axles.	9,10	Apply

Mapping of COs with POs and PSOs

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

1-low, 2-medium, 3-high

LIST OF EQUIPMENTS (For a Batch of 30 Students)

Sl.No	Name of the Equipment's	Qty.
1.	Light duty vehicle chassis frame	1No.
2.	Heavy duty vehicle chassis frame	1No.
3.	Steering systems with different gear boxes	2Nos.
4.	Frontaxle	2Nos.
5.	Rearaxle	2Nos.
6.	Differential	2Nos.
7.	Clutch and gear box (light duty, heavy duty)	2Nos.
8.	Leaf spring	1No.
9.	Brake drum	1No.

R. White
Chairman (BoS,



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

OBJECTIVES:

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

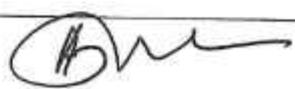
List of Exercise/Experiments:

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

LIST OF EQUIPMENT (for a batch of 30 Students)

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

P:45 TOTAL: 45 PERIODS


Chairman (BoS)



COURSE OUTCOMES:

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

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

Mapping of COs with POs and PSOs

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

1-low, 2-medium, 3-high


Chairman (BoS)



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

Common to AE, ME & SFE

PREREQUISITE

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

OBJECTIVES:

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

List of Exercise/Experiments:

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

P:30 TOTAL: 30 PERIODS

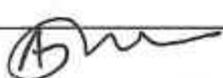
COURSE OUTCOMES:

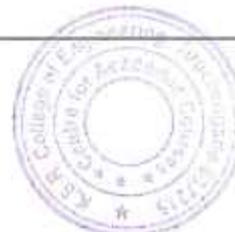
At the end of the course, the students will be able to:

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

REFERENCES:

1. <https://www.youtube.com/watch?v=602zbf8RN4>
2. <https://www.youtube.com/watch?v=CRa9dJnZRu0>
3. <https://www.youtube.com/watch?v=3KsRjnn83T0>


Chairman (BoS)



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

1-low, 2-medium, 3-high

Chairman (BoS)



24AUP42	SEMINAR PRESENTATION	Category	L	T	P	SL	C
		EEC	0	0	30	0	1

OBJECTIVES:

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

Guidelines:

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

TOTAL: 30 PERIODS

COURSE OUTCOMES:

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

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

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

R. White

Chairman (BoS)



Assessment Weightage

Presentation Skills	Technical Knowledge	Viva Voce	Total
30	20	10	50

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

R. Kumar
Chairman (BoS)



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

Arjun Kumar

Chairman (BoS)



TEXT BOOKS:

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

REFERENCES:

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

Mapping of COs with POs and PSOs

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

Anirban
Chairman (BoS)



24AUE02	AUTOMOTIVE POLLUTION AND CONTROL	Category	L	T	P	SL	C	
		ESC	45	0	0	45	3	
PREREQUISITE: NIL								
OBJECTIVE: This course explains the main pollutants produced by vehicles and how they affect the environment. It also covers simple and practical techniques to reduce emissions and keep vehicles running cleanly.								
UNIT - I	EMISSION FROM AUTOMOBILES							(9)
Sources of pollution. Various emissions from automobiles – Pollutants formation and its effects on environment and human beings. Emission control techniques – Emission standards.								
UNIT - II	EMISSION FROM SPARK IGNITION ENGINE AND ITS CONTROL							(9)
Pollutants formation in SI Engines – Carbon monoxide, Unburned hydrocarbon, NO _x , Smoke – Effects of design and operating variables on emission formation – controlling of pollutants, Catalytic converters – charcoal canister – positive crank case ventilation system, secondary air injection, thermal reactor and laser assisted combustion.								
UNIT - III	EMISSION FROM COMPRESSION IGNITION ENGINE AND ITS CONTROL							(9)
Formation of White, Blue, and Black smokes, NO _x , soot, sulphur particulate and intermediate compounds – physical and chemical delay – significance effect of operating variables on emission formation – fumigation, EGR, HCCI, particulate traps, SCR – cetane number effect-								
UNIT - IV	NOISE POLLUTION FROM AUTOMOBILES							(9)
Sources of noise – engine noise, transmission noise, vehicle structural noise, aerodynamics noise and wxhaust noise - testing procedure for noise. Noise reduction in Automobiles – encapsulation technique for noise reduction – engine room sealing and driver cabin sealing - silencer design.								
UNIT - V	TEST PROCEDURES AND EMISSION MEASUREMENTS							(9)
Constant volume sampling I & III systems - sampling procedures – chassis dyno, seven mode and thirteen mode cycles for emission sampling – sampling problems – emission analysers – NDIR, FID, chemiluminescent, smoke meters, dilution tunnel, SHED test and sound level meters.								
L = 45, SL = 45, TOTAL = 90 PERIODS								

R. [Signature]
Chairman (BoS)



COURSE OUTCOMES:

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

COs	Course Outcome	Cognitive Level
CO1	Perceive the effects of automobile emissions on environment and human beings.	Understand
CO2	Summarize the formation of major pollutants in SI engine and study pollutant control techniques.	Understand
CO3	Depict the formation of emission in CI engine and identify suitable emission control techniques.	Understand
CO4	Recognize sources of noise pollution from automobiles and its reduction method.	Understand
CO5	Establish test procedures and emission measurements in automobile.	Apply

TEXT BOOKS:

- 1 B P Pundir, Engine Emissions, Narosa publications, New Delhi, Second Edition, 2017.
- 2 D J Patterson and N A Henin, Emission from Combustion Engine and their control, Anna Arbor Science Publication, Washington, 1985.
3. John Foreman, Sound Analysis and Noise Control, Kluwer Academic Publishers 1 November 1990

REFERENCES:

- 1 Gerhard Knothe, Jon Van Gerpen, Jargon Krahl, The Biodiesel Handbook, AOCS Press Champaign, Illinois, 2005.
- 2 Transactions of SAE on Biofuels (Alcohols, vegetable oils, CNG, LPG, Hydrogen, Biogas etc.).
- 3 Science direct Journals (Biomass & Bio energy, Fuels, Energy, Energy conversion Management, Hydrogen Energy, etc.) on biofuels.
- 4 Mehrdad Ehsani, Yimin Gao, Stefano Longo and Kambiz Ebrahimi, Modern Electric, Hybrid Electric, and Fuel Cell Vehicles, CRC Press; 3rd edition, 2018.

Mapping of COs with POs and PSOs

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

R. [Signature]
Chairman (BoS)



24AUE03	ALTERNATIVE FUELS AND ENERGY SYSTEMS	Category	L	T	P	SL	C	
		ESC	45	0	0	45	3	
PREREQUISITE: NIL								
OBJECTIVE: To provide knowledge of alternative fuels and modern energy systems emphasizing performance, emissions, and sustainability.								
UNIT - I	ALCOHOL FUELS							(9)
Introduction to alternative fuels – need for alternative fuels – availability of different alternative fuels for SI and CI engines. Alcohols as fuels - production methods of alcohols - properties of alcohols as fuels – methods of using alcohols in CI and SI engines - blending, dual fuel operation, surface ignition and oxygenated additives - performance, emission and combustion characteristics in CI and SI engines.								
UNIT - II	VEGETABLE OILS AS FUELS							(9)
Various vegetable oils and their important properties - different methods of using vegetable oils in IC engines – blending, preheating, trans-esterification and emulsification of vegetable oils – performance, emission and combustion characteristics in IC engines.								
UNIT - III	HYDROGEN FUELS							(9)
Production methods of hydrogen - combustive properties of hydrogen - problems associated with hydrogen as fuel and solutions - different methods of using hydrogen in SI and CI engines - performance, emission and combustion analysis in engines - hydrogen storage – safety aspects of hydrogen.								
UNIT - IV	BIOGAS, NATURAL GAS AND LPG AS FUELS							(9)
Production methods of biogas, natural gas and LPG - properties studies - CO ₂ and H ₂ S scrubbing in biogas, modification required to use in SI and CI Engines – performance and emission characteristics of biogas, CNG and LPG in SI and CI engines.								
UNIT - V	ELECTRIC, HYBRID AND FUEL CELL VEHICLES							(9)
Introduction to energy storage requirements in hybrid and electric vehicles, battery based energy storage and its analysis, Fuel cell based energy storage and its analysis, hybridization of different energy storage devices. Basics of fuel cell drive-train systems, fuel cell characteristics - different types of fuel cells, fuel cell modeling, and hydrogen storage methods.								
L = 45, SL = 45, TOTAL = 90 PERIODS								

R. [Signature]
Chairman (BoS)



COURSE OUTCOMES:

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

COs	Course Outcome	Cognitive Level
CO1	Summarize the possible ways of using alcohols as a fuel in the IC engines.	Understand
CO2	Infer the challenges and difficulties in using vegetable oil as an alternative fuel in IC engines.	Understand
CO3	Recognize the uses of hydrogen as fuel in SI and CI engines.	Understand
CO4	Relate the usefulness of biogas, natural gas and LPG as fuels in SI and CI engines.	Understand
CO5	Perceive the energy storage needs of hybrid and electric vehicles and hydrogen storage systems.	Understand

TEXT BOOKS:

- 1 Ayhan Demirbas, Biodiesel - A Realistic Fuel Alternative for Diesel Engines, Springer-Verlag London Limited , 2008, ISBN 13: 9781846289941
- 2 Society of Automotive Engineers Inc, 2014. Society of Automotive Engineers Inc, 2014, ISBN 13: 9780768000528
- 3 Fuel Cell Handbook (Seventh Edition), EG&G Technical Services, Inc. November 2004

REFERENCES:

- 1 Gerhard Knothe, Jon Van Gerpen, Jargon Krahl, The Biodiesel Handbook, AOCS Press Champaign, Illinois, 2005.
- 2 Transactions of SAE on Biofuels (Alcohols, vegetable oils, CNG, LPG, Hydrogen, Biogas etc.).
- 3 Science direct Journals (Biomass & Bio energy, Fuels, Energy, Energy conversion Management, Hydrogen Energy, etc.) on biofuels.
- 4 Mehrdad Ehsani, Yimin Gao, Stefano Longo and Kambiz Ebrahimi, Modern Electric, Hybrid Electric, and Fuel Cell Vehicles, CRC Press; 3rd edition, 2018.

Mapping of COs with POs and PSOs

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

R. [Signature]
Chairman (BoS)



24AUE07	MATERIAL SCIENCE AND METALLURGY	Category	L	T	P	SL	C
		PCC	45	0	0	45	3
PREREQUISITE: Engineering Physics, Engineering Chemistry							
OBJECTIVES: To provide a clear understanding of the structure, properties, and behavior of engineering materials including metals, alloys, polymers, ceramics, and composites. It covers phase diagrams, heat treatment processes, mechanical properties, and material testing methods, enabling students to select and apply suitable materials for various engineering applications							
UNIT I	CONSTITUTION OF ALLOYS AND PHASE DIAGRAMS						(9)
Constitution of alloys – Solid solutions, substitutional and interstitial – phase diagrams, isomorphous, eutectoid, eutectic, peritectic, and peritectoid reactions, Iron – Iron carbide equilibrium diagram. Classification of steel and cast iron microstructure, properties and applications.							
UNIT II	HEAT TREATMENT						(9)
Full annealing, stress relief, recrystallization, spheroidizing, normalizing and tempering. Isothermal transformation diagrams – cooling curves superimposed on I.T. diagram, critical cooling rate - hardenability, Jominy end quench test – austempering and martempering. Case hardening - carburizing, nitriding, cyaniding, carbonitriding, flame and induction hardening.							
UNIT III	NON-METALLIC MATERIALS						(9)
Polymers – types of polymer, commodity and engineering polymers – glass transition and melting temperature of polymers – structures, properties and applications of Polyethylene (PE), Polypropylene (PP), Polystyrene (PS), Polyvinylchloride (PVC), Polycarbonate (PC), Polyamide (PA), Polyimide (PI), Polyamide-imide (PAI), Poly Tetra Fluro Ethylene (PTFE)- Glass annealing – introduction to fibre and particulate reinforced composites							
UNIT IV	MATERIALS FOR AUTOMOTIVE COMPONENTS						(9)
Criteria of selecting materials for automotive components viz cylinder block, cylinder head, piston and piston ring. Gudgeon pin, connecting rod, crank shaft, crank case, cam shaft, engine valve, gear wheel, clutch plate, axle, bearings, chassis, spring, body panel and brake lining.							
UNIT V	MECHANICAL PROPERTIES AND TESTING						(9)
Mechanism of plastic deformation, slip and twinning - types of fracture - testing of materials under tension, compression and shear loads - Hardness tests (Brinell, Vickers and Rockwell), Impact test - Izod and Charpy, fatigue and creep tests, fracture toughness tests.							
L = 45, SL = 45, TOTAL = 90 PERIODS							

R. [Signature]
Chairman (BoS)



COURSE OUTCOMES:													
At the end of the course, the students will be able to:													
COs	Course Outcome											Cognitive Level	
CO1	Decipher alloys and phase diagram, iron-iron carbide diagram and steel classification.											Understand	
CO2	Narrate isothermal transformation, continuous cooling diagrams and different heat treatment processes.											Understand	
CO3	Pinpoint the different polymer, ceramics and composites and their uses in engineering field.											Understand	
CO4	Recognize and select the suitable materials for various automotive components.											Understand	
CO5	Summarize the mechanism of plastic deformation and testing mechanical properties.											Understand	
TEXT BOOKS:													
1. Kenneth G. Budinski and Michael K. Budinski, Engineering Materials Prentice-Hall of India Private Limited, 4th Indian Reprint 2010.													
2. Khanna.O.P, A text book of Materials Science and Metallurgy, Khanna Publishers, 2003													
REFERENCES:													
1. Raghavan.V, Materials Science and Engineering, Prentice Hall of India Pvt., Ltd., 2015.													
2. Sydney H. Avner, Introduction to Physical Metallurgy, Tata McGraw Hill Book Company, 2007.													
3. Dieter. G.E., Mechanical Metallurgy, Tata McGraw-Hill, Third Edition, 2017													
4. Williams D Callister, Material Science and Engineering, Wiley India Pvt Ltd, Revised Indian Edition 2014.													
Mapping of COs with POs and PSOs													
COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	2	-	-	-	-	-	1	-	-	1	-	-
CO2	3	2	-	-	-	-	-	1	-	-	1	-	-
CO3	2	2	-	-	-	-	-	1	-	-	1	-	-
CO4	3	2	-	-	-	-	-	1	-	-	1	-	-
CO5	2	2	-	-	-	-	-	1	-	-	1	-	-
Avg.	3	2	-	-	-	-	-	1	-	-	1	-	-
1-low, 2-medium, 3-high													

R. [Signature]
Chairman (BoS)



24AUE08	AUTOMOTIVE FABRICATION PROCESSES	Category	L	T	P	SL	C
		PCC	45	0	0	45	3
PREREQUISITE: Fundamental knowledge on Manufacturing processes.							
OBJECTIVES: To provide knowledge of manufacturing methods and fabrication techniques used in the automotive industry.							
UNIT I	SHEET METAL WORKS						(9)
Introduction to sheet metal stamping - blanking - punching - bending, flanging and curling - coining, embossing, and stretching. Sheet metal working: bending, forming and deep drawing, shearing. applications in automotive industry.							
UNIT II	BRAZING AND SOLDERING						(9)
Brazing and soldering – construction and principle of soldering and brazing, compositions of solder. Different equipment and processes involved in brazing and soldering process their relative merits, demerits, applications and defects.							
UNIT III	FORMING PROCESSES						(9)
Forging: Smith forging, drop and press forging, M/c forging, forging defects. Extrusions: Direct, indirect, impact and hydrostatic extrusion and their applications, extrusion of tubes. Wire drawing methods and variables in wire – drawing and their applications. Brief introduction to explosive forming, coating and deposition methods. Principles of jig - fixture, principles of location, types of locators, types of clamping devices, types of bushes, selection of locators, clamps and bushes, types of jig							
UNIT IV	SUPER FINISHING PROCESSES						(9)
Introduction about super finishing processes. Construction and working principle of grinding, lapping, honing, buffing, barrel tumbling, burnishing, powder coating, polishing. Nano-finishing technique their relative merits, demerits, applications and defects.							
UNIT V	COATING PROCESS						(9)
Need of coating process, coating material characteristics, types of coating process E-coating Powder coating chemical vapor deposition (CVD) & physical vapor deposition - plasma spraying - surface color coating by brush, roller and spray applications							
L = 45, SL = 45, TOTAL =90 PERIODS							

R. White

Chairman (BoS)



COURSE OUTCOMES:

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

COs	Course Outcome	Cognitive Level
CO1	Summarize the various techniques involved in sheet metal works.	Understand
CO2	Select brazing and soldering methods for automotive fabrication.	Understand
CO3	Designate the appropriate forming processes for automotive applications.	Understand
CO4	Perceive the process of super finishing of automotive components.	Understand
CO5	Recognize the coating process for automotive fabrication	Understand

TEXT BOOKS:

1. M. P. Groover, Fundamentals of Modern Manufacturing: Materials, Processes, and Systems, 6th ed. Hoboken, NJ, USA: Wiley, 2015.
2. P. C. Sharma, A Textbook of Production Technology (Manufacturing Processes). New Delhi, India: S. Chand Publishing, 2002.
3. Arthur A, Coatings Technology Handbook, CRC Press, 2005

REFERENCES:

1. P. N. Rao, Manufacturing Technology: Foundry, Forming and Welding, Vol. 1, 5th ed. New Delhi, India: McGraw Hill Education, (editions/reprints 2013–2018).
2. S. Kalpakjian and S. R. Schmid, Manufacturing Engineering and Technology, 6th ed. Upper Saddle River, NJ, USA: Prentice Hall, 2010.
3. O. P. Khanna, Text Book of Welding Technology, New Delhi, India: Dhanpat Rai Publications Revised Edition. 2015.
4. W. F. Hosford and R. M. Caddell, Metal Forming: Mechanics and Metallurgy, 3rd ed. Cambridge, UK: Cambridge University Press, 2007.

Mapping of COs with POs and PSOs

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

1-low, 2-medium, 3-high

R. [Signature]

Chairman (BoS)



24AUE11	COMPUTER AIDED MANUFACTURING	Category	L	T	P	SL	C
		PEC	45	0	0	45	3
PREREQUISITE: -							
OBJECTIVE: To enable students to understand and apply computer-based tools, CNC programming, and automation technologies for efficient and accurate manufacturing processes.							
UNIT - I	CAD / CAM INTERFACE	(9)					
Introduction to CAD/CAM - Current trends in manufacturing engineering - design for manufacturing, assembly – process planning techniques - total approach to product development - concurrent engineering - rapid prototyping - CAD / CAM software.							
UNIT - II	FUNDAMENTALS OF CNC MACHINES	(9)					
CNC technology - functions of CNC control in machine tools - classification of CNC systems - contouring system - interpolators, open loop, closed loop CNC systems - CNC controllers, hardware features - direct numerical control (DNC Systems). IoT-enabled CNC Machines and Smart Manufacturing - Concept of IoT in CNC machining - Cloud-based CNC monitoring - Role of IoT in Industry 4.0 manufacturing - Five axis CNC machines – horizontal / vertical machining center - cycle time reduction.							
UNIT - III	CONSTRUCTIONAL FEATURES OF CNC MACHINES	(9)					
Design considerations of CNC machines for improving machining accuracy - structural members - slide ways - side linear bearings - ball screws - spindle drives; feed drives - work holding devices, tool holding devices - automatic tool changers. Feedback devices - principles of operation - machining centres - tooling for CNC machines.							
UNIT - IV	PART PROGRAMMING FOR CNC MACHINES	(9)					
Numerical control codes - standards - manual programming - canned cycles, subroutines - computer assisted programming, CAD / CAM approach to NC part programming - APT language, machining from 3D models.							
UNIT - V	COMPUTER AIDED PROCESS PLANNING AND MODELING	(9)					
Process planning - role of process planning in CAD / CAM integration - approaches to computer aided process planning - variant approach, generative approaches - Group Technology. Emerging challenges in CAD / CAM, product data management - product modeling - assembly modeling - tolerance modeling. AI Applications in CNC Machining and Process Planning - Introduction to Artificial Intelligence in manufacturing - AI-based process planning and optimization.							
L = 45, SL = 45, TOTAL = 90 PERIODS							

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COURSE OUTCOMES:		
Upon completion of the course, the students will be able to:		
COs	Course Outcome	Cognitive Level
CO1	Perceive the principles and workflow of the CAD/CAM interface and its role in integrated manufacturing systems.	Understand
CO2	Decipher the fundamentals and operational concepts of CNC machines used in modern manufacturing.	Understand
CO3	Ascertain the constructional features, drive mechanisms, and control systems of CNC machines..	Understand
CO4	Develop and optimize manual part programs for CNC turning and milling operations using standard G & M codes.	Apply
CO5	Pertain computer-aided process planning and modeling techniques to improve manufacturing productivity and efficiency.	Apply

TEXT BOOKS:

- 1 Radhakrishnan P, Computer Numerical Control , New Central Book Agency, Delhi, Fourth Edition, 2018.
- 2 Mikell P Groover., Automation, Production Systems and computer integrated manufacturing, Pearson Education ,Delhi, Fifth Edition, 2015.

REFERENCES:

- 1 Yoram Koren., Computer Control of Manufacturing Systems, McGraw-Hill Book Company, Delhi, Second Edition, 2017.
- 2 Koren, Y., Computer Control of Manufacturing systems, McGraw Hill (2008).
- 3 Smith G.T, CNC - Machining, Techniques - Vol. 1, 2 & 3, verlag, UK, Second Edition, 2011.
- 4 Kant Vajpayee S, Principles of Computer Integrated Manufacturing, Prentice Hall of India Ltd., Delhi, Second Edition, 2013.

Mapping of COs with POs and PSOs

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

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24AUE32	BATTERY TECHNOLOGY	Category	L	T	P	SL	C
		ESC	45	0	0	45	3
PREREQUISITE: Basic knowledge of Chemistry.							
OBJECTIVE: To provide fundamental knowledge of battery electrochemistry, and energy storage mechanisms. Students learn various battery types, performance evaluation methods, and safety practices.							
UNIT - I	LI-ION BATTERY						(9)
Introduction about batteries. Significance of Li-ion batteries - classification of Li-Ion batteries - construction of Li-Ion batteries - energy density - charging and discharging profiles - influence of temperature - life and ageing issues - safety aspects and thermal runaway.							
UNIT - II	LI-ION BATTERY SYSTEMS						(9)
Battery systems and subsystems - battery modules - cells in series and parallel configurations - battery cooling systems - battery management systems - cell balancing - battery housing - assembly of battery systems - production aspects - regulations on battery systems.							
UNIT - III	BATTERY MANAGEMENT SYSTEM						(9)
Battery management systems; functions and architecture, performance parameter measurement, equalization management circuit, data communication, logic and safety control, testing stability. Battery plant issues							
UNIT - IV	ENERGY STORAGE						(9)
Battery based energy storage, overview of batteries, battery parameters, battery charging, regenerative braking, alternative novel energy sources-solar photovoltaic cells, fuel cells, super capacitors, and flywheels							
UNIT - V	RECENT TRENDS IN BATTERY SYSTEMS						(9)
Study of battery systems in electric passenger vehicles (Bus, Car and Two Wheeler) - production and cost analysis - mass production demands - cell manufacturing - demands on cooling systems - introduction to grid-to-vehicle, vehicle to grid (V2G) or vehicle to buildings (V2B) or vehicle to home (V2H) operations, bi-directional EV charging systems, energy management strategies used in hybrid and electric vehicle - second life use for battery packs - solid state batteries - ecosystem for electric vehicles							
L = 45, SL = 45, TOTAL = 90 PERIODS							

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COURSE OUTCOMES:

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

COs	Course Outcome	Cognitive Level
CO1	Select suitable Li-Ion battery cells for use in electric vehicles based on the calculation of various cell parameters.	Understand
CO2	Prepare mechanical assembly drawings of battery systems for electric vehicles.	Understand
CO3	Elucidate battery management system for various battery systems to obtain peak performance by monitoring and charge equalization.	Understand
CO4	Perceive the energy storage in the batteries	Understand
CO5	Summarize the cost benefit analysis of battery sub systems based on market conditions and manufacturability	Understand

TEXT BOOKS:

- 1 Reiner Korthauer, "Lithium-Ion Batteries: Basics and Applications", Springer, August 2018 ISBN 978-3-662-53069-6.
- 2 Marc A Rosen, Aida Farsi "Battery Technology: From Fundamentals to Thermal Behavior and Management", Academic Press Inc (25 January 2023); Elsevier, 2023.

REFERENCES:

- 1 Jiuchun Jiang and Caiping Zhang, Fundamentals and Applications of Lithium-Ion Batteries in Electric Drive VehiclesI, John Wiley and Sons, 2015
- 2 John G. Hayes and G. Abas Goodarzi, Electric PowertrainI, First Edition, John Wiley and Sons, 2018.
- 3 James Larminie and John Lowry, Electric Vehicle Technology ExplainedI, John Wiley and Sons, 2018.
- 4 Masataka Wakihara and Osamu Yamamoto, Lithium ion Batteries Fundamental and Performance, Wiley-VCH, Verlag GmbH, 1999

Mapping of COs with POs and PSOs

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

R. [Signature]
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