J.K.K MUNIRAJAH COLLEGE OF TECHNOLOGY

(An Autonomous Institution)

Approved by AICTE, New Delhi, Affiliated to Anna University – Chennai

National Assessment and Accreditation Council (NAAC), Bangalore with "A" Grade

T.N. PALAYAM, GOBICHETTIPALAYM TK, ERODE DT-638506

B.E / B.Tech REGULATIONS 2024

CHOICE BASED CREDIT SYSTEM

B. E MECHANICAL ENGINEERING

Curriculum and Syllabi

For the Students Admitted from the

Academic Year 2024-2025

Version:1.0	Date : 14.08.2024

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I. INSTITUTION VISION & MISSION

VISION

- To create and Mold students as engineers with adequate core and interdisciplinary knowledge and skills for the welfare of mankind and society through quality education for students with value added education and Ethical values.

MISSION

- To mould our students in the attainment of professional competence for coping with the rapid and challenging advancements in technologies and the ever changing world of business, industry and services.
- To help and guide our students in their personal growth shaping them into mature and responsible individuals.
- Providing rigorous academic knowledge to the students through high quality education, training models and research activities.
- Providing platform to the students for holistic development with participation in co-curricular and extracurricular activities.

II. DEPARTMENT OF MECHANICAL ENGINEERING

VISION

- To produce capable graduate engineers with an aptitude for research and leadership

MISSION

- Enrich the students' knowledge and computing skills through innovative teaching- learning process with state- of- art- infrastructure facilities.
- Endeavour the students to become an entrepreneur and employable through adequate industry institute interaction.
- Inculcating leadership skills, professional communication skills with moral and ethical values to serve the society and focus on students' overall development.

III. PROGRAM EDUCATIONAL OBJECTIVES (PEO)

Bachelor of Mechanical Engineering curriculum is designed to impart Knowledge, Skill and Attitude on the graduates to

- Have a successful career in Mechanical Engineering and allied industries.
- Have expertise in the areas of Design, Thermal, Materials and Manufacturing.
- Contribute towards technological development through academic research and industrial practices.
- Practice their profession with good communication, leadership, ethics and social responsibility.
- Graduates will adapt to evolving technologies through life-long learning,

IV. PROGRAM OUTCOMES (POS)

1. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

2. **Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

3. **Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

4. **Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

5. **Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

6. **The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

7. **Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

8. **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

9. **Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

10. **Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

11. **Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

12. **Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

V. PROGRAM SPECIFIC OUTCOMES(PSO)

PSO1: Ability to identify, analyze and solve engineering problems relating to mechanical systems together with allied engineering streams.

PSO2: Students shall qualify at the State, National and International level competitive examination for employment, higher studies and research.

MAPPING OF COURSE OUTCOMES WITH PROGRAM OUTCOME

Year	Sem	Course name	PO												PSO	
			1	2	3	4	5	6	7	8	9	10	11	12	1	2
I	I	Induction Programme	-													
		Technical English-I	-	-	-	2	-	1	-	-	2.4	3	-	2.6	-	-
		Matrices and Differential Calculus	3	3	1	-	-	-	-	-	-	-	-	-	-	-
		Engineering Physics	3	1.2	1.2	1	-	-	-	1.2	1	1.4	1.2	1.4	-	-
		Engineering Chemistry	2	2	2	1	-	1	1	-	-	-	-	1	-	-
		Fundamentals of Computing & programming in C	2	2	2	2	1.6	1.6	1.6	0.8	0.4	0.4	0.4	-	2	1.6
		Heritage of Tamils	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Programming in C Laboratory	**2**	**3**	**3**	**1**	**2**	**-**	**-**	**-**	**1**	**1**	**-**	**2**	**3**	**3**
		Physics and Chemistry Laboratory	3	3	1	1	-	-	-	-	-	-	-	-	-	-
			3	2	1	-	1	3	2	1	-	-	-	1	-	-
		Communication Skills-I	-	-	-	2	-	1	-	-	2	3	-	3	-	-
	II	Technical English-II	-	1	1	-	-	-	1	1	2	3	-	2	-	-
		Statistics and Numerical Methods	3	3	1	1	1	-	-	-	2	-	2	3	-	-
		Material Science	3	1	2	1	2	1	1	1	-	-	-	-	-	-
		Basic Electrical and Electronics Engineering	3	3	2	2	-	-	-	-	-	1	-	-	3	3
		Tamils and Technology	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Engineering Graphics	3	2	3	3	2	-	-	-	3	2	3	3	3	3
		Basic Electrical and Electronics Engineering Laboratory	3	2	-	-	1	1	1	-	-	-	-	2	2	1
		Engineering Practices Laboratory	3	2	-	-	1	1	1	-	-	-	-	2	2	1
		Communication Skills-II	-	-	-	2	-	1	-	-	2	3	-	3	-	-

B. E MECHANICAL ENGINEERING											
Courses of study and scheme of Assessment (REGULATIONS 2024)											
SEMESTER I											
S.No	**Course Code**	**Course Title**	**Category**	**Periods/ Week**			**Total Contact Periods**	**Credits**	**Max. Marks**		
				L	**T**	**P**			**CIA**	**ESE**	**TM**
THEORY											
1	24IP101	Induction Programme	3 WEEKS								
2	24EN101	Technical English-I	HSS	3	0	0	3	3	40	60	100
3	24MA102	Matrices and differential Calculus	BS	3	1	0	4	4	40	60	100
4	24PH103	Engineering Physics	BS	3	0	0	3	3	40	60	100
5	24CY104	Engineering Chemistry	BS	3	0	0	3	3	40	60	100
6	24CS105	Fundamentals of Computing & programming in C	ES	3	0	0	3	3	40	60	100
7	24TA106	Heritage of Tamils	HSS	1	0	0	1	1	40	60	100
PRACTICALS											
8	24CS108	Programming in C Laboratory	ES	0	0	3	3	2	60	40	100
9	24PC109	Physics and Chemistry Laboratory	BS	0	0	3	3	2	60	40	100
EMPLOYABILITY ENHANCEMENT COURSES											
10	24EN110	Communication Skills-I	EEC	0	0	2	2	1	100	0	100
			Total	**16**	**1**	**8**	**25**	**22**			

SEMESTER II											
S.No	Course Code	Course Title	Category	Periods /Week			Total Contact Period	Credits	Max. Marks		
				L	T	P			CIA	ESE	TM
THEORY											
1	24EN201	Technical English-II	HSS	3	0	0	3	3	40	60	100
2	24MA202	Statistics and Numerical Methods	BS	3	1	0	4	4	40	60	100
3	24PH205	Material Science	BS	3	0	0	3	3	40	60	100
4	24EE201	Basic Electrical and Electronics Engineering	ES	3	0	0	3	3	40	60	100
5	24EG204	Engineering Graphics	ES	2	0	3	3	3	40	60	100
5	24TA206	Tamils and Technology	HSS	1	0	0	1	1	40	60	100
PRACTICALS											
7	24EE202	Basic Electrical and Electronics Engineering Laboratory	ES	0	0	3	3	2	60	40	100
8	24EP203	Engineering Practices Laboratory	ES	0	0	4	4	2	60	40	100
EMPLOYABILITY ENHANCEMENT COURSES											
9	24EN210	Communication Skills-II	EEC	0	0	2	2	1	100	0	100
			Total	**16**	**1**	**10**	**27**	**22**			

SEMESTER III											
S.No	Course Code	Course Title	Category	Periods/ Week			Total Contact Period	Credits	Max. Marks		
				L	T	P			CIA	ESE	TM
THEORY											
1	24MA304	Fourier Series And Transforms	BS	3	1	0	4	4	40	60	100
2	24ME301	Industrial Metallurgy	PC	3	0	0	3	3	40	60	100
3	24ME302	Engineering Thermodynamics	PC	3	0	0	3	3	40	60	100
4	24ME303	Manufacturing Process-I	PC	3	0	0	3	3	40	60	100
5	24ME304	Engineering Mechanics	PC	3	0	0	3	3	40	60	100
THEORY CUM PRACTICALS											
6	24ME305	Fluid Mechanics	PC	3	0	2	5	4	50	50	100
PRACTICALS											
7	24ME306	Manufacturing Process Laboratory	PC	0	0	3	3	2	60	40	100
8	24ME307	Computer Aided Modeling Laboratory	PC	0	0	4	4	2	60	40	100
EMPLOYABILITY ENHANCEMENT COURSES											
9	24GE308	Soft Skills and Effective Communication	EEC	1	0	0	1	1	100	0	100
			Total	**19**	**1**	**8**	**28**	**25**			

SEMESTER IV											
S.No	Course Code	Course Title	Category	Periods/ Week			Total Contact Period	Credits	Max. Marks		
				L	T	P			CIA	ESE	TM
THEORY											
1	24ME401	Kinematics and Dynamics of Machines	PC	3	1	0	4	4	40	60	100
2	24ME402	Thermal Systems Engineering	PC	3	0	0	3	3	40	60	100
3	24ME403	Mechanics of Solids	PC	3	0	0	3	3	40	60	100
4	24ME404	Metrology and Instrumentation	PC	3	0	0	3	3	40	60	100
5	24GE405	Environmental Sciences and Sustainability	BS	2	0	0	2	2	40	60	100
THEORY CUM PRACTICAL											
6	24ME405	Manufacturing Process-II	PC	3	0	2	5	4	50	50	100
PRACTICALS											
7	24ME407	Thermal Engineering Laboratory	PC	0	0	3	3	2	60	40	100
EMPLOYABILITY ENHANCEMENT COURSES											
8	24GE409	Personality Development	EEC	1	0	0	1	1	100	0	100
		Total		**21**	**1**	**7**	**29**	**22**			

SEMESTER V											
S.No	Course Code	Course Title	Category	Periods/ Week			Total Contact Period	Credits	Max. Marks		
				L	T	P			CIA	ESE	TM
THEORY											
1	24ME501	Industry 4.0	PC	3	0	0	3	3	40	60	100
2	24ME502	Turbo Machinery	PC	3	0	0	3	3	40	60	100
3	24ME503	Design of Mechanical Systems	PC	3	0	0	3	3	40	60	100
4		Professional Elective-I	PE	3	0	0	3	3	40	60	100
5		Open Elective-I	OE	3	0	0	3	3	40	60	100
PRACTICALS											
6	24ME509	Metrology and Dynamics Laboratory	PC	0	0	3	3	2	60	40	100
EMPLOYABILITY ENHANCEMENT COURSES											
7	24GE507	Aptitude Skills	EEC	1	0	0	1	1	100	0	100
MANDATORY COURSES											
8	24MC1--	Mandatory course-I	MC	3	0	0	3	0	100	0	100
		Total		**19**		**3**	**22**	**18**			

SEMESTER VI											
S.No	Course Code	Course Title	Category	Periods/ Week			Total Contact Period	Credits	Max. Marks		
				L	T	P			CIA	ESE	TM
THEORY											
1	24ME601	Heat and Mass Transfer	PC	3	0	0	3	3	40	60	100
2		Professional Elective-II	PE	3	0	0	3	3	40	60	100
3		Professional Elective-III	PE	3	0	0	3	3	40	60	100
4		Professional Elective-IV	PE	3	0	0	3	3	40	60	100
5		Open Elective-II	OE	3	0	0	3	3	40	60	100
THEORY CUM PRACTICAL											
6	24ME617	Computer aided design and Manufacturing	PC	3	0	2	5	4	50	50	100
PRACTICALS											
7	24ME618	Heat Transfer Laboratory	PC	0	0	3	3	2	60	40	100
EMPLOYABILITY ENHANCEMENT COURSES											
8	24ME619	Innovative Project Work	EEC	0	0	3	3	2	60	40	100
MANDATORY COURSE											
9	24MC2--	Mandatory Course-II	MC		0	0	3	0	100	0	100
		Total		**18**	**0**	**8**	**26**	**23**			

SEMESTER VII											
S.No	Course Code	Course Title	Category	Periods/ Week			Total Contact Period	Credits	Max. Marks		
				L	T	P			CIA	ESE	TM
THEORY											
1.	24ME701	Human Values and Ethics	HSS	2	0	0	2	2	40	60	100
2.	24ME702	Manufacturing Automation	PC	3	0	0	3	3	40	60	100
3.		Professional Elective-V	PE	3	0	0	3	3	40	60	100
4.		Professional Elective-VI	PE	3	0	0	3	3	40	60	100
5.		Open Elective-III	OE	3	0	0	3	3	40	60	100
THEORY CUM PRACTICAL COURSE											
7	24ME713	Mechatronics and IoT	PC	3	0	2	5	4	50	50	100
PRACTICAL COURSE											
8	24ME714	Simulation and Analysis Laboratory	PC	0	0	3	3	2	40	60	100
EMPLOYABILITY ENHANCEMENT COURSES											
6.	24GE706	Comprehensive Test And Viva Voce	EEC	0	0	2	2	1	100	-	100
			Total	**17**		**7**	**24**	**21**			

SEMESTER VIII											
S.No	Course Code	Course Title	Category	Periods/ Week			Total Contact Period	Credits	Max. Marks		
				L	T	P			CIA	ESE	TM
EMPLOYABILITY ENHANCEMENT COURSES											
1.	24ME801	Summer Internship	EEC	0	0	0	2	2	100	-	100
2.	24ME802	Project Work	EEC	0	0	20	20	10	60	40	100
			Total	**0**	**0**	**20**	**20**	**12**			

SUMMARY OF CREDITS

S.No	Course Category	Credits per Semester								Total Credits	Credits in %
		I	II	III	IV	V	VI	VII	VIII		
1	HSS	4	4	-	-	-	-	2	-	10	6.06
2	BS	12	7	4	2	-	-	-	-	25	15.15
3	ES	5	10	-	-	-	-	-	-	15	9.09
4	PC	-	-	20	19	11	9	9	-	68	41.21
5	PE	-	-	-	-	3	9	6	-	18	10.90
6	OE	-	-	-	-	3	3	3	-	9	5.45
7	EEC	1	1	1	1	1	2	1	12	20	12.12
8	MC	-	-	-	-	-	-	-	-	-	
Total Credits/ Semester		22	22	25	22	18	23	21	12	165	100

CATEGORIZATION OF COURSES

I. Humanities and Social Sciences including Management Courses (HSS)
II. Basic Science Courses(BS)
III. Engineering Science Courses(ES)
IV. Professional Core Courses(PC)
V. Professional Elective Courses(PE)
VI. Open Elective Courses(OE)
VII. Mandatory Courses (MC)
VIII. Employability Enhancement Courses(EEC)

CATEGORIZATION OF COURSES							
Humanities and Social Sciences including Management Courses (HSS)							
S.No	**Course Code**	**Course Title**	**L**	**T**	**P**	**C**	**SEM**
1.	24EN101	Technical English-I	3	0	0	3	I
2.	24TA106	Heritage of Tamils	1	0	0	1	I
3.	24EN201	Technical English-II	3	0	0	3	II
4.	24TA206	Tamils and Technology	1	0	0	1	II
5.	24MS701	Human Values and Ethics	2	0	0	2	VII

CATEGORIZATION OF COURSES							
Basic Science Courses (BS)							
S.No	**Course Code**	**Course Title**	**L**	**T**	**P**	**C**	**SEM**
1.	24MA102	Matrices and Differential Calculus	3	1	0	4	I
2.	24PH103	Engineering Physics	3	0	0	3	I
3.	24CY104	Engineering Chemistry	3	0	0	3	I
4.	24PC109	Physics and Chemistry Laboratory	0	0	3	2	I
5.	24MA202	Statistics and Numerical Methods	3	1	0	4	II
6.	24PH205	Material Science	3	0	0	3	II
7.	24GE405	Environmental Sciences and Sustainability	2	0	0	2	IV

CATEGORIZATION OF COURSES							
Engineering Science Courses(ES)							
S. No	**Course Code**	**Course Title**	**L**	**T**	**P**	**C**	**SEM**
1.	24CS105	Fundamentals of Computing & programming in C	3	0	0	3	I
2.	24CS108	Programming in C Laboratory	0	0	3	2	I
3.	24EE201	Basic Electrical and Electronics Engineering	3	0	0	3	II
4.	24EE202	Basic Electrical and Electronics Engineering Laboratory	0	0	3	2	II
5.	24EP203	Engineering Practices Laboratory	0	0	4	2	II
6.	24GE104	Engineering Graphics	2	0	3	3	II

CATEGORIZATION OF COURSES							
Professional Core							
S.No	**Course Code**	**Course Title**	**L**	**T**	**P**	**C**	**SEM**
1.	24ME301	Industrial Metallurgy	3	0	0	3	III
2.	24ME302	Thermodynamics For Mechanical Engineers	3	0	0	3	III
3.	24ME303	Manufacturing Process-I	3	0	0	3	III
4.	24ME304	Engineering Mechanics	3	0	0	3	III
5.	24ME305	Fluid Mechanics	3	0	2	4	III
6.	24ME306	Manufacturing Process Laboratory-I	0	0	3	2	III
7.	24ME307	Computer Aided Modelling Laboratory	0	0	4	2	III
8.	24ME401	Kinematics and Dynamics of Machines	3	1	0	4	IV
9.	24ME402	Thermal Systems Engineering	3	0	0	3	IV
10.	24ME403	Mechanics of Solids	3	0	0	3	IV
11.	24ME404	Metrology and Instrumentation	3	0	0	3	IV
12.	24ME405	Manufacturing Process-II	3	0	2	4	IV
13.	24ME407	Thermal Engineering Laboratory	0	0	3	2	IV
14..	24ME501	Industry 4.0	3	0	3	3	V
15.	24ME502	Turbo Machinery	3	1	0	4	V
16.	24ME503	Design of Mechanical Systems	3	1	0	4	V

17.	24ME509	Metrology and Dynamics Laboratory	0	0	3	2	V
18.	24ME601	Heat and Mass Transfer	3	1	0	4	VI
19.	24ME617	Computer aided design and Manufacturing	3	0	2	4	VI
20.	24ME618	Heat Transfer Laboratory	0	0	3	2	VI
21.	24ME702	Manufacturing Automation	3	0	3	3	VII
22.	24ME713	Mechatronics and IoT	3	0	2	4	VII
23.	24ME714	Simulation and Analysis Laboratory	0	0	3	2	VII

CATEGORIZATION OF COURSES							
Professional Electives							
S.No	**Course Code**	**Course Title**	**L**	**T**	**P**	**C**	**SEM**
1	24ME504	Mechanical Vibrations	3	0	0	3	V
2	24ME505	Mechanics of Composite Materials	3	0	0	3	V
3	24ME506	Product design and Development	3	0	0	3	V
4	24ME507	Design for Manufacture and Assembly	3	0	0	3	V
5	24ME508	Emerging Technologies in Automotive Systems	3	0	0	3	V
6	24ME602	Additive Manufacturing	3	0	0	3	VI
7	24ME603	Lean Manufacturing	3	0	0	3	VI
8	24ME604	CNC Technology	3	0	0	3	VI
9	24ME605	Advanced Welding Technology	3	0	0	3	VI

10	24ME606	Non Destruction Evaluation Techniques	3	0	0	3	VI
11	24ME607	Thermal Management in Electric Vehicles	3	0	0	3	VI
12	24ME608	Energy Conservation and Management	3	0	0	3	VI
13	24ME609	Hybrid and Electric Vehicle Technology	3	0	0	3	VI
14	24ME610	Energy Efficient Buildings	3	0	0	3	VI
15	24ME611	Energy Storage Devices	3	0	0	3	VI
16	24ME612	Alternative energy systems and Applications	3	0	0	3	VI
17	24ME613	Bio Energy Conversion Techniques	3	0	0	3	VI
18	24ME614	Fuel Cell Technology	3	0	0	3	VI
19	24ME615	Green Energy Systems	3	0	0	3	VI
20	24ME616	Solar Energy Systems	3	0	0	3	VI
21	24ME703	Modern Robotics	3	0	0	3	VII
22	24ME704	Smart Mobility and Intelligent Vehicles	3	0	0	3	VII
23	24ME705	Drone Technologies	3	0	0	3	VII
24	24ME706	Flexible Manufacturing systems	3	0	0	3	VII
25	24ME707	Intelligent Manufacturing systems	3	0	0	3	VII
26	24ME708	Artificial Intelligence Applications in Mechanical Engineering	3	0	0	3	VII
27	24ME709	Mechatronics System Design	3	0	0	3	VII
28	24ME710	IoT Concepts and Applications	3	0	0	3	VII
29	24ME711	Data Science Fundamentals	3	0	0	3	VII
30	24ME712	cial Intelligence in Automation	3	0	0	3	VII

CATEGORIZATION OF COURSES							
MANDATORY COURSES I							
S.No	**Course Code**	**Course Title**	**L**	**T**	**P**	**Credit**	**Sem**
1	24MC501	Indian Constitution	3	0	0	0	V
2	24MC502	Women and Gender Studies	3	0	0	0	V
3	24MC503	Intellectual Property Rights	3	0	0	0	V

CATEGORIZATION OF COURSES							
MANDATORY COURSES II							
S. No	**Course Code**	**Course Title**	**L**	**T**	**P**	**Credit**	**Sem**
1	24MC601	Industrial Safety	3	0	0	0	VI
2	24MC602	Research Paper Publication	3	0	0	0	VI
3	24MC603	Political and Economic Thoughts of Human Society	3	0	0	0	VI

CATEGORIZATION OF COURSES							
EMPLOYABILITY ENHANCEMENT COURSES							
S.No	**Course Code**	**Course Title**	**L**	**T**	**P**	**Credit**	**Sem**
1.	24EN110	Communication Skills-I	0	0	2	1	I
2.	24EN210	Communication Skills-II	0	0	2	1	II
3.	24GE308	Soft Skills and Effective Communication	1	0	0	1	III
4.	24GE409	Personality Development	1	0	0	1	IV

5.	24GE507	Aptitude Skills	1	0	0	1	V
6.	24ME619	Innovative Project Work	0	0	4	2	VI
7.	24GE706	Comprehensive Test And Viva Voce	0	0	2	1	VII
8.	24ME801	Summer Internship	0	0	2	2	VIII
9.	24ME802	Project Work	0	0	20	10	VIII

PROFESSIONAL ELECTIVES –REGISTRATION

Professional Elective Courses will be registered in Semesters V and VI. These courses are listed in Elective lists that contain a list of courses to be selected for the respective semester.

SI NO	ELECTIVE	SEMESTER	CREDITS
1	PROFESSIONAL ELECTIVE I	V	3
2	PROFESSIONAL ELECTIVE II	VI	3
3	PROFESSIONAL ELECTIVE III	VI	3
4	PROFESSIONAL ELECTIVE IV	VI	3
5	PROFESSIONAL ELECTIVE V	VII	3
6	PROFESSIONAL ELECTIVE VI	VII	3
TOTAL CREDITS:			18

Semester V contains One professional electives and Semester VI contains three Professional and semester VII contains Two Professional electives. Students are permitted to choose any one of the Professional Electives from the elective list given below.

PROFESSIONAL ELECTIVE: I											
S.No	Course Code	Course Title	Category	Periods/ Week			Total Contact Period	Credits	Max. Marks		
				L	T	P			CIA	ESE	TM
1.	24ME504	Mechanical Vibrations	PE	3	0	0	3	3	40	60	100
2.	24ME505	Mechanics of Composite Materials	PE	3	0	0	3	3	40	60	100
3.	24ME506	Product design and Development	PE	3	0	0	3	3	40	60	100
4.	24ME507	Design for Manufacture and Assembly	PE	3	0	0	3	3	40	60	100
5.	24ME508	Emerging Technologies in Automotive Systems	PE	3	0	0	3	3	40	60	100

PROFESSIONAL ELECTIVE-II											
S.No	Course Code	Course Title	Category	Periods/ Week			Total Contact Period	Credits	Max. Marks		
				L	T	P			CIA	ESE	TM
1.	24ME602	Additive Manufacturing	PE	3	0	0	3	3	40	60	100
2.	24ME603	Lean Manufacturing	PE	3	0	0	3	3	40	60	100
3.	24ME604	CNC Technology	PE	3	0	0	3	3	40	60	100
4.	24ME605	Advanced Welding Technology	PE	3	0	0	3	3	40	60	100
5.	24ME606	Non Destruction Evaluation Techniques	PE	3	0	0	3	3	40	60	100

PROFESSIONAL ELECTIVE-III											
S.No	Course Code	Course Title	Category	Periods/ Week			Total Contact Period	Credits	Max. Marks		
				L	T	P			CIA	ESE	TM
1.	24ME607	Thermal Management in Electric Vehicles	PE	3	0	0	3	3	40	60	100
2.	24ME608	Energy Conservation and Management	PE	3	0	0	3	3	40	60	100
3.	24ME609	Hybrid and Electric Vehicle Technology	PE	3	0	0	3	3	40	60	100
4.	24ME610	Energy Efficient Buildings	PE	3	0	0	3	3	40	60	100
5.	24ME611	Energy Storage Devices	PE	3	0	0	3	3	40	60	100

PROFESSIONAL ELECTIVE-IV											
S.No	Course Code	Course Title	Category	Periods/ Week			Total Contact Period	Credits	Max. Marks		
				L	T	P			CIA	ESE	TM
1.	24ME612	Alternative energy systems and Applications	PE	3	0	0	3	3	40	60	100
2.	24ME613	Bio Energy Conversion Techniques	PE	3	0	0	3	3	40	60	100
3.	24ME614	Fuel Cell Technology	PE	3	0	0	3	3	40	60	100
4.	24ME615	Green Energy Systems	PE	3	0	0	3	3	40	60	100
5.	24ME616	Solar Energy Systems	PE	3	0	0	3	3	40	60	100

PROFESSIONAL ELECTIVE-V											
S.No	Course Code	Course Title	Category	Periods/ Week			Total Contact Period	Credits	Max. Marks		
				L	T	P			CIA	ESE	TM
1.	24ME703	Modern Robotics	PE	3	0	0	3	3	40	60	100
2.	24ME704	Smart Mobility and Intelligent Vehicles	PE	3	0	0	3	3	40	60	100
3.	24ME705	Drone Technologies	PE	3	0	0	3	3	40	60	100
4.	24ME706	Flexible Manufacturing systems	PE	3	0	0	3	3	40	60	100
5.	24ME707	Intelligent Manufacturing systems	PE	3	0	0	3	3	40	60	100

PROFESSIONAL ELECTIVE-VI											
S.No	Course Code	Course Title	Category	Periods/ Week			Total Contact Period	Credits	Max. Marks		
				L	T	P			CIA	ESE	TM
1	24ME708	Artificial Intelligence Applications in Mechanical Engineering	PE	3	0	0	3	3	40	60	100
2	24ME709	Mechatronics System Design	PE	3	0	0	3	3	40	60	100
3	24ME710	IoT Concepts and Applications	PE	3	0	0	3	3	40	60	100
4	24ME711	Data Science Fundamentals	PE	3	0	0	3	3	40	60	100
5	24ME712	Artificial Intelligence in Automation	PE	3	0	0	3	3	40	60	100

OPEN ELECTIVE											
S.No	Course Code	Course Title	Category	Periods/ Week			Total Contact Period	Credits	Max. Marks		
				L	T	P			CIA	ESE	TM
1	24ME901	Industrial Engineering	OE	3	0	0	3	3	40	60	100
2	24ES901	Environmental Social Impact	OE	3	0	0	3	3	40	60	100
3	24ME902	Renewable Energy System	OE	3	0	0	3	3	40	60	100
4	24MA901	Graph Theory	OE	3	0	0	3	3	40	60	100
5	24ME903	Energy Conservation and Management	OE	3	0	0	3	3	40	60	100
6	24MG901	Management Science	OE	3	0	0	3	3	40	60	100
7	24ME904	Production Planning and Control	OE	3	0	0	3	3	40	60	100
8	24TC901	Tele health Technology	OE	3	0	0	3	3	40	60	100
9	24ME905	Application and Design Thinking	OE	3	0	0	3	3	40	60	100
10	24EC901	Sensors	OE	3	0	0	3	3	40	60	100
11	24EC902	Sensors and Actuators	OE	3	0	0	3	3	40	60	100
12	24AG901	Urban Agriculture	OE	3	0	0	3	3	40	60	100
13	24ME906	Wearable Devices	OE	3	0	0	3	3	40	60	100
14	24EE901	Electric and Hybrid Vehicle	OE	3	0	0	3	3	40	60	100
15	24EE902	Electric Vehicle Technology	OE	3	0	0	3	3	40	60	100
16	24HC901	Health Care Management Systems	OE	3	0	0	3	3	40	60	100
17	24ME906	Non Traditional Machining Techniques	OE	3	0	0	3	3	40	60	100

III SEMESTER SYLLABUS

24MA304	FOURIER SERIES AND TRANSFORMS	L T P C 3 1 0 4

COURSE OBJECTIVES:

- To acquaint the student with Fourier series techniques in solving heat flow problems used in various situations.
- To introduce the basic concepts of PDE for solving standard partial differential equations.
- To introduce Fourier series analysis which is central to many applications in engineering apart from its use in solving boundary value problems
- To acquaint the student with Fourier transform techniques used in wide variety of situations.
- To introduce the effective mathematical tools for the solutions of partial differential equations that model several physical processes and to develop Z transform techniques for discrete time systems.

UNIT I	FOURIER SERIES	9+3

Dirichlet's conditions – General Fourier series – Odd and even functions – Half range sine series and cosine series – Root mean square value – Harmonic analysis.

UNIT II	PARTIAL DIFFERENTIAL EQUATIONS	9+3

Formation of Partial differential equations –Solutions of standard types of first order partial differential equations - Lagrange's linear equation - Linear partial differential equations of second and higher order with constant coefficients of both homogeneous and non-homogeneous types.

UNIT III	APPLICATIONS OF PARTIAL DIFFERENTIAL EQUATIONS	9+3

Problems using Fourier series solutions of One dimensional Wave equation – One dimensional equation of Heat conduction – Steady state solution of Two-dimensional equation of Heat conduction (Cartesian coordinates only).

UNIT IV	FOURIER TRANSFORMS	9+3

Statement of Fourier integral theorem– Fourier transform pair – Fourier sine and cosine transforms – Properties – Transforms of simple functions – Convolution theorem – Parseval's identity.

UNIT V	Z - TRANSFORMS AND DIFFERENCE EQUATIONS	9+3

Z- transforms - Elementary properties (Statements only) – Convergence of Z-transforms – Initial and final value theorems - Inverse Z-transform using Partial fraction , Residue method and Convolution theorem - Formation of difference equations – Solution of difference equations using Z - transforms.

TOTAL PERIODS: 60

TEXT BOOKS:

1. Grewal B.S., "Higher Engineering Mathematics", 44th Edition, Khanna Publishers, New Delhi, 2018.
2. Kreyszig E, "Advanced Engineering Mathematics ", 10thEdition, John Wiley, New Delhi, India, 2018.

REFERENCES:

1. Andrews. L.C and Shivamoggi. B, "Integral Transforms for Engineers" SPIE Press, 1999.
2. Bali. N.P and Manish Goyal, "A Textbook of Engineering Mathematics", 10th Edition, Laxmi Publications Pvt. Ltd, 2021.
3. James. G., "Advanced Modern Engineering Mathematics", 4thEdition, Pearson Education, New Delhi, 2016.
4. Narayanan. S., Manikavachagom Pillai.T.K and Ramanaiah.G "Advanced Mathematics for Engineering Students", Vol. II & III, S.Viswanathan Publishers Pvt. Ltd, Chennai, 1998.
5. Ramana. B.V., "Higher Engineering Mathematics", McGraw Hill Education Pvt. Ltd, New Delhi, 2018.
6. Wylie. R.C and Barrett. L.C., "Advanced Engineering Mathematics "Tata McGraw Hill Education Pvt. Ltd, 6th Edition, New Delhi, 2012.

COURSE OUTCOMES:

Upon successful completion of the course, students should be able to:

CO1: Solve differential equations using Fourier series analysis which plays a vital role in engineering applications.

CO2: Understand how to solve the given standard partial differential equations.

CO3: Appreciate the physical significance of Fourier series techniques in solving one- and two dimensional heat flow problems and one-dimensional wave equations.

CO4: Understand the mathematical principles on Fourier transforms provide them the ability to formulate and solve some of the physical problems of engineering.

CO5: Use the effective mathematical tools for the solutions of partial differential equations by using Z transform techniques for discrete time systems.

MAPPING OF Cos WITH POs AND PSOs :

COs	PO`s												PSO`s		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	3	1	0	0	0	0	0	0	0	0	0	0	0	0
2	3	3	1	0	0	0	0	0	0	0	0	0	0	0	0
3	3	3	1	0	0	0	0	0	0	0	0	0	0	0	0
4	3	3	1	0	0	0	0	0	0	0	0	0	0	0	0
5	3	3	1	0	0	0	0	0	0	0	0	0	0	0	0
AVG	3	3	1	0	0	0	0	0	0	0	0	0	0	0	0

24ME301	INDUSTRIAL METALLURGY	L T P C 3 0 0 3

COURSE OBJECTIVES:

1. . To understand the solidification process and microstructural evolution in ferrous and non-ferrous cast alloys.
2. To study the phase diagrams and heat treatment processes used in metallurgy.
3. To analyze the effects of alloying elements in different metal systems.
4. To explore the applications of non-metallic materials and their composites.
5. To learn about mechanical property testing and failure mechanisms.

UNIT I	FERROUS CAST ALLOYS	9

Solidification of pure metals and alloys -Eutectic and eutectoid reactions -Nucleation and growth-Microstructural evolution in cast irons (FG, CGI, SG)-Alloy steels and stainless steels – composition and properties-Melting procedures, composition control, slag-metal reactions

UNIT II	NON-FERROUS CAST ALLOYS	9

Aluminum, copper, magnesium, nickel, and zinc alloys Grain refinement, modification, and degassing techniques -Heat treatment of aluminum alloys (solution and precipitation hardening) -Residual stresses and casting defects

UNIT III	PHYSICAL METALLURGY AND HEAT TREATMENT	9

Phase diagrams – Isomorphous, eutectic, peritectic systems-Iron-carbon phase diagram and its relevance - TTT and CCT diagrams – applications in steel processing - Heat treatment processes: annealing, normalizing, hardening, tempering -Case hardening: carburizing, nitriding, cyaniding.

UNIT IV	NON-METALLIC MATERIALS AND COMPOSITES	9

Polymer materials: PE, PP, PS, PVC, PET, PA, PMMA, PC, ABS - Thermosetting and thermoplastic polymers - Engineering ceramics – Al_2O_3, SiC, Si_3N_4, PSZ, SIALON -Metal-matrix and polymer-matrix composites

UNIT V	MECHANICAL PROPERTIES AND FAILURE ANALYSIS	9

Plastic deformation: slip, twinning, dislocation movement- Types of fracture: ductile, brittle, fatigue failure - Hardness testing: Brinell, Rockwell, Vickers, nano-hardness testsImpact testing: Izod and Charpy tests -Creep and fatigue failure mechanisms

TOTAL PERIODS: 45

TEXTBOOKS:

1. Kenneth G. Budinski and Michael K. Budinski, Engineering Materials, Prentice Hall, 9th Edition, 2018.
2. Sydney H. Avner, Introduction to Physical Metallurgy, McGraw Hill, 1994.

REFERENCES:

1. A. Alavudeen, N. Venkateshwaran, J. T. Winowlin Jappes, Engineering Materials and Metallurgy, Laxmi Publications, 2006.
2. G.S. Upadhyay & Anish Upadhyay, Materials Science and Engineering, Viva Books, 2020.
3. Raghavan V., Materials Science and Engineering, Prentice Hall of India, 6th Edition, 2019.
4. Williams D. Callister, Materials Science and Engineering, Wiley India, 2nd Edition, 2019.

COURSE OUTCOMES:

1. Explain the solidification behavior and phase evolution in ferrous alloys.
2. Analyze non-ferrous alloy properties and their processing techniques.
3. Interpret phase diagrams and apply heat treatment principles.
4. Summarize the properties and applications of non-metallic materials.
5. Perform material testing and understand failure mechanisms.

MAPPING OF Cos WITH POs AND PSOs :

COs	PO`s												PSO`s		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	1	3	2			2	2	1	2			2	2	1
2	3	1	3	1	2	1		2	2	1	2		2	2	1
3	3	1	3				2	2	1	2			2	2	1
4	3	1	3		2			2	2	1	2		2	2	1
5	3	1	3	2	2			2	2	1	2		2	2	1
AVG	3	1	3	2			2	2	1	2			2	2	1

24ME302	ENGINEERING THERMODYNAMICS	Version:1.0
DEPARTMENT OF MECHANICAL ENGINEERING		

Programme & branch	MECHANICAL ENGINEERING	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

1. To understand the fundamental laws of thermodynamics and their applications in engineering.
2. To analyze various thermodynamic cycles used in power generation and refrigeration.
3. To study the properties of pure substances and equations of state for gases and vapors.
4. To apply principles of energy conservation in closed and open systems.
5. To evaluate performance parameters of thermodynamic systems.

UNIT I	BASIC CONCEPTS AND FIRST LAW OF THERMODYNAMICS	9

Basic concepts — concept of continuum, comparison of microscopic and macroscopic approach. Path and point functions. Thermodynamic Equilibrium State, path and process. Quasi-static, reversible and irreversible processes. Heat and work transfer, definition and comparison, sign convention. Displacement work and other modes of work .P-V diagram. Zeroth law of thermodynamics — concept of temperature and thermal equilibrium– relationship between temperature scales – First law of thermodynamics –application to closed and open systems — steady and unsteady flow processes

UNIT II	SECOND LAW OF THERMODYNAMICS AND ENTROPY	9

Heat Reservoir, source and sink. Heat Engine, Refrigerator, Heat pump. Statements of second law and its corollaries. Carnot cycle Reversed Carnot cycle, Performance. principle of increase in entropy. Applications of II Law. High and low grade energy. Available and non-available energy of a source and finite body. Energy and irreversibility. Expressions for the energy of a closed system and open systems. Energy balance and entropy generation. Irreversibility. I and II law Efficiency.

UNIT III	PROPERTIES OF PURE SUBSTANCES AND EQUATIONS OF STATE	9

Formation of steam and its thermodynamic properties, p-v, p-T, T-v, T-s, h-s diagrams. p-v-T surface. Use of Steam Table and Mollier Chart. Determination of dryness fraction. Application of I and II law for pure substances. Ideal and actual Rankine cycles, Cycle Improvement Methods.

UNIT IV	GAS AND VAPOR POWER CYCLES	9

Properties of Ideal gas- Ideal and real gas comparison- Equations of state for ideal and real gases- Reduced properties. Compressibility factor-.Principle of Corresponding states. –Generalised Compressibility Chart and its use-. Maxwell relations, Tds Equations, Difference and ratio of heat capacities, Energy equation, Joule-Thomson Coefficient, Clausius Clapeyron equation, Phase Change Processes. Simple Calculations.

UNIT V	REFRIGERATION, AIR CONDITIONING, AND PSYCHROMETRICS	9

Mole and Mass fraction. Properties of gas mixture — Molar mass, gas constant, density, change in internal energy, enthalpy, entropy and Gibbs function. Psychrometric properties, Psychrometric charts. Property calculations of air

vapour mixtures by using chart and expressions. Psychrometric process — adiabatic saturation, sensible heating and cooling, humidification, dehumidification, evaporative cooling and adiabatic mixing. Simple Applications

TOTAL PERIODS: 45

TEXTBOOKS:

1. Yunus A. Cengel, Michael A. Boles, Thermodynamics: An Engineering Approach, McGraw-Hill, 9th Edition, 2021.
2. P.K. Nag, Engineering Thermodynamics, McGraw-Hill, 6th Edition, 2020.

REFERENCES:

1. R.K. Rajput, Engineering Thermodynamics, Laxmi Publications, 5th Edition, 2018.
2. Moran, Shapiro, Fundamentals of Engineering Thermodynamics, Wiley, 8th Edition, 2020.
3. Van Wylen and Sonntag, Fundamentals of Classical Thermodynamics, Wiley, 6th Edition, 2019

COURSE OUTCOMES:

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

1. Apply the first law of thermodynamics to engineering applications.
2. Evaluate entropy changes and apply the second law of thermodynamics to systems.
3. Interpret phase diagrams and use equations of state for gases and vapors.
4. Analyze various power cycles and their efficiencies.
5. Assess refrigeration and air-conditioning cycles for different applications.

MAPPING OF Cos WITH POs AND PSOs :

COs	**PO`s**												**PSO`s**		
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
1	3	1	3	2	-	-	2	2	1	2	-	-	2	2	1
2	3	1	3	1	2	1	-	2	2	1	2	-	2	2	1
3	3	1	3	-	-	-	2	2	1	2	-	-	2	2	1
4	3	1	3	-	2	-	-	2	2	1	2	-	2	2	1
5	3	1	3	2	2	-	-	2	2	1	2	-	2	2	1
AVG	**3**	**1**	**3**	**1.6**	**2**		**2**	**2**	**1.6**	**1.4**	**2**	**-**	**2**	**2**	**1**

24ME303	MANUFACTURING PROCESS-I	Version:1.0

DEPARTMENT OF MECHANICAL ENGINEERING

Programme & branch	MECHANICAL ENGINEERING	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES

The course content enables students to

- To demonstrate the operational principles of different metal casting processes.
- To understand and apply the principles of various metal joining techniques.
- To analyze the fundamentals of bulk metal deformation.
- To explore the principles of sheet metal forming.
- To study and practice the techniques of plastic molding.

UNIT – I	METAL CASTING PROCESSES	9

Sand Casting – Sand Mould – Type of patterns - Pattern Materials – Pattern allowances – Molding sand Properties and testing – Cores –Types and applications – Molding machines – Types and applications– Melting furnaces – Principle of special casting processes- Shell, investment – Ceramic mould – Pressure die casting – low pressure, gravity- Tilt pouring, high pressure die casting- Centrifugal Casting – CO_2 casting –- Defects in Sand casting process-remedies

UNIT- II	METAL JOINING PROCESSES	9

Fusion welding processes – Oxy fuel welding – Filler and Flux materials-–Arc welding, Electrodes, Coating and specifications – Gas Tungsten arc welding –Gas metal arc welding - Submerged arc welding – Electro slag welding– Plasma arc welding — Resistance welding Processes -Electron beam welding –Laser beam Welding Friction welding – Friction stir welding – Diffusion welding – Thermit Welding, Weld defects types, causes and cure– Brazing - soldering – Adhesive bonding.

UNIT - III	BULK DEFORMATION PROCESSES	9

Hot working and cold working of metals – Forging processes – Open, impression and closed die forging – cold forging- Characteristics of the processes – Typical forging operations – rolling of metals – Types of Rolling – Flat strip rolling – shape rolling operations – Defects in rolled parts – Principle of rod and wire drawing – Tube drawing – Principles of Extrusion – Types – Hot and Cold extrusion. Introduction to shaping operations.

UNIT -IV	SHEET METAL AND FORMING PROCESSES	9

Sheet metal characteristics – Typical shearing, bending and drawing operations – Stretch forming operations – Formability of sheet metal – Test methods –special forming processes - Working principle and applications – Hydro forming – Rubber pad forming – Metal spinning – Introduction of Explosive forming, magnetic pulse forming, peen forming, Super plastic forming – Micro forming – Incremental forming.

UNIT –V	POWDER METALLURGY AND PLASTIC PROCESSING	9

Production of metal powder: Atomization, crushing; Blending; Compacting: Die pressing, iso-static pressing; Sintering: Principle, continuous sintering process; Plastic processing: Injection, blow moulding and rotational moulding

TOTAL = 45 PERIODS

COURSE OUTCOMES

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

1. Explain the principle of different metal casting processes.
2. Describe the various metal joining processes.
3. Illustrate the different bulk deformation processes.
4. Apply the various sheet metal forming process.
5. Apply suitable Powder metallurgy and plastic molding techniques.

TEXT BOOKS

1. Kalp akjian. S, "Manufacturing Engineering and Technology", Pearson Education India,4th Edition, 2013
2. P.N .Rao Manufacturing Technology Volume 1 Mc Grawhill Education 5th edition, 2018.

REFERENCE BOOKS

1. Roy. A. Lindberg, Processes and materials of manufacture, PHI / Pearson education, 2006.
2. S.Gowri, P.Hariharan and A.SureshBabu, "Manufacturing Technology I", Pearson Education, 2017
3. Paul Degarma E, Black J.T and Ronald A. Kosher, Eligth Edition, Materials and Processes, in Manufacturing, Eight Edition, Prentice – Hall of India, 1997.
4. Hajra Chouldhary S.K and Hajra Choudhury. AK., Elements of workshop Technology, volume I and II,
5. Media promoters and Publishers Private Limited, Mumbai, 1997
6. Sharma, P.C., A Text book of production Technology, S.Chand and Co. Ltd., 2004

E - RESOURCES

1. URL: https://fractory.com/metal-casting-types/
2. https://osme.co.in/wp-content/uploads/2020/04/Metal-Joining-6th.pdf
3. https://www.me.iitb.ac.in/~ramesh/courses/ME206/Bulkdef1.pdf
4. https://www.youtube.com/@MdAsif-fs3il
5. https://www.youtube.com/@vickytutelage6648

MAPPING OF Cos WITH Pos AND PSOs

COs	POs												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO 1	3	1	3	3	-	-	-	-	-	-	3	-	3	3	-
CO 2	3	3	3	1	-	-	-	-	-	-	3	-	3	3	-
CO 3	3	3	3	3	-	-	-	-	-	-	3	-	3	3	-
CO 4	3	1	3	3	-	-	-	-	-	-	3	-	3	3	-
CO 5	3	2	3	3	-	-	-	-	-	-	3	-	3	3	-
AV G	3	2	3	2.6	-	-	-	-	-	-	3	-	3	3	-

24ME304	ENGINEERING MECHANICS	Version:1.0			
DEPARTMENT OF MECHANICAL ENGINEERING					
Programme & branch	MECHANICAL ENGINEERING	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES

The course content enables students to

- To Learn the use scalar and vector analytical techniques for analysing forces in statically determinate structures
- To introduce the equilibrium of rigid bodies, vector methods and free body diagram
- To study and understand the properties of surfaces and solids.
- To learn the principles of friction, forces and apply the concepts of frictional forces at the contact surfaces of various engineering systems.
- To develop basic dynamics concepts – force, momentum, work and energy

UNIT – I	STATICS OF PARTICLES	9

Fundamental Concepts and Principles, Systems of Units, Method of Problem Solutions, Statics of Particles - Forces in a Plane, Resultant of Forces, Resolution of a Force into Components, Rectangular Components of a Force, Unit Vectors. Equilibrium of a Particle- Newton's First Law of Motion, Space and Free-Body Diagrams.

UNIT- II	EQUILIBRIUM OF RIGID BODIES	9

Principle of Transmissibility, Equivalent Forces, Vector Product of Two Vectors, Moment of a Force about a Point, Varignon's Theorem, Rectangular Components of the Moment of a Force, Distributed Loads on Beams, Moment of a Force about an Axis, Couple - Moment of a Couple, Equivalent Couples, Addition of Couples, Resolution of a Given Force into a Force -Couple system, Further Reduction of a System of Forces, Equilibrium in Two Dimensions - Reactions at Support.

UNIT - III	PROPERTIES OF SURFACES AND SOLIDS	9

Centroids of lines and areas – symmetrical and unsymmetrical shapes, Determination of Centroids by Integration, Theorems of Pappus-Guldinus, Centre of Gravity of a ThreeDimensional Body, Moments of Inertia of Areas and Mass - Determination of the Moment of Inertia of an Area by Integration, Polar Moment of Inertia, Radius of Gyration of an Area, Parallel-Axis Theorem, Moments of Inertia of Composite Areas, Moments of Inertia of a Mass - Moments of Inertia of Thin Plates

UNIT -IV	FRICTION	9

The Laws of Dry Friction, Coefficients of Friction, Angles of Friction, Wedge friction, Wheel Friction, Rolling Resistance, Ladder friction, Belt friction.

UNIT –V	DYNAMICS OF PARTICLES	9

Kinematics - Rectilinear Motion and Curvilinear Motion of Particles. Kinetics- Newton's Second Law of Motion-Equations of Motions, Dynamic Equilibrium, Energy and Momentum Methods - Work of a Force, Kinetic Energy of a Particle, Principle of Work and Energy, Principle of Impulse and Momentum, Impact of bodies.

TOTAL = 45 PERIODS

COURSE OUTCOMES

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

1. Illustrate the vector and scalar representation of forces and moments of particles.
2. Draw the free body diagram and apply equilibrium principle for two dimensional rigid bodies.
3. Determine the centroid and moment of inertia of various surface and solids.
4. Apply the friction and its effects by the laws of friction.
5. Apply fundamental principle to solve the problem in dynamics of particles and rigid bodies.

TEXT BOOKS

1. Beer Ferdinand P, Russel Johnston Jr., David F Mazurek, Philip J Cornwell, Sanjeev Sanghi, Vector Mechanics for Engineers: Statics and Dynamics, McGraw Higher Education., 12thEdition, 2019.
2. Vela Murali, "Engineering Mechanics-Statics and Dynamics", Oxford University Press, 2018

REFERENCE BOOKS

1. Boresi P and Schmidt J, Engineering Mechanics: Statics and Dynamics, 1/e, Cengage learning, 2008.
2. Hibbeller, R.C., Engineering Mechanics: Statics, and Engineering Mechanics: Dynamics, 13th edition, Prentice Hall, 2013.
3. Irving H. Shames, Krishna Mohana Rao G, Engineering Mechanics – Statics and Dynamics, 4thEdition, Pearson Education Asia Pvt. Ltd., 2005.

MAPPING OF Cos WITH Pos AND PSOs

COs	POs												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO 1	3	3	2	-	1	-	-	-	-	-	-	1	2	1	1
CO 2	3	3	2	-	1	-	-	-	-	-	-	1	2	1	1
CO 3	3	3	2	1	1	-	-	-	-	-	-	1	2	1	1
CO 4	3	3	2	1	1	-	-	-	-	-	-	1	2	1	1
CO 5	3	3	3	1	1	-	-	-	-	-	-	1	2	1	1
AVG	**3**	**3**	**2.3**	**1**	**1**	-	-	-	-	-	-	**1**	**2**	**1**	**1**

24ME305	FLUID MECHANICS	Version:			
DEPARTMENT OF MECHANICAL ENGINEERING					
Programme & branch	BE & MECHANICAL ENGINEERING	L	T	P	C
		3	0	2	4

COURSE OBJECTIVES

The course content enables students to:

- To introduce the students about properties and behaviour of the fluids under static conditions
- To impart basic knowledge of the dynamics of fluids through the control volume approach and to expose to the applications of the conservation laws.
- To understand the relationship among the parameters involved in the given fluid phenomenon and to predict the performance of prototypes by model studies
- To expose to the applications of the conservation laws to a) flow measurements b) flow through pipes (both laminar and turbulent) and c) forces on pipe bends.
- To exposure to the significance of boundary layer theory and its applications.

UNIT – I	FLUID PROPERTIES AND FLUID STATICS	6

Scope of fluid mechanics – Definitions of a fluid – Methods of analysis – Continuum hypothesis – System and Control volume approach – Reynold's transportation theorem – Fluid properties – Fluid statics – Manometry – Forces on plane and curved surfaces – Buoyancy and floatation – Stability of floating bodies.

UNIT- II	BASIC CONCEPTS OF FLUID FLOW	6

Kinematics: Classification of flows – Streamline, streak-line and path-lines Dynamics : Application of control volume to continuity, energy and momentum – Euler's equation of motion along a stream line – Bernoulli's equation – Applications to velocity and discharge measurements – Linear momentum equation – Application to Pipe bends – Moment of momentum equation.

UNIT - III	DIMENSIONAL ANALYSIS AND MODEL STUDIES	6

Fundamental dimensions – Dimensional homogeneity – Rayleigh's method and Buckingham Pi theorem – Dimensionless parameters – Similitude and model studies – Distorted and undistorted models.

UNIT -IV	INCOMPRESSIBLE VISCOUS FLOW	6

Reynolds experiment – Laminar flow in pipes and between parallel plates – Development of laminar and turbulent flows in pipes – Darcy-Weisbach equation – Moody diagram – Major and minor losses of flow in pipes – Total energy line – Hydraulic grade line – Siphon – Pipes in series and parallel – Equivalent pipes.

UNIT –V	BOUNDARY LAYERS	6

Definition of boundary layers – Laminar and turbulent boundary layers – Displacement, momentum and energy thickness – Momentum integral equation – Applications – Separation of boundary layer – Drag and Lift forces.

TOTAL = 30 PERIODS

FLUID MECHANICS LABORATORY

LIST OF EXPERIMENTS

1. Determination of coefficient of discharge of a venturimeter
2. Determination of friction factor for flow through pipes
3. Characteristics of centrifugal pumps
4. Characteristics of reciprocating pump
5. Characteristics of Pelton wheel turbine
6. Calibration of Rotameter

TOTAL = 30 PERIODS

LEARNING OUTCOMES

On completion of the course, the student is expected to:

CO1: Demonstrate the difference between solid and fluid, its properties and behaviour in static conditions
CO2: Apply the conservation laws applicable to fluids and its application through fluid kinematics and dynamics.
CO3: Formulate the relationship among the parameters involved in the given fluid phenomenon and to predict the performance of prototypes by model studies
CO4: Estimate the losses in pipelines for both laminar and turbulent conditions and analysis of pipes connected in series and parallel.
CO5: Explain the concept of boundary layer and its application to find the drag force excreted by the fluid on the flat solid surface.

TEXT BOOKS

1. Modi P.N and Seth Hydraulics and Fluid Mechanics including Hydraulic Machines Standard Book House New Delhi. 2015.
2.Bansal, R.K., Text Book of Fluid mechanics and Hydraulic Machines, Laxmi Publications Pvt. Ltd., New Delhi,2006.

REFERENCE BOOKS

1. S K Som; Gautam Biswas and S Chakraborty, Introduction to Fluid Mechanics and Fluid Machines, Tata McGraw Hill Education Pvt. Ltd., 2012.
2. Streeter, V.L. Wylie, E. B. and Bedford K.W, Fluid Mechanics. (9 th Ed.) Tata McGraw Hill, New Delhi, 1998
3. Jain A. K. Fluid Mechanics including Hydraulic Machines, Khanna Publishers, New Delhi, 2014.
4. Narayana Pillai N. Principles of Fluid Mechanics and Fluid Machines, (3 rd Ed.) University Press (India) Pvt. Ltd. 2009.

MAPPING OF Cos WITH Pos AND PSOs															
COs	**POs**												**PSOs**		
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	**3**	**2**	**1**	**1**	**1**	**2**	**2**	**1**	**1**	**1**	**1**	**2**	**3**	**2**	**1**
CO2	**2**	**2**	**1**	**1**	**1**	**2**	**2**	**1**	**1**	**1**	**1**	**2**	**3**	**2**	**1**
CO3	**3**	**2**	**3**	**2**	**1**	**2**	**2**	**1**	**1**	**1**	**1**	**2**	**3**	**3**	**2**
CO4	**3**	**3**	**3**	**2**	**1**	**3**	**2**	**1**	**1**	**1**	**1**	**3**	**3**	**3**	**3**
CO5	**3**	**3**	**2**	**2**	**1**	**3**	**2**	**1**	**1**	**1**	**1**	**3**	**3**	**3**	**3**
AVG	**2.80**	**2.40**	**2.00**	**1.60**	**1.00**	**2.40**	**2.00**	**1.00**	**1.00**	**1.00**	**1.00**	**2.40**	**3.00**	**2.60**	**3.00**

24ME306	MANUFACTURING PROCESS LAB	Version:1.0

DEPARTMENT OF MECHANICAL ENGINEERING

Programme & branch	MECHANICAL ENGINEERING	L	T	P	C
		0	0	3	2

COURSE OBJECTIVES

The course content enables students to

CO1 Demonstrate the safety precautions exercised in the mechanical workshop.
CO2 Make the workpiece as per given shape and size using Lathe.
CO3 Join two metals using arc welding.
CO4 Use sheet metal fabrication tools and make simple tray and funnel.
CO5 Use different moulding tools, patterns and prepare sand moulds.

LIST OF EXPERIMENTS

Machining and Machining time estimations for:

1. Facing and Plain Turning
2. Step Turning and Chamfering
3. Taper Turning
4. External Thread cutting
5. Internal Thread cutting
6. Knurling, Drilling, Boring and Reaming
7. Square Head Shaping
8. Hexagonal Head Shaping
9. Fabrication of simple structural shapes using Gas Metal Arc Welding / Arc Welding
10. Joining of plates and pipes using Gas Metal Arc Welding/ Arc Welding /Submerged arc welding
11. Preparation of green sand moulds
12. Manufacturing of simple sheet metal components using shearing and bending operations.

MAPPING OF Cos WITH Pos AND PSOs

COs	POs												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	1	-	-	3	2	3	2	1	-	3	-	-	-
CO2	3	3	2	2	1	-	-	-	2	2	3	3	-	-	-
CO3	3	3	2	1	-	-	2	-	3	2	3	3	-	-	-
CO4	3	2	3	2	-	-	-	-	2	2	3	3	-	-	-
CO5	3	2	3	1	-	-	-	-	3	2	3	3	-	-	-
AVG	3	2.4	2.2	1.5	1	3	2	3	2.4	1.8	3	3	-	-	-

24ME307	COMPUTER AIDED MODELING LABORATORY				
DEPARTMENT OF MECHANICAL ENGINEERING					
Programme & branch	MECHANICAL ENGINEERING	L	T	P	C
		0	0	3	2

COURSE OBJECTIVES

The course content enables students to

CO1 To provide knowledge and skills to draw orthographic projections of simple components using geometric modeling software

CO2 To impart knowledge for creating three dimensional assembly models of few automotive and machine components using CAD Software.

CO3 To provide knowledge on generating 3D assembly models of few machine elements using CAD software.

CO4 To provide knowledge on three dimensional model of simple mechanism and animation using CAD software.

CO5 To expose the knowledge to prepare the technical documents for the given components using software

LIST OF EXPERIMENTS

1. Create an orthographic view of machine components from the given isometric drawings
2. Construct a three dimensional assembly model of bearing
3. Generate a three dimensional shaft and coupling assembly model by considering tolerance in each Component
4. Create a three dimensional assembly model of Piston and Connecting Rod.
5. Build a three dimensional assembly model of power drive system.
6. Create a three dimensional assembly model of two wheeler suspension system
7. Construct a three dimensional assembly model of control valve.
8. Generate a three dimensional assembly model of Jig/fixture.
9. Create a three dimensional assembly model of simple mechanism and animate its working using modeling software.
10. Create technical documents for an I.C engine assembly using 3D via software.

COURSE OUTCOMES (CO'S)

CO1. To provide knowledge and skills to draw orthographic projections of simple components using geometric modeling software.

CO 2. To impart knowledge for creating three dimensional assembly models of few automotive and machine components using CAD Software

CO 3. To provide knowledge on generating 3D assembly models of few machine elements using CAD software

CO 4. To provide knowledge on three dimensional model of simple mechanism and animation using CAD software

CO 5. To expose the knowledge to prepare the technical documents for the given components using software.

MAPPING OF Cos WITH Pos AND PSOs															
COs	POs												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO 3
CO 1	-	-	-	-	3	-	-	-	2	1	-	-	2	-	-
CO 2	-	-	-	-	3	-	-	-	2	1	-	-	2	-	-
CO 3	-	-	-	-	3	-	-	-	2	1	-	-	2	-	-
CO 4	-	-	-	-	3	-	-	-	2	1	-	-	2	-	-
CO 5	-	-	-	-	3	-	-	-	2	1	-	-	2	-	-
AV G	-	-	-	-	3	-	-	-	2	1	-	-	2	-	-

24GE208	SOFT SKILLS AND EFFECTIVE OMMUNICATION				
DEPARTMENT OF MECHANICAL ENGINEERING					
Programme& branch	**MECHANICAL ENGINEERING**	**L**	**T**	**P**	**C**
		0	**0**	**2**	**1**

COURSE OBJECTIVES

- Develop an understanding of soft skills and their role in effective communication.
- Enhance verbal and non-verbal communication skills for professional and personal effectiveness.
- Equip students with career management strategies and professional networking skills.
- Train students in professional communication, interview etiquette, and workplace protocols.
- Develop strong group discussion and interview skills through practical training and simulations.

UNIT – I	**INTRODUCTION TO SOFT SKILLS AND COMMUNICATION**	**6**

Definition and Importance of Soft Skills & Communication – types of soft skills (interpersonal, intrapersonal, leadership, emotional intelligence) - Understanding Communication: Definition, Process, and Models - Barriers to Communication - Difference between Soft Skills and Hard Skills

UNIT- II	**VERBAL AND NON-VERBAL COMMUNICATION**	**6**

Importance of Verbal and Non- Verbal communication (Speak clearly, Listen actively, Positive body language) - Elements of Verbal Communication (Clarity, Tone, and Conciseness) - Oral Communication: Public Speaking, Presentations, and Speeches - Non-Verbal Communication: Body Language, Gestures, Eye Contact, Posture - Active Listening and Effective Feedback

UNIT - III	**CAREER MANAGEMENT & PROFESSIONAL NETWORKING**	**6**

Difference between Groups and Teams - Effective Time and Stress Management - Building and Maintaining a Professional Network - Respecting Social and Workplace- Protocols - Understanding Career Growth and Management.

UNIT -IV	**INTERVIEW ETIQUETTE & PROFESSIONAL COMMUNICATION**	**6**

Interview Etiquette - Mock Interviews - Dress Code and Professional Grooming - Importance of Body Language and Non-Verbal Cues - Strategies for Answering Common Interview Questions - Handling Stress and Nervousness in Interviews - Practicing One-to-One and Panel Interviews

UNIT –V	**INTERVIEW & GROUP DISCUSSION SKILLS**	**6**

Understanding Different Types of Interviews (Face-to-Face, Panel, Telephonic, Skype) Resume Presentation - Group Discussions **:** Importance, Techniques and Practice - Questioning and Clarifying in a Discussion - GD Strategies and Common Mistakes to avoid - Interactive activities to improve GD Performance.

TOTAL = 30 PERIODS

LEARNING OUTCOMES

At the end of the course learners will be able to

CO1 - Understand the importance of soft skills and communication.

CO2 - Develop verbal and non-verbal communication skills for professional interactions.

CO3 - Learn career management strategies and professional networking techniques.

CO4 - Demonstrate effective interview etiquette and professional communication.

CO5 - Exhibit confidence in group discussions and teamwork scenarios

NOTE:

- **Internal mode only**

COs	**POs**												**PSOs**		
	PO 1	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**PO 11**	**PO 12**	**PSO 1**	**PSO2**	**PSO 3**
CO1	-	-	-	-	1	-	-	-	-	1	1	-	-	-	-
CO2	-	-	-	-	-	-	-	-	3	1	-	2	-	-	-
CO3	-	-	-	-	-	-	-	-	3	1	-	2	-	-	-
CO4	-	-	-	-	-	-	-	-	1	2	-	2	-	-	-
CO5	-	-	-	-	-	-	-	-	-	2	-	2	-	-	-
AVG	**-**	**-**	**-**	**-**	**1**	**-**	**-**	**-**	**2.3**	**1.4**	**-**	**1.8**	**-**	**-**	**-**

IV SEMESTER SYLLABUS

24ME401	KINEMATICS AND DYNAMICS OF MACHINES	Version:			
DEPARTMENT OF MECHANICAL ENGINEERING					
Programme& branch	MECHANICAL ENGINEERING	L	T	P	C
		3	1	0	4

COURSE OBJECTIVES

The course content enables students to:

- To understand the basic components and layout of linkages in the assembly of a system machine.
- To study the basic concepts of toothed gearing and kinematics of gear trains.
- To understand the motion resulting from a specified set of linkages, design few linkage mechanisms and cam mechanisms for specified output motions.
- To Analyzing the force-motion relationship in components subjected to external forces and analyzing of standard mechanisms.
- To analyzing the undesirable effects of unbalances resulting from prescribed motions in mechanism and the effect of dynamics of undesirable vibrations.

UNIT – I	KINEMATICS OF MECHANISMS	12

Machine Structure - Kinematic link, pair and - chain Grueblers criteria - Constrained motion - Degrees of freedom - Slider crank and crank rocker mechanisms – Inversions – Applications - Kinematic analysis of simple mechanisms - Determination of velocity and acceleration by relative velocity Method - Velocity and acceleration of piston, angular velocity and angular acceleration of connecting rod of reciprocating engine.

UNIT- II	GEARS AND GEAR TRAINS	12

Gears: profile and geometry - Nomenclature of spur and helical gears-Velocity of sliding, Length of path of contact and are of contact, Contact ratio, Interference, Calculation of minimum number of teeth. Gear trains: Simple, compound gear trains and epicyclic gear trains - Determination of speed and torque.

UNIT - III	CAMS AND FLYWHEEL	12

Cams - Types of cams - Design of profiles - Knife edged, flat faced and roller ended followers with and without offsets for various types of follower motions. Turning moment diagram: Fluctuation of energy and speed, mass of flywheel required for IC engines and mechanical presses.

UNIT -IV	BALANCING	12

Static and dynamic balancing – Balancing of rotating masses – Balancing a single cylinder engine – Balancing of Multi-cylinder inline, V-engines – Partial balancing in engines – Balancing of linkages – Balancing machines-Field balancing of discs and rotors.

UNIT –V	VIBRATION	12

Free vibrations – Equations of motion – natural Frequency – Damped Vibration – bending critical speed of simple shaft – Torsional vibration – Forced vibration – harmonic Forcing – Vibration isolation.

TOTAL = 60 PERIODS

LEARNING OUTCOMES

After successful completion of this course, the students will be able to:

CO 1: Discuss the basics of mechanism.

CO 2: Solve problems on gears and gear trains.

CO 3: The students will be able to generate the cam profile for the given follower motion and will be able to apply gyroscopic effect to automobiles.

CO 4: The students will be able to balance the reciprocating and rotating masses in machines.

CO 5: Determine stresses induced in cylinders subjected to internal, external pressures.

TEXT BOOKS

1. F.B. Sayyad, "Kinematics of Machinery", MacMillan Publishers Pvt Ltd., Tech-max Educational
2. F. B. Sayyad, "Dynamics of Machinery", McMillan Publishers India Ltd., Tech-Max Educational
3. Rattan, S.S, "Theory of Machines.

REFERENCE BOOKS

1. Allen S. Hall Jr., "Kinematics and Linkage Design", Prentice Hall.
2. Robert L. Norton, Kinematics and Dynamics of Machinery, Tata McGraw-Hil.
3. Wilson and Sadler, Kinematics and Dynamics of Machinery, Pearson.

MAPPING OF Cos WITH Pos AND PSOs

COs	POs												PSOs		
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO1	PSO2	PSO3
CO1	3	2	1	-	2	-	-	-	-	-	-	-	1	-	3
CO2	3	2	2	-	2	-	-	-	-	-	-	-	1	-	3
CO3	3	2	2	-	2	-	-	-	-	-	-	-	1	-	3
CO4	3	2	2	-	2	-	-	-	-	-	-	-	1	-	3
CO5	3	2	2	-	2	-	-	-	-	-	-	-	1	-	3
AVG	3.00	2.00	1.67	-	2.00	-	-	-	-	-	-	-	1.00	-	3.00

24ME402	THERMAL SYSTEMS ENGINEERING	Version:

DEPARTMENT OF MECHANICAL ENGINEERING

Programme& branch	MECHANICAL ENGINEERING	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES

The course content enables students to:

- To learn the concepts and laws of thermodynamics to predict the operation of thermodynamic cycles
- To analyzing the performance of steam nozzle, calculate critical pressure ratio
- To identify the basic components, working and performance of IC Engines
- To analyzing the various performance parameters of IC engines and auxiliary systems
- To Evaluating the performance of refrigeration and air conditioning systems and understanding their working principles.

UNIT – I	Air Standard Cycles and Regenerative Cycles	9

Air standard cycles – Otto, Diesel, Dual and Brayton-- Air standard efficiency - Mean effective pressure - Comparison between cycles.

UNIT- II	Steam Nozzle. Analysis	9

Types and Shapes of nozzles Flow of steam through nozzles, Critical pressure ratio, Variation of mass flow rate with pressure ratio. Effect of friction. Meta stable flow.

UNIT - III	Internal Combustion Engines – Combustion In SI And CI Engines	9

I.C. ENGINES: Classification - Working principles, Valve and Port Timing Diagrams p-v diagrams- two stroke & four stroke. Combustion in S.I. Engines: Normal Combustion and abnormal combustion – Importance of flame speed and effect of engine variables – Type of Abnormal combustion, pre-ignition and knocking – Fuel requirements and fuel rating, combustion chamber – requirements, types.

Combustion in C.I. Engines: Four stages of combustion – Delay period and its importance – Effect of engine variables – Diesel Knock– Need for air movement, suction, chambers and nozzles used.

UNIT -IV	Testing And Performance Of IC Engines And Auxiliary Systems	9

Testing and Performance parameters and calculations- Brake power – Determination of frictional losses and indicated power – Performance test – Heat balance sheet. Multipoint Fuel Injection system and Common rail direct injection systems. Ignition systems – Magneto, Battery and Electronic. Lubrication and Cooling systems. Concepts of Supercharging and Turbo charging.

UNIT –V	Refrigeration and Air conditioning systems.	9

Reverse Carnot cycle, air refrigeration, Working principle of vapor compression refrigeration and vapor absorption refrigeration systems and, use of T- s and P-h diagrams. , performance calculations and applications. : Atmospheric air, properties, psychrometry chart, psychrometric processes, air- conditioning processes, requirements for comfort and industrial air-conditioning, summer and winter air conditioning systems.

TOTAL = 45 PERIODS

LEARNING OUTCOMES

After successful completion of this course, the students will be able to:

1. Apply the concepts and laws of thermodynamics to different air standard cycles and solve problems.
2. Solve the problems in steam nozzle and calculate critical pressure ratio.
3. Identify the functioning and features of IC engine, components and auxiliaries.
4. Solve the problems with various performance parameters of IC engines
5. Explaining the concept of refrigeration and air conditioning systems.

TEXT BOOKS

1. Mahesh. M. Rathore, "Thermal Engineering",1st Edition, Tata Mc GrawHill,2010.
2. Ganesan.V,"InternalCombustionEngines"4thEdition,Tata Mc GrawHill,2012.

REFERENCE BOOKS

1.Ballaney.P,"ThermalEngineering",25thEdition,KhannaPublishers,2017.

2.Domkundwar, Kothandaraman,&Domkundwar,"ACourseinThermalEngineering",6thEdition, Dhanpat Rai& Sons, 2011.

3. Gupta H.N, "Fundamentals of Internal Combustion Engines", 2nd Edition Prentice Hall of India, 2013.

4. Mathur M.L and Mehta F.S., "Thermal Science and Engineering", 3rd Edition,Jain Brothers Pvt. Ltd, 2017.

5. Soman.K,"ThermalEngineering",2ndEdition,PrenticeHallofIndia,2011.

COs	POs												PSOs		
	PO 1	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**PO 11**	**PO 12**	**PSO 1**	**PSO 2**	**PSO 3**
CO1	3	3	1	2	-	-	-	-	-	-	-	-	2	1	**3**
CO2	3	2	2	1	-	-	-	-	-	-	-	-	1	2	**3**
CO3	3	2	1	1	-	-	-	-	-	-	-	-	2	2	**3**
CO4	3	3	3	2	-	-	-	-	-	-	-	-	3	2	**3**
CO5	3	3	2	1	-	-	-	-	-	-	-	-	2	2	**3**
AVG	**3.00**	**2.6**	**1.8**	**1.4**	-	-	-	-	-	-	-	-	**2.0**	**1.8**	**3.00**

24ME403	MECHANICS OF SOLIDS	Version:			
DEPARTMENT OF MECHANICAL ENGINEERING					
Programme& branch	MECHANICAL ENGINEERING	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES

The course content enables students to:

- To understand stresses and deformation in a member due to an axial loading. Also to estimate the thermal stresses, strains and strain energy in members subjected to axial loading.
- Understand the concept of shear force and bending moment with respect to beams and to draw the shear force and bending moment diagrams.
- Understand bending and shear stresses in beams of various cross sections under different loading conditions.
- Understand and analyze beam deflections using various methods like double integration approach, Macaulay's method.
- Study the pressure vessels, their classification and to estimate various stresses such as radial, circumferential, longitudinal and shrinkage induced in them, concepts of torsion.

UNIT – I	SIMPLE STRESSES & STRAINS,STRAIN ENERGY & IMPACT LOADING	9

SIMPLE STRESSES & STRAINS: Concept of stress and strain- Types of stresses & strains tensile, compressive, shear –Hooke's law – stress – strain diagram for mild steel – Factor of safety – Lateral strain, Poisson's ratio & volumetric strain – Bars of varying cross section – composite bars. Elastic moduli and the relationship between them. Temperature stresses.

STRAIN ENERGY & IMPACT LOADING: Strain energy - Resilience – Stress due to various types of axial loads- Gradually applied suddenly applied and impact loadings.

UNIT- II	SHEAR FORCE AND BENDING MOMENT	9

Definition of beam – Types of beams - concepts of SF & BM with point load, Uniformly Distributed Load, uniformly varying loads and combination of these loads, Point of contra flexure, Relation between S.F., B.M and rate of loading at a section of a beam.

UNIT - III	FLEXURAL STRESSES AND SHEAR STRESSES	9

FLEXURAL STRESSES: Theories of simple bending – Assumptions - derivation of bending equation, - Neutral axis, Moment of resistance, determination of bending stresses, section modulus of rectangular and circular sections (solid and hallow), I & T sections.

SHEAR STRESSES: Shear stress distribution across various beams sections- rectangular, circular, I and T sections.

UNIT -IV	DEFLECTION OF BEAMS	9

Member bending into a circular arc –slope, deflection and radius of curvature. Determination of slope and

deflection for cantilever and simply supported beams subjected to point loads and U.D.L by Double integration method, Macaulay's method, Moment area method.

UNIT –V	THIN AND THICK CYLINDERS AND TORSION OF SHAFTS	9

THIN CYLINDERS: Thin cylinders - longitudinal and circumferential stresses, Derivation of formulae and calculations of hoop stress, longitudinal stress in a cylinder subjected to internal pressure

THICK CYLINDERS: Derivation of formulae for radial and hoop stresses, Lame's equation, cylinders subjected to inside & outside pressure, compound cylinders.

TORSION OF SHAFTS: Theory of pure torsion, Torsional moment of resistance, derivation of Torsion equation, assumptions in the theory of pure torsion, polar modulus, power transmitted by a circular shaft, shafts in series, shafts in parallel.

TOTAL = 45 PERIODS

LEARNING OUTCOMES

After successful completion of this course, the students will be able to:

CO 1: Illustrate the concepts of stress and strain and thermal stress in members, strain energy due gradually, suddenly applied loads.

CO 2: Analyze shear force diagrams and bending moment diagrams to the different loads for the different support arrangements.

CO 3: Determine shear stresses induced in the beams which are made with different cross sections like rectangular, circular, I, T sections.

CO 4: Solve the equations of slope and deflection for different support arrangements by double integration method, Macaulay's method.

CO 5: Determine stresses induced in cylinders subjected to internal, external pressures.

TEXT BOOKS

1. Mechanics of Materials by B.C. Punmia, Ashok Kumar Jain, Arun Kumar
2. Strength of materials by S. Ramamrutham, Dhanpat Rai Publications.
3. Strength of materials by R. K. Bansal, Lakshmi publications

REFERENCE BOOKS

1. Introduction to solid mechanics by Irving H. Shames, James M. Pitarresi, Pearson Publications.
2. Mechanics of Materials (In Si Units) by Beer and Johnson, Tata McGraw-Hil.
3. Strength of Materials (Mechanics of Materials) by James M.Gere and Barry J.Goodno, PWSKENT Publishing Company, 1990
4. Strength of Materials (Mechanics of Solids) by R.K. Rajput, S.Chand Publications.

MAPPING OF Cos WITH Pos AND PSOs															
COs	**POs**												**PSOs**		
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	**3**	**2**	**1**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**3**
CO2	**3**	**3**	**2**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**3**
CO3	**3**	**3**	**2**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**3**
CO4	**3**	**3**	**2**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**3**
CO5	**3**	**2**	**2**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**3**
AVG	**3.00**	**2.67**	**1.67**	**2.67**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**3.00**

24ME404	METROLOGY AND INSTRUMENTATION	VERSION:			
DEPARTMENT OF MECHANICAL ENGINEERING					
Programme& branch	MECHANICAL ENGINEERING	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES

The course is intended to

- Inspection of engineering parts with various precision instruments.
- Design of part, tolerances and fits.
- Principles of measuring instruments and gauges and their uses.
- Imparting the principles of measurement which includes the working mechanism of various displacement transducers, measurement of temperature and pressure gauges.

UNIT – I	SYSTEMS OF LIMITS AND FITS	9

Introduction, nominal size, tolerance, limits, deviations, fits - Unilateral and bilateral tolerance system, form tolerance, Assembly tolerance and tolerance estimation methods, hole and shaft basis systems- interchangeability and selective assembly. International standard system of tolerances, selection of limits and tolerances for correct functioning.

UNIT- II	LINEAR MEASUREMENT,MEASUREMENT OF ANGLES AND TAPERS	9

LINEAR MEASUREMENT: Length standards, end standards, slip gauges- calibration of the slip gauges, dial indicators, micrometers.

MEASUREMENT OF ANGLES AND TAPERS: Different methods – bevel protractor, angle slip gauges- spirit levels- sine bar, rollers and spheres used to measure angles and tapers.

UNIT - III	LIMIT GAUGES AND OPTICAL MEASURING INSTRUMENTS	9

LIMIT GAUGES: Taylor's principles-design of GO and NO GO gauges; plug, ring, snap, gap, taper, profile and position gauges.

OPTICAL MEASURING INSTRUMENTS: Tools maker's microscope and uses, auto collimators, optical projector, optical flats and their uses. Need of inspection, surface testing, surface finish, Laser instrumentation.

UNIT -IV	BASIC PRINCIPLES OF INSTRUMENTATION AND MEASUREMENT OF DISPLACEMENT	9

BASIC PRINCIPLES OF INSTRUMENTATION: Selection of instrumentation, Units and standards – Static measurements – Scale and pointer type instruments – Definition of range, sensitivity, hysteresis, accuracy, precision, reliability, repeatability, linearity, drift, Static and dynamic response, reproducibility,

calibration procedure, errors in measuring instruments, source of errors.

MEASUREMENT OF DISPLACEMENT: Theory and construction of various transducers to measure displacement - LVDT, piezo electric, inductive, capacitance, resistance.

UNIT –V	**MEASUREMENT OF TEMPERATURE AND MEASUREMENT OF PRESSURE**	**9**

MEASUREMENT OF TEMPERATURE: Classification, ranges, various principles of measurement, expansion, electrical resistance, thermistor, thermocouple.

MEASUREMENT OF PRESSURE: Units - classification – different principles used. Manometers, piston, bourdon pressure gauges, bellows - diaphragm gauges. Low pressure measurement, McLeod pressure gauge.

TOTAL = 45 PERIODS

LEARNING OUTCOMES

After successful completion of this course, the students will be able to:

CO 1: Explain the design tolerances and fits for selected product quality.

CO 2: Illustrate the standards of length, angle measurement.

CO 3: Demonstrate the concepts of limit gauges and optical measurements.

CO 4: Explain of various transducers to measure displacement

CO 5: Analyze various temperature and pressure transducers for engineering applications

TEXT BOOKS

1. Engineering Metrology, Mahajan, Dhanpat Rai Publishers.
2. Measurement Systems Applications & design by D.S Kumar, Khanna Publishers

REFERENCE BOOKS

1. Engineering Metrology, R.K.Jain, Khanna Publishers.
2. Engineering Metrology by I.C.Gupta, DhanpatRai Publishers.
3. Mechanical and Industrial Measurements, R.K. Jain, Khanna Publishers.

E - RESOURCES

1.https://www.youtube.com/watch?v=HpIEeBtJupY&list=PLbMVogVj5nJSZiwuh_tp50dKry8mCxzKA&index=1

2. http://www.gvpce.ac.in/syllabi/Engineering%20Metrology.pdf

MAPPING OF Cos WITH Pos AND PSOs															
COs	**POs**												**PSOs**		
	PO 1	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**PO 11**	**PO 12**	**PSO 1**	**PSO 2**	**PSO 3**
CO1	**3**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**3**	**-**	**2**
CO2	**3**	**2**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**3**	**-**	**2**
CO3	**3**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**3**	**-**	**2**
CO4	**3**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**3**	**-**	**2**
CO5	**3**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**3**	**2**	**2**
AVG	**3.00**	**2.00**	**2.00**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**3.00**	**2.00**	**2.00**

24GE405	ENVIRONMENTAL SCIENCES AND SUSTAINABILITY	L T P C 2 0 0 2

COURSE OBJECTIVES:

- To introduce the basic concepts of environment, ecosystems and biodiversity and emphasize on the biodiversity of India and its conservation.
- To impart knowledge on the causes, effects and control measures of environmental pollutions, waste management, occupational health and safty management system and environmental protection act.
- To facilitate the understanding of global and Indian scenario of renewable and nonrenewable resources,causes of their degradation and measures to preserve them.
- To familiarize the concept of sustainable development goals and appreciate the interdependence of economic and social aspects of sustainability, recognize and analyze climate changes, concept of carbon credit and the challenges of environmental management.
- To inculcate and embrace sustainability practices and develop a broader understanding on green materials and analyze the role of sustainable urbanization.

UNIT I	ENVIRONMENT AND BIODIVERSITY	6

Definition, scope and importance of environment – need for public awareness. Eco-system and Energy flow– ecological succession. Types of biodiversity: genetic, species and ecosystem diversity– values of biodiversity, India as a mega-diversity nation – hot-spots of biodiversity – threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts – endangered and endemic species of India – conservation of biodiversity: In- situ and ex-situ.

UNIT II	ENVIRONMENTAL POLLUTION	6

Causes, Effects and Preventive measures of Water, Soil, Air and Noise Pollutions. Solid, Hazardous and E-Waste management. Case studies on Occupational Health and Safety Management system (OHASMS). Environmental protection, Environmental protection acts.

UNIT III	RENEWABLE SOURCES OF ENERGY	6

Energy management and conservation, New Energy Sources: Need of new sources. Different types new energy sources. Applications of- Hydrogen energy, Ocean energy resources, Tidal energy conversion. Concept, origin and power plants of geothermal energy.

UNIT IV	SUSTAINABILITY AND MANAGEMENT	6

Sustainability - concept, needs and challenges-economic, social and aspects of sustainability-from Unsustainability to Sustainability- Development, GDP-Sustainable Development and Goals. Climate change- Global, Regional and local environmental issues and possible solutions-case studies. Concept of Carbon Credit, Carbon Footprint.

UNIT V	SUSTAINABILITY PRACTICES	6

Zero waste and R concept, ISO 14000 Series, Material Life cycle assessment, Environmental Impact Assessment. Sustainable habitat: Energy efficiency, Sustainable transports, Green buildings, Green materials. Green Engineering: Sustainable urbanization- Socio-economical and technological change.

TOTAL PERIODS: 30

TEXT BOOKS:

1. Anubha Kaushik and C. P. Kaushik's "Perspectives in Environmental Studies", 6th Edition, New Age International Publishers ,2018.
2. Benny Joseph, 'Environmental Science and Engineering', Tata McGraw-Hill, New Delhi, 2016.
3. Gilbert M.Masters, 'Introduction to Environmental Engineering and Science', 2nd edition, Pearson Education, 2004. 4. Allen, D. T. and Shonnard, D. R., Sustainability Engineering: Concepts, Design and Case Studies, Prentice Hall.
5. Bradley. A.S; Adebayo, A.O., Maria, P. Engineering applications in sustainable design and development, Cengage learning.
6. Environment Impact Assessment Guidelines, Notification of Government of India, 2006.
7. Mackenthun, K.M., Basic Concepts in Environmental Management, Lewis Publication, London, 1998.

REFERENCES:

1. R.K. Trivedi, 'Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standards', Vol. I and II, Enviro Media. 38 . Edition 2010.
2. Cunningham, W.P. Cooper, T.H. Gorhani, 'Environmental Encyclopedia', Jaico Publ., House, Mumbai, 2001.
3. Dharmendra S. Sengar, 'Environmental law', Prentice hall of India PVT. LTD, New Delhi, 2007.
4. Rajagopalan, R, 'Environmental Studies-From Crisis to Cure', Oxford University Press, Third Edition, 2015.
5. Erach Bharucha "Textbook of Environmental Studies for Undergraduate Courses" Orient Blackswan Pvt. Ltd. 2013.

COURSE OUTCOMES:

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

CO1: Recognize and understand the functions of environment, ecosystems and biodiversity and their conservation.
CO2: Identify To identify the causes, effects of environmental pollution and natural disasters and contribute to thepreventive measures in the society.
CO3: Identify and apply the understanding of renewable and non-renewable resources and contribute to the sustainable measures to preserve them for future generations.
CO4: Recognize the different goals of sustainable development and apply them for suitable technological advancement and societal development.
CO5: Demonstrate the knowledge of sustainability practices and identify green materials and the role of sustainable urbanization.

MAPPING OF Cos WITH POs AND PSOs :

COs	PO`s												PSO`s		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	2	1	-	-	-	2	3	-	-	-	-	2	-	-	-
2	3	2	-	-	-	3	3	-	-	-	-	2	-	-	-
3	3	-	1	-	-	2	2	-	-	-	-	2	-	-	-
4	3	2	1	1	-	2	2	-	-	-	-	2	-	-	-
5	3	2	1	-	-	2	2	-	-	-	-	1	-	-	-
AVG	*2.8*	*1.8*	*1*	*1*	-	*2.2*	2.4	-	-	-	-	1.8	-	-	-

24ME405	MANUFACTURING PROCESS-II				Version:
DEPARTMENT OF MECHANICAL ENGINEERING					
Programme& branch	MECHANICAL ENGINEERING	L	T	P	C
		3	0	2	5

COURSE OBJECTIVES

The course content enables students to:

- To study the concepts and basic mechanics of metal cutting and the factors affecting machinability
- To learn working of basic and advanced turning machines.
- To teach the basics of machine tools with reciprocating and rotating motions and abrasive finishing processes.
- To study the basic concepts of CNC of machine tools and constructional features of CNC.
- To learn the basics of CNC programming concepts to develop the part programme for Machine centre and turning centre

UNIT – I	MECHANICS OF METAL CUTTING	9

Mechanics of chip formation, forces in machining, Types of chip, cutting tools – single point cutting tool nomenclature, orthogonal and oblique metal cutting, thermal aspects, cutting tool materials, tool wear, tool life, surface finish, cutting fluids and Machinability.

UNIT- II	TURNING MACHINES	9

Centre lathe, constructional features, specification, operations – taper turning methods, thread cutting methods, special attachments, surface roughness in turning, machining time and power estimation. Special lathes - Capstan and turret lathes- tool layout – automatic lathes: semi-automatic – single spindle: Swiss type, automatic screw type – multi spindle

UNIT - III	RECIPROCATING MACHINE TOOLS	9

Reciprocating machine tools: shaper, planer, slotter: Types and operations- Hole making: Drilling, reaming, boring, tapping, type of milling operations-attachments- types of milling cutters– machining time calculation - Gear cutting, gear hobbing and gear shaping – gear finishing methods Abrasive processes: grinding wheel – specifications and selection, types of grinding process – cylindrical grinding, surface grinding, centreless grinding, internal grinding - micro finishing methods

UNIT -IV	CNC MACHINES	9

Computer Numerical Control (CNC) machine tools, constructional details, special features – Drives, Recirculating ball screws, tool changers; CNC Control systems – Open/closed, point-to-point/continuous - Turning and machining centres – Work holding methods in Turning and machining centres, Coolant systems, Safety features.

UNIT –V	PROGRAMMING OF CNC MACHINE TOOLS	9

Coordinates, axis and motion, Absolute vs Incremental, Interpolators, Polar coordinates, Program planning, G and M codes, Manual part programming for CNC machining centers and Turning centers – Fixed cycles, Loops and subroutines, Setting up a CNC machine for machining.

List Of Experiments

1. Horizontal Milling Machine
2. Vertical Milling Machine
3. Surface Grinding Machine
4. Cylindrical Grinding Machine
5. Radial Drilling Machine
6. Lathe Tool Dynamometer
7. Gear Hobbing Machine
8. Tool and cutter grinder
9. CNC Lathe
10. CNC Milling machine

TOTAL (L:45 + P:30): 75 PERIODS

LEARNING OUTCOMES

After successful completion of this course, the students will be able to:

CO 1: Apply the mechanism of metal removal process and to identify the factors involved in improving machinability.

CO 2: Describe the constructional and operational features of centre lathe and other special purpose lathes.

CO 3: Describe the constructional and operational features of reciprocating machine tools

CO 4: Apply the constructional features and working principles of CNC machine tools.

CO 5: Demonstrate the Program CNC machine tools through planning, writing codes and setting up CNC machine tools to manufacture a given component.

TEXT BOOKS

1. Kalp akjian. S, "Manufacturing Engineering and Technology", Pearson Education India,7th Edition, 2018.
2. Mich ael Fitzpatrick, Machining and CNC Technology, McGraw-Hill Education; 4th edition, 2018.

REFERENCE BOOKS

1. Ro y. A. Lindberg, Processes and materials of manufacture, PHI / Pearson education, 2006.
2. Ge ofrey Boothroyd, "Fundamentals of Metal Machining and Machine Tools", McGraw Hill, 1984.
3. Ra o. P.N "Manufacturing Technology," Metal Cutting and Machine Tools, Tata McGraw- Hill, New Delhi, 2009.
4. A. B. Chattopadhyay, Machining and Machine Tools, Wiley, 2nd edition, 2017.
5. Pe ter Smid, CNC Programming Handbook, Industrial Press Inc.;Third edition, 2007.

MAPPING OF Cos WITH Pos AND PSOs															
COs	**POs**												**PSOs**		
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**3**	**-**	**-**	**3**	**-**	**-**
CO2	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**2**	**-**	**-**	**-**	**-**
CO3	**-**	**3**		**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
CO4	**-**	**-**		**-**	**-**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
CO5	**-**	**-**	**3**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**3**	**-**	**-**	**-**
AVG	**3**	**3**	**3**	**-**	**-**	**3**	**-**	**-**	**-**	**3**	**2**	**3**	**3**	**-**	**-**

DEPARTMENT OF MECHANICAL ENGINEERING					
Programme& branch	**MECHANICAL ENGINEERING**	**L**	**T**	**P**	**C**
		0	**0**	**3**	**2**

COURSE OBJECTIVES
The course content enables students to:
• To study the valve and port timing diagram for CI and SI engine • To analyze the Viscosity, Flash Point and Fire Point for various fuels/Lubiricants • To study the performance characteristics of IC engines • To detect the losses in heat balance test from the IC engine • To analyzing the performance of the air compressor and Refrigeration system
List of Experiments
1. Valve Timing Diagram for CI Engine Cut Section Model. 2. Port Timing Diagram for SI Engine Cut Section Model. 3. Determination of Viscosity Using Redwood Viscometer. 4. Determination of Flash Point and Fire Point Using cleavland apparatus 5. Performance Test on Diesel Engine mechanical Loading Device 6. Performance Test on Diesel Engine Electrical Loading Loading Device 7. Retardation Test on Diesel Engine with mechanical Loading Device. 8. Heat Balance Test in Diesel Engine Using mechanical Loading Device. 9. Performance test on a two stage Reciprocating Air compressor 10. Determination of COP of a Refrigeration system
TOTAL PERIODS : 45
LEARNING OUTCOMES
After successful completion of this course, the students will be able to:
• Understand the valve and port timing diagram for CI and SI engine • Analyzing the Viscosity, Flash Point and Fire Point for various fuels/Lubiricants • Evaluate the performance characteristics of IC engines • Detecting the losses in heat balance test from the IC engine • Evaluate the performance of the air compressor and Refrigeration system

COs	POs												PSOs	
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	2	2	1	1	**-**	1	**-**	**-**	**-**	**-**	**-**	**-**	1	1
CO2	2	2	1	1	**-**	1	**-**	**-**	**-**	**-**	**-**	**-**	2	1
CO3	2	2	2	1	**-**	1	**-**	**-**	**-**	**-**	**-**	**-**	2	1
CO4	2	2	2	1	**-**	1	**-**	**-**	**-**	**-**	**-**	**-**	3	1
CO5	2	2	2	1	**-**	1	**-**	**-**	**-**	**-**	**-**	**-**	2	1
AVG	**2.0**	**2.0**	**1.6**	**1.0**	**-**	**1.0**	**-**	**-**	**-**	**-**	**-**	**-**	**2.0**	**1.0**
Low(1); Medium(2); High(3)														

24GE409	PERSONALITY DEVELOPMENT	L T P C 0 0 2 1

COURSE OBJECTIVES:

- To enhance communication skills and develop fluency in English.
- To improve self-confidence, emotional intelligence, and soft skills.
- To develop leadership, teamwork, and decision-making abilities.
- To prepare students for career opportunities through resume writing, interviews, and networking.
- To instill ethical values, professional etiquette, and adaptability in diverse environments.

UNIT I	INTRODUCTION TO PERSONALITY DEVELOPMENT	6

Definition, Scope, and Importance of Personality Development - Self-Awareness and Self-Confidence Building - Effective Goal Setting & Motivation - Role of Communication in Personality Enhancement.

UNIT II	COMMUNICATION & SOFT SKILLS	6

Verbal & Non-Verbal Communication Skills - Listening, Speaking, and Presentation Skills - Body Language & Personal Grooming - Overcoming Fear & Building Confidence in Public Speaking.

UNIT III	EMOTIONAL INTELLIGENCE & INTERPERSONAL SKILLS	6

Understanding & Managing Emotions - Stress Management & Conflict Resolution - Building Strong Interpersonal Relationships - Empathy, Active Listening, and Negotiation Skills.

UNIT IV	CAREER READINESS & PROFESSIONAL DEVELOPMENT	6

Resume Writing & Cover Letter Preparation - Group Discussion & Interview Techniques - Workplace Etiquette & Professional Ethics - Networking & Personal Branding.

UNIT V	LEADERSHIP, ETHICS & DECISION-MAKING	6

Leadership Qualities & Styles - Decision-Making & Problem-Solving Skills - Ethical Behaviour & Integrity in Professional Life - Adaptability & Growth Mind set in a Dynamic World.

TOTAL PERIODS: 30

TEXT BOOKS:

1. **Robbins, Mel.** ***The High 5 Habit: Take Control of Your Life with One Simple Habit*****. 1st Edition, Hay House Inc., 2021.**

2. **Grant, Adam.** ***Think Again: The Power of Knowing What You Don't Know*****. 1st Edition, Viking, 2021.**

3. **Tawwab, Nedra Glover.** ***Set Boundaries, Find Peace: A Guide to Reclaiming Yourself*****. 1st Edition, TarcherPerigee, 2021.**

4. **Brown, Brené.** ***Atlas of the Heart: Mapping Meaningful Connection and the Language of Human Experience*****. 1st Edition, Random House, 2021.**

REFERENCES:

1. https://www.youtube.com/watch?v=1JlnVGd7jhw
2. https://www.youtube.com/watch?v=3BvuVvczCwQ
3. https://www.youtube.com/watch?v=Hi-K-4UHuUo
4. https://www.youtube.com/watch?v=UEYCOq9wcvc
5. https://www.youtube.com/watch?v=4BZuWrdC-9M

COURSE OUTCOMES:

CO1: Understand personality development, self-awareness, confidence, goal setting, and motivation.

CO2: Develop communication and soft skills, including verbal, non-verbal, and public speaking.

CO3: Apply emotional intelligence, stress management, conflict resolution, and interpersonal skills.

CO4: Enhance career readiness through resume writing, interviews, workplace etiquette, and networking.

CO5: Develop leadership, ethical decision-making, problem-solving, and a growth mind-set.

NOTE:

- **Internal mode only**

Cos - PO's & PSO's MAPPING

CO	PO												PSO		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
1	-	-	-	-	-	2	-	2	3	3	2	3	-	-	-
2	-	-	-	-	3	-	-	-	2	3	2	3	-	-	-
3	-	1	1	2	-	2	-	2	3	3	2	3	-	-	-
4	-	-	-	-	3	-	-	1	2	3	-	3	-	-	-
5	-	2	2	2	-	1	1	-	-	2	-	2	-	-	-

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