SRI RANGANATHAR
INSTITUTE OF ENGINEERING AND TECHNOLOGY
(An Autonomous Institution)
(Approved by AICTE, New Delhi, Affiliated to Anna University, Chennai)
Athipalayam, Coimbatore - 641 110. website: sriet.ac.in, Ph: 0422 - 2697792

REGULATIONS 2024
CHOICE BASED CREDIT SYSTEM
B. E. MECHANICAL ENGINEERING

VISION

Our vision is to be a distinguished centre of excellence in "Mechanical Engineering, fostering continuous learning, advanced skilling, and research collaboration, dedicated to advancing mechanical education and scientific exploration for societal betterment."

MISSION

- Enlightening students with effective pedagogies, hands-on practice and advanced skills.
- Stimulating students' interest through add-on courses for better collaborative learning and employability.
- Providing guidance on innovative research and leadership proficiency.
- Nurture entrepreneurship, human values and ethics, team work along with social skills.

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

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

PEO1:	Lead a prosperous career in mechanical engineering and associated industries.
PEO2:	Possess a deep proficiency in the areas of manufacturing, materials, thermal and design.
PEO3:	Contribute to the advancement of technology through academic research and the practical application in industry.
PEO4:	Exhibit their professional activities with effective communication, strong leadership, ethical principles, and a commitment to social responsibility.
PEO5:	Graduates will stay abreast of advancing technologies through continuous, life-long learning.

PROGRAM OUTCOMES (POs)

Students graduating from Mechanical Engineering should be able to:

PO1 Engineering Knowledge: Apply knowledge of mathematics, natural science, computing, engineering fundamentals and an engineering specialization for 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 to engage in independent and life-long learning in the broadest context of technological change.

PROGRAM SPECIFIC OUTCOMES (PSOs)

PSO1: Identify, formulate and solve engineering problems in the core streams of Mechanical Engineering, i.e., design, thermal, fluid and manufacturing engineering.

PSO2: Design, develop and test energy efficient systems for required engineering applications by representing engineering systems through 2D/3D Drawings.

PEO / PO MAPPING:

PEOs	POs											PSOs	
	1	2	3	4	5	6	7	8	9	10	11	1	2
1	3	3	3	3	3	3	3	3	3	3	3	3	3
2	3	2	2	2	2	1	2	1	3		3	3	3
3	3	1	2	1	2	2	3	2	1	2	3	3	3
4	2	2	2	2	2	2	2	2			3	2	3
5	3	2	2	2	1	3	1	2	2	1	3	3	3

Mapping of Course Outcome and Programme Outcome

Year	Semester	Semester	Course name	PO's											PSOs	
				1	2	3	4	5	6	7	8	9	10	11	1	2
I	I	24HS3151	Functional English	2	2	2	2	2	3	3	2	3	3	3		
		24MA3151	Matrices and Calculus	3	3	1	1				2		2	3		
		24GE3151	Programming in C	2	2	2	1	2	1	1	1	2		3	2	2
		24BE3051	Basic Electrical and Electronics Engineering	3	3	3	2	2	2	1	1	1	1	2	3	3
		24GE3152	Heritage of Tamil													
		24CY3051	Engineering Chemistry	3	1	1	1		2		1			1		
		24GE3171	Programming in C Laboratory	2	2	3	2	1	2			2	1	2	2	2
		24GE3071	Engineering Practices Laboratory	3	2	2		2					1	2	2	
		24ES3151	Basic Computing Skills for Engineers	3	2	2	2	3	2						3	2
		24GE3172	Soft Skills - I													
I	II	24HS3252	Professional English	2	2	2	2	2	3	3	2	3	3	3		
		24MA3251	Statistics and Numerical Methods	3	3	1	1				2		2	3		
		24GE3052	Problem Solving and Python Programming	2	3	3	3	2						2	2	3
		24GE3051	Engineering Graphics	3	2	2	1	1						2	1	3
		24GE3252	Tamils and Technology													
		24PH3051	Engineering Physics	3	1	2										
		24GE3072	Problem Solving and Python Programming Laboratory	2	3	3	3	2						2	2	3
		24GE3272	Soft Skills – II													
II	III	24MA3351	Transforms and Partial Differential Equations	3	3	1	1				2			3		
		24ME3351	Engineering Mechanics	3	2	3	1	1						3	2	
		24ME3391	Engineering Thermodynamics	3	3	1		1	2					3	3	2

		24ME3392	Engineering Materials and Metallurgy	3	1	3	2	2	2	1				2	2	1
		24CE3391	Fluid Mechanics and Machinery	3	3	3	2				2			1	2	
		24ME3381	Computer Aided Machine Drawing	2	1	1	1	2				1		1	2	1
II	**IV**	24GE3451	Environmental Sciences and Sustainability	2	2	2	2	2	2	1	2	1	1	2	2	1
		24ME3492	Hydraulics and Pneumatics	2	2	2	2	2						1	2	1
		24ME3493	Manufacturing Technology	3	2	2	2	1				1		2	1	
		24ME3451	Thermal Engineering	3	2	1	1							2	2	2
		24ME3491	Strength of Materials for Mechanical Engineers	3	2	2	2	2			1	1		2	2	1
		24ME3482	Manufacturing Technology Laboratory	3	2	3	3		1		2			1	1	2

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CHOICE BASED CREDIT SYSTEM
B. E. MECHANICAL ENGINEERING
CURRICULUM AND SYLLABI FOR I TO VIII SEMESTERS

SEMESTER – I

S. No.	COURSE CODE	COURSE TITLE	CATEGORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
MANDATORY NON-CREDIT COURSE								
1	24IP3151	Induction Program	MNC	Two Weeks				0
THEORY COURSES								
2	24HS3151	Functional English	HSMC	2	0	0	2	2
3	24MA3151	Matrices and Calculus	BSC	3	1	0	4	4
4	24GE3151	Programming in C	ESC	3	0	0	3	3
5	24BE3051	Basic Electrical and Electronics Engineering	ESC	3	0	0	3	3
6	24GE3152	Heritage of Tamil	HSMC	1	0	0	1	1
THEORY COURSE WITH LABORATORY COMPONENT								
7	24CY3051	Engineering Chemistry	BSC	3	0	2	5	4
LABORATORY COURSES								
8	24GE3171	Programming in C Laboratory	ESC	0	0	4	4	2
9	24GE3071	Engineering Practice Laboratory	ESC	0	0	4	4	2
PROFESSIONAL DEVELOPMENT COURSE								
10	24ES3151	Basic Computing Skills for Engineers	EEC	0	0	2	2	1
11	24GE3172	Soft Skills - 1	EEC	0	0	2	2	1
			TOTAL	**15**	**1**	**14**	**30**	**23**

SEMESTER – II

S. No.	COURSE CODE	COURSE TITLE	CATEGORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
THEORY COURSES								
1	24HS3252	Professional English	HSMC	2	0	0	2	2
2	24MA3251	Statistics and Numerical Methods	BSC	3	1	0	4	4
3	24GE3052	Problem Solving and Python Programming	ESC	3	0	0	3	3
4	24GE3051	Engineering Graphics	ESC	2	2	0	4	4
5	24GE3252	Tamils and Technology	HSMC	1	0	0	1	1
6		NCC Credit Course Level 1 #	-	2#	0	0	2#	2#
THEORY COURSE WITH LABORATORY COMPONENT								
7	24PH3051	Engineering Physics	BSC	3	0	2	5	4
LABORATORY COURSES								
8	24GE3072	Problem Solving and Python Programming Laboratory	ESC	0	0	4	4	2
PROFESSIONAL DEVELOPMENT COURSE								
9	24GE3272	Soft skills – II	EEC	0	0	2	2	1
			TOTAL	**15**	**1**	**8**	**25**	**21**

 # NCC Credit Course level 1 is offered for NCC students only. The grades earned by the students will be recorded in the Mark Sheet, however the same shall not be considered for the computation of CGPA.

SEMESTER III

SL. NO.	COURSE CODE	COURSE TITLE	CATEORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
THEORY COURSES								
1.	24MA3351	Transforms and Partial Differential Equations	BSC	3	1	0	4	4
2.	24ME3351	Engineering Mechanics	ESC	3	0	0	3	3
3.	24ME3391	Engineering Thermodynamics	PCC	3	1	0	4	4
4.	24ME3392	Engineering Materials and Metallurgy	PCC	3	0	0	3	3
THEORY COURSE WITH LABORATORY COMPONENT								
5.	24CE3391	Fluid Mechanics and Machinery	ESC	3	0	2	5	4
LABORATORY COURSES								
6.	24ME3381	Computer Aided Machine Drawing	PCC	0	0	4	4	2
7.	24ME3301	Industry Oriented Course$-I	EEC	0	0	2	2	1
			TOTAL	**17**	**2**	**8**	**25**	**21**

$ Skill Based Course

SEMESTER IV

SL. NO.	COURSE CODE	COURSE TITLE	CATEGORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
THEORY COURSES								
1.	24GE3451	Environmental Sciences and Sustainability	BSC	2	0	0	2	2
2.	24ME3492	Hydraulics and Pneumatics	PCC	3	0	0	3	3
3.	24ME3493	Manufacturing Technology	PCC	3	0	0	3	3
4.		NCC Credit Course Level 2[#]		3#	0	0	3#	3#
THEORY COURSE WITH LABORATORY COMPONENT								
5.	24ME3451	Thermal Engineering	PCC	3	0	2	5	4
6.	24ME3491	Strength of Materials for Mechanical Engineers	PCC	3	0	2	5	4
LABORATORY COURSES								
7.	24ME3482	Manufacturing Technology Laboratory	PCC	0	0	4	4	2
8.	24ME3402	Industry Oriented Course[$]-II	EEC	0	0	2	2	1
			TOTAL	**14**	**0**	**10**	**24**	**19**

 # NCC Credit Course level 2 is offered for NCC students only. The grades earned by the students will be recorded in the Mark Sheet, however the same shall not be considered for the computation of CGPA.

$ Skill Based Course

SEMESTER V

S. NO.	COURSE CODE	COURSE TITLE	CATEGORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
THEORY COURSES								
1.	24ME3591	Design of Machine Elements	PCC	3	1	0	4	4
2.	24ME3592	Metrology and Measurements	PCC	3	0	0	3	3
3.	24ME3593	Theory of Machines	PCC	3	1	0	4	4
4.	24GE3055	Renewable energy	BSC	3	0	0	3	3
5.		Professional Elective-I	PEC	3	0	0	3	3
6.		Professional Elective-II	PEC	3	0	0	3	3
7.		Mandatory Course[&]-I	MC	3	0	0	3	0
LABORATORY COURSES								
8.	24ME3511	Summer Internship[$]-I	EEC	0	0	2	0	1
9.	24ME3581	Metrology and Dynamics Laboratory	PCC	0	0	4	4	2
			TOTAL	**21**	**2**	**6**	**27**	**23**

$ Two weeks Summer Internship carries one credit and it will be done during IV semester summer vacation and same will be evaluated in V semester.

& Mandatory Course-I is a Non-credit Course (Student shall select one course from the list given under MC- I)

SEMESTER VI

S. NO.	COURSE CODE	COURSE TITLE	CATEORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
THEORY COURSES								
1.	24ME3691	Heat and Mass Transfer	PCC	3	1	0	4	4
2.	24GE3790	Entrepreneurship Development	HSMC	2	0	0	2	2
3.	24ME3692	Design of Transmission System	PCC	3	1	0	4	4
4.		Professional Elective-III	PEC	-	-	-	-	3
5.		Mandatory Course-II	MC	3	0	0	3	0
6.		NCC Credit Couse Level 3 #		3#	0	0	3	3#
THEORY COURSE WITH LABORATORY COMPONENT								
7.		Open Elective* -I	OEC	2	0	2	4	3
LABORATORY COURSES								
8.	24ME3681	CAD/CAM Laboratory	PCC	0	0	4	4	2
9.	24ME3682	Heat Transfer Laboratory	PCC	0	0	4	4	2
10.	24ME3601	Industry Oriented Course$-III	EEC	0	0	2	2	1
			TOTAL	-	-	-	-	**21**

& Mandatory Course-II is a Non-credit Course (Student shall select one course from the list given under MC- II)

***Open Elective – II shall be chosen from the emerging technologies**

 # NCC Credit Course level 3 is offered for NCC students only. The grades earned by the students will be recorded in the Mark Sheet, however the same shall not be considered for the computation of CGPA

***Open Elective – I shall be chosen from the emerging technologies**

$ Skill Based Course

SEMESTER VII / VIII*

S. NO.	COURSE CODE	COURSE TITLE	CATEORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
THEORY COURSES								
1.	24GE3791	Human Values and Ethics	HSMC	2	0	0	2	2
2.	24ME3892	Computer Integrated Manufacturing	PCC	3	0	0	3	3
3.		Professional Elective-IV	PEC	-	-	-	-	3
THEORY COURSE WITH LABORATORY COMPONENT								
4.	24ME3791	Mechatronics	PCC	2	0	2	4	3
5.		Open Elective* -II	OEC	2	0	2	4	3
LABORATORY COURSES								
6.	24ME3702	Simulation and Analysis laboratory	PCC	0	0	4	4	2
7.	24ME3706	Summer Internship-II	EEC	0	0	2	0	1
8.	24ME3711	Project Work – Phase-I	EEC	0	0	2	2	2
			TOTAL	-	-	-	-	**19**

#Two weeks Summer Internship carries one credit and it will be done during VI semester summer vacation and same will be evaluated in VII semester.

***If students undergo internship in Semester VII, then the courses offered during semester VII will be offered during semester VIII.**

SEMESTER VIII /VII*

S. NO.	COURSE CODE	COURSE TITLE	CATE GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
THEORY COURSES								
1.	24GE3792	Industrial Management	HSMC	3	0	0	3	3
2.		Open Elective** -IV	OEC	3	0	0	3	3
LABORATORY COURSES								
3.	24ME3811	Project Work – Phase-II	EEC	0	0	16	16	8
			TOTAL	**6**	**0**	**16**	**22**	**14**

***If students undergo internship in Semester VII, then the courses offered during semester VII will be offered during semester VIII.**
*****Open Elective III and IV (Shall be chosen from the list of open electives offered by other Programmes).**

TOTAL CREDITS:161

MANDATORY COURSES I

S. NO.	COURSE CODE	COURSE TITLE	CATEGORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
1.	24MX3081	Introduction to Women and Gender Studies	MC	3	0	0	3	0
2.	24MX3082	Elements of Literature	MC	3	0	0	3	0
3.	24MX3083	Film Appreciation	MC	3	0	0	3	0
4.	24MX3084	Disaster Risk Reduction and Management	MC	3	0	0	3	0

MANDATORY COURSES II

S. NO.	COURSE CODE	COURSE TITLE	CATEGORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
1.	24MX3085	Well Being with Traditional Practices - Yoga, Ayurveda and Siddha	MC	3	0	0	3	0
2.	24MX3086	History of Science and Technology in India	MC	3	0	0	3	0
3.	24MX3087	Political and Economic Thought for a Humane Society	MC	3	0	0	3	0
4.	24MX3088	State, Nation Building and Politics in India	MC	3	0	0	3	0
5.	24MX3089	Industrial Safety	MC	3	0	0	3	0

PROFESSIONAL ELECTIVE COURSES: VERTICALS

VERTICAL 1	VERTICAL 2	VERTICAL 3	VERTICAL 4	VERTICAL 5	VERTICAL 6	VERTICAL 7	VERTICAL 8	VERTICAL 9	VERTICAL 10
MODERN MOBILITY SYSTEMS	**PRODUCT AND PROCESS DEVELOPMENT**	**ROBOTICS AND AUTOMATION**	**DIGITAL AND GREEN MANUFACTURING**	**PROCESS EQUIPMENT AND PIPING DESIGN**	**CLEAN AND GREEN ENERGY TECHNOLOGIES**	**COMPUTATIONAL ENGINEERING**	**DIVERSIFIED COURSES GROUP 1**	**DIVERSIFIED COURSES GROUP 2**	**DIVERSIFIED COURSES GROUP 3**
Automotive Materials, Components, Design & Testing	Value Engineering	Sensors and Instrumentation	Digital Manufacturing and IoT	Design of Pressure Vessels	Bioenergy Conversion Technologies	Computational Solid Mechanics	Automobile Engineering	Turbo Machines	Advanced Vehicle Engineering
Conventional and Futuristic Vehicle Technology	Additive Manufacturing	Electrical Drives and Actuators	Lean Manufacturing	Failure Analysis and NDT Techniques	Carbon Footprint estimation and reduction techniques	Computational Fluid Dynamics and Heat transfer	Measurements and Controls	Non-traditional Machining Processes	Advanced Internal Combustion Engineering
Renewable Powered Off Highway Vehicles and Emission Control Technology	CAD/CAM	Embedded Systems and Programming	Modern Robotics	Material Handling and solid processing Equipment	Energy Conservation in Industries	Theory on Computation and Visualization	Design Concepts in Engineering	Industrial safety	Casting and Welding Processes
Vehicle Health Monitoring, Maintenance and Safety	Design For X	Robotics	Green Manufacturing Design and Practices	Rotating Machinery Design	Energy Efficient Buildings	Computational Bio-Mechanics	Composite Materials and Mechanics	Design of Transmission System	Process Planning and Cost Estimation
CAE and CFD Approach in Future Mobility	Ergonomics in Design	Smart Mobility and Intelligent Vehicles	Environment Sustainability and Impact Assessment	Thermal and Fired Equipment design	Energy Storage Devices	Advanced Statistics and Data Analytics	Electrical Drives and Control	Thermal Power Engineering	Surface Engineering
Hybrid and Electric Vehicle Technology	New Product Development	Haptics and Immersive Technologies	Energy Saving Machinery and Components	Industrial Layout Design and Safety	Renewable Energy Technologies	CAD and CAE	Power Plant Engineering	Design for Manufacturing	Precision Manufacturing
Thermal Management of Batteries and Fuel Cells	Product Life Cycle Management	Drone Technologies	Green Supply Chain Management	Design Codes and Standards	Equipment for Pollution Control	Machine Learning for Intelligent Systems	Refrigeration and Air Conditioning	Power Generation Equipment Design	Gas Dynamics and Jet Propulsion
-	-	-	-	-	-	-	Dynamics of Ground Vehicles	-	Operational Research

Registration of Professional Elective Courses from Verticals:

Professional Elective Courses will be registered in Semesters V and VI. These courses are listed in groups called verticals that represent a particular area of specialisation / diversified group. Students are permitted to choose all the Professional Electives from a particular vertical or from different verticals.

The registration of courses for B.E./B.Tech (Honours) or Minor degree shall be done from Semester V to VIII. The procedure for registration of courses explained above shall be followed for the courses of B.E/B.Tech (Honours) or Minor degree also. For more details on B.E./B.Tech (Honours) or Minor degree refer to the Regulations 2021, Clause 4.10 (Amendments).

PROFESSIONAL ELECTIVE COURSES : VERTICALS

VERTICAL 1 : MODERN MOBILITY SYSTEMS

Sl. No.	Course Code	Course Title	Category	Periods Per week			Total Contact period	Credits
				L	T	P		
1.	24CME331	Automotive Materials, Components, Design and Testing	PEC	2	0	2	4	3
2.	24CME332	Conventional and Futuristic Vehicle Technology	PEC	3	0	0	3	3
3.	24CME333	Renewable Powered Off Highway Vehicles and Emission Control Technology	PEC	3	0	0	3	3
4.	24CME334	Vehicle Health Monitoring, Maintenance and Safety	PEC	3	0	0	3	3
5.	24CME335	CAE and CFD Approach in Future Mobility	PEC	2	0	2	4	3
6.	24CME336	Hybrid and Electric Vehicle Technology	PEC	3	0	0	3	3
7.	24CME337	Thermal Management of Batteries and Fuel Cells	PEC	3	0	0	3	3

VERTICAL 2 : PRODUCT AND PROCESS DEVELOPMENT

Sl. No.	Course Code	Course Title	Category	Periods Per week			Total Contact period	Credits
				L	T	P		
1.	24CME338	Value Engineering	PEC	3	0	0	3	3
2.	24CME339	Additive Manufacturing	PEC	2	0	2	4	3
3.	24CME340	CAD/CAM	PEC	3	0	0	3	3
4.	24CME341	Design For X	PEC	3	0	0	3	3
5.	24CME342	Ergonomics in Design	PEC	3	0	0	3	3
6.	24CME343	New Product Development	PEC	3	0	0	3	3
7.	24CME344	Product Life Cycle Management	PEC	3	0	0	3	3

VERTICAL 3: ROBOTICS AND AUTOMATION

Sl. No.	Course Code	Course Title	Category	Periods Per week			Total Contact Period	Credits
				L	T	P		
1.	24MR3491	Sensors and Instrumentation	PEC	3	0	0	3	3
2.	24MR3492	Electrical Drives and Actuators	PEC	3	0	0	3	3
3.	24MR3492	Embedded Systems and Programming	PEC	2	0	2	4	3
4.	24MR3691	Robotics	PEC	3	0	0	3	3

5.	24CMR338	Smart Mobility and Intelligent Vehicles	PEC	3	0	0	3	3
6.	24CME345	Haptics and Immersive Technologies	PEC	3	0	0	3	3
7.	24CRA332	Drone Technologies	PEC	3	0	0	3	3

VERTICAL 4: DIGITAL AND GREEN MANUFACTURING

Sl. No.	Course Code	Course Title	Category	Periods Per week			Total Contact Period	Credits
				L	T	P		
1.	24CME346	Digital Manufacturing and IoT	PEC	2	0	2	4	3
2.	24CME347	Lean Manufacturing	PEC	3	0	0	3	3
3.	24CME348	Modern Robotics	PEC	2	0	2	4	3
4.	24CME349	Green Manufacturing Design and Practices	PEC	3	0	0	3	3
5.	24CME350	Environment Sustainability and Impact Assessment	PEC	3	0	0	3	3
6.	24CME351	Energy Saving Machinery and Components	PEC	3	0	0	3	3
7.	24CME352	Green Supply Chain Management	PEC	3	0	0	3	3

VERTICAL 5: PROCESS EQUIPMENT AND PIPING DESIGN

Sl. No.	Course Code	Course Title	Category	Periods Per week			Total Contact Period	Credits
				L	T	P		
1.	24CME353	Design of Pressure Vessels	PEC	3	0	0	3	3
2.	24CME354	Failure Analysis and NDT Techniques	PEC	2	0	2	4	3
3.	24CME355	Material Handling and Solid Processing Equipment	PEC	3	0	0	3	3
4.	24CME356	Rotating Machinery Design	PEC	3	0	0	3	3
5.	24CME357	Thermal and Fired Equipment Design	PEC	3	0	0	3	3
6.	24CME358	Industrial Layout Design and Safety	PEC	2	0	2	4	3
7.	24CME359	Design Codes and Standards	PEC	3	0	0	3	3

VERTICAL 6: CLEAN AND GREEN ENERGY TECHNOLOGIES

Sl. No.	Course Code	Course Title	Category	Periods Per week			Total contact Periods	Credits
				L	T	P		
1.	24CME360	Bioenergy Conversion Technologies	PEC	3	0	0	3	3
2.	24CME361	Carbon Footprint Estimation and Reduction	PEC	3	0	0	3	3

		Techniques						
3.	24CME362	Energy Conservation in Industries	PEC	3	0	0	3	3
4.	24CME363	Energy Efficient Buildings	PEC	3	0	0	3	3
5.	24CME364	Energy Storage Devices	PEC	3	0	0	3	3
6.	24CME365	Renewable Energy Technologies	PEC	3	0	0	3	3
7.	24CME366	Equipment for Pollution Control	PEC	3	0	0	3	3

VERTICAL 7: COMPUTATIONAL ENGINEERING

Sl. No.	Course Code	Course Title	Category	Periods Per week			Total contact periods	Credits
				L	T	P		
1.	24CME367	Computational Solid Mechanics	PEC	3	0	0	3	3
2.	24CME368	Computational Fluid Dynamics and Heat transfer	PEC	3	0	0	3	3
3.	24CME369	Theory on Computation and Visualization	PEC	3	0	0	3	3
4.	24CME370	Computational Bio-Mechanics	PEC	3	0	0	3	3
5.	24CME371	Advanced Statistics and Data Analytics	PEC	3	0	0	3	3
6.	24CME372	CAD and CAE	PEC	2	0	2	4	3
7.	24CRA342	Machine Learning for Intelligent Systems	PEC	3	0	0	3	3

VERTICAL 8: DIVERSIFIED COURSES GROUP 1

Sl. No.	Course Code	Course Title	Category	Periods Per week			Total Contact Periods	Credits
				L	T	P		
1.	24CME380	Automobile Engineering	PEC	3	0	0	3	3
2.	24ME3001	Measurements and Controls	PEC	3	0	0	3	3
3.	24CME381	Design Concepts in Engineering	PEC	3	0	0	3	3
4.	24CME382	Composite Materials and Mechanics	PEC	3	0	0	3	3
5.	24CME383	Electrical Drives and Control	PEC	3	0	0	3	3
6.	24CME384	Power Plant Engineering	PEC	3	0	0	3	3
7.	24CME385	Refrigeration and Air Conditioning	PEC	3	0	0	3	3
8.	24CAU332	Dynamics of Ground Vehicles	PEC	3	0	0	3	3

VERTICAL 9: DIVERSIFIED COURSES GROUP 2

Sl. No.	Course Code	Course Title	Category	Periods Per week			Total Contact Periods	Credits
				L	T	P		
1.	24CAE353	Turbo Machines	PEC	3	0	0	3	3
2.	24CME387	Non-traditional Machining Processes	PEC	3	0	0	3	3
3.	24CME388	Industrial safety	PEC	3	0	0	3	3
4.	24CME389	Design of Transmission System	PEC	3	0	0	3	3
5.	24CME390	Thermal Power Engineering	PEC	3	0	0	3	3
6.	24CME391	Design for Manufacturing	PEC	3	0	0	3	3
7.	24CME392	Power Generation Equipment Design	PEC	3	0	0	3	3

VERTICAL 10: DIVERSIFIED COURSES GROUP 3

Sl. No.	Course Code	Course Title	Category	Periods Per week			Total Contact periods	Credits
				L	T	P		
1.	24CME393	Advanced Vehicle Engineering	PEC	3	0	0	3	3
2.	24CME394	Advanced Internal Combustion Engineering	PEC	3	0	0	3	3
3.	24CME395	Casting and Welding Processes	PEC	3	0	0	3	3
4.	24CME396	Process Planning and Cost Estimation	PEC	3	0	0	3	3
5.	24CME397	Surface Engineering	PEC	3	0	0	3	3
6.	24CME398	Precision Manufacturing	PEC	3	0	0	3	3
7.	24CME386	Gas Dynamics and Jet Propulsion	PEC	3	0	0	3	3
8.	24CME399	Operational Research	PEC	3	0	0	3	3

OPEN ELECTIVES

(Students shall choose the open elective courses, such that the course contents are not similar to any other course contents/title under other course categories)

OPEN ELECTIVE I AND II

(EMERGING TECHNOLOGIES)

To be offered other than Faculty of Information and Communication Engineering

SL. NO.	COURSE CODE	COURSE TITLE	CATEGORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
1.	OCS351	Artificial Intelligence and Machine Learning Fundamentals	OEC	2	0	2	4	3
2.	OCS352	IoT Concepts and Applications	OEC	2	0	2	4	3
3.	OCS353	Data Science Fundamentals	OEC	2	0	2	4	3
4.	CCS333	Augmented Reality / Virtual Reality	OEC	2	0	2	4	3

OPEN ELECTIVES – III

SL. NO.	COURSE CODE	COURSE TITLE	CATE GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
1.	24OCE353	Lean Concepts, Tools And Practices	OEC	3	0	0	3	3
2.	24OHS351	English for Competitive Examinations	OEC	3	0	0	3	3
3.	24OMG352	NGOs and Sustainable Development	OEC	3	0	0	3	3
4.	24OMG353	Democracy and Good Governance	OEC	3	0	0	3	3
5.	24OME354	Applied Design Thinking	OEC	3	0	0	3	3
6.	24MF3003	Reverse Engineering	OEC	3	0	0	3	3
7.	24OPR351	Sustainable Manufacturing	OEC	3	0	0	3	3
8.	24AU3791	Electric and Hybrid Vehicles	OEC	3	0	0	3	3
9.	24OAS352	Space Engineering	OEC	3	0	0	3	3
10.	24OIM351	Industrial Management	OEC	3	0	0	3	3
11.	24OIE354	Quality Engineering	OEC	3	0	0	3	3
12.	24OSF351	Fire Safety Engineering	OEC	3	0	0	3	3
13.	24OAE352	Fundamentals of Aeronautical engineering	OEC	3	0	0	3	3
14.	24OML351	Introduction to non-destructive testing	OEC	3	0	0	3	3
15.	24OMR351	Mechatronics	OEC	3	0	0	3	3
16.	24ORA351	Foundation of Robotics	OEC	3	0	0	3	3
17.	24OGI351	Remote Sensing Concepts	OEC	3	0	0	3	3
18.	24OAI351	Urban Agriculture	OEC	3	0	0	3	3
19.	24OEN351	Drinking Water Supply and Treatment	OEC	3	0	0	3	3
20.	24OEE352	Electric Vehicle Technology	OEC	3	0	0	3	3
21.	24OEI353	Introduction to PLC Programming	OEC	3	0	0	3	3

22.	24OCH351	Nano Technology	OEC	3	0	0	3	3
23.	24OCH352	Functional Materials	OEC	3	0	0	3	3
24.	24OFD352	Traditional Indian Foods	OEC	3	0	0	3	3
25.	24OFD353	Introduction to food processing	OEC	3	0	0	3	3
26.	24OPY352	IPR for Pharma Industry	OEC	3	0	0	3	3
27.	24OTT351	Basics of Textile Finishing	OEC	3	0	0	3	3
28.	24OTT352	Industrial Engineering for Garment Industry	OEC	3	0	0	3	3
29.	24OTT353	Basics of Textile Manufacture	OEC	3	0	0	3	3
30.	24OPE351	Introduction to Petroleum Refining and Petrochemicals	OEC	3	0	0	3	3
31.	24OPE334	Energy Conservation and Management	OEC	3	0	0	3	3
32.	24OPT351	Basics of Plastics Processing	OEC	3	0	0	3	3
33.	24OEC351	Signals and Systems	OEC	3	0	0	3	3
34.	24OEC352	Fundamentals of Electronic Devices and Circuits	OEC	3	0	0	3	3
35.	24CBM348	Foundation Skills in integrated product Development	OEC	3	0	0	3	3
36.	24CBM333	Assistive Technology	OEC	3	0	0	3	3
37.	24OMA352	Operations Research	OEC	3	0	0	3	3
38.	24OMA353	Algebra and Number Theory	OEC	3	0	0	3	3
39.	24OMA354	Linear Algebra	OEC	3	0	0	3	3
40.	24OBT352	Basics of Microbial Technology	OEC	3	0	0	3	3
41.	24OBT353	Basics of Biomolecules	OEC	3	0	0	3	3
42.	24OBT354	Fundamentals of Cell and Molecular Biology	OEC	3	0	0	3	3
27.	24OTT351	Basics of Textile Finishing	OEC	3	0	0	3	3
28.	24OTT352	Industrial Engineering for Garment Industry	OEC	3	0	0	3	3
29.	24OTT353	Basics of Textile Manufacture	OEC	3	0	0	3	3

30.	24OPE351	Introduction to Petroleum Refining and Petrochemicals	OEC	3	0	0	3	3
31.	24OPE334	Energy Conservation and Management	OEC	3	0	0	3	3
32.	24OPT351	Basics of Plastics Processing	OEC	3	0	0	3	3
33.	24OEC351	Signals and Systems	OEC	3	0	0	3	3
34.	24OEC352	Fundamentals of Electronic Devices and Circuits	OEC	3	0	0	3	3
35.	24CBM348	Foundation Skills in integrated product Development	OEC	3	0	0	3	3
36.	24CBM333	Assistive Technology	OEC	3	0	0	3	3
37.	24OMA352	Operations Research	OEC	3	0	0	3	3
38.	24OMA353	Algebra and Number Theory	OEC	3	0	0	3	3
39.	24OMA354	Linear Algebra	OEC	3	0	0	3	3
40.	24OBT352	Basics of Microbial Technology	OEC	3	0	0	3	3
41.	24OBT353	Basics of Biomolecules	OEC	3	0	0	3	3
42.	24OBT354	Fundamentals of Cell and Molecular Biology	OEC	3	0	0	3	3

SUMMARY

B.E. MECHANICAL ENGINEERING										
S.No	**Subject Area**	**Credits per Semester**								**Total Credits**
		I	**II**	**III**	**IV**	**V**	**VI**	**VII/VIII**	**VIII/VII**	
1	**HSMC**	3	3				2	2	3	**13**
2	**BSC**	8	8	4	2	3				**25**
3	**ESC**	10	9	7						**26**
4	**PCC**			9	16	13	12	8		**58**
5	**PEC**					6	3	3		**12**
6	**OEC**						3	3	3	**9**
7	**EEC**	2	1	1	1	1	1	3	8	**18**
8	**Non-Credit /(Mandatory)**	-	-	-	-	Y	Y	-	-	**-**
Total		**23**	**21**	**21**	**19**	**23**	**21**	**19**	**14**	**161**

ENROLLMENT FOR B.E. / B. TECH. (HONOURS) / MINOR DEGREE (OPTIONAL)

A student can also optionally register for additional courses (18 credits) and become eligible for the award of B.E. / B. Tech. (Honours) or Minor Degree.

For B.E. / B. Tech. (Honours), a student shall register for the additional courses (18 credits) from semester V onwards. These courses shall be from the same vertical or a combination of different verticals of the same programme of study only.

For minor degree, a student shall register for the additional courses (18 credits) from semester V onwards. All these courses have to be in a particular vertical from any one of the other programmes, Moreover, for minor degree the student can register for courses from any one of the following verticals also.

Complete details are available in clause 4.10 (Amendments) of Regulations 2021.

VERTICALS FOR MINOR DEGREE (In addition to all the verticals of other programmes)

Vertical I	Vertical II	Vertical III	Vertical IV	Vertical V
Fintech and Block Chain	**Entrepreneurship**	**Public Administration**	**Business Data Analytics**	**Environment and Sustainability**
Financial Management	Foundations of Entrepreneruship	Principles of Public Administration	Statistics for Management	Sustainable infrastructure Development
Fundamentals of Investment	Team Building and Leadership	Constitution of India	Datamining for Business Intelligence	Sustainable Agriculture and Environmental Management
Banking, Financial Services and Insurance	Management for Business	Public Personnel Administration	Human Resource Analytics	Sustainable Bio Materials
Introduction to Blockchain and its Applications	Creativity and Innovation in Entrepreneurship	Administrative Theories	Marketing and Social Media Web Analytics	Materials for Energy Sustainability
Fintech Personal Finance and Payments	Principles of Marketing Management for Business	Indian Administrative System	Operation and Supply Chain Analytics	Green Technology
Introduction to Fintech	Human Resource Management for Entrepreneurs	Public Policy Administration	Financial Analytics	Environmental Quality Monitoring and Analysis
-	Financing New Business Ventures	-	-	Integrated Energy Planning for Sustainable Development
-	-	-	-	Energy Efficiency for Sustainable Development

(Choice of courses for Minor degree is to be made from any one vertical of other programmes or from anyone of the following verticals)

VERTICAL 1: FINTECH AND BLOCK CHAIN

SL. NO.	COURSE CODE	COURSE TITLE	CATEGORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
1.	CMG331	Financial Management	PEC	3	0	0	3	3
2.	CMG332	Fundamentals of Investment	PEC	3	0	0	3	3
3.	CMG333	Banking, Financial Services and Insurance	PEC	3	0	0	3	3
4.	CMG334	Introduction to Blockchain and its Applications	PEC	3	0	0	3	3
5.	CMG335	Fintech Personal Finance and Payments	PEC	3	0	0	3	3
6.	CMG336	Introduction to Fintech	PEC	3	0	0	3	3

VERTICAL 2: ENTREPRENERUSHIP

SL. NO.	COURSE CODE	COURSE TITLE	CATEGORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
1.	CMG337	Foundations of Entrepreneruship	PEC	3	0	0	3	3
2.	CMG338	Team Building and Leadership Management for Business	PEC	3	0	0	3	3
3.	CMG339	Creativity and Innovation in Entrepreneurship	PEC	3	0	0	3	3
4.	CMG340	Principles of Marketing Management for Business	PEC	3	0	0	3	3
5.	CMG341	Human Resource Management for Entrepreneurs	PEC	3	0	0	3	3
6.	CMG342	Financing New Business Ventures	PEC	3	0	0	3	3

VERTICAL 3: PUBLIC ADMINISTRATION

SL. NO.	COURSE CODE	COURSE TITLE	CATEGORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
1.	CMG343	Principles of Public Administration	PEC	3	0	0	3	3
2.	CMG344	Constitution of India	PEC	3	0	0	3	3
3.	CMG345	Public Personnel Administration	PEC	3	0	0	3	3
4.	CMG346	Administrative Theories	PEC	3	0	0	3	3
5.	CMG347	Indian Administrative System	PEC	3	0	0	3	3
6.	CMG348	Public Policy Administration	PEC	3	0	0	3	3

VERTICAL 4: BUSINESS DATA ANALYTICS

SL. NO.	COURSE CODE	COURSE TITLE	CATEGORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
1.	CMG349	Statistics for Management	PEC	3	0	0	3	3
2.	CMG350	Datamining for Business Intelligence	PEC	3	0	0	3	3
3.	CMG351	Human Resource Analytics	PEC	3	0	0	3	3
4.	CMG352	Marketing and Social Media Web Analytics	PEC	3	0	0	3	3
5.	CMG353	Operation and Supply Chain Analytics	PEC	3	0	0	3	3
6.	CMG354	Financial Analytics	PEC	3	0	0	3	3

VERTICAL 5: ENVIRONMENT AND SUSTAINABILITY

SL. NO.	COURSE CODE	COURSE TITLE	CATEGORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
1.	CES331	Sustainable infrastructure Development	PEC	3	0	0	3	3
2.	CES332	Sustainable Agriculture and Environmental Management	PEC	3	0	0	3	3
3.	CES333	Sustainable Bio Materials	PEC	3	0	0	3	3

4.	CES334	Materials for Energy Sustainability	PEC	3	0	0	3	3
5.	CES335	Green Technology	PEC	3	0	0	3	3
6.	CES336	Environmental Quality Monitoring and Analysis	PEC	3	0	0	3	3
7.	CES337	Integrated Energy Planning for Sustainable Development	PEC	3	0	0	3	3
8.	CES338	Energy Efficiency for Sustainable Development	PEC	3	0	0	3	3

24HS3151	FUNCTIONAL ENGLISH	L	T	P	C
		2	0	0	2

COURSE OBJECTIVES:

1. To develop engineering and technology students basic reading and writing skills.
2. To help learners develop their listening skills, enable them to listen to lectures and comprehend them by asking questions; and seeking clarifications.
3. To help learners develop their speaking skills and speak fluently in real contexts.
4. To help learners develop vocabulary of a general kind by developing their reading skills

UNIT I BASIC ENGLISH FOR EFFECTIVE COMMUNICATION 6

Listening: Listening to short extracts-British Council B1 & B2 speaking: Self Introduction, introducing others, Extempore, Impromptu, Reading: Reading short stories, comprehension - skimming-scanning Writing: Developing hints, Free writing Language development: Present Tense, Articles, Modal Verbs Vocabulary development: – Word formation –Prefixes & Suffixes, root words.

UNIT – II CONTEXTUAL COMMUNICATION SKILLS 6

Listening: Telephonic conversations, conceptual conversations, Listening to experience speaking: Sharing information of a personal kind, greeting, taking leave, Manuscript, Memorized Reading: Reading newspapers and understanding the context Writing: Paragraph writing -Day-to-day events, Cloze exercises Language development: Past Tense, Subject-verb Agreement Vocabulary development: Guessing meanings of words in context.

UNIT – III DISCOURSE AND STRUCTURE 6

Listening: Listening to product descriptions; and narratives from different sources-speaking: Short presentation, asking about routine actions and expressing facts and opinions, Reading: Interpreting pictures of visual graphics- Reading and reviewing Books/Articles Writing: Understanding text structure, jumbled sentences -Language development: Future Tense, Degrees of comparison, Gerunds and Infinitives -Vocabulary development: use of reference words and discourse markers, Idioms and Phrases

UNIT – IV INTERACTIVE AND WRITTEN COMMUNICATION 6

Listening- Listening to dialogues - listening to longer texts and filling up the blanks, speaking-Role Play, Travelogue -Reading: Reading different types of magazines Writing: Formal and Informal letter writing, E-mail etiquette Language development: Wh questions- Question Tags Vocabulary development: synonyms-antonyms, phrasal verbs, If Conditional Clause

UNIT – V ACADEMIC FLUENCY AND STRUCTURED EXPRESSION 6

Listening: Listening to a podcas speaking: conversational speaking, short group conversations, Reading: Journals both general and technical Writing: Writing short essays, hints development, dialogue writingLanguage development: Spelling and Punctuations, Cause and Effect, Transition words,Vocabulary development-collocations, Use of sequence words .

TOTAL: 30 PERIODS

COURSE OUTCOMES:

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

CO1 Write effectively and flawlessly avoiding grammatical errors in a variety of professional and social settings.

CO2 Utilize appropriate writing strategies in technical and business context.

CO3 Make use of listening skills in business and workplace environments and relates to oral communication confidently.

CO4 Develop corporate test-taking strategies as well as employability skills.

CO5 Exhibits learners' reading skills for effective communication in personal and official conversations / situations .

TEXT BOOKS:

1. Board of Editors. Fluency in English A course book for Engineering and Technology. Orient Blackswan, Hyderabad: 2016.
2. Rizvi, Ashraf. M. Effective Technical Communication, Tata McGraw-Hill, New Delhi, 2017

REFERENCES:

1. Raman, Meenakshi and Sharma, Sangeetha "Technical Communication Principles and Practice" Oxford University Press: New Delhi, 2014
2. Kumar, Suresh. E. "Engineering English" Orient Blackswan: Hyderabad, 2015.
3. Muralikrishna, & Sunita Mishra. Communication Skills for Engineers. Pearson, New Delhi. 2011.
4. Mitra K. Barun, "Effective Technical Communication – A Guide for Scientists and Engineers", Oxford University Press, New Delhi, 2006.

CO's-PO's & PSO's MAPPING:

CO's	PO's											PSO's	
	1	2	3	4	5	6	7	8	9	10	11	1	2
1	1	1	1	1	1	3	3	1	3		3		
2	1	1	1	1	1	3	3	1	3		3		
3	2	3	2	3	2	3	3	2	3	3	3		
4	2	3	2	3	2	3	3	2	3	3	3		
5	2	3	3	3		3	3	2	3		3		
Low (1) ; Medium (2) ; High (3)													

Course Coordinator

(D. Indumathi)
AP/Eng.

BoS Chairman / HoD (S&H)

24MA3151	MATRICES AND CALCULUS	L	T	P	C
		3	1	0	4

COURSE OBJECTIVES:

1. To develop the use of matrix algebra techniques that is needed by engineers for practical application
2. To familiarize the students with concepts of differential calculus.
3. To make the student acquire sound knowledge of techniques in solving ordinary differential equations that model engineering problems.
4. To familiarize the student with functions of several variables.
5. To make the students understand various techniques of integration.

UNIT I MATRICES **9+3**

Eigenvalues and Eigenvectors of a real matrix – Characteristic equation – Properties of Eigenvalues and Eigenvectors – Cayley - Hamilton theorem – Diagonalization of matrices by orthogonal transformation – Reduction of a quadratic form to canonical form by orthogonal transformation – Nature of quadratic forms – Applications: Stretching of an elastic membrane.

UNIT – II DIFFERENTIAL CALCULUS **9+3**

Representation of functions - Limit of a function - Continuity - Derivatives - Differentiation rules - Maxima and Minima of functions of one variable.

UNIT – III DIFFERENTIAL EQUATIONS **9+3**

Higher order linear differential equations with constant coefficients – Method of variation of parameters – Cauchy's and Legendre's linear equations – Simultaneous first order linear equations with constant coefficients.

UNIT – IV FUNCTIONS OF SEVERAL VARIABLES **9+3**

Limits and Continuity – Partial derivatives – Total derivative – Differentiation of implicit functions – Jacobian and properties – Taylor's series for functions of two variables – Maxima and minima of functions of two variables – Lagrange's method of undetermined multipliers

UNIT – V INTEGRAL CALCULUS **9+3**

Definite and Indefinite integrals - Substitution rule - Techniques of Integration: Integration by parts, Trigonometric substitutions, Double integrals – Area enclosed by plane curves.

TOTAL: 45+15 PERIODS

COURSE OUTCOMES:

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

CO1 Use the matrix algebra methods for solving practical problems.
CO2 Use both the limit definition and rules of differentiation to differentiate functions
CO3 Explain the concept of differential equation.
CO4 Use differential calculus ideas on several variable functions.
CO5 Evaluate integrals both by using Riemann sums and by using the fundamental theorem of calculus.

TEXT BOOKS:

1. Bali N. P and Manish Goyal, "A Text book of Engineering Mathematics", Eighth Edition, Laxmi Publications Pvt Ltd., 2011.
2. Grewal. B.S, "Higher Engineering Mathematics", 41st Edition, Khanna Publications, Delhi, 2011.
3. Kreyszig Erwin, "Advanced Engineering Mathematics", John Wiley and Sons, 10th Edition, New Delhi, 2016

REFERENCES:

1. Dass, H.K., and Er. Rajnish Verma," Higher Engineering Mathematics", S. Chand Private Ltd., 2011.
2. Glyn James, "Advanced Modern Engineering Mathematics", 3rd Edition, Pearson Education, 2012
3. Peter V. O'Neil," Advanced Engineering Mathematics", 7th Edition, Cengage learning, 2012.
4. Ramana B.V, "Higher Engineering Mathematics", Tata McGraw Hill Publishing Company, New Delhi, 2008.
5. Sivarama Krishna Das P. and Rukmangadachari E., "Engineering Mathematics", Volume I, Second Edition, PEARSON Publishing, 2011.

CO's-PO's & PSO's MAPPING

CO's	PO's											PSO's	
	1	2	3	4	5	6	7	8	9	10	11	1	2
1	3	3	1	1				2		2	3		
2	3	3	1	1				2		2	3		
3	3	3	1	1				2		2	3		
4	3	3	1	1				2		2	3		
5	3	3	1	1				2		2	3		
Low (1) ; Medium (2) ; High (3)													

Course Coordinator **BOS Chairman/ HoD(S&H)**

SRI RANGANATHAR
INSTITUTE OF ENGINEERING AND TECHNOLOGY
(An Autonomous Institution)
(Approved by AICTE, New Delhi, Affiliated to Anna University, Chennai)
Athipalayam, Coimbatore - 641 110. website: sriet.ac.in, Ph: 0422 - 2697792

24GE3151	PROGRAMMING IN C	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

1. To understand the constructs of C Language.
2. To develop C programs using arrays and strings.
3. To develop modular applications in C using functions.
4. To develop applications in C using pointers and structures.
5. To do input/output and file handling in C.

UNIT I BASICS OF C PROGRAMMING **9**

Introduction to programming and features – Applications of C Language - Structure of C program - C programming: Data Types - Constants – Keywords – Operators and Expression Precedence and Associativity- Input/Output and assignment statements – Decision making statements - Switch statement - Looping statements – Preprocessor directives - Compilation process

UNIT II ARRAYS AND STRINGS **9**

Introduction to Arrays: Declaration, Initialization – One dimensional array –Two dimensional arrays - String operations: length, compare, concatenate, copy – Selection sort, linear and binary search.

UNIT III FUNCTIONS AND POINTERS **9**

Function prototype, function definition, function call, Built-in functions (string functions) – Recursion – Pointers – Null pointer and generic pointer – Pointer arithmetic – Arrays and pointers – Array of pointers – Parameter passing: Pass by value, Pass by reference.

UNIT – IV STRUCTURES AND UNION **9**

Structure - Nested structures – Pointer and Structures – Array of structures – Self-referential structures – Dynamic memory allocation - Singly linked list – typedef – Union - Storage classes and Visibility.

UNIT – V FILE PROCESSING **9**

Files – Types of file processing: Sequential access, Random access – Sequential access file - Random access- Command line arguments.

TOTAL: 45 PERIODS

COURSE OUTCOMES:

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

CO1 Demonstrate knowledge on C Programming constructs.
CO2 Design and implement applications using arrays and strings
CO3 Develop and implement modular applications in C using functions.
CO4 Develop applications in C using structures and pointers.
CO5 Design applications using sequential and random-access file processing.

TEXT BOOKS:

1. ReemaThareja, "Programming in C", Oxford University Press, Second Edition, 2016.
2. Kernighan, B.W and Ritchie,D.M, "The C Programming language", Second Edition, Pearson Education, 2015.

REFERENCES:

1. Paul Deitel and Harvey Deitel, "C How to Program with an Introduction to C++", Eighth edition, Pearson Education, 2018.
2. Yashwant Kanetkar, Let us C, 17th Edition, BPB Publications, 2020.
3. Byron S. Gottfried, "Schaum's Outline of Theory and Problems of Programming with C", McGraw- Education, 1996.
4. Pradip Dey, Manas Ghosh, "Computer Fundamentals and Programming in C", Second
5. Edition, Oxford University Press, 2013.
6. Anita Goel and Ajay Mittal, "Computer Fundamentals and Programming in C", 1st Edition, Pearson Education, 2013.

CO's-PO's & PSO's MAPPING

COs	POs											PSOs	
	1	2	3	4	5	6	7	8	9	10	11	1	2
1	1	2	2	1	2	1	1	1	2		3	2	1
2	2	2	2	1	2	1	1	1	2		3	3	2
3	2	3	2	1	2	1	1	1	2		3		2
4	3	2	2	1	3	1	1	1	2		3	3	2
5	2	3	3	1	2	1	2	1	2		3		2
Low (1) ; Medium (2) ; High (3)													

COURSE COORDINATOR

BOS CHAIRMAN / HOD

SRI RANGANATHAR
INSTITUTE OF ENGINEERING AND TECHNOLOGY
(An Autonomous Institution)
(Approved by AICTE, New Delhi, Affiliated to Anna University, Chennai)
Athipalayam, Coimbatore - 641 110. website: sriet.ac.in, Ph: 0422 - 2697792

24BE3051	BASIC ELECTRICAL AND ELECTRONICS ENGINEERING	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

1. To introduce the basics of electric circuits and analysis.
2. To impart knowledge in the basics of working principles and application of electrical machines.
3. To introduce analog devices and their characteristics.
4. To educate on the fundamental concepts of digital electronics.
5. To introduce the functional elements and working of measuring instruments.

UNIT – I ELECTRICAL CIRCUITS 9

DC Circuits: Circuit Components: Conductor, Resistor, Inductor, Capacitor – Ohm's Law - Kirchhoff's Laws — Simple problems, Mesh analysis with independent sources only (Steady state) Introduction to AC Circuits and Parameters: Waveforms, Average value, RMS Value, Instantaneous power, real power, reactive power and apparent power, power factor – Steady state analysis of RLC circuits (Simple problems only)

.

UNIT – II ELECTRICAL MACHINES 9

Construction and Working principle- DC Separately and Self excited Generators, EMF equation, Types and Applications. Working Principle of DC motors, Torque Equation, Types and Applications. Construction, working principle and Applications of Transformer (single phase), Three Phase Induction Motor.

UNIT – III ANALOG ELECTRONICS 9

Resistor, Inductor and Capacitor in Electronic Circuits- PN Junction Diodes, Zener Diode Characteristics Applications Bipolar Junction Transistor-Biasing, JFET, SCR, MOSFET, IGBT Types, I-V Characteristics and Applications.

UNIT – IV DIGITAL ELECTRONICS 9

Review of number systems, binary codes, Combinational logic - representation of logic functions-SOP and POS forms, K-map representations -minimization using K maps (Simple Problems only).

UNIT – V MEASUREMENTS AND INSTRUMENTATION 9

Functional elements of an instrument, Standards and calibration, Operating Principle, types - Moving Coil and Moving Iron meters, Measurement of three phase power, Energy Meter, Instrument Transformers-CT and PT, DSO- Block diagram.

TOTAL: 45 PERIODS

COURSE OUTCOMES:

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

CO1 Compute the electric circuit parameters for simple problems.
CO2 Explain the working principle and applications of electrical machines.
CO3 Analyze the characteristics of Analog electronic devices.
CO4 Explain the basic concepts of digital electronics.
CO5 Explain the operating principles of measurement instruments.

TEXT BOOKS:

1. Kothari DP and I.J Nagrath, "Basic Electrical and Electronics Engineering", Second Edition, McGraw Hill Education, 2020.
2. S.K. Bhattacharya "Basic Electrical and Electronics Engineering", Pearson Education, Second Edition, 2017.
3. Sedha R.S., "A text book book of Applied Electronics", S. Chand & Co., 2008.
4. James A. Svoboda, Richard C. Dorf, "Dorf's Introduction to Electric Circuits", Wiley, 2018.
5. A.K. Sawhney, Puneet Sawhney 'A Course in Electrical & Electronic Measurements & Instrumentation', Dhanpat Rai and Co, 2015.

REFERENCES:

1. Kothari DP and I.J Nagrath, "Basic Electrical Engineering", Fourth Edition, McGraw Hill Education, 2019.
2. Thomas L. Floyd, 'Digital Fundamentals', 11th Edition, Pearson Education, 2017.
3. Albert Malvino, David Bates, 'Electronic Principles, McGraw Hill Education; 7th edition, 2017.
4. Mahmood Nahvi and Joseph A. Edminister, "Electric Circuits", Schaum' Outline Series, McGraw Hill, 2002.
5. H.S. Kalsi, 'Electronic Instrumentation', Tata McGraw-Hill, New Delhi, 2010.

CO's-PO's & PSO's MAPPING

CO's	PO's											PSO's	
	1	2	3	4	5	6	7	8	9	10	11	1	2
1	3	3	3	2	2	2	1	1	1	1	3	3	3
2	3	2	2	2	2	2	1	1	1	1	2	2	3
3	3	3	3	1	2	2	1	1	1	1	2	3	3
4	3	3	2	2	2	2	1	1	1	1	2	2	3
5	3	2	3	2	2	2	1	1	1	1	2	3	3
Low (1) ; Medium (2) ; High (3)													

Course Coordinator

BOS Chairman/HOD

24GE3152 **தமிழர் மரபு** **L T P C**
1 0 0 1

COURSE OBJECTIVES:

1. இந்திய மொழிக் குடும்பங்கள் பற்றிய அறிவை வழங்குதல், திராவிட மொழிகள் மற்றும் தமிழ் ஒரு செம்மொழியாக நிலை பெறுதல்.
2. பாறை ஓவியங்கள் முதல் நவீன சிற்பங்கள் வரை தமிழ் கலையை ஆய்வு செய்தல், அதன் வரலாற்று மற்றும் கலாச்சார சூழலைப் புரிந்துகொள்வது.
3. நாட்டுப்புறக் கலைகளை ஆராய்தல், தமிழ் கலாச்சாரம் மற்றும் சமூகத்தில் அவற்றின் பங்கைப் புரிந்துகொள்வது.
4. தமிழ் கல்வெட்டுகளின் வரலாறு மற்றும் பரிணாம வளர்ச்சியைப் புரிந்து கொள்ளுதல்
5. இந்திய சுதந்திரப் போராட்டத்தில் தமிழர்களின் பங்கை பகுப்பாய்வு செய்தல்.

அலகு I மொழி மற்றும் இலக்கியம் **3**

இந்திய மொழிக் குடும்பங்கள் - திராவிட மொழிகள் - தமிழ் ஒரு செம்மொழி -தமிழ் செவ்விலக்கியங்கள் – சங்க இலக்கியங்களில் அகவாழ்வு மற்றும் புறவாழ்வு - திருக்குறளில் மேலாண்மைக் கருத்துக்கள் - தமிழ் இலக்கிய வளர்ச்சியில் பாரதியார் மற்றும் பாரதிதாசன் ஆகியோரின் பங்களிப்பு.

அலகு – II மரபு - பாறை ஓவியங்கள் முதல் நவீன ஓவியங்கள் வரை **3**

நடுகல் முதல் நவீன சிற்பங்கள் வரை - ஐம்பொன் சிலைகள்- பழங்குடியினர் மற்றும் அவர்கள் தயாரிக்கும் கைவினைப் பொருட்கள், பொம்மைகள் - சுடுமண் சிற்பங்கள் - குமரிமுனையில் திருவள்ளுவர் சிலை

அலகு– III நாட்டுப்புறக் கலைகள் மற்றும் வீர விளையாட்டுகள் **3**

தெருக்கூத்து, கரகாட்டம், வில்லுப்பாட்டு, கணியான் கூத்து, ஒயிலாட்டம், தோல்பாவைக் கூத்து, சிலம்பாட்டம், வளரி, புலியாட்டம் - இசைக் கருவிகள் மிருதங்கம், பறை, வீணை, யாழ், தமிழர்களின் விளையாட்டுகள்.

அலகு – IV கல்வெட்டு மற்றும் தொல்லியல் **3**

கல்வெட்டின் வரலாறு உத்தரமேரூர் கல்வெட்டு – தேர்தல் முறைகள் - தஞ்சாவூர் பெருவுடையார் கோயில் கல்வெட்டு – தொல்லியல் என்றால் என்ன? அதன் பணி - தமிழர் நகரங்கள் ; பூம்புகார், கீழடி ,அரிக்காமேடு, ஆதிச்சநல்லூர்

அலகு – V இந்திய தேசிய இயக்கம் மற்றும் இந்திய பண்பாட்டிற்குத் தமிழர்களின் பங்களிப்பு **3**

இந்திய விடுதலைப்போரில் தமிழர்களின் பங்கு - சமூக நீதி மற்றும் சமத்துவ இயக்கங்கள் -சுயமரியாதை இயக்கம்- பெண்கள் உரிமை மற்றும் சமூக எழுச்சி இயக்கம் - சமூக நீதிக்கான சட்டங்கள் – இடஒதுக்கீடு மற்றும் கல்வி வாய்ப்பு

TOTAL: 15 PERIODS

24GE3152 **HERITAGE OF TAMIL** **L T P C**
1 0 0 1

COURSE OBJECTIVES:

1. To provide the knowledge on the Indian language families, focusing on Dravidian languages and the status of Tamil as a classical language.
2. To study the Tamil art from ancient rock paintings to modern sculptures, understanding its historical and cultural context
3. To explore folk arts like Therukuthu, Karagattam, Villupattu, and Silambattam, understanding their role in Tamil culture and society
4. To understand the history and evolution of Tamil inscriptions, from the Brahmi script to the Tamil Vatteluthu script
5. To analyze the role of Tamils in the Indian Freedom Struggle, highlighting their significant contributions.

UNIT I LANGUAGE AND LITERATYRE **3**

Language Families in India - Dravidian Languages – Tamil as a Classical Language - Classical Literature in Tamil– Inner life and outer life in Sangam literature- Management Principles in Thirukural - Development of Modern literature in Tamil - Contribution of Bhàrathiyar and Bharathidhasan.

UNIT – II HERITAGE - ROCK ART PAINTINGS TO MODERN ART – SCULPTURE 3

Hero stone to modern sculpture - Bronze statues - Tribals and their handicrafts, toys - Clay sculptures - Thiruvalluvar statue at Kumarimunai

UNIT – III FOLK AND MARTIAL ARTS **3**

Therukoothu, Karagattam, Villu Pattu, Kaniyan Koothu, Oyillattam, Leatherpuppetry, Silambattam, Valari, Tiger dance - Making of musical instruments - Mridhangam, Parai, Veenai, Yazh and Nadhaswaram Sports and Games of Tamils.

UNIT – IV INSCRIPTION AND ARCHAEOGY **3**

History of Inscription Uttaramerur Inscription – Election Methods - Thanjavur Peruvudaiyar Temple Inscription – What is Archaeology? Its Work - Tamil Cities; Poompuhar, Keezhadi, Arikkamedu,

UNIT – V CONTRIBUTION OF TAMILS TO INDIAN NATIONAL MOVEMENT AND INDIAN CULTURE **3**

Contribution of Tamils to Indian Freedom Struggle - The Cultural Influence of Tamils over the other parts of India – Self-Respect Movement - - Women's Rights and Social Uprising Movement - Laws for Social Justice - Reservation and Educational Opportunity.

TOTAL: 15 PERIODS

பாடநூல் / TEXT BOOKS:

1. தமிழக வரலாறு மக்களும் பண்பாடும் கே.கே. பிள்ளை (வெளியீடு: தமிழ்நாடு பாடநூல் மற்றும் கல்வியியல் பணிகள் கழகம்.
2. கணினித் தமிழ் -முனைவர் இல, சுந்தரம், (விகடன் பிரசுரம்).
3. கீழடி வைகை நதிக்கரையில் சங்ககால நகர நாகரிகம் (தொல்லியல் துறை வெளியீடு)
4. பொருநை ஆற்றங்கரை நாகரிகம். (தொல்லியல் துறை வெளியீடு)
5. Social Life of Tamils (Dr.K.K. Pillay) A joint publication of TNTB & ESC and RMRL-(in print)
6. Social Life of the Tamils The Classical Period (Dr.S. Singaravelu) (Published by: International Institute of Tamil Studies.
7. Historical Heritage of the Tamils (Dr.S.V. Subatamanian, Dr. K.D. Thirunavukkarasu) (Published by: International Institute of Tamil Studies).

பார்வை நூல் : REFERENCES:

1. The Contributions of the Tamils to Indian Culture (Dr. M. Valarmathi) (Published by: International Institute of Tamil Studies.)
2. Keeladi - 'Sangam City Civilization on the banks of river Vaigai (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation,
3. Tamil Nadu) Studies in the History of India with Special Reference to Tamil Nadu (Dr.K.K.Pillay) (Published by: The Author)
4. Porunai Civilization (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)
5. Journey of Civilization Indus to Vaigai (R. Balakrishnan) (Published by: RMRL) - Reference Book.

Course Coordinator **BoS Chairman / HoD (S&H)**

24CY3051	ENGINEERING CHEMISTRY	L	T	P	C
		3	0	2	4

COURSE OBJECTIVES:

1. To inculcate sound understanding of water quality parameters and sample analysis methodologies.
2. To impart knowledge on the basic principles and preparatory methods of nanomaterials.
3. To introduce the basic concepts and applications of phase rule and alloys.
4. To familiarize the students with the operating principles, working processes and applications of energy conversion and storage devices.
5. To make students understand the fundamentals of polymer chemistry.

UNIT I WATER TREATEMENT & ANALYSIS **9**

Water: Sources and impurities, Water quality parameters, Boiler troubles: Scale and sludge, Boiler corrosion, Caustic embrittlement, Priming & Foaming. Desalination of brackish water: Reverse Osmosis Treatment of boiler feed water: Internal treatment (phosphate, colloidal, sodium aluminate and calgon conditioning) and External treatment – Ion exchange demineralization.

UNIT – II NANOCHEMISTRY **9**

Basics: Distinction between molecules, nanomaterials and bulk materials. Types of nanomaterials: definition, properties and uses of nanorods, nanowire and nanotube .Properties of nanomaterials (optical, electrical, mechanical and magnetic). Preparation of nanomaterials: Laser ablation, electrochemical deposition and electro spinning. Applications of nanomaterials in medicine, agriculture, energy, electronics and catalysis.

UNIT – III PHASE RULE AND ALLOYS **9**

Phase rule: Introduction, Terms. One component system – water system; Reduced phase rule; Construction of a simple eutectic phase diagram - Two component system: lead-silver system, Alloys: Introduction- Definition- properties of alloys- significance of alloying, functions and effect of alloying elements- Nichrome and stainless steel (18/8) – heat treatment of steel.

UNIT – IV ENERGY SOURCES AND STORAGE DEVICES **9**

Nuclear energy: light water nuclear power plant, breeder reactor. Solar energy conversion - Recent developments in solar cell materials. Geothermal energy; Batteries: Types of batteries, Primary battery – dry cell, Secondary battery – lead acid battery and lithium-ion battery; Electric vehicles – working principles; Fuel cells: H_2-O_2 fuel cell.

UNIT – V POLYMER CHEMISTRY **9**

Introduction: Classification of polymers – Natural and synthetic; Thermoplastic and Thermosetting. Functionality – Degree of polymerization. Types and mechanism of polymerization: Addition (Free Radical, cationic and anionic); condensation and copolymerization. Preparation, properties and uses of Nylon 6,6, and Epoxy resin.

TOTAL: 45 PERIODS

LIST OF EXPERIMENTS

1. Preparation of Na_2CO_3 as a primary standard and estimation of acidity of a water sample using the primary standard.
2. Determination of total, temporary & permanent hardness of water by EDTA method.
3. Determination of chloride content of water sample by Argentometric method.
4. Determination of strength of given hydrochloric acid using pH meter.
5. Synthesis of ZnO nanoparticles.

TOTAL : 30 PERIODS

TOTAL : 45+30 = 75 PERIODS

COURSE OUTCOMES:

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

CO1 To give proper water treatment methods for analysing the acid, hardness, chloride and the pH metry methodology.

CO2 To recognize and use fundamental ideas in nanoscience and nanotechnology when planning the synthesis of nanomaterials for engineering and technological use.

CO3 To utilize the phase rule and alloys expertise to work for the needs of material selection.

CO4 To identify various energy resource types and use them for proper uses in the energy sector.

CO5 To educate students the fundamentals of polymer chemistry.

TEXT BOOKS:

1. P. C. Jain and Monica Jain, "Engineering Chemistry", 17th Edition, Dhanpat Rai Publishing Company (P) Ltd, New Delhi, 2018.
2. Sivasankar B., "Engineering Chemistry", Tata McGraw-Hill Publishing Company Ltd, New Delhi, 2008.
3. S.S. Dara, "A Text book of Engineering Chemistry", S. Chand Publishing, 12th Edition, 2018.
4. O.G. Palanna, "Engineering Chemistry" McGraw Hill Education (India) Private Limited, 2nd Edition, 2017.

REFERENCES:

1. B. S. Murty, P. Shankar, Baldev Raj, B. B. Rath and James Murday, "Text book of nanoscience and nanotechnology", Universities Press-IIM Series in Metallurgy and Materials Science, 2018.
2. T. Pradeep, "Nano: The Essentials: Understanding Nano science and Nano technology", (2008) Tata McGraw-Hill Publishing Company Limited, New Delhi.
3. B.R.Puri, L.R.Sharma, M.S.Pathania.,"Principles of Physical Chemistry", Vishal Publishing Company, 2008.
4. O.V. Roussak and H.D. Gesser, Applied Chemistry-A Text Book for Engineers and Technologists, Springer Science Business Media, New York, 2nd Edition, 2013.

CO's-PO's & PSO's MAPPING

CO's	PO's											PSO's	
	1	2	3	4	5	6	7	8	9	10	11	1	2
1	3	2	2	2		1		2			1		
2	2	1	1	1		2		1			1		
3	3	1	1	1		1		1			1		
4	3	1	1	1		2		1			1		
5	3	1	2	1		2		2			2		
Low (1) ; Medium (2) ; High (3)													

Course Coordinator

BoS Chairman / HoD (S&H)

SRI RANGANATHAR
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24GE3171 **PROGRAMMING IN C LABORATORY**

L	T	P	C
0	0	4	2

COURSE OBJECTIVES:

1. To familiarize with C programming constructs
2. To develop programs in C using basic constructs.
3. To develop programs in C using arrays.
4. To develop applications in C using strings, pointers, functions.
5. To develop applications in C using structures.
6. To develop applications in C using file processing.

LIST OF EXPERIMENTS:

1. I/O statements, operators, expressions
2. decision-making constructs: if-else, goto, switch-case, break-continue
3. Loops: for, while, do-while
4. Arrays: 1D and 2D
5. Strings: operations
6. Functions: call, return, passing parameters by (value, reference)
7. Recursion
8. Pointers: Pointers to functions, Pointers to Pointers
9. Structures: Nested Structures, Arrays of Structures
10. Files: reading and writing, file operations.

TOTAL:60 PERIODS

COURSE OUTCOMES:

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

CO1 Demonstrate knowledge on C programming constructs.
CO2 Develop programs in C using basic constructs
CO3 Develop programs in C using arrays.
CO4 Develop applications in C using strings, pointers, functions
CO5 Develop applications in C using structures.
CO6 Develop applications in C using file processing.

CO's-PO's & PSO's MAPPING

CO's	PO's											PSO's	
	1	2	3	4	5	6	7	8	9	10	11	1	2
1	1	3	3	1	1	1		2	1	2	2	2	2
2	2	3	3	2	1	1		2	1	2	2	2	3
3	2	2	2	1	1	2		2		2	2	2	2
4	2	2	2	2	1	2		3		3	3	3	2
5	2	2	3	2	3	2		3		3	3	3	3
6	2	2	3	2	1	2		2	1	2	2	2	2

Low (1) ; Medium (2) ; High (3)

COURSE COORDINATOR

BOS CHAIRMAN / HOD

24GE3071	ENGINEERING PRACTICES LABORATORY	L	T	P	C
		0	0	4	2

COURSE OBJECTIVES:

1. Drawing pipe line plan; laying and connecting various pipe fittings used in common household plumbing work; Sawing; planning; making joints in wood materials used in common household.
2. Wiring various electrical joints in common household electrical wire work.
3. Welding various joints in steel plates using arc welding work; Machining various simple processes like turning, drilling, tapping in parts; Assembling simple mechanical assembly of common household equipment's; Making a tray out of metal sheet using sheet metal work.
4. Soldering and testing simple electronic circuits; Assembling and testing simple electronic components on PCB.

PART I **GROUP – A (CIVIL & ELECTRICAL)**

CIVIL ENGINEERING PRACTICES **15**

PLUMBING WORK:

1. Connecting various basic pipe fittings like valves, taps, coupling, unions, reducers,elbows and other components which are commonly used in household.
2. Preparing plumbing line sketches.
3. Laying pipe connection to the suction side of a pump
4. Laying pipe connection to the delivery side of a pump.
5. Connecting pipes of different materials: Metal, plastic and flexible pipes used in household appliances

WOOD WORK:

1. Sawing,
2. Planing and
3. Making joints like T-Joint, Mortise joint and Tenon joint and Dovetail joint.

PART II **ELECTRICAL ENGINEERING PRACTICES** **15**

1. Introduction to switches, fuses, indicators and lamps - Basic switch board wiring with lamp, fan and three pin socket
2. Staircase wiring
3. Fluorescent Lamp wiring with introduction to CFL and LED types.
4. Energy meter wiring and related calculations/ calibration
5. Study of Iron Box wiring and assembly
6. Study of Fan Regulator (Resistor type and Electronic type using Diac/Triac/quadrac)
7. Study of emergency lamp wiring/Water heater

GROUP – B (MECHANICAL AND ELECTRONICS)

PART III **MECHANICAL ENGINEERING PRACTICES** **15**

WELDING WORK:

1. Welding of Butt Joints, Lap Joints, and Tee Joints using arc welding.
2. Practicing gas welding.

BASIC MACHINING WORK:

1. (simple)Turning.
2. (simple)Drilling.

3. (simple)Tapping.

SHEET METAL WORK:

1. Making of a square tray

PART IV ELECTRONIC ENGINEERING PRACTICES 15

SOLDERING WORK:

1. Soldering simple electronic circuits and checking continuity.

ELECTRONIC ASSEMBLY AND TESTING WORK:

1. Assembling and testing electronic components on a small PCB.

ELECTRONIC EQUIPMENT STUDY:

1. Study an element of smart phone.
2. Assembly and dismantle of LED TV.

TOTAL: 60 PERIODS

OUTCOMES:

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

CO1 Draw pipe line plan; lay and connect various pipe fittings used in common household plumbing work; Saw; plan; make joints in wood materials used in common household wood work.

CO2 Wire various electrical joints in common household electrical wire work.

CO3 Weld various joints in steel plates using arc welding work;.

CO4 Machine various simple processes like turning, drilling, tapping in parts; Make a tray out of metal sheet using sheet metal work.

CO5 Solder and test simple electronic circuits; Assemble and test simple electronic components on PCB.

CO's-PO's & PSO's MAPPING

CO's	PO's											PSO's	
	1	2	3	4	5	6	7	8	9	10	11	1	2
1	3	2	2		2					1	2	2	
2	3	2	2		2					1	2	2	
3	3	2	2		2					1	2	2	
4	3	2	2		2					1	2	2	
5	3	2	2		2					1	2	2	
Low (1) ; Medium (2) ; High (3)													

Course Coordinator

BoS Chairman/HoD

Chairman - Board of Studies
Department Of Mechanical Engineering
Sri Ranganathar Institute of Engineering and Technology
Coimbatore - 641 110.

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24ES3151	BASIC COMPUTING SKILLS FOR ENGINEERS	L	T	P	C
		0	0	2	1

COURSE OBJECTIVES:

1. Create and edit documents, spreadsheets, and presentations using MS Office.
2. Use advanced features like mail merge, data forms, and subtotalling in MS Excel
3. Design professional slides and presentations using MS PowerPoint.
4. Apply data analysis and visualization techniques using charts and graphs.
5. Use internet resources effectively and safely.

UNIT -I MS OFFICE **7**

Creating, editing, saving and printing text documents - Font and paragraph formatting - Simple character formatting - Inserting tables, smart art, page breaks - Using lists and styles - Working with images - Using Spelling and Grammar check - Understanding document properties - Mail Merge.

UNIT – II MS EXCEL **7**

Spreadsheet basics - Creating, editing, saving and printing spreadsheets - Working with functions & formulas - Modifying worksheets with color & autoformats - Graphically representing data : Charts & Graphs - Speeding data entry : Using Data Forms - Analyzing data : Data Menu, Subtotal, Filtering Data- Formatting worksheets - Securing & Protecting spreadsheets.

UNIT – III MS POWER POINT **8**

Opening, viewing, creating, and printing slides - Applying auto layouts Adding custom animation - Using slide transitions - Graphically representing data : Charts & Graphs - Creating Professional Slide for Presentation.

UNIT -IV INTERNET **8**

Understanding how to search/Google - bookmarking and Going to a specific website - Copy and paste Internet content into your word file and emails - Understanding social media platforms such as Facebook & Many more - learn with best practices.

TOTAL: 30 PERIODS

COURSE OUTCOMES

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

CO1	To create, edit, and format professional documents using MS Word.
CO2	To design, create, and manage spreadsheets using MS Excel for data analysis.
CO3	To create engaging presentations using MS PowerPoint with multimedia elements.
CO4	To effectively use internet resources, apply online safety practices, and leverage social media.

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CO's-PO's & PSO's MAPPING

CO's	PO's											PSO's	
	1	2	3	4	5	6	7	8	9	10	11	1	2
1	2				3							3	
2	3	2	2	2	3							3	2
3			2		3							3	
4					3	2						3	

Low (1) ; Medium (2) ; High (3)

COURSE COORDINATOR

BOS CHAIRMAN/ HOD

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24GE3172	SOFT SKILLS I	L	T	P	C
		0	0	2	1

COURSE OBJECTIVES:

1. To build verbal competence by improving skills in verbal analogy, sentence structuring, error spotting, and contextual language use.
2. To develop effective listening and communication strategies by overcoming barriers and applying the principles of the 7C's of communication.
3. To enhance interpersonal skills through training in group decision-making, negotiation, and paralanguage for professional settings.
4. To foster personal and professional development through self-grooming, SWOT analysis, and effective communication etiquette.

UNIT I VERBAL COMPETENCE **10**

1. Verbal Analogy
2. Cloze Test
3. Corporate vocabulary

UNIT II EFFECTIVE COMMUNICATION **10**

1. Overcoming Communication Barriers
2. Body Language and its Etiquette
3. 7C's of Communication

UNIT III INTERPERSONAL SKILLS **10**

1. Group Decision Making
2. Negotiation Skills
3. Self-Grooming & SWOT analysis

TOTAL: 30 PERIODS

Course Coordinator

[D. Indumathi]
AP/Eng.

BoS Chairman / HoD (S&H)

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24HS3252	PROFESSIONAL ENGLISH	L	T	P	C
		2	0	0	2

COURSE OBJECTIVES:

1. Develop strategies and skills to augment their ability to read and comprehend engineering and technology texts.
2. Foster their ability to write convincing job applications and effective reports.
3. Develop their speaking skills to make technical presentations and participate in group discussions.
4. Strengthen their listening skill which will help them comprehend lectures and talks in their areas of specialization.

UNIT I APPLIED ENGLISH FOR TECHNICAL CONTEXTS 6

Listening: Listening to motivational speech-Speaking: Asking for and giving directions -Reading: Reading short technical texts from newspapers and magazines -Writing: Extended definitions, checklists, recommendation-Vocabulary Development: Technical vocabulary, abbreviations - Language Development: Mixed tenses

UNIT – II TECHNICAL DOCUMENTATION AND COMMUNICATION 6

Listening: Listening to TED talks-Speaking: Describing a process, narrating a story-Reading:Reading advertisements, summarizing -Writing: Interpreting charts, graphs, Formal Letters (Quotations, Clarification, Placing orders & Complaint letters)-Vocabulary-Development: Vocabulary used in formal letters/emails and reports -Language Development: British and American spelling, numerical adjectives.

UNIT – III INTEGRATED SKILLS FOR ACADEMIC ENGLISH PROFICIENCY 6

Listening: Listening to classroom lectures, commentaries Speaking: Oral presentations -Reading: User manuals, speed reading techniques-Writing: Process writing, Use of sequence words, Analytical essays and issue-based essays -Vocabulary Development: Sequence words, misspelled words-Language Development: Identifying different types of sentences

UNIT – IV JOB READINESS AND CAREER SKILLS 6

Listening: Listening to documentaries, listening to virtual interviews Speaking: Mock interview Reading: Reading for detailed comprehension Writing: Email writing, Job application- Résumé preparation, Vocabulary Development: Finding suitable synonyms, Paraphrasing Language Development: Clauses, If conditionals

UNIT – V REPORTS AND COLLABORATIVE SPEAKING 6

Listening: Listening to talks based on the profession -Speaking: Participating in a group discussion - Reading: Reading pictography-Writing: Writing reports- feasibility, Survey and Industrial reports -Vocabulary Development: one-word substitution-Language Development: Reported speech, Active and Passive voice, Impersonal passive

TOTAL: 30 PERIODS

COURSE OUTCOMES:

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

CO1 Develop listening skills effectively in both academic and professional settings.

CO2 Enhance speaking skills by engaging confidently in technical and professional discussions.

CO3 Practice and refine reading techniques to efficiently extract key information from academic and technical texts.

CO4 Gains expertise in writing various forms of academic and professional documents.

CO5 Expand corporate vocabulary and gain job readiness through career-oriented tasks.

TEXT BOOKS:

1. Tom Hutchinson and Alan Waters, English for Specific Purposes: A Learning-Centered Approach, Cambridge University Press, 2019.
2. Paul Emmerson, English for Careers: Business, Professional, and Technical English, Cambridge University Press, 2008.

REFERENCES:

1. Michael Swan, Practical English Usage, Oxford University Press, 2005.
2. Gerald J. Alred, Charles T. Brusaw, and Walter E. Oliu, The Handbook of Technical Writing, St. Martin's Press, 2018.
3. M. Ashraf Rizvi, Business Communication, Tata McGraw-Hill Education, 2010.
4. M. K. Murthy, English for Engineers and Technologists, Wiley, 2014.

CO's-PO's & PSO's MAPPING:

CO's	PO's											PSO's	
	1	2	3	4	5	6	7	8	9	10	11	1	2
1	1	1	1	1	1	3	3	1	3		3		
2	1	1	1	1	1	3	3	1	3		3		
3	2	3	2	3	2	3	3	2	3	3	3		
4	2	3	2	3	2	3	3	2	3	3	3		
5	2	3	3	3		3	3	2	3		3		
Low (1) ; Medium (2) ; High (3)													

Course Coordinator

[D. INDUMATHI]
AP/Eng.

BoS Chairman / HoD (S&H)

24MA3251	STATISTICS AND NUMERICAL METHODS	L	T	P	C
		3	1	0	4

COURSE OBJECTIVES:

1. To provide the necessary basic concepts of a statistical hypothesis testing to understand problems occurring in engineering and technology.
2. To understand and apply statistical principles in designing experiments and analyzing data to draw meaningful conclusions.
3. To introduce the basic concepts of solving algebraic and transcendental equations.
4. To introduce the numerical techniques of interpolation in various intervals and numerical techniques of differentiation and integration which plays an important role in engineering and technology disciplines.
5. To acquaint the knowledge of various techniques and methods of solving ordinary differential equations

UNIT – I TESTING OF HYPOTHESIS **9+3**

Sampling distributions - Tests for single mean, proportion and difference of means (Large and small samples) – Tests for single variance and equality of variances – Chi square test for goodness of fit – Independence of attributes.

UNIT – II DESIGN OF EXPERIMENTS **9+3**

One way and two way classifications - Completely randomized design – Randomized block design – Latin square design

UNIT – III SOLUTION OF EQUATIONS AND EIGENVALUE PROBLEMS **9+3**

Solution of algebraic and transcendental equations - Fixed point iteration method – Newton Raphson method- Solution of linear system of equations - Gauss elimination method – Pivoting - Gauss Jordan method – Iterative methods of Gauss Jacobi and Gauss Seidel - Eigenvalues of a matrix by Power method for symmetric matrices.

UNIT – IV INTERPOLATION, NUMERICAL DIFFERENTIATION AND NUMERICAL INTEGRATION **9+3**

Lagrange's and Newton's divided difference interpolations – Newton's forward and backward difference interpolation – Approximation of derivatives using interpolation polynomials – Numerical single and double integrations using Trapezoidal and Simpson's 1/3 rules.

UNIT – V NUMERICAL SOLUTION OF ORDINARY DIFFERENTIAL EQUATIONS **9+3**

Single step methods: Taylor's series method - Euler's method - Modified Euler's method - Fourth order Runge-Kutta method for solving first order differential equations - Multi step methods: Milne's predictor corrector method for solving first order differential equations.

TOTAL: 45+15 PERIODS

COURSE OUTCOMES:

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

CO1 Apply the concept of testing of hypothesis for small and large samples in real life problems.

CO2 Apply the basic concepts of classifications of design of experiments in the field of agriculture.

CO3 Appreciate the numerical techniques of interpolation in various intervals and apply the numerical techniques of differentiation and integration for engineering problems.

CO4 Understand the knowledge of various techniques and methods for solving first and second order ordinary differential equations.

CO5 Solve the partial and ordinary differential equations with initial and boundary conditions by using certain techniques with engineering applications.

TEXT BOOKS:

1. Grewal, B.S., and Grewal, J.S., "Numerical Methods in Engineering and Science", Khanna Publishers, 10th Edition, New Delhi, 2015.
2. Johnson, R.A., Miller, I and Freund J., "Miller and Freund's Probability and Statistics for Engineers", Pearson Education, Asia, 8th Edition, 2015.

REFERENCES:

1. Burden, R.L and Faires, J.D, "Numerical Analysis", 9th Edition, Cengage Learning, 2016.
2. Devore. J.L., "Probability and Statistics for Engineering and the Sciences", Cengage Learning, New Delhi, 8th Edition, 2014.
3. Gerald. C.F. and Wheatley. P.O. "Applied Numerical Analysis" Pearson Education, Asia, New Delhi, 7th Edition, 2007.
4. Gupta S.C. and Kapoor V. K., "Fundamentals of Mathematical Statistics", Sultan Chand & Sons, New Delhi, 12th Edition, 2020.
5. Spiegel. M.R., Schiller. J. and Srinivasan. R.A., "Schaum's Outlines on Probability and Statistics ", Tata McGraw Hill Edition, 4th Edition, 2012.
6. Walpole. R.E., Myers. R.H., Myers. S.L. and Ye. K., "Probability and Statistics for Engineers and Scientists", 9th Edition, Pearson Education, Asia, 2010.

CO's-PO's & PSO's MAPPING

CO's	PO's											PSO's	
	1	2	3	4	5	6	7	8	9	10	11	1	2
1	3	3	1	1				2		2	3		
2	3	3	1	1				2		2	3		
3	3	3	1	1				2		2	3		
4	3	3	1	1				2		2	3		
5	3	3	1	1				2		2	3		
Low (1) ; Medium (2) ; High (3)													

Course Coordinator

BOS Chairman/ HoD(S&H)

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24GE3051	ENGINEERING GRAPHICS	L	T	P	C
		2	2	0	4

COURSE OBJECTIVES:

1. Drawing engineering curves
2. Drawing of projection of lines and plane surfaces
3. Drawing projection of solids.
4. Drawing section of solids and development of solids
5. Drawing isometric and freehand sketch of simple objects.

UNIT I PLANE CURVES **12**

Basic Geometrical constructions, Curves used in engineering practices: Conics — Construction of ellipse, parabola and hyperbola by eccentricity method — Construction of cycloid — construction of involutes of square and circle — Drawing of tangents and normal to the above curves.

UNIT – II PROJECTION OF LINES AND PLANE SURFACE **12**

Projection of straight lines (only First angle projections) inclined to both the principal planes - Determination of true lengths and true inclinations by rotating line method and traces. Projection of planes (polygonal and circular surfaces) inclined to both the principal planes by rotating object method.

UNIT – III PROJECTION OF SOLIDS **10**

Projection of simple solids like prisms, pyramids, cylinder and cone when the axis is inclined to one of the principal planes and parallel to the other by rotating object method.

UNIT – IV PROJECTION OF SECTIONED SOLIDS AND DEVELOPMENT OF SURFACES **12**

Sectioning of above solids in simple vertical position when the cutting plane is inclined to the one of the principal planes and perpendicular to the other — obtaining true shape of section. Development of lateral surfaces of simple and sectioned solids — Prisms, pyramids cylinders and cones

UNIT – V ISOMETRIC AND FREE HAND SKETCHING **14**

Principles of isometric projection — isometric scale - Isometric projections of simple solids and truncated solids - Prisms, pyramids, cylinders. Visualization concepts and Free Hand sketching: Visualization principles —Representation of Three dimensional objects — Layout of views- Freehand sketching of multiple views from pictorial views of objects.

TOTAL: 60 PERIODS

COURSE OUTCOMES:

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

CO1 Draw basic geometrical constructions and draw various engineering curves such as conics (ellipse, parabola, hyperbola), cycloids, and involutes, including constructing tangents and normal to these curves.

CO2 Apply principles of orthographic projection to lines and plane surfaces in first angle projection, and determine true lengths and inclinations of lines and planes using the rotating line and rotating object methods.

CO3 Project simple solids with inclined axes using rotating object method.

CO4 Demonstrate proficiency in sectioning solids with inclined cutting planes and developing lateral surfaces of various solids, and also obtaining true shapes of sections and surface developments.

CO5 Draw isometric projections of simple and truncated solids using isometric scales and apply visualization principles to represent 3D objects accurately through freehand techniques.

TEXT BOOKS:

1. Bhatt N.D. and Panchal V.M., "Engineering Drawing", Charotar Publishing House, 53rd Edition, 2019.
2. Natrajan K.V., "A Text Book of Engineering Graphics", Dhanalakshmi Publishers, Chennai, 2018.
3. Parthasarathy, N. S. and Vela Murali, "Engineering Drawing", Oxford University Press, 2015

REFERENCES:

1. Basant Agarwal and Agarwal C.M.,"Engineering Drawing", McGraw Hill, 2nd Edition, 2019.
2. Gopalakrishna K.R., "Engineering Drawing" (Vol. I&II combined), Subhas Publications, Bangalore, 27th Edition, 2017.
3. Luzzader, Warren.J. and Duff, John M., "Fundamentals of Engineering Drawing with an introduction to Interactive Computer Graphics for Design and Production, Eastern Economy Edition, Prentice Hall of India Pvt. Ltd, New Delhi, 2005.

CO's-PO's & PSO's MAPPING

CO's	PO's											PSO's	
	1	2	3	4	5	6	7	8	9	10	11	1	2
1	3	2	2	1	1						2	1	3
2	3	3	2	1	1						2	1	3
3	3	2	2	1	1						2	1	3
4	3	3	2	1	1						2	1	3
5	3	2	3	1	1						2	2	3
Low (1) ; Medium (2) ; High (3)													

M. Chandra.
Course Coordinator

BoS Chairman/HoD

24GE3052	PROBLEM SOLVING AND PYTHON PROGRAMMING	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

1. To understand the basics of algorithmic problem solving.
2. To learn to solve problems using Python conditionals and loops.
3. To define Python functions and use function calls to solve problems.
4. To use Python data structures - lists, tuples, dictionaries to represent complex data.
5. To do input/output with files in Python.

UNIT I COMPUTATIONALTHINKING AND PROBLEM SOLVING 9

Fundamentals of Computing – Identification of Computational Problems -Algorithms, building blocks of algorithms (statements, state, control flow, functions), notation (pseudo code, flow chart, programming language), simple strategies for developing algorithms (iteration, recursion) tower of Hanoi.

UNIT – II DATATYPE, EXPRESSIONS, CONDITIONS 9

Python interpreter and interactive mode, debugging; values and types: int, float, boolean, string and list; variables, expressions, statements, precedence of operators, comments, Conditionals: Boolean values and operators, conditional (if), alternative (if-else),chained conditional (if-elif-else)

UNIT – III CONTROL FLOW, FUNCTIONS, STRINGS 9

Iteration: state, while, for, break, continue, pass; Fruitful functions: return values, parameters, local and global scope, function composition, recursion; Strings: string slices, immutability, string functions and methods, string module.

UNIT – IV LISTS, TUPLES, DICTIONARIES 9

Lists: list operations, list slices, list methods, list loop, mutability, aliasing, cloning lists, list parameters; Tuples: operations and methods, tuple assignment, Dictionaries: operations and methods; advanced list processing.

UNIT – V FILES, MODULES, PACKAGES AND LIBRARIES 9

Files and exceptions: text files, reading and writing files, command line arguments, errors and exceptions, handling exceptions, modules, packages; NumPy and Pandas-Introduction, data frames, data handling.

TOTAL: 45 PERIODS

COURSE OUTCOMES:

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

CO1 Develop algorithmic solutions to simple computational problems.
CO2 Develop and execute simple Python programs using condition.
CO3 Decompose a Python program into functions and execute simple program using functions.
CO4 Represent compound data using Python lists, tuples, dictionaries etc.
CO5 Read and write data from/to files in Python programs.

TEXT BOOKS:

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

REFERENCES:

1. Paul Deitel and Harvey Deitel, "Python for Programmers", Pearson Education, 1st Edition, 2021.
2. G Venkatesh and Madhavan Mukund, "Computational Thinking: A Primer for Programmers and Data Scientists", 1st Edition, Notion Press, 2021.
3. John VGuttag,"Introduction to Computation and Programming Using Python: With Applications to Computational Modeling and Understanding Data", Third Edition, MIT Press, 2021
4. Eric Matthes, "Python Crash Course, A Hands - on Project Based Introduction to Programming", 2nd Edition, No Starch Press, 2019.

CO's-PO's & PSO's MAPPING

COs	POs											PSOs	
	1	2	3	4	5	6	7	8	9	10	11	1	2
1	3	3	3	3	2					2	2	3	3
2	3	3	3	3	2					2	2	3	
3	3	3		3	2					2		3	
4	2	2		2	2					1		3	
5	1	2			1					1		2	
Low (1) ; Medium (2) ; High (3)													

COURSE COORDINATOR

BOS CHAIRMAN / HOD

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24GE3252	தமிழர் தொழில்நுட்பம்	L	T	P	C
		1	0	0	1

COURSE OBJECTIVES:

1. பண்டைய தமிழரின் தொழில்நுட்பத் திறன்கள் பற்றி அறிதல்.
2. வழிபாட்டு கட்டிடக் கலையின் பரிணாம வளர்ச்சியை அறிதல்.
3. பண்டைய உற்பத்தி நுட்பங்களை மதிப்பீடு செய்தல்.
4. வேளாண்மை மற்றும் நீர்ப்பாசன முறைகளின் நவீன முன்னோடிகளைக் கண்டறிதல்.
5. தமிழில் அறிவியல் மற்றும் கணினி நுட்பங்களை அறிந்து பயன்படுத்து திறன் வளர்த்தல்.

அலகு I நெசவு மற்றும் பானை தொழில் நுட்பம் **3**

சங்க காலத்தில் நெசவுத் தொழில் – பானை தொழில் நுட்பம் - கருப்பு மற்றும் சிவப்புப் மட்பாண்டங்கள்.

அலகு – II வடிவமைப்பு மற்றும் கட்டுமான தொழில் நுட்பம் **3**

சங்க காலத்தில் வீட்டு வடிவமைப்புகள் - சங்க கால கட்டுமானப் பொருட்கள் - மாமல்லபுரத்தின் சிற்பங்கள் மற்றும் கோயில்கள் - சோழர்களின் பெரிய கோயில்கள் மற்றும் பிற வழிபாட்டுத் தலங்கள் - நாயக்கர் கால கோயில்கள் - செட்டி நாட்டு வீடுகள்.

அலகு– III உற்பத்தி தொழில்நுட்பம் **3**

கப்பல் கட்டும் கலை - இரும்புத் தொழில் - இரும்பு உருக்குதல் - செம்பு மற்றும் தங்க நாணயங்கள் - மணிகள் தயாரிக்கும் தொழில்கள் - கல் மணிகள் – கண்ணாடி மணிகள் - ஓடு மணிகள் - எலும்பு மணிகள்.

அலகு – IV வேளாண்மை மற்றும் நீர்ப்பாசன தொழில்நுட்பம் **3**

அணை, குளம், குளங்கள், மதகு, சோழர் கால குமிழி தூம்புவின் முக்கியத்துவம், கால்நடை பராமரிப்பு - விவசாயம் மற்றும் வேளாண்மை சார்ந்த செயல்பாடுகள் - கடல் பற்றிய அறிவு – மீன்பிடித்தல் - முத்து மற்றும் முத்துக்குளித்தல்.

அலகு -V அறிவியல் தமிழ மற்றும தமிழ்கணினி **3**

அறிவியல் தமிழ் வளர்ச்சி – தமிழ் கணினிமயமாக்கல் - தமிழில் இணையம் மற்றும் தகவல் தொடர்பு சாதனங்கள் -தமிழ் எழுதும் எழுத்துருக்கள் - தமிழில் தொழில்நுட்ப சொற்கள் - தமிழ் இணையக் கல்விக்கழகம்– தமிழ் மின் நூலகம்- மின் இதழ்கள்.

TOTAL: 15 PERIODS

24GE3252	TAMILS AND TECHNOLOGY	L	T	P	C
		1	0	0	1

COURSE OBJECTIVES:

1. To understand the technological skills of the ancient Tamils.
2. To study the evolutionary development of temple architecture.
3. To evaluate ancient production techniques.
4. To identify the ancient precedents of modern agricultural and irrigation practices.
5. To develop the ability to understand and use scientific and computer technologies in Tamil.

UNIT I WEAVING AND CERAMIC TECHNOLOGY 3

Weaving Industry during Sangam Age – Ceramic technology – Black and Red Ware Potteries (BRW) – Graffiti on Potteries.

UNIT – II DESIGN AND CONSTRUCTION TECHNOLOGY 3

Designing and Structural construction House & Designs in household materials during Sangam Age - Sculptures and Temples of Mamallapuram - Great Temples of Cholas and other worship places - Temples of Nayaka Period - Chetti Nadu Houses,

UNIT – III MANUFACTURING TECHNOLOGY 3

. Art of Ship Building - Iron industry - Iron smelting,steel -Copper and goldCoins as source of history - Minting of Coins – Beads making-industries Stone beads -Glass beads - Terracotta beads - Shell beads/ bone beats.

UNIT – IV AGRICULTURE AND IRRIGATION TECHNOLOGY 3

Dam, Tank, ponds, Sluice, Significance of Kumizhi Thoompu of Chola Period, Animal Husbandry - Agriculture and Agro Processing - Knowledge of Sea - Fisheries – Pearl - Conche diving .

UNIT – V SCIENTIFIC TAMIL & TAMIL COMPUTING 3

Development of Scientific Tamil - Tamil computing – Digitalization of Tamil Books – Tamil Digital Library – Internet and Information Communication Devices in Tamil – Tamil Writing Fonts – Technical Terms in Tamil – Tamil Virtual Academy – Tamil E-Library.

பாடநூல் / TEXT BOOKS:

1. தமிழக வரலாறு மக்களும் பண்பாடும் கே.கே. பிள்ளை (வெளியீடு: தமிழ்நாடு பாடநூல் மற்றும் கல்வியியல் பணிகள் கழகம்.
2. கணினித் தமிழ் -முனைவர் இல, சுந்தரம், (விகடன் பிரசுரம்).
3. கீழடி வைகை நதிக்கரையில் சங்ககால நகர நாகரிகம் (தொல்லியல் துறை வெளியீடு)
4. பொருநை ஆற்றங்கரை நாகரிகம். (தொல்லியல் துறை வெளியீடு)
5. Social Life of Tamils (Dr.K.K.Pillay) A joint publication of TNTB & ESC and RMRL-(in print)
6. Social Life of the Tamils The Classical Period (Dr.S.Singaravelu) (Published by: International Institute of Tamil Studies.
7. Historical Heritage of the Tamils (Dr.S.V.Subatamanian, Dr.K.D. Thirunavukkarasu) (Published by: International Institute of Tamil Studies).

பார்வை நூல் : REFERENCES:

1. The Contributions of the Tamils to Indian Culture (Dr.M. Valarmathi) (Published by: International Institute of Tamil Studies).
2. Keeladi - 'Sangam City Civilization on the banks of river Vaigai (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu) Studies in the History of India with Special Reference to Tamil Nadu (Dr.K.K.Pillay) (Published by: The Author).
3. Porunai Civilization (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)
4. Journey of Civilization Indus to Vaigai (R.Balakrishnan) (Published by: RMRL) - Reference Book.

Course Coordinator

BoS Chairman / HoD (S&H)

NCC Credit Course Level 1*

24NX3251	(ARMY WING) NCC Credit Course Level - I	L T P C 2 0 0 2
NCC GENERAL		**6**
NCC 1	Aims, Objectives & Organization of NCC	1
NCC 2	Incentives	2
NCC 3	Duties of NCC Cadet	1
NCC 4	NCC Camps: Types & Conduct	2
NATIONAL INTEGRATION AND AWARENESS		**4**
NI 1	National Integration: Importance & Necessity	1
NI 2	Factors Affecting National Integration	1
NI 3	Unity in Diversity & Role of NCC in Nation Building	1
NI 4	Threats to National Security	1
PERSONALITY DEVELOPMENT		**7**
PD 1	Self-Awareness, Empathy, Critical & Creative Thinking, Decision Making and Problem Solving	2
PD 2	Communication Skills	3
PD 3	Group Discussion: Stress & Emotions	2
LEADERSHIP		**5**
L 1	Leadership Capsule: Traits, Indicators, Motivation, Moral Values, Honour 'Code	3
L 2	Case Studies: Shivaji, Jhasi Ki Rani	2
SOCIAL SERVICE AND COMMUNITY DEVELOPMENT		**8**
SS 1	Basics, Rural Development Programmes, NGOs, Contribution of Youth	3
SS 4	Protection of Children and Women Safety	1
SS 5	Road / Rail Travel Safety	1
SS 6	New Initiatives	2
SS 7	Cyber and Mobile Security Awareness	1

TOTAL : 30 PERIODS

COURSE COORDINATOR

BOS CHAIRMAN

NCC Credit Course Level 1*

24NX3252	(NAVAL WING) NCC Credit Course Level - I	L	T	P	C
		2	0	0	2
NCC GENERAL					**6**
NCC 1	Aims, Objectives & Organization of NCC				1
NCC 2	Incentives				2
NCC 3	Duties of NCC Cadet				1
NCC 4	NCC Camps: Types & Conduct				2
NATIONAL INTEGRATION AND AWARENESS					**4**
NI 1	National Integration: Importance & Necessity				1
NI 2	Factors Affecting National Integration				1
NI 3	Unity in Diversity & Role of NCC in Nation Building				1
NI 4	Threats to National Security				1
PERSONALITY DEVELOPMENT					**7**
PD 1	Self-Awareness, Empathy, Critical & Creative Thinking, Decision Making and Problem-Solving				2
PD 2	Communication Skills				3
PD 3	Group Discussion: Stress & Emotions				2
LEADERSHIP					**5**
L 1	Leadership Capsule: Traits, Indicators, Motivation, Moral Values, Honour Code				3
L 2	Case Studies: Shivaji, Jhasi Ki Rani				2
SOCIAL SERVICE AND COMMUNITY DEVELOPMENT					**8**
SS 1	Basics, Rural Development Programmes, NGOs, Contribution of Youth				3
SS 4	Protection of Children and Women Safety				1
SS 5	Road / Rail Travel Safety				1
SS 6	New Initiatives				2
SS 7	Cyber and Mobile Security Awareness				1

TOTAL : 30 PERIODS

COURSE COORDINATOR

BOS CHAIRMAN

NCC Credit Course Level 1*

24NX3253	(AIR FORCE WING) NCC Credit Course Level - I	L	T	P	C
		2	0	0	2

NCC GENERAL		**6**
NCC 1	Aims, Objectives & Organization of NCC	1
NCC 2	Incentives	2
NCC 3	Duties of NCC Cadet	1
NCC 4	NCC Camps: Types & Conduct	2
NATIONAL INTEGRATION AND AWARENESS		**4**
NI 1	National Integration: Importance & Necessity	1
NI 2	Factors Affecting National Integration	1
NI 3	Unity in Diversity & Role of NCC in Nation Building	1
NI 4	Threats to National Security	1
PERSONALITY DEVELOPMENT		**7**
PD 1	Self-Awareness, Empathy, Critical & Creative Thinking, Decision Making and Problem Solving	2
PD 2	Communication Skills	3
PD 3	Group Discussion: Stress & Emotions	2
LEADERSHIP		**5**
L 1	Leadership Capsule: Traits, Indicators, Motivation, Moral Values, Honour Code	3
L 2	Case Studies: Shivaji, Jhasi Ki Rani	2
SOCIAL SERVICE AND COMMUNITY DEVELOPMENT		**8**
SS 1	Basics, Rural Development Programmes, NGOs, Contribution of Youth	3
SS 4	Protection of Children and Women Safety	1
SS 5	Road / Rail Travel Safety	1
SS 6	New Initiatives	2
SS 7	Cyber and Mobile Security Awareness	1

TOTAL : 30 PERIODS

COURSE COORDINATOR

BOS CHAIRMAN

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24PH3051	ENGINEERING PHYSICS	L	T	P	C
		3	0	2	4

COURSE OBJECTIVES:

1. To make the students effectively achieve an understanding the basics of Properties of Matter and i applications.
2. To introduce the basics of optics and lasers and its applications.
3. To enable the students to gain knowledge of fiber optic technology and its applications.
4. Equipping the students to successfully understand the importance of Thermal properties.
5. To inculcate an idea of significance of nano structures, quantum confinement and ensuing nano device applications.

UNIT I PROPERTIES OF MATTER 9

Elasticity - Stress-strain diagram and its uses - Factors affecting elastic modulus - Torsional stress and deformations - Torsional pendulum: theory and experiment.

Bending of beams - Bending moment - Cantilever: theory and experiment- Uniform and non-uniform bending: theory and experiment.

UNIT – II OPTICS AND LASERS 9

Optics: Reflection and refraction of light waves – Total internal reflection – Interference – Theory of Air-wedge experiment.

LASER: Principle of Spontaneous emission and stimulated emission. Population inversion, pumping methods- Einstein's A and B coefficients: derivation. Types of Lasers - Semiconductor Laser-homojunction and heterojunction - Industrial applications of Laser.

UNIT – III FIBER OPTIC TECHNOLOGY 9

Principle and propagation of light - Numerical aperture and Acceptance angle - Types of optical fibers (material, refractive index, mode) - Fiber optic communication System - Block diagram – Fiber optic sensors – temperature and displacement – Endoscope.

UNIT – IV THERMAL PHYSICS 9

Transfer of heat energy – thermal expansion of solids and liquids –bimetallic strips - thermal conduction, convection and radiation– thermal conductivity - Lee's disc method: (theory only) - conduction through compound media (series and parallel) – thermal insulation – applications: refrigerators, ovens and solar water heaters.

UNIT – V NANO DEVICES 9

Introduction - quantum confinement – quantum structures: quantum wells, wires and dots — band gap of nanomaterials. Tunneling – Single electron phenomena: Coulomb blockade – resonant tunneling diode – single electron transistor - Carbon nanotubes: Properties and applications - Optics in quantum structures – quantum well laser.

TOTAL: 45 PERIODS

LIST OF EXPERIMENTS (Any 5)

1. Determination of rigidity modulus of wire and moment of inertia of the disc -Torsional pendulum.
2. Determination of Young's modulus by uniform bending method.
3. Determination of Young's modulus by non-uniform bending method.

4. Simple harmonic oscillations of cantilever and Find young's modulus of the bar.
5. Determination of thickness of a thin wire by using travelling microscope – Air wedge method.
6. Determination of wavelength of the Laser using grating.
7. Determination of Numerical aperture and acceptance angle of an optical fiber.

TOTAL: 30 PERIODS

TOTAL : 45+30 = 75 PERIODS

COURSE OUTCOMES:

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

CO1 Understand the importance of properties of matter, elastic behaviour and Bending moment of materials.

CO2 Demonstrate a strong foundational knowledge in optics and laser, the thickness of the thin materials by using interference concept.

CO3 Express their knowledge in fiber optic technology.

CO4 Understand the importance of thermal properties of materials.

CO5 Understand the basics of quantum structures and their applications.

TEXT BOOKS:

1. Bhattacharya D K and Poonam Tandon, "Engineering Physics", 2nd edition, Oxford University Press, Chennai, 2017
2. Marikani A, "Engineering Physics", 3rd edition, PHI publishers, Chennai, 2021.
3. Parag K. Lala, Quantum Computing: A Beginner's Introduction, McGraw-Hill Education (Indian Edition), 2020.
4. Gaur, R.K. & Gupta, S.L. "Engineering Physics". Dhanpat Rai Publishers, 2012.

REFERENCES:

1. Charles Kittel, Introduction to Solid State Physics, Wiley India Edition, 2019
2. V. V.Mitin, V.A. Kochelap and M.A.Stroscio, Introduction to Nanoelectronics, Cambridge Univ.Press, 2008
3. G.W. Hanson, Fundamentals of Nanoelectronics, Pearson Education (Indian Edition) 2009.
4. Y.B.Band and Y.Avishai, Quantum Mechanics with Applications to Nanotechnology and Information Science, Academic Press, 2013.

CO's-PO's & PSO's MAPPING

CO's	PO's											PSO's	
	1	2	3	4	5	6	7	8	9	10	11	1	2
1	3	1	2										
2	3	1	2										
3	3	1	2										
4	3	1	1										
5	3	1	1										
Low (1) ; Medium (2) ; High (3)													

Course Coordinator **BoS Chairman / HoD (S&H)**

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24GE3072	PROBLEM SOLVING AND PYTHON PROGRAMMING LABORATORY	L	T	P	C
		0	0	4	2

COURSE OBJECTIVES:

1. To understand the problem solving approaches.
2. To learn the basic programming constructs in Python.
3. To practice various computing strategies for Python-based solutions to real world problems.
4. To use Python data structures - lists, tuples, dictionaries.
5. To do input/output with files in Python.

LIST OF EXPERIMENTS:

1. Identification and solving of simple real life or scientific or technical problems, and developing flow charts for the same. (Electricity Billing, Retail shop billing, compute Electrical Current in Three Phase AC Circuit, etc.)
2. Python programming using simple statements and expressions (exchange the values of two variables, circulate the values of n variables, distance between two points).
3. Scientific problems using Conditionals and Iterative loops. (Number series, Number Patterns, pyramid pattern)
4. Implementing real-time/technical applications using Lists, Tuples. (Items present in a library/Components of a car/ Materials required for construction of a building – operations of list & tuples).
5. Implementing real-time/technical applications using Sets, Dictionaries. (Language, components of an automobile, Elements of a civil structure, etc.- operations of Sets & Dictionaries)
6. Implementing programs using Functions. (Factorial, largest number in a list, area of shape)
7. Implementing programs using Strings. (reverse, palindrome, character count)
8. Implementing programs using written modules and Python Standard Libraries pandas, numpy. Matplotlib)
9. Implementing real-time/technical applications using File handling. (copy from one file to another, word count, longest word)
10. Implementing real-time/technical applications using Exception handling. (divide by zero error, voter's age validity, student mark range validation).

TOTAL:60 PERIODS

COURSE OUTCOMES:

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

CO1	Develop algorithmic solutions to simple computational problems.
CO2	Develop and execute simple Python programs
CO3	Implement programs in Python using conditionals and loops for solving problems.
CO4	Deploy functions to decompose a Python program
CO5	Process compound data using Python data structures.

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CO's-PO's & PSO's MAPPING

CO's	PO's											PSO's	
	1	2	3	4	5	6	7	8	9	10	11	1	2
1	3	3	3	3	2					2	2	3	3
2	3	3	3	3	2					2	2	3	
3	3	3	3	3	2					2		3	
4	2	2		2	2					1		3	
5	1	2			1					1		2	
Low (1) ; Medium (2) ; High (3)													

COURSE COORDINATOR

BOS CHAIRMAN / HOD

24GE3272	SOFT SKILLS II	L	T	P	C
		0	0	2	1

COURSE OBJECTIVES:

1. To develop effective presentation skills through structured techniques, body language, and time management.
2. To enhance group discussion and public speaking abilities by fostering confidence, strategic thinking, and audience engagement.
3. To equip learners with essential interview skills, including preparation, etiquette, and handling various interview formats.
4. To improve professional communication and soft skills required for academic, corporate, and real-world scenarios.

UNIT I PRESENTATION SKILLS **10**

1. Presentation techniques
2. Virtual presentation
3. Public speaking

UNIT II GROUP DISCUSSION AND PUBLIC SPEAKING **10**

1. Introduction to Group Discussion
2. Group Discussion Strategies
3. Activities to improve GD skills

UNIT III INTERVIEW SKILLS **10**

1. Listening to Interviews
2. Interview Techniques and Etiquette
3. Online Interview Techniques

TOTAL: 30 PERIODS

Course Coordinator
(D. Indumathi)
AP/Eng.

BoS Chairman / HoD (S&H)

24MA3351 TRANSFORMS AND PARTIAL DIFFERENTIAL EQUATIONS

L	T	P	C
3	1	0	4

COURSE OBJECTIVES:

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

UNIT – I PARTIAL DIFFERENTIAL EQUATIONS **9+3**

Formation of partial differential equations –Solutions of standard types of first order partial differential equation ns - First order partial differential equations reducible to standard types- Lagrange's linear equation - Linear partial differential equations of second order with constant coefficients of homogeneous type.

UNIT – II 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 – Parseval's identity – Harmonic analysis.

UNIT – III APPLICATIONS OF PARTIAL DIFFERENTIAL EQUATIONS **9+3**

Classification of PDE – Method of separation of variables - 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 – Convergence of Z-transforms - – Initial and final value theorems - Inverse Z-transform using partial fraction and convolution theorem - Formation of difference equations – Solution of difference equations using Z - transforms.

TOTAL: 45+15 PERIODS

COURSE OUTCOMES:

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

CO1 Understand how to solve the given standard partial differential equations.

CO2 Solve differential equations using Fourier series analysis which plays a vital role in engineering applications.

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 and its applications.

CO5 Use the effective mathematical tools for the solutions of difference equations by using Z transform techniques for discrete time systems

TEXT BOOKS:

1. Grewal B.S., "Higher Engineering Mathematics", 44thEdition, Khanna Publishers, New Delhi, 2018.
2. Kreyszig E, "Advanced Engineering Mathematics ", 10th Edition, 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", 4th Edition, Pearson Education, New Delhi, 2016.
4. Narayanan. S., Manicavachagom Pillay.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.

CO's-PO's & PSO's MAPPING

CO's	PO's											PSO's	
	1	2	3	4	5	6	7	8	9	10	11	1	2
1	3	3	1	1				2			3		
2	3	3	1	1				2			3		
3	3	3	1	1				2			3		
4	3	3	1	1				2			3		
5	3	3	1	1				2			3		
Low (1) ; Medium (2) ; High (3)													

Course Coordinator **BOS Chairman/ HoD(S&H)**

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24ME3351 **ENGINEERING MECHANICS** **L T P C**
3 0 0 3

COURSE OBJECTIVES:

1. Apply scalar and vector analytical techniques to analyze forces in statically determinate structures.
2. Demonstrate understanding of the equilibrium of rigid bodies using vector methods and free body diagrams.
3. Analyze distributed forces, surface loading on beams, and intensity.
4. Apply principles of friction to determine frictional forces at contact surfaces in various engineering systems
5. Understand basic dynamics concepts such as 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, Scalar Product of Two Vectors, Mixed Triple Product of Three Vectors, 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, - Reactions at Supports and Connections

UNIT – III DISTRIBUTED FORCES **9**

Centroids of lines and areas – symmetrical and unsymmetrical shapes, Determination of Centroids by Integration, Theorems of Pappus-Guldinus, Distributed Loads on Beams,. 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. Friction in Brakes.

UNIT – V DYNAMICS OF PARTICLES **9**

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

OUTCOMES:

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

CO1 Apply scalar and vector analytical techniques to solve problems involving forces in statically determinate structures.

CO2 Demonstrate comprehension of the equilibrium conditions of rigid bodies through the use of vector methods and free body diagrams

CO3 Analyze distributed forces and surface loadings on beams to determine resultant forces and moments.

CO4 Apply the principles of friction to evaluate frictional forces at contact surfaces within various engineering systems.

CO5 Understand fundamental dynamics concepts, including force, momentum, work, and energy, and their applications in mechanical systems

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.

REFERENCES:

1. Boresi P and Schmidt J, Engineering Mechanics: Statics and Dynamics, 1/e, Cengage learning, 2008.
2. Hibbeller, R.C., and 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, 4th Edition,Pearson Education Asia Pvt. Ltd., 2005.
4. Meriam J L and Kraige L G, Engineering Mechanics: Statics and Engineering Mechanics: Dynamics, 7th edition, Wiley student edition, 2013.
5. Timoshenko S, Young D H, Rao J V and Sukumar Pati, Engineering Mechanics, 5thEdition, McGraw Hill Higher Education, 2013.

CO's-PO's & PSO's MAPPING

COs	POs											PSOs	
	1	2	3	4	5	6	7	8	9	10	11	1	2
1	3	2	3	1	1	-	-	-	-	-	3	2	-
2	3	2	3	1	1	-	-	-	-	-	3	2	-
3	3	2	3	1	1	-	-	-	-	-	3	2	-
4	3	2	3	1	1	-	-	-	-	-	3	2	-
5	3	2	3	1	1	-	-	-	-	-	3	2	-

Low (1) ; Medium (2) ; High (3)

Course Coordinator

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24ME3391 ENGINEERING THERMODYNAMICS

L	T	P	C
3	1	0	4

COURSE OBJECTIVES:

1. To introduce the Laws of thermodynamics.
2. To understand the Entropy and irreversibility concepts.
3. To learn the various properties of steam through steam tables and Mollier chart
4. To learn the psychometric concepts underlying Air conditioning process.
5. To understand the underlying principles of operations in different Refrigeration System..

UNIT I BASICS, ZEROTH AND FIRST LAW **12**

Review of Basics – Thermodynamic systems, Properties and processes Thermodynamic Equilibrium - Displacement work - P-V diagram. Thermal equilibrium - Zeroth law – Concept of temperature and Temperature Scales. First law – application to closed and open systems – steady and unsteady flow processes.

UNIT – II SECOND LAW AND ENTROPY **12**

Heat Engine – Refrigerator - Heat pump. Statements of second law and their equivalence & corollaries. Carnot cycle - Reversed Carnot cycle - Performance - Clausius inequality. Concept of entropy - High and low-grade energy, Available and non-available energy, Irreversibility, I and II law Efficiency and its applications.

UNIT – III PROPERTIES OF PURE SUBSTANCES **12**

Steam - formation and its thermodynamic properties - p-v, p-T, T-v, T-s, h-s diagrams. PVT surface. Determination of dryness fraction. Calculation of work done and heat transfer in non-flow and flow processes using Steam Table and Mollier Chart.

UNIT – IV PSYCHROMETRY **12**

Psychrometric properties: Psychrometric charts, Property calculations of air vapour mixtures by using chart and expressions, Psychrometric processes-sensible heating and cooling, humidification, dehumidification, evaporative cooling and adiabatic mixing. Simple Applications.

UNIT – V REFRIGERATION SYSTEMS **12**

Refrigeration: definition, terminology used, desirable properties of refrigerant, classification of refrigerants, selection of refrigerant, types of refrigeration systems, ideal vapour compression refrigeration cycle, Vapour absorption refrigeration cycle, Aqua Ammonia & Li-Br Systems, Steam Jet Refrigeration, Thermo Electric Refrigeration, Air Refrigeration cycles.

TOTAL: 60 PERIODS

OUTCOMES:

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

CO1 Apply the Zeroth and first law of thermodynamics by formulating temperature scales and calculating the property changes in closed and open engineering systems.

CO2 Apply the second law of thermodynamics in analyzing the performance of thermal devices through energy and entropy calculations.

CO3 Apply the properties of pure substance in computing the macroscopic properties of ideal and real gases using gas laws and appropriate thermodynamic relations..

CO4 Analyse psychrometrically the Air conditioning processes

CO5 Discuss the various types of Refrigeration systems.

TEXT BOOKS:

1. Nag.P.K., "Engineering Thermodynamics", 6th Edition, Tata McGraw Hill (2017), New Delhi.
2. Natarajan, E., "Engineering Thermodynamics: Fundamentals and Applications", 2nd Edition (2014), Anuragam Publications, Chennai.
3. Kothandaraman.C.P., Domkundwar. S,Domkundwar. A.V., "A course in thermal Engineering", Fifth Edition, "Dhanpat Rai & sons , 2012.

REFERENCES:

1. Cengel, Y and M. Boles, Thermodynamics - An Engineering Approach, Tata McGraw Hill,9th Edition,2019.
2. Er.Rajput. R. K., "Thermal Engineering", tenth Edition, Lakshmi publication,2015.
3. Rathakrishnan, E., "Fundamentals of Engineering Thermodynamics", 2nd Edition, Prentice Hall of India Pvt. Ltd, 2006.
4. Venkatesh. A, "Basic Engineering Thermodynamics", Universities Press (India) Limited.

CO's-PO's & PSO's MAPPING

COs	POs											PSOs	
	1	2	3	4	5	6	7	8	9	10	11	1	2
1	3	3	1								3	3	1
2	3	3	2								3	3	2
3	3	3	1		1	2					3	2	1
4	3	2	1								3	3	2
5	3	2	1								3	3	2

Low (1) ; Medium (2) ; High (3)

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24ME3392	ENGINEERING MATERIALS AND METALLURGY	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

1. To learn constructing the phase diagram and using of iron-iron carbide phase diagram for microstructure formation.
2. To learn selecting and applying various heat treatment processes and its microstructure formation.
3. To illustrate the different types of ferrous and non-ferrous alloys and their uses in engineering field.
4. To illustrate the different polymer, ceramics and composites and their uses in engineering field.
5. To learn the various testing procedures and failure mechanism in engineering field.

UNIT I CONSTITUTION ALLOYS AND PHASE DIAGRAMS **9**

Constitution of alloys – Solid solutions, substitutional and interstitial – phase diagrams, Isomorphous, eutectic, eutectoid, peritectic, and peritectoid reactions, Iron – Iron carbide equilibrium diagram. Classification of steel and cast Iron microstructure, properties and application.

UNIT – II HEAT TREATMENT **9**

Definition – Full annealing, stress relief, recrystallization and spheroidising – normalising, hardening and tempering of steel. Austempering, martempering - Hardenability, Jominy end quench test – case hardening, carburizing, Nitriding, cyaniding, carbonitriding – Flame and Induction hardening – Vacuum and Plasma hardening – Thermo-mechanical treatments.

UNIT – III FERROUS AND NON-FERROUS METALS **9**

Effect of alloying additions on steel (Mn, Si, Cr, Mo, Ni, V, Ti & W)– stainless and tool steels – HSLA - Maraging steels – Grey, white, malleable, spheroidal – alloy cast irons, Copper and its alloys – Brass, Bronze and Cupronickel – Aluminium and its alloy; Al-Cu – precipitation strengthening treatment – Titanium alloys , Mg-alloys, Ni-based super alloys – shape memory alloys – Properties and Applications.

UNIT – IV NON-METALLIC MATERIALS **9**

Polymers – types of polymers, commodity and engineering polymers – Properties and applications of PE, PP, PS, PVC, PMMA, PET, PC, PA, PEEK, PTFE, Nylon, Engineering Ceramics – Properties and applications of Al_2O_3, SiC, Si_3N_4, PSZ and SIALON – Composites- Matrix and reinforcement materials - applications of Composites – Nano composites - Bioinspired materials.

UNIT – V MECHANICAL PROPERTIES AND DEFORMATION MECHANISMS **9**

Mechanisms of plastic deformation, slip and twinning – Types of fracture – fracture mechanics-Griffith's theory- Testing of materials under tension, compression and shear loads – Hardness tests (Brinell, Rockwell), Impact test Izod and charpy, fatigue and creep failure mechanisms.

TOTAL: 45 PERIODS

OUTCOMES:

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

CO1 Explain alloys and phase diagram, Iron-Iron carbon diagram and steel classification.

CO2 Explain isothermal transformation, continuous cooling diagrams and different heat treatment processes.

CO3 Clarify the effect of alloying elements on ferrous and non-ferrous metals.

CO4 Summarize the properties and applications of non-metallic materials.

CO5 Explain the testing of mechanical properties

TEXT BOOKS:

1. Kenneth G.Budinski and Michael K. Budinski, "Engineering Materials", Prentice Hall of India Private Limited, 9th edition, 2018.
2. Sydney H.Avner, "Introduction to Physical Metallurgy", McGraw Hill Book Company, 1994.

REFERENCES:

1. Alavudeen, N. Venkateshwaran, and J. T.WinowlinJappes, A Textbook of Engineering Materials and Metallurgy, Laxmi Publications, 2006.
2. Amandeep Singh Wadhwa, and Harvinder Singh Dhaliwal, A Textbook of Engineering Material and Metallurgy, University Sciences Press, 2008.
3. G.S. Upadhyay and Anish Upadhyay, "Materials Science and Engineering", Viva Books Pvt.Ltd, New Delhi, 2020.
4. Raghavan.V, "Materials Science and Engineering", Prentice Hall of India Pvt.Ltd. 6th edition, 2019.
5. Williams D Callister, "Material Science and Engineering" Wiley India Pvt Ltd, 2nd edition Reprint 2019.

CO's-PO's & PSO's MAPPING

COs	POs											PSOs	
	1	2	3	4	5	6	7	8	9	10	11	1	2
1	3	1	3	2							2	2	1
2	3	1	3	1		2	1				2	2	1
3	3	1	3								2	2	1
4	3	1	3			2					2	2	1
5	3	1	3	2	2						2	2	1
Low (1) ; Medium (2) ; High (3)													

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24CE3391	FLUID MECHANICS AND MACHINERY	L	T	P	C
		3	0	2	4

COURSE OBJECTIVES:

1. To introduce the students about the properties of the fluids, behaviour of fluids under static conditions
2. To impart basic knowledge of the dynamics of fluids and boundary layer concept
3. 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
4. To exposure to the significance of boundary layer theory and its thicknesses.
5. To expose the students to basic principles of working of hydraulic machineries and to design Pelton wheel, Francis and Kaplan turbine, centrifugal and reciprocating pumps.

UNIT I FLUID - PROPERTIES, STATICS AND DYNAMICS **9**

Fluid - Units and dimensions - Physical Properties of fluids -Fluid Statics- Pascal Law - Pressure Measurements by manometers. Fluid Dynamics - Continuity equation - energy or Bernoullis equation -Momentum or Euler's Equation.

UNIT – II FLOW THROUGH PIPES **9**

Laminar flow - Reynold's Experiment - Laminar flow through circular conduits - Turbulent Flow - Darcy Weisbach equation - Chezy's Equation - Friction factor and Moody diagram - Losses in Pipe Flow - Major and minor losses - Pipes in series and parallel.

UNIT – III DIMENSIONAL ANALYSIS AND MODEL STUDIES **9**

Fundamental dimensions - Dimensional homogeneity - Rayleigh's method and Buckingharn Pi theorem - Dimensionless parameters - Similitude and model studies - Similarity Laws - Types of Models.

UNIT – IV PUMPS **9**

Classification of pumps - Centrifugal pumps - Working principle - Heads and efficiencies - Velocity triangles - Axial Flow Pump - Reciprocating pump working principle - Indicator diagram and it's variations - Rotary pumps

UNIT – V TURBINES **9**

Turbines - Classification of turbines - Working principles - Pelton wheel - Francis turbine - Kaplan turbine - Work done - Efficiencies - Draft tube - Specific speed - Performance curves for turbines - Governing of turbines

45 PERIODS

PRACTICAL EXERCISES: **30 PERIODS**

1. Determination of the Coefficient of discharge of using Orifice meter.
2. Determination of the Coefficient of discharge of using Venturi meter

3. Determination of major energy loss for a given set of pipes.
4. Conducting experiments and draw the characteristic curves of Centrifugal pump.
5. Conducting experiments and draw the characteristic curves of Pelton wheel.
6. Conducting experiments and draw the characteristics curves of Kaplan turbine.

TOTAL: 75 PERIODS

OUTCOMES:

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

CO1 Discuss the properties, statics and dynamics of fluids.

CO2 Calculate the major and minor losses associated with pipe flow.

CO3 Interpret the dimensional analysis for various physical quantities and model analysis.

CO4 Explain the working of reciprocating pump and analyze the performance of centrifugal pump

CO5 Explain the working of different types of turbines and analyse performance of the turbines.

TEXT BOOKS:

1. Modi P.N. and Seth, S.M. Hydraulics and Fluid Mechanics, Standard Book House, New Delhi, 22nd edition (2019)
2. Jain A. K. Fluid Mechanics including Hydraulic Machines, Khanna Publishers, New Delhi, 2014
3. Kumar K. L., Engineering Fluid Mechanics, Eurasia Publishing House (p) Ltd. New Delhi, 2016

REFERENCES:

1. Fox W.R. and McDonald A.T., Introduction to Fluid Mechanics John-Wiley and Sons, Singapore, 2011.
2. Pani B S, Fluid Mechanics: A Concise Introduction, Prentice Hall of India Private Ltd, 2016

CO's-PO's & PSO's MAPPING

COs	POs											PSOs	
	1	2	3	4	5	6	7	8	9	10	11	1	2
1	3	3	3	2				2			1	2	
2	3	3	3	2				2			1	2	
3	3	2	3	2				2			1	2	
4	3	3	3	2				2			1	2	
5	3	3	3	2				2			1	2	

Low (1) ; Medium (2) ; High (3)

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24ME3381	COMPUTER AIDED MACHINE DRAWING	L	T	P	C
		0	0	4	2

COURSE OBJECTIVES:

1. To acquire the skills and practical experience in handling 2D drafting and 3D modelling software systems, standard drawing practices using fits and tolerances.
2. To prepare assembly drawings both manually and using standard CAD packages.
3. To Preparing standard drawing layout for modelled parts, assemblies with BoM

PART I DRAWING STANDARDS & FITS AND TOLERANCES 12

Code of practice for Engineering Drawing, BIS specifications – Welding symbols, riveted joints, keys, fasteners – Reference to hand book for the selection of standard components like bolts, nuts, screws, keys etc. - Limits, Fits – Tolerance of individual dimensions IS919- Specification of Fits – Preparation of production drawings and reading of part and assembly drawings, basic principles of Geometric Dimensioning &Tolerance.

PART II 2D DRAFTING 48

Drawing, Editing, Dimensioning, Layering, Hatching, Block, Array, Detailing, Detailed Drawing.

1. Bearings – Bush Bearing,
2. Valves – Safety and Non-return Valves.
3. Couplings – Flange, Oldham's, Muff, Gear couplings.
4. Joints – Universal, Knuckle, Gib& Cotter, Strap, Sleeve &Cotter joints.
5. Engine parts – Piston, Connecting Rod, Crosshead (vertical and horizontal), Stuffing box, multi-plate clutch.
6. Machine Components – Screw Jack, Machine Vice, LatheTail Stock, Lathe Chuck, Plummer Block, Vane and Gear pumps.

TOTAL: 60 PERIODS

OUTCOMES:

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

CO1 Identify the international standards pertaining to machine drawing.
CO2 Understand the importance of the linking functional and visualization aspects in the preparation of the part drawings.
CO3 Apply limits and tolerances to assemblies and choose appropriate fits for given assemblies.
CO4 Interpret the Machining and surface finish symbols on the component drawings.
CO5 Draw the part or assembly drawings as per the conventions.

TEXT BOOKS:

1. Gopalakrishna K.R., "Machine Drawing", 17th Edition, Subhas Stores Books Corner, Bangalore,2003.
2. N. D. Bhatt and V.M. Panchal, "Machine Drawing", 51st Edition, Charator Publishers,2022.

REFERENCES:

1. K. L Narayana, P.Kannaiah, K.Venkata Reddy, Machine Drawing , 15 Edition , New Age International Publication.
2. Goutam Pohit and Goutam Ghosh, "Machine Drawing with AutoCAD", 1st Edition,Pearson Education, 2004.
3. Junnarkar, N.D., "Machine Drawing", 1st Edition, Pearson Education, 2004
4. N. Siddeshwar, P. Kanniah, V.V.S. Sastri," Machine Drawing" , published by Tata McGrawHill,2006
5. S. Trymbaka Murthy, "A Text Book of Computer Aided Machine Drawing", CBS Publishers, New Delhi,2007

CO's-PO's & PSO's MAPPING

COs	POs											PSOs	
	1	2	3	4	5	6	7	8	9	10	11	1	2
1	2	1	1	1	2				1		1	2	1
2	2	1	1	1	2				1		1	2	1
3	2	1	1	1	2				1		1	2	1
4	2	1	1	1	2				1		1	2	1
5	2	1	1	1	2				1		1	2	1

Low (1) ; Medium (2) ; High (3)

Course Coordinator **BOS Chairman/HOD**

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24ME3301	INDUSTRY ORIENTED COURSE-I	L	T	P	C
		0	0	2	1

COURSE OBJECTIVES:

The objective of this course is to bridge the gap between academic learning and industrial expectations by introducing students to industry-relevant practices, tools, and technologies in the field of mechanical engineering. It aims to provide foundational exposure to industrial machinery, safety protocols, basic CAD/CAM and CNC operations, and enhance soft skills such as communication and teamwork to prepare students for future internships and employment in core industries.

I COURSE CONTENT

This value-added course aims to introduce students to the fundamentals of industrial practices in the mechanical engineering domain. The course covers an overview of different types of mechanical industries, industrial workflow, and shop-floor discipline, along with the basics of industrial safety, personal protective equipment (PPE), and standard operating procedures (SOPs). Students will gain exposure to commonly used machines such as lathes, milling machines, drilling machines, CNC systems, and metrology tools. The course also includes an introduction to CAD/CAM, basic part modeling, CNC programming fundamentals using G and M codes, and simulation of tool paths. Industrial visits or expert sessions will help students connect theoretical concepts with real-world applications. Additionally, the course includes soft skill development modules focusing on resume preparation, communication, teamwork, and interview readiness to enhance students' employability.

TOTAL: 30 PERIODS

COURSE OUTCOMES:

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

CO1 Understand the structure, workflow, and safety standards of mechanical industries.

CO2 Identify and describe the functions of common industrial machines and tools used in manufacturing.

CO3 Develop basic skills in CAD modeling, CAM tool path generation, and CNC programming.

CO4 Gain exposure to industrial practices through expert interactions, simulations, and/or visits.

CO5 Demonstrate improved communication, teamwork, and job-readiness skills relevant to industrial careers.

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24GE3451	ENVIRONMENTAL SCIENCE AND SUSTAINABILITY	L	T	P	C
		2	0	0	2

COURSE OBJECTIVES:

1. To introduce the basic concepts of environment, ecosystems and biodiversity and emphasize on the biodiversity of India and its conservation.
2. To impart knowledge on the causes, effects and control or prevention measures of environmental pollution and natural disasters.
3. To facilitate the understanding of global and Indian scenario of renewable and nonrenewable resources, causes of their degradation and measures to preserve them.
4. To familiarize the concept of sustainable development goals and appreciate the interdependence of economic and social aspects of sustainability, recognize and analyze climate changes.
5. To inculcate and embrace sustainability practices and develop a broader understanding on green materials, energy cycles 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- 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 -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 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

Development, GDP ,Sustainability-concept, needs and challenges-economic, social and aspects of sustainability-from unsustainability to sustainability-millennium development goals, and protocols-Sustainable Development Goals-targets, indicators and intervention areas Climate change-Global, Regional and local environmental issues and possible solutions-case studies.

UNIT – V SUSTAINABILITY PRACTICES 6

Zero waste and R concept, Circular economies ISO:14000 Series, Material Life cycle assessment, Environmental Impact Assessment. Sustainable habitat: Green buildings, Green materials, Energy efficiency, Sustainable transports. Sustainable energy: Green Engineering: Sustainable urbanization.

TOTAL: 30 PERIODS

COURSE OUTCOMES:

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

CO1 To recognize and understand the functions of environment, ecosystems and biodiversity and their conservation.

CO2 To identify the causes, effects of environmental pollution and natural disasters and contribute to the preventive measures in the society.

CO3 To identify and apply the understanding of renewable and non-renewable resources and contribute to the sustainable measures to preserve them for future generations.

CO4 To recognize the different goals of sustainable development and apply them for suitable technological advancement and societal development.

CO5 To demonstrate the knowledge of sustainability practices and identify green materials, energy cycles and the role of sustainable urbanization.

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.
6. S.Pream Kumar, K.Vijay Sankar, A. Suresh Kumar, M.Priyanka, "Environmental Science and Sustainability", Charulatha Publications.2025

COs' – PO's & PSO's MAPPING

CO's	PO's											PSO's	
	1	2	3	4	5	6	7	8	9	10	11	1	2
1	2	2	2	2	2	2	1	2	1		1	2	1
2	2	2	2	2	2	2	1	2	1		1	2	1

3	2	2	2	2	2	2	1	2	1	1	2	2	1
4	2	2	2	2	2	2	1	2	1	2	2	2	1
5	2	2	2	2	2	2	1	2	1	1	2	2	1
Low (1) ; Medium (2) ; High (3)													

Course Instructor

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24ME3492	HYDRAULICS AND PNEUMATICS	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

1. To provide the knowledge on the working principles of fluid power systems.
2. To study the fluids and components used in modern industrial fluid power system.
3. To develop the design, construction and operation of fluid power circuits.
4. To learn the working principles of pneumatic power system and its components.
5. To provide the knowledge of trouble shooting methods in fluid power systems.

UNIT I FLUID POWER PRINICIPLES AND HYDRAULIC PUMPS 9

Introduction to Fluid power – Advantages and Applications – Fluid power systems – Types of fluids - Properties of fluids and selection – Basics of Hydraulics – Pascal's Law – Principles of flow - Problems, Sources of Hydraulic power: Pumping Theory— Pump Classification – Construction, Working, Design, Advantages, Disadvantages, Performance, Selection criteria of pumps – Problems

UNIT – II HYDRAULIC ACTUATORS AND CONTROL COMPONENTS 9

Hydraulic Actuators: Cylinders – Types and construction, Application, Hydraulic cushioning – Rotary Actuators-Hydraulic motors - Control Components: Direction Control, Flow control and pressure control valves – Types, Construction and Operation – Accessories: Reservoirs, Filters – types and selection- Applications – Fluid Power ANSI Symbols.

UNIT – III HYDRAULIC CIRCUITS AND SYSTEMS 9

Accumulators, Intensifiers, Industrial hydraulic circuits – Regenerative, Pump Unloading, Double-Pump, Air-over oil, Sequence, Reciprocation, Synchronization, Fail-Safe, Speed Control, Hydrostatic transmission, Electro hydraulic circuits, –Servo and Proportional valves – Applications- Mechanical, hydraulic servo systems.

UNIT – IV PNEUMATIC AND ELECTRO PNEUMATIC SYSTEMS 9

Properties of air –Air preparation and distribution – Filters, Regulator, Lubricator, Muffler, Air control Valves, Quick Exhaust Valves, Pneumatic actuators, Design of Pneumatic circuit –Cascade method – Electro Pneumatic System – Elements – Ladder diagram – timer circuits- Introduction to fluidics and pneumatic logic circuits

UNIT – V TROUBLE SHOOTING AND APPLICATIONS 9

Installation, Selection, Maintenance, Trouble Shooting and Remedies in Hydraulic and Pneumatic systems, Design of hydraulic circuits for Drilling, Planning, Shaping, Surface grinding, Press and Forklift applications; Design of Pneumatic circuits for metal working, handling circuits. – Low-cost Automation – Hydraulic and Pneumatic power packs, IOT in Hydraulics and pneumatics

TOTAL: 45 PERIODS

OUTCOMES:

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

CO1 Apply the working principles of fluid power systems and hydraulic pumps.
CO2 Apply the working principles of hydraulic actuators and control components.
CO3 Design and develop hydraulic circuits and systems.

CO4 Apply the working principles of pneumatic circuits and power system and its components.
CO5 Identify various troubles shooting methods in fluid power systems.

TEXT BOOKS:

1. Anthony Esposito, "Fluid Power with Applications", Prentice Hall, 2009.
2. James A. Sullivan, "Fluid Power Theory and Applications", Fourth Edition, Prentice Hall, 1997

REFERENCES:

1. Jagadeesha. T., "Pneumatics Concepts, Design and Applications ", Universities Press, 2015.
2. Joshi.P., Pneumatic Control", Wiley India, 2008.
3. Majumdar, S.R., "Oil Hydraulics Systems – Principles and Maintenance",TataMcGraw Hill, 2001.
4. Shanmugasundaram.K., "Hydraulic and Pneumatic Controls". Chand & Co, 2006.
5. Srinivasan.R., "Hydraulic and Pneumatic Controls", Vijay Nicole Imprints, 3 rd edition,2019.

CO's-PO's & PSO's MAPPING

COs	POs											PSOs	
	1	2	3	4	5	6	7	8	9	10	11	1	2
1	2	2	2	2	2						1	2	1
2	2	2	2	2	2						1	2	1
3	2	2	2	2	2						1	2	1
4	2	2	2	2	2						1	2	1
5	2	2	2	2	2						1	2	1
Low (1) ; Medium (2) ; High (3)													

Course Coordinator

BOS Chairman/HOD

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24ME3493	MANUFACTURING TECHNOLOGY	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

1. To illustrate the working principles and operations of various metal casting and joining process.
2. To study and analyze the working principle of various metal forming and bulk deformation process
3. To study the concepts and basic mechanics of metal cutting and the factors affecting machinability
4. To learn the working principle and operation of various special machining process
5. To learn the basics of CNC programming concepts to develop the part programme for Machine centre and turning centre.

UNIT I METAL CASTING AND METAL JOINING PROCESSES 9

Sand Casting Process – Sand Mould, Type of patterns, Pattern Materials, Pattern allowances, Molding sand Properties and testing, Defects in Sand casting process-remedies; Gas Welding - Oxy fuel welding, Arc Welding - Gas Tungsten arc welding –Gas metal arc welding; Resistance welding - Electron beam welding, Laser beam Welding, Friction welding - Friction stir welding - Diffusion welding, Thermit Welding; Weld defects – inspection &remedies.

UNIT – II METAL DEFORMATION AND METAL FORMING PROCESSES 9

Forging processes – Open, impression and closed die forging, Typical forging operations; Rolling processes - Flat strip rolling, shape rolling operations; Drawing operations – Rod, Wire and Tube drawing; Special forming process - Hydro forming, Rubber pad forming, Metal spinning, Explosive forming. Introduction to thermoplastic and thermosetting – Transfer molding, blow molding process.

UNIT – III 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, cutting tool materials, tool wear, tool life, surface finish, cutting fluids and Machinability

UNIT – IV SPECIAL MACHINING PROCESS 9

Special lathes - Capstan and turret lathes, automatic lathes: semi-automatic – single spindle: Swiss type, automatic screw type – multi spindle; 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

UNIT – V CNC PROGRAMMING AND CONTROL 9

Computer Numerical Control (CNC) machine tools, constructional details; CNC Control systems – Open/closed, point-to-point/continuous - Turning and machining centres; Coolant systems, Safety features; 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

TOTAL: 45 PERIODS

OUTCOMES:

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

CO1 Describe the various operations of metal casting and metal joining processes.

CO2 Illustrate the different bulk deformation and manufacturing of plastic components

CO3 Apply the mechanism of metal removal process and to identify the factors involved in improving machinability

CO4 Describe the constructional and operational features of reciprocating machine tools.

CO5 Demonstrate the Program CNC machine tools through planning, writing codes and setting up CNC machine tools to manufacture a given component

TEXT BOOKS:

1. Kalpakjian. S, "Manufacturing Engineering and Technology", Pearson Education India,4th Edition, 2013
2. Kalpakjian. S, "Manufacturing Engineering and Technology", Pearson Education India,7th Edition, 2018.
3. Michael Fitzpatrick, Machining and CNC Technology, McGraw-Hill Education; 4th edition, 2018.

REFERENCES:

1. Roy. A. Lindberg, Processes and materials of manufacture, PHI / Pearson education, 2006.
2. S. Gowri P. Hariharan, A.Suresh Babu, Manufacturing Technology I, Pearson Education, 2008.
3. Roy. A. Lindberg, Processes and materials of manufacture, PHI / Pearson education, 2006.
4. Geofrey Boothroyd, "Fundamentals of Metal Machining and Machine Tools", McGraw Hill, 1984.
5. Rao. P.N "Manufacturing Technology," Metal Cutting and Machine Tools, Tata McGraw- Hill, New Delhi, 2009.

CO's-PO's & PSO's MAPPING

COs	POs											PSOs	
	1	2	3	4	5	6	7	8	9	10	11	1	2
1	3	2	2	1	1				1		2	1	
2	3	2	2	1	1				1		2	1	
3	3	2	2	2	1				1		2	1	
4	3	2	2	2	1				1		2	1	
5	3	2	2	2	2				1		2	1	
Low (1) ; Medium (2) ; High (3)													

Course Coordinator **BOS Chairman/HOD**

NCC Credit Course Level 2*

24NX3451	(ARMY WING) NCC Credit Course Level - II	L T P C 3 0 0 3

PERSONALITY DEVELOPMENT		**9**
PD 3	Group Discussion: Change your mindset, Time Management, Social Skills	6
PD 5	Public Speaking	3
LEADERSHIP		**7**
L 2	Case Studies: APJ Abdul Kalam, Deepa Malik, Maharana Pratap, N Narayan Murty, Ratan Tata, Rabindra Nath Tagore, Role of NCC cadets in 1965	7
DISASTER MANAGEMENT		**13**
DM 1	Disaster Management Capsule: Organisation, Types of Disasters, Essential Services, Assistance, Civil Defence Organisation	3
DM 2	Initiative Training, Organising Skills, Do's & Don't's, Natural Disasters, Man Made Disasters	9
DM 3	Fire Service & Fire Fighting	1
ENVIRONMENTAL AWARENESS & CONSERVATION		**3**
EA 1	Environmental Awareness and Conservation	3
GENERAL AWARENESS		**4**
GA 1	General Knowledge	4
ARMED FORCES		**6**
AF 1	Armed Forces, Army, CAPF, Police	6
ADVENTURE		**1**
AD 1	Introduction to Adventure Activities	1
BORDER & COASTAL AREAS		**2**
BCA 1	History, Geography & Topography of Border/Coastal areas	2

TOTAL: 45 PERIODS

COURSE COORDINATOR

BOS CHAIRMAN

NCC Credit Course Level 2*

24NX3452	(NAVAL WING) NCC Credit Course Level - II	L T P C 3 0 0 3
PERSONALITY DEVELOPMENT		**9**
PD 3	Group Discussion: Change your mindset, Time Management, Social Skills	6
PD 5	Public Speaking	3
LEADERSHIP		**7**
L 2	Case Studies: APJ Abdul Kalam, Deepa Malik, Maharana Pratap, N Narayan Murty, Ratan Tata, Rabindra Nath Tagore, Role of NCC cadets in 1965	7
DISASTER MANAGEMENT		**13**
DM 1	Disaster Management Capsule: Organisation, Types of Disasters, Essential Services, Assistance, Civil Defence Organisation	3
DM 2	Initiative Training, Organising Skills, Do's & Don't's, Natural Disasters, Man Made Disasters	9
DM 3	Fire Service & Fire Fighting	1
ENVIRONMENTAL AWARENESS & CONSERVATION		**3**
EA 1	Environmental Awareness and Conservation	3
GENERAL AWARENESS		**4**
GA 1	General Knowledge	4
NAVAL ORIENTATION		**6**
AF 1	Armed Forces and Navy Capsule	3
EEZ 1	EEZ Maritime Security and ICG	3
ADVENTURE		**1**
AD 1	Introduction to Adventure Activities	1
BORDER & COASTAL AREAS		**2**
BCA 1	History, Geography & Topography of Border/Coastal areas	2

TOTAL: 45 PERIODS

COURSE COORDINATOR

BOS CHAIRMAN

NCC Credit Course Level 2*

24NX3453	(AIR FORCE WING) NCC Credit Course Level - II	L T P C 3 0 0 3
PERSONALITY DEVELOPMENT		**9**
PD 3	Group Discussion: Change your mindset, Time Management, Social Skills	6
PD 5	Public Speaking	3
LEADERSHIP		**7**
L 2	Case Studies: APJ Abdul Kalam, Deepa Malik, Maharana Pratap, N Narayan Murty, Ratan Tata, Rabindra Nath Tagore, Role of NCC cadets in 1965	7
DISASTER MANAGEMENT		**13**
DM 1	Disaster Management Capsule: Organisation, Types of Disasters, Essential Services, Assistance, Civil Defence Organisation	3
DM 2	Initiative Training, Organising Skills, Do's & Don't's, Natural Disasters, Man Made Disasters	9
DM 3	Fire Service & Fire Fighting	1
ENVIRONMENTAL AWARENESS & CONSERVATION		**3**
EA 1	Environmental Awareness and Conservation	3
GENERAL AWARENESS		**4**
GA 1	General Knowledge	4
GENERAL SERVICE KNOWLEDGE		**6**
GSK 1	Armed Forces & IAF Capsule	2
GSK 2	Modes of Entry in IAF, Civil Aviation	2
GSK 3	Aircrafts - Types, Capabilities & Role	2
ADVENTURE		**1**
AD 1	Introduction to Adventure Activities	1
BORDER & COASTAL AREAS		**2**
BCA 1	History, Geography & Topography of Border/Coastal areas	2

TOTAL: 45 PERIODS

COURSE COORDINATOR

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24ME3451	THERMAL ENGINEERING	L	T	P	C
		3	0	2	4

COURSE OBJECTIVES:

1. To learn the concepts and laws of thermodynamics to predict the operation of thermodynamic cycles and performance of Internal Combustion (IC) engines and Gas Turbines
2. To analyzing the performance of steam nozzle, calculate critical pressure ratio
3. To Evaluating the performance of steam turbines through velocity triangles, understand the need for governing and compounding of turbines
4. To analyzing the working of IC engines and various auxiliary systems present in IC engines
5. To evaluating the various performance parameters of IC engines

UNIT I THERMODYNAMIC CYCLES **9**

Air Standard Cycles – Carnot, Otto, Diesel, Dual, Brayton – Cycle Analysis, Performance and Comparison.

UNIT – II STEAM NOZZLES AND INJECTOR **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. Metastable flow.

UNIT – III STEAM AND GAS TURBINES **9**

Types, Impulse and reaction principles, Velocity diagrams, Work done and efficiency – optimal operating conditions. Multi-staging, compounding and governing. Gas turbine cycle analysis – open and closed cycle.

UNIT – IV INTERNAL COMBUSTION ENGINES – FEATURES AND COMBUSTION **9**

IC engine – Classification, working, components and their functions. Geometric, operating, and performance comparison of SI and CI engines. Desirable properties and qualities of fuels. Air-fuel ratio calculation – lean and rich mixtures.– Knocking – phenomena and control

UNIT – V INTERNAL COMBUSTION ENGINE PERFORMANCE AND AUXILIARY SYSTEMS **9**

Performance and Emission Testing, Performance parameters and calculations. Multipoint Fuel Injection system and Common rail direct injection systems. Ignition systems – Magneto, Battery and Electronic. Lubrication and Cooling systems.

45 PERIODS

PRACTICAL EXERCISES: **30 PERIODS**

1. Valve Timing and Port Timing diagrams.
2. Performance Test on four – stroke Diesel Engine.
3. Heat Balance Test on 4 – stroke Diesel Engine.

4. Morse Test on Multi-Cylinder Petrol Engine.
5. Determination of Flash Point and Fire Point of various fuels / lubricants
6. Performance test on a two stage Reciprocating Air compressor
7. Determination of COP of a Refrigeration system
8. Study of Steam Generators and Turbines.

TOTAL: 75 PERIODS

OUTCOMES:

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

CO1 Apply thermodynamic concepts to different air standard cycles and solve problems.

CO2 To solve problems in steam nozzle and calculate critical pressure ratio.

CO3 Explain the flow in steam turbines, draw velocity diagrams, flow in Gas turbines and solve problems.

CO4 Explain the functioning and features of IC engine, components and auxiliaries.

CO5 Calculate the various performance parameters of IC engines.

TEXT BOOKS:

1. Mahesh. M. Rathore, "Thermal Engineering", 1st Edition, Tata McGraw Hill, 2010.
2. Ganesan.V, " Internal Combustion Engines" 4th Edition, Tata McGraw Hill, 2012.

REFERENCES:

1. Ballaney. P, "Thermal Engineering", 25th Edition, Khanna Publishers, 2017.
2. Domkundwar, Kothandaraman, &Domkundwar, "A Course in Thermal Engineering", 6th Edition, DhanpatRai& 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, "Thermal Engineering", 2nd Edition, Prentice Hall of India, 2011.

CO's-PO's & PSO's MAPPING

COs	POs											PSOs	
	1	2	3	4	5	6	7	8	9	10	11	1	2
1	3	2	1	1							2	2	2
2	3	2	2	1							2	2	2
3	3	2	2	1							2	2	2
4	3	2	1	1							2	2	2
5	3	2	1	1							2	2	2

Low (1) ; Medium (2) ; High (3)

Course Coordinator

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24CE3491	STRENGTH OF MATERIALS FOR MECHANICAL ENGINEERS	L	T	P	C
		3	0	2	4

COURSE OBJECTIVES:

1. To understand the concepts of stress, strain, principal stresses and principal planes.
2. To study the concept of shearing force and bending moment due to external loads in determinate beams and their effect on stresses.
3. To determine stresses and deformation in circular shafts and helical spring due to torsion.
4. To compute slopes and deflections in determinate beams by various methods.
5. To study the stresses and deformations induced in thin and thick shells.

UNIT I STRESS, STRAIN AND DEFORMATION OF SOLIDS 9

Rigid bodies and deformable solids – Tension, Compression and Shear Stresses - Deformation of simple and compound bars – Thermal stresses – Elastic constants - Volumetric strains – Stresses on inclined planes – Principal stresses and principal planes – Mohr's circle of stress

UNIT – II TRANSVERSE LOADING ON BEAMS AND STRESSES IN BEAM 9

Beams – Types - Transverse loading on beams – Shear force and bending moment in beams – Cantilever, Simply supported beams. Theory of simple bending – Bending stress distribution – Load carrying capacity – Proportioning of sections – Shear stress distribution.

UNIT – III TORSION 9

Theory of Torsion – Stresses and Deformations in Solid and Hollow Circular Shafts – Combined bending moment and torsion of shafts - Power transmitted to shaft – Shaft in series and parallel – Closed and Open Coiled helical springs – springs in series and parallel

UNIT – IV DEFLECTION OF BEAMS 9

Elastic curve – Governing differential equation - Double integration method - Macaulay's method - Conjugate beam method for computation of slope and deflection of determinant beams.

UNIT – V THIN CYLINDERS, SPHERES AND THICK CYLINDERS 9

Stresses in thin cylindrical shell due to internal pressure - circumferential and longitudinal stresses - Deformation in thin cylinders – Spherical shells subjected to internal pressure – Deformation in spherical shells – Thick cylinders - Lame's theory.

45 PERIODS

LAB EXPERIMENT 30 PERIODS

1. Tension test on mild steel rod
2. Torsion test on mild steel rod

3. Hardness test on metal (Rockwell and Brinell hardness)
4. Compression test on helical spring
5. Deflection test on carriage spring

TOTAL: 75 PERIODS

OUTCOMES:

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

CO1 Understand the concepts of stress and strain in simple and compound bars, the important of principal stresses and principal planes.

CO2 Understand the load transferring mechanism in beams and stress distribution due to shearing force and bending moment.

CO3 Apply basic equation of torsion in designing of shafts and helical springs

CO4 Calculate slope and deflection in beams using different methods.

CO5 Analyze thin and thick shells for applied pressures.

TEXT BOOKS:

1. Rajput R.K. "Strength of Materials (Mechanics of Solids)", S.Chand & company Ltd., New Delhi, 7th edition, 2018.
2. Rattan S.S., "Strength of Materials", Tata McGraw Hill Education Pvt .Ltd., New Delhi, 2017.

REFERENCES:

1. Singh. D.K., "Strength of Materials", Ane Books Pvt Ltd., New Delhi, 2021.
2. Egor P Popov, "Engineering Mechanics of Solids", 2nd edition, PHI Learning Pvt. Ltd., New Delhi, 2015.
3. Beer. F.P. & Johnston. E.R. "Mechanics of Materials", Tata McGraw Hill, 8th Edition, New Delhi 2019.
4. Vazirani. V.N, Ratwani. M.M, Duggal .S.K "Analysis of Structures: Analysis, Design and Detailing of Structures-Vol.1", Khanna Publishers, New Delhi 2014.

CO's-PO's & PSO's MAPPING

COs	POs											PSOs	
	1	2	3	4	5	6	7	8	9	10	11	1	2
1	3	2	2	2	2				1		2	2	1
2	3	2	2	2	2			1	1		2	2	1
3	3	2	2	2	2			1			2	2	1
4	3	2	2	2	2			1			2	2	1
5	3	2	2	2	2						2	2	1

Low (1) ; Medium (2) ; High (3)

Course Coordinator

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24ME3482	MANUFACTURING TECHNOLOGY LABORATORY	L	T	P	C
		0	0	4	2

COURSE OBJECTIVES:

1. To Selecting appropriate tools, equipment's and machines to complete a given job.
2. To Performing various welding process using GMAW and fabricating gears using gear making machines.
3. To Performing various machining process such as rolling, drawing, turning, shaping, drilling, milling and analysing the defects in the cast and machined components.

LIST OF EXPERIMENTS

1. Fabricating simple structural shapes using Gas Metal Arc Welding machine
2. Preparing green sand moulds with cast patterns
3. Taper Turning and Eccentric Turning on circular parts using lathe machine.
4. Knurling, external and internal thread cutting on circular parts using lathe machine.
5. Shaping – Square and Hexagonal Heads on circular parts using shaper machine
6. Drilling and Reaming using vertical drilling machine
7. Milling contours on plates using vertical milling machine.
8. Cutting spur and helical gear using milling machine
9. Generating gears using gear hobbing machine
10. Generating gears using gear shaping machine
11. Grinding components using cylindrical and centerless grinding machine
12. Grinding components using surface grinding machine
13. Cutting force calculation using dynamometer in milling machine
14. Cutting force calculation using dynamometer in lathe machine
15. Programming of Knurling, external and internal thread cutting on circular parts using CNC Machine
16. Programming of Drilling and Reaming using vertical drilling CNC machine

TOTAL: 60 PERIODS

OUTCOMES:

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

CO1 **Demonstrate** the ability to operate and fabricate basic components using conventional machine tools like lathe, shaper, milling, and drilling machines to perform operations such as taper turning, threading, knurling, and gear cutting.

CO2 **Apply** the principles of casting and welding techniques to prepare simple moulds and perform fabrication using GMAW for structural applications.

CO3 **Analyze** machining and cutting operations by measuring cutting forces using dynamometers to evaluate machining performance and optimize parameters.

CO4 **Develop** basic CNC programming skills to perform operations such as turning, drilling, threading, and knurling using CNC machines.

CO5 **Evaluate** surface finish and dimensional accuracy of components machined using grinding operations such as cylindrical, centerless, and surface grinding.

CO's-PO's & PSO's MAPPING

COs	POs											PSOs	
	1	2	3	4	5	6	7	8	9	10	11	1	2
1	3	2	3			1		2			1	1	2
2	3	2	3			1		2			1	1	2
3	3	3	2	3		1		2			1	1	2
4	3	2	3			1		2			1	1	2
5	3	2	2	3		1		2			1	1	2
Low (1) ; Medium (2) ; High (3)													

Course Coordinator

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24ME3402	INDUSTRY ORIENTED COURSE-II	L	T	P	C
		0	0	2	1

COURSE OBJECTIVES:

The objective of this course is to bridge the gap between academic learning and industrial expectations by introducing students to industry-relevant practices, tools, and technologies in the field of mechanical engineering. It aims to provide foundational exposure to industrial machinery, safety protocols, basic CAD/CAM and CNC operations, and enhance soft skills such as communication and teamwork to prepare students for future internships and employment in core industries.

I COURSE CONTENT

This value-added course aims to introduce students to the fundamentals of industrial practices in the mechanical engineering domain. The course covers an overview of different types of mechanical industries, industrial workflow, and shop-floor discipline, along with the basics of industrial safety, personal protective equipment (PPE), and standard operating procedures (SOPs). Students will gain exposure to commonly used machines such as lathes, milling machines, drilling machines, CNC systems, and metrology tools. The course also includes an introduction to CAD/CAM, basic part modeling, CNC programming fundamentals using G and M codes, and simulation of tool paths. Industrial visits or expert sessions will help students connect theoretical concepts with real-world applications. Additionally, the course includes soft skill development modules focusing on resume preparation, communication, teamwork, and interview readiness to enhance students' employability.

TOTAL: 30 PERIODS

COURSE OUTCOMES:

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

CO1 Understand the structure, workflow, and safety standards of mechanical industries.

CO2 Identify and describe the functions of common industrial machines and tools used in manufacturing.

CO3 Develop basic skills in CAD modeling, CAM tool path generation, and CNC programming.

CO4 Gain exposure to industrial practices through expert interactions, simulations, and/or visits.

CO5 Demonstrate improved communication, teamwork, and job-readiness skills relevant to industrial careers.

Course Coordinator **BOS Chairman/HOD**