



(An Autonomous Institution)

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Accredited by NBA-AICTE, NAAC-UGC with 'A++' Grade
Saravanampatti, Coimbatore – 641035.



**REGULATION 2023 CURRICULAM
AND SYLLABI**

CHOICE BASED CREDIT SYSTEM

**DEPARTMENT OF MECHANICAL
ENGINEERING**

B.E - MECHANICAL ENGINEERING



SNS COLLEGE OF TECHNOLOGY

(An Autonomous Institution)

COIMBATORE-35

DEPARTMENT OF MECHANICAL ENGINEERING

R2023 – SUGGESTED CURRICULUM

B.E –MECHANICAL ENGINEERING



Description / Semester	AICTE	SNSCT – Suggested	Sem 1	Sem 2	Sem 3	Sem 4	Sem 5	Sem 6	Sem 7	Sem 8
Humanity, Social Science & Mandatory (HSMC)	12	12	3	4	2				2	
Basic Science (BSC)	25	28	8	11	5	7				
Engineering Sciences (ESC)	24	26	8	8	2	4			2	
Programme Core (PCC)	48	51			14	14	11	12		
Programme Elective (PEC)	18	15					3	3	3	6
Open Elective (OEC)	18	9					3	3	3	
Project/Seminar/Internship (EEC)	15	28	3	1	1	1	5	3	2	12
Mandatory Courses (MC)	(Non Credit)									
TOTAL	160	169	22	24	24	26	22	21	12	18

SEMESTER I									
Sl.No	Course Code	Course	L	T	P	Contact hrs/week	Credit	Int/Ext	Category
Theory Courses									
1.	23MAT101	Matrices and Calculus	3	1	0	4	4	40/60	BSC
2.	23PYT101	Engineering Physics	3	0	0	3	3	40/60	BSC
3.	23MET101	Engineering Mechanics	3	0	0	3	3	40/60	ESC
4.	23EET101	Basics of Electrical and Electronics Engineering	3	0	0	3	3	40/60	ESC
5.	23GET103	Heritage of Tamils	1	0	0	1	1	40/60	HSMC
Theory Integrated Practical Courses									
6.	23GEB101	Design Thinking and Innovation	1	0	4	5	3	50/50	EEC
Practical Courses									
7.	23PYP101	Physics Laboratory	0	0	2	2	1	60/40	BSC
8.	23ENP101	Professional Communication	0	0	4	4	2	60/40	HSMC
9.	23GEP101	Workshop Practices Laboratory	0	0	4	4	2	60/40	ESC
Mandatory Course									
10.	23CHT103	Environmental Science and Sustainability	2	0	0	2	0	100/0	MC
Total			16/1/14			31	22		

SEMESTER II									
Sl. No.	Course Code	Course	L	T	P	Contact hrs/week	Credit	Int/Ext	Category
Theory Courses									
1.	23MAT102	Complex Analysis and Laplace Transforms	3	1	0	4	4	40/60	BSC
2.	23CHT102	Chemistry of Engineering Materials	3	0	0	3	3	40/60	BSC
3.	23ENT101	Communicative English	3	0	0	3	3	40/60	HSMC
4.	23ITT101	Programming in C and Data Structures	3	0	0	3	3	40/60	ESC
5.	23MET102	Engineering Drawing	1	0	4	5	3	40/60	ESC
6.	23MET103	Introduction to Mechanical Engineering	3	0	0	3	3	40/60	BSC
7.	23GET104	Tamils & Technology	1	0	0	1	1	40/60	HSMC
Practical Courses									
8.	23CHP103	Chemistry Laboratory	0	0	2	2	1	60/40	BSC
9.	23ITP101	Programming in C and Data Structures Laboratory	0	0	4	4	2	60/40	ESC
10.	23MEP101	Internship-I	2 Weeks			-	1	100/0	EEC
Mandatory Course									
11.	23HST103	Indian Constitution	2	0	0	2	0	100/0	MC
Total			19/1/10			30	24		

SEMESTER III										
Sl. No.	Course Code	Course	L	T	P	Contact hrs/week	Credit	Int/Ext	Category	PRE-REQUISITES
Theory Courses										
1.	23MAT201	Partial Differential Equations and Transforms	3	0	0	3	3	40/60	BSC	23MAT101 23MAT102
2.	23MET201	Engineering Thermodynamics	3	0	0	3	3	40/60	PCC	23PYT101 23CHT102
3.	23MET202	Manufacturing Technology	3	0	0	3	3	40/60	PCC	
4.	23MET203	Engineering Materials and Metallurgy	2	0	0	2	2	40/60	PCC	23PYT101
5.	23GET275	VQAR-I	2	0	0	2	2	40/60	BSC	
Theory Integrated Practical Courses										
6.	23MEB201	Fluid Mechanics and Machinery	3	0	2	5	4	50/50	PCC	23PYT101 23CHT102
7.		Language Elective	1	0	2	3	2	50/50	HSMC	
Practical Courses										
8.	23ITP102	Python Programming	0	0	4	4	2	60/40	ESC	
9.	23MEP201	Computer Aided Machine Drawing	0	0	4	4	2	60/40	PCC	23MET102
10.	23MEP202	Mini Project – I	0	0	2	2	1	100/0	EEC	
Total			17/0/14			31	24			

SEMESTER IV											
Sl. No.	Course Code	Course	L	T	P	Contact hrs/week	Credit	Int/Ext	Category	PRE-REQUISITES	
Theory Courses											
1.	23MAT204	Statistics and Numerical Methods	3	0	0	3	3	40/60	BSC	23MAT201	
2.	23MET205	Strength of Materials	3	1	0	4	4	40/60	PCC		
3.	23MET206	Metrology and Measurements	2	0	0	2	2	40/60	PCC		
4.	23MET207	Internet of Things for Production Systems	3	0	0	3	3	40/60	PCC		
5.	23GET276	VQAR-II	2	0	0	2	2	40/60	BSC	23GET275	
Theory Integrated Practical Courses											
5.	23MEB202	Thermal Engineering	2	0	2	4	3	50/50	PCC		
6.	23EEB210	Electrical Machines and Drives	3	0	2	5	4	50/50	ESC	23EET101	
Practical Courses											
7.	23MEP202	Manufacturing & Measurements Laboratory	0	0	4	4	2	60/40	PCC		
8.	23GEP275	Personality Branding	0	0	4	4	2	60/40	EEC		
9.	23MEP203	Internship-II	2 Weeks					1	100/0	EEC	
Total			18/1/12			31	26				

SEMESTER V										
Sl. No.	Course Code	Course	L	T	P	Contact hrs/week	Credit	Int/Ext	Category	PRE-REQUISITES
Theory Courses										
1.	23MET301	Design of Machine Elements	3	0	0	3	3	40/60	PCC	
2.	23MET302	Theory of Machines	3	1	0	4	4	40/60	PCC	23MET101
3.		Professional Elective - I	3	0	0	3	3	40/60	PEC	
4.		Open Elective – I	3	0	0	3	3	40/60	OEC	
Theory Integrated Practical Courses										
5.	23MEB301	CAD/CAM and Automation	2	0	2	4	3	50/50	PCC	
6.		Career Course –I	2	0	4	6	4	50/50	EEC	
Practical Courses										
7.	23MEP301	Dynamics Laboratory	0	0	2	2	1	100/0	PCC	
8.	23MEP302	Mini Project – II	0	0	2	2	1	100/0	EEC	
		Total	16/1/10			27	22			

SEMESTER VI										
Sl. No.	Course Code	Course	L	T	P	Contact hrs/week	Credit	Int/Ext	Category	PRE-REQUISITES
Theory Courses										
1.	23MET303	Design of Transmission Systems	3	0	0	3	3	40/60	PCC	
2.	23MET304	Finite Element Analysis	3	0	0	3	3	40/60	PCC	
3.		Professional Elective - II	3	0	0	3	3	40/60	PEC	
4.		Open Elective - II	3	0	0	3	3	40/60	OEC	
Theory Integrated Practical Courses										
4.	23MEB302	Heat & Mass Transfer	3	0	2	5	4	50/50	PCC	23MET201
6.		Career Course -II	1	0	2	3	2	50/50	EEC	
Practical Courses										
7.	23MEP303	Data Analytics in Digital Manufacturing Laboratory	0	0	2	2	1	60/40	PCC	
8.	23MEP304	Simulation and Analysis Lab	0	0	2	2	1	60/40	PCC	
9.	23MEP305	Internship-III	2 Weeks				1	100/0	EEC	
Mandatory Course										
10.	23HST105	Essence of Indian Traditional Knowledge	2	0	0	2	0	100/0	MC	
		Total	18/0/8			26	21			

SEMESTER VII										
Sl. No.	Course Code	Course	L	T	P	Contact hrs/week	Credit	Int/Ext	Category	PRE-REQUISITES
Theory Courses										
1.	23MET401	Biology for Mechanical Engineers	2	0	0	2	2	40/60	ESC	
2.	23GET401	Universal Human Values	2	0	0	2	2	40/60	HSMC	
3.		Professional Elective - III	3	0	0	3	3	40/60	PEC	
4.		Open Elective - III	3	0	0	3	3	40/60	OEC	
Practical Courses										
5.	23MEP401	Project – I	0	0	4	4	2	60/40	EEC	
	Total		10/0/4			14	12			

SEMESTER VIII										
Sl. No.	Course Code	Course	L	T	P	Contact hrs/week	Credit	Int/Ext	Category	PRE-REQUISITES
Theory Courses										
1.		Professional Elective - IV	3	0	0	3	3	40/60	PEC	
2.		Professional Elective - V	3	0	0	3	3	40/60	PEC	
Practical Courses										
3.	23MEP402	Project – II	0	0	24	24	12	60/40	EEC	
	Total		6/0/24			30	18			

LANGUAGE ELECTIVE COURSES

Sl.No.	Course Code	Courses Offered	L	T	P	J	C
1	23GEB202	HINDI	1	0	2	0	2
2	23GEB203	JAPANESE	1	0	2	0	2
3	23GEB204	GERMAN	1	0	2	0	2
4	23GEB205	FRENCH	1	0	2	0	2

CAREER COURSES (UG)

Sl.No.	Course Code	Courses Offered	Sem	L	T	P	C
Track 1 Job (6 Credits)	23GEB375	Personnel Psychology & Technical Interviewing	V Semester	2	0	4	4
	23GEB379	Employable Skill Development	VI Semester	1	0	2	2
Track 2 Entrepreneurship (6 Credits)	23GEB376	Entrepreneurship & Business Canvas Model	V Semester	2	0	4	4
	23GEB382	Economics, Finance & Accounting and Intellectual Property Rights	VI Semester	1	0	2	2
Track 3 Higher Education (6 Credits)	23GEB377	Advanced Verbal Quantitative Aptitude & Reasoning and Networking	V Semester	2	0	4	4
	23GEB380	Higher Studies in Abroad & India	VI Semester	1	0	2	2
Track 4 Govt./RRB/ Bank (6 credits)	23GEB378	Foundation Course on Competitive Exams	V Semester	2	0	4	4
	23GEB381	Personnel Psychology for Govt. Jobs	VI Semester	1	0	2	2

Mandatory Courses (UG)

Course Code	Course Title	L	T	P	C
23CHT103	Environmental Sciences and Sustainability	2	0	0	0
23HST103	Indian Constitution	2	0	0	0
23HST105	Essence of Indian Traditional Knowledge	2	0	0	0

Other Special Courses (UG)

Course Code	Course Title	L	T	P	C
23GEB101	Design Thinking and Innovation	1	0	0	3
23GET275	VQAR – I	2	0	0	2
23GEP275	Personality Branding	0	0	4	2
23GET276	VQAR – II	2	0	0	2
23GET401	Universal Human Values	2	0	0	2

Professional Elective - I

S.No	Course Code	Courses Offered	L	T	P	C	Sem
1	23MEE301	Resource Management Techniques	3	0	0	3	V
2	23MEE302	Sustainable Energy Technology	3	0	0	3	V
3	23MEE303	Modern Manufacturing Methods	3	0	0	3	V
4	23MEE304	Energy Audit	3	0	0	3	V
5	23MEE305	Principles of Management	3	0	0	3	V

Professional Elective - II

S.No	Course Code	Courses Offered	L	T	P	C	Sem
1	23MEE306	Fluid Power Automation	3	0	0	3	VI
2	23MEE307	Human-Machine Interface (HMI) Design	3	0	0	3	VI
3	23MEE308	Additive Manufacturing	3	0	0	3	VI
4	23MEE309	Excel for Business – Essentials	3	0	0	3	VI
5	23MEE310	Engineering Economics and Cost Analysis	3	0	0	3	VI

Professional Elective - III

S.No	Course Code	Courses Offered	L	T	P	C	Sem
1	23MEE401	Design for Manufacture and Assembly	3	0	0	3	VII
2	23MEE402	Waste to Energy	3	0	0	3	VII
3	23MEE403	Lean Six Sigma for Supply Chain Analytics	3	0	0	3	VII
4	23MEE404	Solar Photovoltaics: Fundamentals and Technologies	3	0	0	3	VII
5	23MEE405	Total Quality Management	3	0	0	3	VII

Professional Elective - IV

S.No	Course Code	Courses Offered	L	T	P		Sem
1	23MEE406	Optimization Techniques	3	0	0	3	VIII
2	23MEE407	Hybrid Technology	3	0	0	3	VIII
3	23MEE408	Rapid Prototyping	3	0	0	3	VIII
4	23MEE409	Industrial Digitalization	3	0	0	3	VIII
5	23MEE410	Product Life Cycle Management	3	0	0	3	VIII

Professional Elective - V

S.No	Course Code	Courses Offered	L	T	P	C	Sem
1	23MEE411	Energy Conversion Engineering	3	0	0	3	VIII
2	19MEZ412	Rapid Prototyping	3	0	0	3	VIII
3	19MEZ413	Connected and Automated Vehicles	3	0	0	3	VIII
4	19MEZ414	Heating Ventilation and Air Conditioning System	3	0	0	3	VIII
5	19MEZ415	Smart Manufacturing Process	3	0	0	3	VIII

SEMESTER I

23MAT101	MATRICES AND CALCULUS	L	T	P	J	C
	(Common to all B.E. / B. Tech. Courses)	3	1	0	0	4
UNIT I	MATRIX EIGEN VALUE PROBLEM					9+3
Eigen values and Eigenvectors of a real matrix – Properties of Eigen values and Eigenvectors – Cayley Hamilton Theorem (statement only) and its applications – Eigen value problems arising from population models (Leslie model).						
UNIT II	ORTHOGONAL TRANSFORMATION OF A REAL SYMMETRIC MATRIX					9+3
Diagonalization of a real symmetric matrix – Quadratic form – Canonical form – Nature of the quadratic form – Reduction of quadratic form to canonical form by orthogonal transformation – Applications: Stretching of an elastic membrane.						
UNIT III	DIFFERENTIAL CALCULUS					9+3
Curvature – Radius of Curvature in Cartesian co-ordinates – Centre of curvature and circle of curvature in Cartesian Co-ordinates – Evolutes – Envelopes.						
UNIT IV	FUNCTIONS OF SEVERAL VARIABLES					9+3
Partial derivatives – Homogeneous functions and Euler’s theorem – Jacobians – Taylor’s series for functions of two variables – Applications: Maxima and minima of functions of two variables – Lagrange’s method of undetermined multipliers.						
UNIT V	MULTIPLE INTEGRALS					9+3
Double integrals (Cartesian co-ordinates) – Change of order of integration – Applications of double integrals (Area) – Triple integrals (Cartesian co-ordinates) – Applications: Volume of solids.						
		L: 45	T:15	P: 0	J: 0	Total: 60 PERIODS
TEXT BOOKS						
1	Kreyszig.E, Advanced Engineering Mathematics, John Wiley and Sons, 10 th Edition, New Delhi 2016.					
2	James Stewart, Calculus, Cengage Learning, 8 th Edition, New Delhi 2015.					
REFERENCES						
1	Grewal.B.S., Higher Engineering Mathematics, Khanna Publishers, New Delhi, 44 th Edition, 2018.					
2	Bali. N.P, Goyal. M. and Watkins. C., Advanced Engineering Mathematics, Firewall Media (An imprint of Lakshmi Publications Pvt., Ltd.), New Delhi, 7 th Edition, 2009.					
3	Jain. R.K. and Iyengar. S.R.K., Advanced Engineering Mathematics, Narosa Publications, New Delhi, 5 th Edition, 2016.					
4	Ramana. B.V., Higher Engineering Mathematics, McGraw Hill Education Pvt. Ltd, New Delhi, 2016.					
5	Thomas. G. B., Hass. J, and Weir. M.D, Thomas Calculus, 14 th Edition, Pearson India, 2018.					
COURSE OUTCOMES						
At the end of the course students should be able to						
CO1	Know about Eigen values and Eigen vectors and its role in the system of equations.					
CO2	Transform the real symmetric matrix from quadratic form to canonical form by means of orthogonal transformation.					
CO3	Determine the radius, centre and circle of curvature of any curve.					
CO4	Use differential calculus ideas on several variable functions.					
CO5	Apply multiple integral ideas in solving areas, volumes and other practical problems.					

23PYT101	ENGINEERING PHYSICS	L	T	P	C	
	(Common for AEROSPACE, AGRI, AUTO, CIVIL, FT, MECH & MCT)	3	0	0	3	
UNIT I CRYSTAL STRUCTURE					9	
Single crystalline, polycrystalline and amorphous materials – single crystals: unit cell, crystal systems, Bravais lattices, directions and planes in a crystal, Miller indices – inter-planar distances - coordination number and packing factor for SC, BCC, FCC, HCP structures; Crystal imperfections –point, line, surface and volume imperfections.						
UNIT II QUANTUM PHYSICS					9	
Black body radiation – Planck’s theory (derivation) – Deduction of Wien’s displacement law and Rayleigh – Jean’s Law from Planck’s theory — Properties of Matter waves –Physical significance of wave function-Schrödinger’s wave equations: Time independent and time dependent equations–Particle in a one dimensional box–Electron microscope-Scanning Electron Microscope (SEM) -Transmission Electron Microscope (TEM).						
UNIT III ELASTICITY					9	
Elasticity – Stress-strain diagram and its uses - factors affecting elastic modulus and tensile strength – torsional stress and deformations – twisting couple - torsion pendulum: theory and experiment - bending of beams - bending moment – cantilever: theory and experiment –uniform and non-uniform bending: theory and experiment - I-shaped girders						
UNIT IV PHYSICS OF ADVANCED MATERIALS					9	
Conductors: classical free electron theory (Lorentz –Drude theory) – electrical conductivity. Superconductors: definition – Meissner effect – type I & II superconductors – BCS theory. Nanomaterials: introduction and properties – synthesis – top-down process: Ball milling method - bottom-up approach: Physical Vapour deposition – applications.						
UNIT V NON-DESTRUCTIVE TESTING					9	
Introduction- Types of defects-Methods of NDT-Visual inspection- Liquid/Dye penetrant testing-Magnetic particle testing-Eddy current testing-Ultrasonic inspection method-Advantages-X-Ray radiography- X-ray Fluoroscopy-Comparison of conventional and real time radiography.						
		L: 45	T: 0	P: 0	J: 0	TOTAL: 45 PERIODS
TEXTBOOKS						
1.	Gaur R.K. and Gupta S.L, “Engineering Physics”, Dhanpat Raipublishers,2013					
2.	Dr.M.N.Avandhanulu,Dr.P.G.Kshirsagar,“ATextbookofEngineeringPhysics”,S.Chand,2014					
3.	Murugesan R And Kiruthika Sivaprasath , “Modern Physics”18 th edition, S.Chand2016					
REFERENCES						
1.	Rajendran.V, Engineering Physics,Tata Mcgraw-Hill Publishing Company Limited, NewDelhi.2017.					
2.	“Engineering Physics”,Wiley, 2013					
3.	A.S.Vasudeva,“Modern Engineering Physics”, S.Chand,2001					
4.	B.K.Pandey Chaturvedi,“Engineering Physics”,CengageLearning,2012					
5.	Charles Kittel,“Solid State Physics”,Wiley(2009),					
6.	Arthur Beiser, Concepts of Modern Physics, Tata McGraw-Hill, New Delhi, 2010.					
7.	C.P. Poole and F.J. Owens, Introduction to Nanotechnology, Wiley, New Delhi, 2007					
COURSE OUTCOMES						
At the end of the course students should be able to						
Co1: Understand the properties of Crystalline Materials.						

Co2: learn the basic concepts of Quantum Mechanics

Co3: Analyze the elastic properties of materials.

Co4: Utilize the knowledge to identify and develop the materials for specific applications.

Co5: Make use of Knowledge on different Non-Destructive testing techniques.

Course	PO												PSO	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO – I	S	M										M		
CO – II	S	M										M		
CO –III	S	M										M		
CO – IV	S	M		W								M		
CO – V	S	M			W							M		

23MET101	ENGINEERING MECHANICS				L	T	P	C
	(Common to All Non-Circuit Branches)				3	0	0	3
UNIT I	BASICS & STATICS OF PARTICLES						9	
Introduction - Units and Dimensions - Vectorial representation of forces and moments – Coplanar Forces - Laws of Mechanics - Lame’s theorem, Resolution and Composition of forces -Equilibrium of a particle - Principle of transmissibility –Free body diagram								
UNIT II	EQUILIBRIUM OF RIGID BODIES						9	
Types of supports and their reactions -requirements of stable equilibrium -Moments and Couples- - Vectorial representation of moments and couples —Varignon’s theorem and applications–Forces in space-Equilibrium of a particle in space–Equilibrium of Rigid bodies in three dimensions								
UNIT III	PROPERTIES OF SURFACES AND SOLIDS						9	
Determination of centroid of areas, volumes and mass–moment of inertia of plane- Parallel axis theorem and perpendicular axis theorem-product of inertia-mass moment of inertia.								
UNIT IV	DYNAMICS OF PARTICLES						9	
Displacements, Velocity and acceleration, their relationship-Relative motion–Curvilinear motion-Newton’s law-Work Energy Equation of particles								
UNIT V	FRICTION AND RIGID BODY DYNAMICS						9	
Friction force - Laws of sliding friction - equilibrium analysis of simple systems with sliding friction -wedge friction-. Rolling resistance -Translation and Rotation of Rigid Bodies –Velocity and acceleration								
L: 45					T: 0	P: 0	J: 0	TOTAL: 45 PERIODS
TEXTBOOKS								
1.	Beer,F.P and Johnston Jr.E.R. “Vector Mechanics for Engineers”, McGraw-Hill Education 11th Edition (India) Pvt Ltd. (2016).							
2.	J.L.Meriam&L.G.Karidge,Engineering VolumeI)andEngineeringMechanics: Dynamics, 8th edition, Wiley student edition, 2016							
REFERENCES								
1.	Vela Murali,“Engineering Mechanics”,Oxford University Press(2010)							
2.	D.P.Sharma “Engineering Mechanics”, Dorling Kindersley (India)Pvt. Ltd, New Delhi2010.							
3.	Dr.I.S Gujral“Engineering Mechanical”second edition,2011,Lakshmi Publication (P).Ltd.							
4.	ArthurP. Boresi and Richard J. Schmidt,“Engineering Mechanics: Statics and Dynamics”, Thomson Asia Private Limited, Singapore, 2010.							
5.	Hibbeller, R.C.,“Engineering Mechanics”,14 th edition, Prentice hall (2016).							
COURSEOUTCOMES								
At the end of the course students should be able to								
CO1: Recognize the basics of equilibrium of particles in2D and3D								
CO2: Review the requirements of equilibrium of rigid bodies in 2D and 3D								
CO3: Compute the center of mass and moment of inertia of surfaces and solids								
CO4: Predict displacement, velocity and acceleration of dynamic particles								
CO5: Solve for friction force and rigid body dynamics								

23EET101	BASIC ELECTRICAL AND ELECTRONICS ENGINEERING (Non-Circuit branches)	L	T	P	C
		3	0	0	3
UNIT I	ELECTRICAL CIRCUITS				9
DC Circuits: Conductor, Resistor, Inductor, Capacitor – Ohm’s Law - Kirchhoff’s Laws – Simple problems: Nodal analysis, Mesh analysis with Independent sources only (Steady state) AC Circuits and Parameters: Waveforms, Average value, RMS Value, Instantaneous power, real power, reactive power and apparent power, power factor (Simple problems only)					
UNIT II	ELECTRICAL MACHINES				9
Construction, Principle of operation, Basic equations and applications of DC Generator, DC Motor- Elementary treatment of Single-phase Transformer, Single and three phase Induction Motors, Synchronous Generator					
UNIT III	WIRING, GROUNDING AND SAFETY				9
Wiring: General Rules, materials and accessories, Types of wiring - Conduit wiring – Wiring layout of Residential building, Grounding: Importance of grounding, Types of grounding - Safety: Causes of accidents, Accident prevention.					
UNIT IV	ANALOG ELECTRONICS				9
Construction, working principle and VI characteristics of Diode, Zener diode, BJT, MOSFET, Applications: Bridge Rectifier, Voltage regulators, UPS, SMPS					
UNIT V	DIGITAL ELECTRONICS AND MEASURING INSTRUMENTS				9
Boolean Algebra-Logic Gates - Half Adder and Full Adders - A/D and D/A Conversion (Any one concept) Functional elements of an instrument, Construction and Operating Principle: Moving Coil and Moving Iron meters, Measurement of three phase power, Energy Meter, Data acquisition					
L: 45T:0 P:0 J:0		TOTAL: 45 PERIODS			

TEXT BOOKS

1. Muthu Subramanian.R, Salivahanan S, “Basic Electrical and Electronics Engineering”, Tata McGraw Hill Publishers,2010
2. Kothari DP and I.J Nagrath, “Basic Electrical and Electronics Engineering”, Second Edition, McGraw Hill Education, 2020

REFERENCES

1. V.Mittle, “Basic Electric engineering”, Tata McGraw Hill Publishers,2017
2. MehtaVK, Mehta Rohit, “Principles of Electrical Engineering and Electronics”, S. Chand & CompanyLtd,2010
3. Black & Decker, “The complete guide to Electrical Wiring”, S. Chand & Company Ltd,2012
4. Nagrath. IJ, “Electronics: Analog and Digital”, Prentice Hall India Pvt. Ltd., 2013
5. Mehta V K, Mehta Rohit, “Principles of Electronics”, S. Chand & Company Ltd, 2005

COURSE OUTCOMES

At the end of the course students should be able to

CO1: Familiarize the elementary concept of electric circuits

CO2: Understand the construction, operation and applications of electrical machines

CO3: Apply the concept of wiring and acquire the importance of grounding and safety

CO4: Gain knowledge on electronic devices and its applications

CO5: Acquire knowledge on basics of digital electronics and measurements

	a	b	c	d	e	f	g	h	i	j	k	l	PSO1	PSO2	PSO3
C01	S	M	S			W							S		
C02	S	M	S			W					S		S		
C03	S	M	S			W					S	W	S	M	
C04	S	M	S			W						W	S	M	
C05	S	M	S			W					S	W	S	M	

23GET103	HERITAGE OF TAMILS	L	T	P	J	C
	(Common to all B.E. / B. Tech. Courses)	1	0	0	0	1
UNIT I	LANGUAGE AND LITERATURE					3
Language Families in India - Dravidian Languages – Tamil as a Classical Language - Classical Literature in Tamil – Secular Nature of Sangam Literature – Distributive Justice in Sangam Literature- Management Principles in Thirukural - Tamil Epics and Impact of Buddhism & Jainism in Tamil Land - Bakthi Literature Azhwars and Nayanmars - Forms of minor Poetry - Development of Modern literature in Tamil - Contribution of Bharathiyar and Bharathidhasan.						
UNIT II	HERITAGE - ROCK ART PAINTINGS TO MODERN ART – SCULPTURE					3
Hero stone to modern sculpture - Bronze icons - Tribes and their handicrafts - Art of temple car making - - Massive Terracotta sculptures, Village deities, Thiruvalluvar Statue at Kanyakumari, Making of musical instruments - Mridhngam, Parai, Veenai, Yazh and Nadhaswaram - Role of Temples in Social and Economic Life of Tamils.						
UNIT III	FOLK AND MARTIAL ARTS					3
Therukoothu, Karagattam, Villu Pattu, Kaniyan Koothu, Oyillattam, Leather puppetry, Silambattam, Valari, Tiger dance - Sports and Games of Tamils.						
UNIT IV	THINAI CONCEPT OF TAMILS					3
Flora and Fauna of Tamils & Aham and Puram Concept from Tholkappiyam and Sangam Literature - Aram Concept of Tamils - Education and Literacy during Sangam Age - Ancient Cities and Ports of Sangam Age - Export and Import during Sangam Age - Overseas Conquest of Cholas.						
UNIT V	CONTRIBUTION OF TAMILS TO INDIAN NATIONAL MOVEMENT AND INDIAN CULTURE					3
Contribution of Tamils to Indian Freedom Struggle - The Cultural Influence of Tamils over the other parts of India – Self-Respect Movement - Role of Siddha Medicine in Indigenous Systems of Medicine – Inscriptions & Manuscripts – Print History of Tamil Books.						
		L : 15	T:0	P: 0	J: 0	Total: 15 PERIODS
TEXT BOOKS & REFERENCES						
<ol style="list-style-type: none"> 1. Social Life of Tamils (Dr.K.K.Pillay) A joint publication of TNTB & ESC and RMRL 2. Social Life of the Tamils - The Classical Period (Dr.S.Singaravelu) (Published by: International Institute of Tamil Studies. 3. Historical Heritage of the Tamils (Dr.S.V.Subatamanian, Dr.K.D. Thirunavukkarasu) (Published by: International Institute of Tamil Studies). 4. The Contributions of the Tamils to Indian Culture (Dr.M.Valarmathi) (Published by: International Institute of Tamil Studies.) 5. Keeladi - ‘Sangam City Civilization on the banks of river Vaigai’ 6. Studies in the History of India with Special Reference to Tamil Nadu (Dr.K.K.Pillay) 7. Porunai Civilization Journey of Civilization Indus to Vaigai (R.Balakrishnan) 						

23GEB101	DESIGN THINKING AND INNOVATION	L	T	P	J	C
	(Common to All B.E. / B. Tech. Courses)	1	0	0	4	3
UNIT I	INTRODUCTION TO DESIGN THINKING					3+12
A brief insight to Design Thinking and Innovation- People Centered Design & Evoking the ‘right problem’- Purpose of Design Thinking- Design Thinking Framework.						
UNIT II	PROCESS IN DESIGN THINKING (EMPATHY, DEFINE)					3+12
Design Thinking Process – Empathy – Uncovering and Investigating Community Concerns - Define: Examine and Reflect on the problem.						
UNIT III	CONCEPTING AND BUILDING (IDEA, CREATE)					3+12
Generating Ideas-Identifying top three ideas-Bundling the Ideas and create concepts-Rapid Prototyping						
UNIT IV	TESTING, REFINING AND PITCHING THE IDEAS					3+12
Importance & Testing the Design with People-Retest and Redefine Results-Creating a Pitch for the design.						
UNIT V	VALUE PROPOSITION DESIGN					3+12
Business Vs Start-up-Briefing the Problem-Problem Validation and User Discovery- Challenge Brief.						
		L :15	T: 0	P: 0	J: 60	Total:75 PERIODS
TEXT BOOKS						
1	Robert A Curedale0, Design Thinking Process & Methods 4th Edition, December 2017, Design Community College Inc.					
2.	Andrew Pressman, Design Thinking: A Guide to Creative Problem Solving for Everyone, First Edition, Nov 2018, Routledge.					
REFERENCES						
1	Idris Mootee, Design Thinking for Strategic Innovation - What They Can't Teach You at Business or Design School, First Edition, 2017, Wiley.					
2	Yves Pigneur, Greg Bernarda, Alan Smith, Trish Papadacos Alex Osterwalder, Value Proposition Design: How to Create Products and Services Customers Want, 2015, Wiley.					
3	Brown, Tim, and Barry Katz. Change by Design: How Design Thinking Transforms Organizations and Inspires Innovation, 2009, Harper Business.					
COURSE OUTCOMES:						
At the end of the course students should be able to						
CO1	Learn new approach-design thinking—that enhances innovation activities in terms of market impact, value creation, and speed.					
CO2	Feel the Empathy and can define their problems based on the Community Concerns					
CO3	Strengthen their individual and collaborative capabilities to identify customer needs, create sound concept hypotheses, collect appropriate data, and develop a prototype that allows for meaningful feedback in a real-world environment					
CO4	Translate broadly defined opportunities into actionable innovation possibilities and recommendations for client organization					
CO5	Become an Entrepreneurs					

23ENP101	PROFESSIONAL COMMUNICATION	L	T	P	C
		0	0	4	2
UNIT I	LISTENING SKILLS				10
The process of Listening & Barriers of listening, listening to Ted Talks and note taking, listening to conversations for specific information, Listening to classroom lectures/talks/Documentaries					
UNITII	READING				10
Cloze exercises, Picture perception, Reading and paraphrasing, Reading and interpreting.					
UNITIII	PROFESSIONALWRITING				10
Cover letter & Resume preparation, Email writing–formal & Informal, Content writing- Planning -writing-editing and proofreading, Report writing – types of report, report format-Fire Accident & Road Accident.					
UNITIV	COMMUNICATION&SOFTSKILLS				15
Communication & Barriers of Communication Verbal & Nonverbal Communication, Time Management, Stress Management, Inter & Intrapersonal skills, Professional ethics, Basic Etiquettes-SocialEtiquette-TelephoneEtiquettes-CorporateEtiquette.					
UNITV	SPEAKING				15
Introduction of self and others, Extempore Speech, Public Speaking, Art of Storytelling-Describing and Narrating, Presentation Skills- preparing PPT and Oral presentation, –Group Discussion– Teambuilding-Mock GD, Interview skills-resume based questions- competency based question-Mock Interview.					
L:0 T: 0 P:60 J:0 TOTAL:60Periods					

TEXTBOOKS

1.	Raman, Meenakshi & Sangeeth Sharma. Technical Communication: Principles and Practice, Oxford University Press, NewDelhi, 2011.
2.	Rizvi, Ashraf. M. Effective Technical Communication, Tata McGraw-Hill, NewDelhi,2005.

REFERENCES

1.	Muralikrishna, & Sunita Mishra. Communication Skills for Engineers. Pearson, NewDelhi. 2011
2.	Mitra K.Barun, –Effective Technical Communication– A Guide for Scientists and Engineers, Oxford University Press, New Delhi, 2006.
3	Leo Jones, Richard Alexander, New International Business English, updated Edition, Cambridge University Press, NY, USA.
4	Smith—Worthington, Darlene & Sue Jefferson. Technical Writing for Success. Cengage, Mason USA.
5	Sharon J. Gerson, Steven M. Gerson, –Technical Writing– Process & Product. 3 rd Edition, Pearson Education (Singapore) (P) Ltd., New Delhi.

COURSEOUTCOME

At the end of the course students should be able to
CO1: Make use of listening skills in both formal and informal contexts
CO2: Develop reading skill to comprehend ambiguity and complexity, and can articulate their own interpretations.
CO3: Demonstrate their writing skills for effective communication in both formal and informal situations
CO4: Discuss clearly, confidently, comprehensibly and communicate with one or many listeners using appropriate communicative strategies
CO5: Apply the various principles of communication in the workplace environment

Course	Programme Outcomes / Programme Specific Outcomes														
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	PSO-1	PSO-2	PSO-3
CO-I								S	M						
CO-II								S	M						
CO-III								S	S						
CO-IV								S	S						
CO-V								S	S						

LIST OF EXPERIMENTS:

Sl. No.	EXPERIMENT
1	Listening Exercises
2	Reading Exercises
3	Cover letter & Resume
4	E-Mail writing
5	Content Writing
6	Report writing
7	Public Speaking
8	Presentation Skills
9	Group Discussion
10	Interview skills

23GEP101	WORKSHOP PRACTICES LABORATORY	L	T	P	J	C
		0	0	4	0	2
LIST OF EXPERIMENTS						
GROUP A (CIVIL & MECHANICAL)						30
CIVIL ENGINEERING						12
Study of plumbing tools and Components Preparation of threads in pipes Preparation of single and multi-tap connections for domestic Study of carpentry tools and its applications Preparation of Cross Lap and Dove Tail Joints.						
MECHANICAL ENGINEERING						18
Study of different types of Welding and its applications Preparation of Butt, Lap and Tee joints Study of sheet metal and its applications Preparation of Rectangular, Square Trays and Funnel Demonstration of Lathe and Drilling Operations Demonstration of Smithy, Foundry tools and Power Tool Operations Plastic Moulding and Glass Cutting						
GROUP B (ELECTRICAL AND ELECTRONICS)						30
ELECTRICAL ENGINEERING PRACTICE						18
Residential housewiring using switches, fuse, miniature circuit breaker, indicator, Lamp and energy meter. Fluorescent lamp wiring Stair-case wiring. Measurement of electrical quantities –voltage, current, power & power factor in RL Circuit. Measurement of energy using single phase energy meter. Measurement of insulation resistance to earth of electrical equipment. Measurement of single and three phase voltages. Study of Iron Box, Emergency Lamp and Fan.						
ELECTRONIC ENGINEERING PRACTICE						12
Study of Electronic components and equipments –Resistor, color coding, measurement of AC signal parameter (peak-peak, rms period, frequency) using CRO. Verification of logic gates: AND, OR, Ex-OR and NOT. Generation of Clock Signal. Soldering practice–Components Devices and Circuits Using general purpose PCB. Characteristics of a PN Junction diode						
L: 0		T: 0		P: 60		J: 0
Total: 60 PERIODS						
COURSE OUTCOMES						
At the end of the course student should be able to:						
CO1	Demonstrate plumbing system and Carpentry for the required applications.					
CO2	Relate the basic machining operations with engineering problems.					
CO3	Apply different types of Welding processes and Sheet metal processes for the Industrial applications.					
CO4	Illustrate Residential House wiring and simple wiring circuits.					
CO5	Employ knowledge on measuring electrical quantities and usage of energy meters.					

23CHT103	ENVIRONMENTAL SCIENCE & SUSTAINABILITY	L	T	P	J	C
	(Common to all B.E / B.Tech)	2	0	0	0	0
UNIT I	ENVIRONMENT AND BIODIVERSITY					6
Definition, scope and importance of environment – need for public awareness. Eco-system and Energy flow– ecological succession. Introduction to biodiversity– Values of biodiversity – threats to biodiversity – endangered and endemic species of India – conservation of biodiversity: In-situ and ex- situ conservation of biodiversity. Field visit on Biodiversity.						
UNIT II	ENVIRONMENTAL POLLUTION					6
Causes, Effects and Preventive measures of Water, Soil, Air and Noise Pollutions. Solid, Hazardous and E-Waste management. Case studies on Occupational Health and Safety Management system (OHASMS). Environmental protection, Environmental protection acts.						
UNIT III	RENEWABLE SOURCES OF ENERGY-NIT (Trichy)					6
Energy management and conservation, New Energy Sources: Need of new sources. Solar energy, Wind energy, Ocean energy resources, Tidal energy conversion. Concept, origin and power plants of geothermal energy. Case study on Present Energy resources in India and its sustainability.						
UNIT IV	SUSTAINABILITY PRACTICES					6
Zero waste and R concept, Circular economy, ISO 14000 Series, Material Life cycle assessment, Environmental Impact Assessment. Sustainable habitat: Green buildings, Green materials, Energy efficiency, Sustainable transports. Sustainable energy: Energy Cycles carbon cycle, emission and Sequestration, Sustainable urbanization and technological change.						
UNIT V	SUSTAINABILITY AND MANAGEMENT					6
Development, GDP, Sustainability - concept, needs and challenges-economic and social aspects of sustainability - millennium development goals and protocols Global, Regional and local environmental issues and possible solutions-case studies. Concept of Carbon Credit, Carbon Footprint. Environmental management in industry- A case study.						
		L :30	T: 0	P: 0	J: 0	T: 30 PERIODS
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	Allen, D. T. and Shonnard, D. R., Sustainability Engineering: Concepts, Design and Case Studies, Prentice Hall.					
REFERENCES						
1	G.Tyler Miller, “Environmental Science” Cengage Learning India Pvt.Ltd. New Delhi.2011					
2	R.K. Trivedi, ‘Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standards’, Vol. I and II, Enviro Media. 38. Edition 2010.					
3	Gilbert M. Masters and Wendell. P.Ela, “Introduction to Environmental Engineering and Science” PHI Learning Pvt. Ltd. New Delhi.2010.					
4	Rajagopalan, R, ‘Environmental Studies-From Crisis to Cure’, Oxford University Press, Third Edition, 2015.					

5	Erach Bharucha “Textbook of Environmental Studies for Undergraduate Courses” Orient Blackswan Pvt. Ltd. 2013.
COURSE OUTCOMES :	
At the end of the course student should be able to:	
CO1	Understand the ecological balance and preservation of bio diversity.
CO2	Know the role of human in prevention of pollution and making a clean environment.
CO3	Explore the environmental impact of various energy resources and also get knowledge about conservation of non-conventional energy resources.
CO4	Recognize the different goals of sustainable development and apply them for suitable technological advancement and societal development.
CO5	Demonstrate the knowledge of sustainability practices and identify green materials, energy cycles and the role of sustainable urbanization.

SEMESTER II

23MAT102	COMPLEX ANALYSIS AND LAPLACE TRANSFORMS	L	T	P	J	C
	(Common to AEROSPACE, AGRI, AUTO, BME, CIVIL, ECE, EEE, FT, MECH, MCT)	3	1	0	0	4
UNIT I	VECTOR CALCULUS					9+3
Derivatives: Gradient and Directional derivatives – Divergence and Curl of a vector field – Solenoidal and Irrotational of a vector – Green’s, Gauss divergence and Stoke’s theorems (statements only) – Verification of theorems and application in evaluating line, surface and volume integrals.						
UNIT II	ORDINARY DIFFERENTIAL EQUATIONS					9+3
Higher order linear differential equations with constant coefficients – Method of variation of parameters – Homogenous equation of Euler’s and Legendre’s type – Solution of system of simultaneous linear first order differential equations with constant coefficients.						
UNIT III	COMPLEX DIFFERENTIATION					9+3
Derivatives of $f(z)$ – Analytic function – Cauchy-Riemann Equations – Harmonic function – Harmonic conjugate – Construction of Analytic function – Conformal Mapping – Mapping by functions: $w = z + c$, cz , $1/z$ – Bilinear transformations – Application to flow problems.						
UNIT IV	COMPLEX INTEGRATION					9+3
Cauchy’s integral theorem – Cauchy’s integral formula – Taylor’s series – Zeros of an analytic function – singularities – Laurent’s series – Residues – Cauchy Residue theorem.						
UNIT V	LAPLACE TRANSFORMS					9+3
Definition, properties, existence conditions – Transforms of elementary functions – Shifting theorem – Transforms of derivatives and integrals – Periodic functions – Initial and final value theorem – Inverse transforms – Application to solution of linear second order ordinary differential equations with constant coefficients.						
		L : 45	T:15	P: 0	J: 0	Total:60PERIODS
TEXT BOOKS						
1.	Kreyszig.E, Advanced Engineering Mathematics, John Wiley and Sons, 10 th Edition, New Delhi 2016.					
2.	Grewal.B.S., Higher Engineering Mathematics, Khanna Publishers, New Delhi, 44 th Edition, 2018.					
REFERENCES						
1.	Bali. N.P, Goyal. M. and Watkins. C., Advanced Engineering Mathematics, Firewall Media (An imprint of Lakshmi Publications Pvt., Ltd.), New Delhi, 7 th Edition, 2009.					
2.	G.B.Thomas, Calculus, 12 th Edition, Pearson Education India, 2015.					
3.	Jain. R.K. and Iyengar. S.R.K., Advanced Engineering Mathematics, Narosa Publications, New Delhi, 5th Edition, 2016.					
4.	Peter V.O Neil, “Advanced Engineering Mathematics”, 7 th Edition, Cengage learning India Pvt Ltd, New Delhi, 2012.					
5.	Srimanta Pal, Subodh C Bhunia, “Engineering Mathematics”, Oxford University Press,2015.					

COURSE OUTCOMES	
At the end of the course students should be able to	
CO1	Evaluate gradient, divergence and curl and solve engineering problems involving cubes, rectangular parallelepipeds by applying various integral theorems.
CO2	Solve the higher order linear differential equations with various methods and apply them in some physical situations.
CO3	Test the analyticity, construct the analytic function and transform complex functions from z-plane to w-plane graphically by using conformal mapping.
CO4	Evaluate real and complex integrals over suitable closed path using various integral theorems.
CO5	Understand the mathematical principles on Laplace transforms and would provide them the ability to formulate and solve some of the physical problems of engineering.

23CHT102	CHEMISTRY OF ENGINEERING MATERIALS	L	T	P	J	C	
(Common to MECH, MCT, AUTO, AERO, AGRI, CIVIL & FT)		3	0	0	0	3	
UNIT I	CORROSION AND ITS CONTROL						9
Corrosion - Chemical corrosion (Oxidation corrosion)-Electrochemical Corrosion-Types of electrochemical Corrosion -Corrosion Control-Corrosion inhibitors- Cathodic protection (Sacrificial anodic protection and Impressed current Cathodic protection)–Protective Coating-Paints and its constituents -Fire Retardant Paint-Electroplating (Au)							
UNIT II	NANOMATERIALS						9
Nano materials and Bulk materials-Size dependent properties (Optical, Electrical and Mechanical) –Synthesis- Solgel method- Chemical Vapour Deposition, Solvothermal, laser ablation- Types of Nano materials-Carbon nano tubes–Properties and uses Application of Nano technology in Electronics Energy science and Medicine.							
UNIT III	FUELS AND COMBUSTION						9
Fuels- Solid Fuel-Coal-classification-manufacture of metallurgical coke by Otto-Hoffmann method- Liquid Fuel–Synthetic petrol-Fischer and Bergius method- - Gaseous fuels- CNG and LPG.- Bio fuels:Categories,Types–Biodiesel,Biogas.Combustion-Calorificvalue-GrossandNetcalorificvalue- Definition-Flue gas analysis by Orsat Apparatus.							
UNIT IV	WATER TECHNOLOGY						9
Introduction-Hard water and Soft water -Hardness-Types-Boiler Troubles- Water Softening – External treatment-Demineralization-Internal Treatment-Water Quality parameters (pH, TDS, Chloride, Fluoride, Sulphate, Iron, BOD, COD and Heavy metals)- Municipal water treatment - Desalination – Reverse osmosis.							
UNIT V	ALLOYS AND ENGINEERING MATERIALS						9
Alloys-classification -Ferrous alloys (Nichrome and stainless steel only)-Non-ferrous alloys (brass and bronze) Heat treatment of steel- Definition of light metals, Characteristics and applications of light metals-Super alloys -Lubricants –Solid lubricants (Graphite and Molybdenum disulphide)-Mechanism of Lubrications. Cement –Portland cement-Chemical composition of Portland cement. Functions and limitations of cement ingredients.							
		L :45	T:0	P:0	J:0	Total: 45 PERIODS	
TEXTBOOKS							
1	P.C.Jain & Monicka Jain, “Engineering Chemistry”, Dhanapat Rai Publishing Company Pvt.Ltd.2017.						
2.	Wiley, “Engineering Chemistry”, John Wiley & Sins. Inc, USA (2014]						
REFERENCES							
1	B. Sivasankar “Engineering Chemistry” Tata McGraw-Hill Pub. Co. Ltd, New Delhi (2009).						
2	Shikha Agarwal, Engineering Chemistry-Fundamentals and Applications, Cambridge University Press, Delhi, SecondEdition,2019.						
3	Dr.Sivanesan and Nandagopal, “EngineeringChemistry-I”V.K.Pub.Pvt.Ltd.2011.						

23ENT101	COMMUNICATIVE ENGLISH	L	T	P	C
		3	0	0	3
UNIT I					9
Grammar - Tenses - Verb forms, Spelling and Importance of Punctuation, Vocabulary - Word formation- Prefixes & Suffixes, one-word Substitution, Reading -Reading and understanding the Context, Writing - Sentence completion- filling the gap, Instructions- Imperative Instructions					
UNIT II					9
Grammar - Uses of Preposition, Active & Passive Voice- impersonal passive, Vocabulary - Technical Vocabulary- Synonyms-Antonyms-Compound words, Reading -Transfer of information (chart, pictures), Writing - Recommendations- writing suggestions, Preparing Checklist.					
UNIT III					9
Grammar -Concord (Subject & Verb agreement), Definite & Indefinite Article, Vocabulary - Uses of Connectives and Linking words, Reading - Summarizing the given passage - Précis writing, Writing - Paragraph writing – Process writing, Analytical, Argumentative paragraphs.					
UNIT IV					9
Grammar - Direct and Indirect speech, Cause and Effect Expression, Vocabulary - Logical sequence of words, Reading -Note-making using Linear method, Writing - Formal Letter writing- Permission letter for Industrial Visit & In-plant training.					
UNIT V					9
Grammar - Clauses -If Conditionals, Vocabulary - Words often confused - Verbal Analogy, Reading - Writing a Book Review Writing - Business Letters- Letter of Quotations, Clarification, Placing orders & Complaint letter.					
L: 45 T: 0 P: 0 J: 0TOTAL:45 Periods					

TEXT BOOKS	
1.	Raman, Meenakshi & Sangeetha Sharma. Technical Communication: Principles and Practice, Oxford University Press, New Delhi, 2011.
2.	Rizvi, Ashraf. M. Effective Technical Communication, Tata McGraw-Hill, New Delhi, 2005.

REFERENCES	
1.	Muralikrishna, & Sunita Mishra. Communication Skills for Engineers. Pearson, New Delhi. 2011
2.	Mitra K. Barun, —Effective Technical Communication – A Guide for Scientists and Engineers, Oxford University Press, New Delhi, 2006.
3.	Leo Jones, Richard Alexander, New International Business English, updated Edition, Cambridge University Press, NY, USA.
4.	Smith—Worthington, Darlene & Sue Jefferson. Technical Writing for Success. Cengage, Mason USA.
5.	Sharon J. Gerson, Steven M. Gerson, —Technical Writing – Process & Product. 3rd Edition, Pearson Education (Singapore) (P) Ltd., New Delhi.

At the end of the course students should be able to

CO1: Use their active and passive vocabulary and construct basic sentence structures

CO2: **Develop** reading skill to comprehend ambiguity and complexity, and can articulate their own interpretations

CO3: **Mark** effectively and flawlessly avoiding grammatical errors for a variety of professional and social settings

CO4: **Make use of** their letter writing skills for effective communication in form Situations

CO5: **Build** their communication skills and enable to articulate with confidence

Course	Programme Outcomes / Programme Specific Outcomes														
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	PSO1	PSO2	PSO3
CO-I		1		1				1	3	3	1	1			
CO-II		1		1			2	2	3	3	3	3			
CO-III		1		1			2	3	3	3	3	3			
CO-IV		1		1			2	2	3	3	3	3			
CO-V		1		1			2	2	3	3	3	3			

23ITT101	PROGRAMMING IN C AND DATA STRUCTURES					L	T	P	J	C
	(Common to BME, ECE and All Non-Circuit Branches)					3	0	0	0	3
UNIT I	INTRODUCTION TO C								8	
Basic blocks of computers–Algorithm, Pseudocode, Flowchart-Structure of C Program-Datatypes - Variables-Constants, Operators-Input and Output Statements										
UNIT II	DECISIONS STATEMENTS AND FUNCTIONS								11	
Decision making and Branching statements-Looping statements, Functions, Call by value, Call by reference										
UNIT III	ARRAYS AND INTRODUCTION TO DATA STRUCTURES								10	
Arrays – One dimensional arrays – Two dimensional Arrays - Structures – Pointers Introduction to Data structures - Types of Data structures – ADT										
UNIT IV	STACK AND QUEUE								9	
Stack ADT-Queue ADT-Array implementation of Queue and Stack ADT-Infix to Postfix conversion-Postfix expression evaluation										
UNIT V	TREES								7	
Trees-Binary Tree-Binary Search Tree-Insertion and Deletion Operation-Tree Traversal										
TOTAL: 45 PERIODS										
1.	Kamthane Ashok, “Programming in C, Pearson Education India 3/e,3rdEdition,2015.									
2.	Aaron M.Tenenbaum, Yedidyah Langsam, Moshe Augenstein,“Data Structures Using C”, Prentice-Hall of India, 2003									
REFERENCES										
1.	A. V. Aho, J. E. Hopcroft, and J. D. Ullman, “Data Structures and Algorithms”, Pearson Education, 2nd Edition, 2007. (Unit III-V)									
2.	E.Balagurusamy“DataStructuresUsing”,McGraw-HillEducation(India),2013(IV-V)									
3.	E.Balagurusamy,“Fundamentals of Computing and Computer Programming”, Tata McGRaw- Hill Publishing Company Limited, (2011). (UNIT I, II)									
COURSE OUTCOMES										
At the end of the course students should be able to										
CO1: Develop algorithms and draw flow chart for solving real world problems										
CO2: Summarize decision making branching and looping statement.										
CO3: Demonstrate functions, arrays and data structure.										
CO4: Describe stack and queue data structure.										
CO5: Have knowledge in tree and its operation.										

23MET102	ENGINEERING DRAWING					L	T	P	J	C
	(Common to all Non-Circuit Branches)					1	0	4	0	3
UNIT I	PROJECTION OF POINTS, LINES AND PLANE SURFACES								3+12	
Projection of points-Projection of straight lines located in the first quadrant-Determination of true Lengths and true inclinations Projection of polygonal surface and circular lamina inclined to both reference planes.										
UNIT II	PROJECTION OF SOLIDS								3+12	
Projection of simple solids like prisms, pyramids, cylinder and cone when the axis is inclined to one reference plane by change of position method										
UNIT III	SECTION OF SOLIDS AND DEVELOPMENT OF SURFACES								3+12	
Sectioning of above solids in simple vertical position by cutting planes inclined to one reference plane and perpendicular to the other-Obtaining true shape of section. Development of lateral surfaces of Simple and truncated solids -Prisms, pyramids, cylinders and cones.										
UNIT IV	PICTORIAL PROJECTIONS AND FREEHAND SKETCHING								3+12	
Principles of isometric projection -isometric scale -isometric projections of simple solids, truncated prisms, pyramids, cylinders and cones. Free hand sketching: Representation of Three-Dimensional objects Need for importance of multiple views and their placement -First angle projection -layout views -Developing visualization skills through free hand sketching of multiple views from pictorial drawing. Perspective projection of prisms, pyramids and cylinders by visual ray method (Not for Examination).										
UNIT V	BUILDING DRAWING								3+12	
Drawing of a plan, Elevation and sectioning of security room and residential building (Two bed rooms, kitchen, hall, etc.) Practicing design in the CAD Software (Not for Examination).										
					L: 15	T: 0	P:60	J: 0	Total: 75 PERIODS	
TEXTBOOKS										
1	N.D.Bhattand V.M.Panchal, “Engineering Drawing”, Charotar Publishing House,53 rd Edition, 2016									
2	K. R. Gopalakrishnan, “Engineering Drawing” (Vol.I& II), Subhas Publications,2014									
REFERENCES										
1	K.V. Natarajan, “A textbook of Engineering Graphics”, Dhanalakshmi Publishers, Chennai, 2015									
2	M.S.Kumar,“EngineeringGraphics”,D.D.Publications,2011									
3	Venugopal &V. PrabhuRaja,“Engineering Graphics”, New Age International (P) Limited, 2014									
4	M.B. ShahandB.C. Rana, “Engineering Drawing”, Pearson Education, 2011.									
5	K.L.Narayanan andP.Kannaiah, “Engineering Drawing” SciTech Publications, 2 nd edition,2012.									
COURSEOUTCOMES										
At the end of the course student should be able to:										
CO1	Sketch the projections of a points, straight lines and plane surfaces									
CO2	Illustrate top view and front view of the solids									
CO3	Sketch sectioned views and develop area required									
CO4	Demonstrate knowledge about isometric, perspective and orthographic projections									
CO5	Design simple buildings with detailed plan and sectional elevation									

COs	ProgrammeOutcomes/ProgrammeSpecificOutcomes													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3													
CO2	3	2								2			1	
CO3	3	2								2	3			
CO4	3			2						2				1
CO5	3			2										

23MET103	INTRODUCTION TO MECHANICAL ENGINEERING	L	T	P	J	C
		3	0	0	0	3
UNIT I	INTRODUCTION TO MECHANICAL ENGINEERING	9				
Introduction to Mechanical Engineering (Overview only): Role of Mechanical Engineering in Industries and Society- Emerging Trends and Technologies in different sectors such as Energy, Manufacturing, Automotive, Aerospace, and Marine sectors.						
UNIT II	INTRODUCTION TO ADVANCED MANUFACTURING SYSTEMS	9				
Steam Formation and Application: Modes of heat transfer, Steam formation, Types of steam, Steam properties and applications of steam Introduction to Advanced Manufacturing Systems: Introduction, components of CNC, advantages and applications of CNC, 3D printing.						
UNIT III	INTRODUCTION TO IC ENGINES	9				
Introduction to IC Engines: Components and working principles, Four Stroke Petrol and Diesel engines, Application of IC Engines, Performance of IC engines						
UNIT IV	INTRODUCTION TO REFRIGERATION AND AIR CONDITIONING	9				
Principle of refrigeration, Refrigerants and their desirable properties. Working principle of VCR refrigeration system, working principle of room air conditioner & Applications of air Conditioners						
UNIT V	INSIGHT INTO FUTURE MOBILITY TECHNOLOGY	9				
Electric and Hybrid Vehicles, Components of Electric and Hybrid Vehicles. Advantages and disadvantages of Electric Vehicles (EVs) and Hybrid vehicles. Introduction to Mechatronics and Robotics: open-loop and closed-loop mechatronic systems. Joints & links, Robot anatomy, Applications of Robots in material handling, processing and assembly and inspection.						
		L: 45	T: 0	P: 0	J: 0	TOTAL: 45 PERIODS
TEXT BOOKS						
1	Elements of Mechanical Engineering, K R Gopala Krishna, Subhash Publications, 2022.					
2.	Elements of Workshop Technology (Vol. 1 and 2), Hazra Choudhry and Nirzar Roy, Media Promoters and Publishers Pvt. Ltd., 2020.					
REFERENCES						
1	An Introduction to Mechanical Engineering, Jonathan Wickert and Kemper Lewis, Third Edition, 4, 2019					
2	Manufacturing Technology- Foundry, Forming and Welding, P.N.Rao Tata McGraw Hill 3rd Ed., 2019.					
3	Robotics, Appu Kuttan KK K. International Pvt Ltd, volume 1					
4	Ananthanarayanan, "Basic Refrigeration And Air Conditioning", Wiley-VCH Verlag GmbH, Vol 3, 2015.					
5	Introduction to Robotics: Mechanics, Planning, and Control, 2018.					
COURSE OUTCOMES						
At the end of the course student should be able to:						
CO1	Understand the role of mechanical engineering in industry and society,					
CO2	Describe the fundamentals of steam and advanced manufacturing systems.					
CO3	Intercept the concept of IC engines and its types.					
CO4	Analyze different air conditioning systems and economic applications.					
CO5	Remember the aspects of future mobility and fundamentals of robotics					

23GET104	TAMILS AND TECHNOLOGY	L	T	P	J	C	
	(Common to all B.E. / B. Tech. Courses)	1	0	0	0	1	
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 - Building materials and Hero stones of Sangam age – Details of Stage Constructions in Silappathikaram - Sculptures and Temples of Mamallapuram - Great Temples of Cholas and other worship places - Temples of Nayaka Period - Type study (Madurai Meenakshi Temple)- Thirumalai Nayakar Mahal - Chetti Nadu Houses, Indo - Saracenic architecture at Madras during British Period.							
UNIT III	MANUFACTURING TECHNOLOGY						3
Art of Ship Building - Metallurgical studies - Iron industry - Iron smelting, steel -Copper and gold- Coins as source of history - Minting of Coins – Beads making-industries Stone beads -Glass beads - Terracotta beads -Shell beads/ bone beats - Archeological evidences - Gem stone types described in Silappathikaram.							
UNIT IV	AGRICULTURE AND IRRIGATION TECHNOLOGY						3
Dam, Tank, ponds, Sluice, Significance of KumizhiThoompu of Chola Period, Animal Husbandry - Wells designed for cattle use - Agriculture and Agro Processing - Knowledge of Sea - Fisheries – Pearl - Conche diving - Ancient Knowledge of Ocean - Knowledge Specific Society.							
UNIT V	SCIENTIFIC TAMIL & TAMIL COMPUTING						3
Development of Scientific Tamil - Tamil computing – Digitalization of Tamil Books – Development of Tamil Software – Tamil Virtual Academy – Tamil Digital Library – Online Tamil Dictionaries – Sorkuvai Project.							
		L : 15	T:0	P: 0	J: 0	Total: 15 PERIODS	
TEXT BOOKS & REFERENCES							
<ol style="list-style-type: none"> 1. Social Life of Tamils (Dr.K.K.Pillay) A joint publication of TNTB & ESC and RMRL – (in print) 2. Social Life of the Tamils - The Classical Period (Dr.S.Singaravelu) (Published by: International Institute of Tamil Studies. 3. Historical Heritage of the Tamils (Dr.S.V.Subatamanian, Dr.K.D. Thirunavukkarasu) (Published by: International Institute of Tamil Studies). 4. The Contributions of the Tamils to Indian Culture (Dr.M.Valarmathi) (Published by: International Institute of Tamil Studies.) 5. 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) 6. Studies in the History of India with Special Reference to Tamil Nadu (Dr.K.K.Pillay) (Published by: The Author) 7. Porunai Civilization (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu) 8. Journey of Civilization Indus to Vaigai (R.Balakrishnan) (Published by: RMRL) – Reference Book. 							

23CHP101	CHEMISTRY LABORATORY (Common to All Branches)				L	T	P	J	C	
					0	0	2	0	1	
LIST OF EXPERIMENTS (ANY EIGHT) 30 hours										
1. Estimation of alkalinity of water sample by indicator method										
2. Determination of hardness of water sample by EDTA method										
3. Estimation of Dissolved oxygen in water sample by Winkler's method										
4. Estimation of Chloride in water sample by Argentometric method										
5. Estimation of copper in brass by EDTA method										
6. Determination of strength of HCl and CH ₃ COOH present in a mixture conduct metrically										
7. Estimation of strength of iron by potentiometric titration										
8. Determination of molecular weight of given polymer by Ostwald's viscometer										
9. Determination of Strength of HCl by pH metry										
10. Determination of corrosion rate of mild steel by weight loss method										
Demo Experiments										
11. Synthesis of nanomaterials by chemical precipitation method										
12. Estimation of strength of iron by spectrophotometry										
L :0					T: 0	P: 30		J: 0	T: 30 PERIODS	
TEXT BOOKS										
1. Department of Chemistry "Chemistry Laboratory Manual",2019										
REFERENCE BOOKS										
1. Vogel's "Text book of Quantitative Analysis", Jeffery G H, Basset J. Mentom J, Denney R.C., 6 th edition, EBS, 2009.										
COURSE OUTCOMES										
At the end of the course students should be able to										
CO1: Analyze the quality of water samples through basic techniques										
CO2: Estimate the amount of metal ions in domestic and industry water										
CO3: Determine the absolute viscosity and molecular weight of Organic solvents										
CO4: Interpret the corrosion rate of metals										

23ITP101	PROGRAMMING IN C AND DATA STRUCTURES LABORATORY					L	T	P	J	C
	(Common to BME, ECE and All Non-Circuit Branches)					0	0	4	0	2
LIST OF EXPERIMENTS										
1	Algorithms and Flow Chart i) Sequential ii) Branching and Looping									
2	Operators & Expressions i) Arithmetic ii) Logical iii) Relational									
3	Condition Statements i) Nested if else ii) Else-if Ladder									
4	Looping i) For ii) While iii) Do-while									
5	Functions i) With and without arguments ii) With and without return type iii) Call by value and Call by reference									
6	Arrays i) Searching element in one dimensional array ii) Matrix multiplication									
7	Structures									
8	Pointers									
9	Implementation of Stack ADT									
10	Implementation of Queue ADT									
11	Implementation of Tree Traversal									
12	Implementation of Binary Search Tree ADT									
					P:60	TOTAL:60 PERIODS				
HARDWARE/SOFTWARE REQUIRED (For a Batch of 30 Students)										
Hardware	<ul style="list-style-type: none"> • 30 PCs with Processor-2.0GHz or Higher • RAM-1GB or Higher • Harddisk-20GB or Higher 									
Software	<ul style="list-style-type: none"> • TURBOC version 3 (or) GCC version 3.3.4 • OS-Windows 2000/Windows XP/NT 									
COURSE OUTCOMES										
At the end of the course students should be able to										
CO1: Develop algorithm and draw flow chart to solve problem. CO2: Write simple programs using basic concepts and control statements in C language. CO 3: Write programs using arrays, structures and pointers. CO4: Implement stack and queue data structure CO5: Implement binary search tree ADT										

23MCP101	INTERNSHIP - I	L	T	P	J	C
		-	-	-	-	1
<ol style="list-style-type: none"> 1. The Internship is provided for the students to update themselves with the recent Technologies and professional skills for better prospects in the future. 2. Internship in industry subjected to permissions from Government and concern Industry subject to the conditions of following the SOP issued by the concern and written consent of the student and parents. 3. Student is supposed to produce joining letter and relieving letter once the internship is over in case of offline internship in any industry. 4. Online internship in industry / other agencies. 5. Seminar by student under mentorship of a faculty. 6. A detailed report shall be submitted based on his Internship and shall be done by only one student. 7. A Mini Project- on some suitable topic related to the branch of study. It can be small fabrication / experimental results/ simulations / Programmes/ application development etc., depending on the branch of the student. Preferably a single student should do it. <p>Student has to prepare detailed report and submit to his/her college.</p> <ol style="list-style-type: none"> 8. A copy of report can be kept in the departments for record. 9. Each student must be assigned a faculty as a mentor from the college and an Industry expert as co-mentor. 10. The evaluation of the work done by students will be carried by the internal and external examiner. 11. External examiner will evaluate for 80 marks and internal examiner will evaluate for 20 marks. 12. The presentation by student in the presence of all students is desirable. 13. Student should produce successful completion certificate in case of offline / online internship in industry 						
						2 Weeks

23HST103	INDIAN CONSTITUTION				L	T	P	J	C
	(Common to All B.E. / B. Tech. Courses)				2	0	0	0	0
UNIT I	INTRODUCTION								6
Historical Background – Constituent Assembly of India – Philosophical foundations of the Indian Constitution – Preamble – Fundamental Rights – Directive Principles of State Policy – Fundamental Duties – Citizenship – Constitutional Remedies for citizens.									
UNIT II	STRUCTURE AND FUNCTION OF CENTRAL GOVERNMENT								6
Union Government – Structures of the Union Government and Functions – President – Vice President – Prime Minister – Cabinet – Parliament – Supreme Court of India – Judicial Review.									
UNIT III	STRUCTURE AND FUNCTION OF STATE GOVERNMENT								6
State Government – Structure and Functions – Governor – Chief Minister – Cabinet – State Legislature – Judicial System in States – High Courts and other Subordinate Courts.									
UNIT IV	CONSTITUTION FUNCTIONS								6
Indian Federal System – Center – State Relations – President’s Rule – Constitutional Amendments – Constitutional Functionaries – Assessment of working of the Parliamentary System in India.									
UNIT V	ELECTION COMMISSION								6
Election Commission: Role and Functioning, Chief Election Commissioner and Election Commissioners, State Election Commission: Role and Functioning, Institute and Bodies for the welfare of SC/ST/OBC and women.									
					L :30	T: 0	P: 0	J: 0	T:30 PERIODS
TEXT BOOKS									
1	Durga Das Basu, “Introduction to the Constitution of India”, Prentice Hall of India, New Delhi.								
2	R.C.Agarwal, “Indian Political System”, S.Chand and Company, New Delhi. (1997)								
REFERENCES									
1	Maciver and Page, “Society: An Introduction Analysis “, Mac Milan India Ltd., New Delhi.								
2	K.L.Sharma, “Social Stratification in India: Issues and Themes”, Jawaharlal Nehru University, New Delhi. (1997)								
3	Sharma, Brij Kishore, “Introduction to the Constitution of India”, Prentice Hall of India, NewDelhi.								
4	U.R.Gahai, “Indian Political System”, New Academic Publishing House, Jalaendhar.								
5	R.N. Sharma, “Indian Social Problems”, Media Promoters and Publishers Pvt. Ltd.								
COURSE OUTCOMES:									
At the end of the course students should be able to									
CO1	Understand the functions of the Indian government.								
CO2	Know the structure and functioning of central government.								
CO3	Understand functioning of Indian constituent.								
CO4	Analyze the functions of the Indian government								
CO5	Summarize the functioning of election commission.								

SEMESTER III

23MAT201	PARTIAL DIFFERENTIAL EQUATIONS AND TRANSFORMS	L	T	P	J	C
	(Common to AEROSPACE,AGRI,AUTO,BME,CIVIL,ECE,EEE,FT,MECH,MCT)	3	0	0	0	3
UNIT I	PARTIAL DIFFERENTIAL EQUATIONS					9
Formation of partial differential equations –Solutions of standard types of first order partial differential equations – Lagrange’s linear equation – Linear partial differential equations of second order with constant coefficients of homogeneous types– Applications.						
UNIT II	FOURIER SERIES					9
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
Classification of PDE – 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
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
Z-transforms – Elementary properties –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.						
		L : 45	T: 0	P: 0	J: 0	Total: 45 PERIODS
TEXT BOOKS						
1.	Kreyszig.E, Advanced Engineering Mathematics, John Wiley and Sons, 10 th Edition, New Delhi 2016.					
2.	Grewal.B.S., Higher Engineering Mathematics, Khanna Publishers, New Delhi, 44 th Edition, 2018.					
REFERENCES						
1.	Bali. N.P, Goyal. M. and Watkins. C., Advanced Engineering Mathematics, Firewall Media (An imprint of Lakshmi Publications Pvt., Ltd.), New Delhi, 7 th Edition, 2009.					
2.	James. G., "Advanced Modern Engineering Mathematics", 4thEdition, Pearson Education, New Delhi, 2016.					
3.	Ramana. B.V., "Higher Engineering Mathematics", McGraw Hill Education Pvt. Ltd, New Delhi, 2018.					
4.	Wylie. R.C. and Barrett. L.C., “Advanced Engineering Mathematics “Tata McGraw Hill Education Pvt. Ltd, 6th Edition, New Delhi, 2012.					
5.	Andrews. L.C and Shivamoggi. B, "Integral Transforms for Engineers" SPIE Press, 1999.					

COURSE OUTCOMES

At the end of the course students should 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 transforms and partial differential equations would provide them the ability to formulate and solve some physical problems of engineering.
CO5	Use the effective mathematical tools for the solutions of partial differential equations by using Z transform techniques for discrete time systems.

CO/PO Mapping

(S/M/W Indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO1	PSO2
CO 1	3	3			2				2	1		2		
CO 2	3	3			2				2	1		2		
CO 3	3	3			2				2			2		
CO 4	3	3		2	2				2			2		
CO 5	3	3		2	2				2			2		

23MET201	ENGINEERING THERMODYNAMICS	L	T	P	J	C	
	(Use of approved Steam tables is permitted)						
		3	0	0	0	3	
UNIT I	BASIC CONCEPTS AND FIRST LAW						9
Basic concepts - concept of continuum - comparison of microscopic and macroscopic approach - Path and point functions - Intensive and extensive - total and specific quantities - System and their types - Thermodynamic Equilibrium-state, path and process - Quasi - static - reversible and irreversible processes - Heat and work transfer - definition and comparison - sign convention - Displacement work and other modes of work - P-V diagram - Zeroth law of thermodynamics - First law of thermodynamics –application to closed and open systems -steady flow processes and its applications.							
UNIT II	SECOND LAW & ENTROPY						9
Heat Reservoir-source and sink -Refrigerator and heat pump-Second law of Thermodynamics-Statements of second law and its corollaries - Carnot cycle -Reversed Carnot cycle - Performance - Carnot theorem - Clausius equality – inequality- Concept of Entropy -T-s & h-s diagram -entropy change for pure substance - ideal gases - different processes - principle of increase in entropy - Applications of II Law -Exergy analysis and its applications							
UNIT III	PROPERTIES OF PURE SUBSTANCE						9
Formation of steam and its thermodynamic properties, - P-V, P-T, T-V, T-s & h-s , P -V-T surface - Use of Steam Table and Mollier Chart - Determination of dryness fraction-Throttling, Separating and Throttling - Application of I& II law for pure substances							
UNIT IV	ANALYSIS OF POWER GENERATION CYCLES						9
Air-standard Power Cycles - Concept - Carnot Cycle - Otto Cycles - Diesel Cycle - Dual Cycle - Brayton Cycle - Efficiency and Mean Effective Pressure and Temperature Qualitative Treatment only :Vapor Power Cycles - Concept - Carnot Cycle - The Rankine Cycle - Effect of Temperature and Pressure on The Rankine Cycle - The Superheat Cycle -The Reheat Cycle -- The Regenerative Cycle							
UNIT V	IDEAL AND REAL GASES, GAS MIXTURE, THERMODYNAMIC RELATIONS						9
Mole and Mass fraction - Dalton's. Properties of gas mixture -Molar mass - gas constant - density. Properties of Ideal gas - Ideal and real gas comparison - Equations of state for ideal and real Gases - Reduced Properties - Compressibility Factor - Maxwell relations - Tds Equations - Difference and ratio of heat Capacities - Energy Equation -Joule -Thomson Coefficient -Clausius - Clapeyron equation and its applications.							
		L : 45	T: 0	P: 0	J: 0	Total: 45 PERIODS	
TEXT BOOKS							
1.	Nag.P.K., "Engineering Thermodynamics", 5 th Edition, Tata McGraw - Hill, New Delhi, 2013.						
2.	Cengel. Y and M.Boles, "Thermodynamics - An Engineering Approach", 8 th Edition, Tata McGraw Hill 2014.						
REFERENCES							
1	Moran, Shapiro, Boettner & Bailey "Principles of Engineering Thermodynamics:" Wiley & Sons,2015.						
2	Holman.J.P. "Thermodynamics", 3rd Edition, McGraw - Hill, 1995.						
3	Rathakrishnan. E., "Fundamentals of Engineering Thermodynamics", 2nd Edition, Prentice - Hall of India Pvt. Ltd, 2006						
4	Arora C.P, "Thermodynamics", Tata McGraw - Hill, New Delhi, 2007.						
5	Kau - Fui Vincent Wong, "Thermodynamics for Engineers", CRC Press, 2010 Indian Reprint.						

COURSE OUTCOMES	
At the end of the course student should be able to:	
CO1	Describe the laws of thermodynamics and their application to a open and closed of systems.chart CO3:demonstrateCarnot,Clausius equality and Inequality theorems and apply the principles of
CO2	Determine dryness fraction of pure substances undergoing processes using Mollier entropy in real time applications.
CO3	DemonstrateCarnot,Clausius equality and Inequality theorems and apply the principles of entropy in real time applications
CO4	Illustrate the principles of various steam power cycles and to solve problems related to steam undergoing various processes
CO5	Analyze the properties of ideal, real and its gas mixtures and apply the knowledge of mathematical relations in thermodynamic equations.

CO/PO Mapping														
(S/M/W Indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak														
CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO1	PSO2
CO 1	3		2			1		1		2		2		
CO2	3	3				2	1		3	2	2	3		3
CO3	2		2			3		2			1		2	
CO4				3		1			2					1
CO 5	1	2			3		3		1		2	2	1	2

23MET202	MANUFACTURING TECHNOLOGY	L	T	P	J	C
		3	0	0	0	3
UNIT-I	CASTING AND JOINING PROCESSES					9
Sand Casting: Sand Mould, Sand Properties, Core Making – Patterns: Types, Materials, allowances – Types of Melting furnaces, Solidification and Cooling, Special casting processes: Types – Fettling - Defects in Sand casting- Gas welding -Types -Flame characteristics– Types of Special Welding Processes – Electron Beam welding and Friction Stir Welding – Brazing, Soldering and Adhesive Bonding - Weld defects – Applications.						
UNIT-II	METAL FORMING AND SHEET METAL PROCESSES					9
Mechanical working of Metals- Plastic deformation theory – Principles - Hot working and Cold working of metals: Forging-Types - Extrusion - Drawing processes – Sheet metal Processes and characteristics– Special forming Processes: Types - Rubber pad forming - Explosive forming - Peen Forming.						
UNIT-III	THEORY OF METAL CUTTING AND TURNING MACHINES					9
Mechanics of chip formation - Single point cutting tool - Forces in machining - Types of chip - Cutting tools -Nomenclature – Orthogonal, Oblique metal cutting - Thermal aspects - Cutting tool materials - Tool wear - Tool life - Surface finish - Cutting fluids and Machinability. Centre lathe - Constructional features - Specification - Operations -Taper turning methods - Thread cutting methods - Machining time and Power estimation - Capstan and turret lathes						
UNIT-IV	MULTI POINT CUTTING AND ABRASIVE MACHINING PROCESSES					9
Types of operations–Drilling - Reaming - Boring - Tapping -Milling operations –Types of milling cutter. Gear manufacturing: Gear milling and Hobbing -Gear shaping and finishing process. Abrasive processes -Grinding wheel - specifications and selection -Types of grinding process-Typical applications– Broaching – Operations – Applications						
UNIT-V	NON - TRADITIONAL MACHINING AND SURFACE MODIFICATION					9
Need for NDT –LBM – EBM – EDM – ECM Applications - Advantages and limitations. Introduction to Powder metallurgy – applications. Surface modification – Methods-CVD- PVD- Electroplating- shot blasting – Application to electronic components manufacturing – Micro fabrication process						
		L : 45	T : 0	P : 0	J : 0	Total: 45 PERIODS
TEXT BOOKS						
1.	Kalpakjian. S, “Manufacturing Engineering and Technology”, Pearson Education India Edition, 8 th edition, 2023					
2.	Hajra Choudhury S.K and Hajra Choudhury A.K., "Elements of workshop Technology", volume I and II, Media promoters and Publishers Private Limited, Mumbai, 14 th edition, 2020.					
REFERENCES						
1	HMT, "Production Technology", Tata McGraw Hill, 2020.					
2	Darell Rush, “Process and Materials of Manufacture,” 4 th Edition, M. Hill Didactics 2022.					
3	Rao, P.N. "Manufacturing Technology Foundry, Forming and Welding", Volume I, 5 th Edition, 2018.					
4	Sharma, P.C., "A Text book of production Technology (Manufacturing Processes)", S. Chand and Co. Ltd., 2022					
5	Rao, P.N. "Manufacturing Technology Metal Cutting and Machine Tools", Volume II 4 th Edition, 2021.					

COURSE OUTCOMES

At the end of the course student should be able to:

CO1	Possess basic knowledge on metal casting and metal joining processes.
CO2	Identify the various methods of metal forming and sheet metal processes
CO3	Understand the metal cutting parameters and various turning operations
CO4	Distinguish various milling, gear cutting and grinding operations
CO5	Compare nontraditional machining operations and surface enhancement methods.

CO/PO Mapping**(S/M/W Indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak**

PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO1	PSO2
2		2			1		1		2		2		
3	3				2	1		3	2	2	3		3
2		2			3		2			1		2	
			3		1			2					1
1	2			3		3		1		2	2	1	2

23MET203	ENGINEERING MATERIALS AND METALLURGY	L	T	P	J	C
		2	0	0	0	2
UNIT I	MECHANICAL PROPERTIES AND DEFORMATION MECHANISMS					6
Mechanisms of plastic deformation - slip and Twinning- Types of Fracture - Testing of materials under tension - compression and shear loads - Hardness tests (Brinell, Vickers and Rockwell) - hardness tests -Impact test Izod and charpy-Fatigue and creep failure mechanism.						
UNIT II	CONSTITUTION OF ALLOYS AND PHASE DIAGRAMS					6
Constitution of alloys–Solid solutions - substitutional and interstitial - phase diagrams -eutectoid - eutectic -peritectic - peritectoid reactions - Iron - Iron carbide equilibrium diagram - microstructure - properties and applications-Microstructural Elements - Introduction to material selection and reliability.						
UNIT III	HEAT TREATMENT					6
Definition -Full annealing - stress relief - recrystallization - spheroidizing–normalizing - hardening and tempering of steel - Construction of TTT diagrams - CCT diagrams -Hardenability - Austempering - martempering - case hardening –carburizing -nitriding- cyaniding - carbonitriding –Effects of Heat treatment.						
UNIT IV	FERROUS AND NON FERROUS METALS					6
An introduction to alloy elements-Effect of alloying additions on steel - HSLA -Maraging steels - Cu alloys -Aluminium and Al -Cu -precipitation strengthening treatment -Bearing alloys - Mg - alloys and Titanium alloys.						
UNIT V	NON - METALLIC MATERIALS					6
Polymers -types of polymer - commodity and engineering polymers–Properties and applications of various thermosetting and thermoplastic polymers (PP, PS, PVC, PMMA, PET, ABS, PPO, PEEK, PTFE, Polymers -Urea and Phenol formaldehydes) - Engineering Ceramics - Properties and Applications of Al ₂ O ₃ -SiC and SIALON- Nano materials-Properties and applications.						
		L : 30	T : 0	P : 0	J : 0	Total: 30 PERIODS
TEXT BOOKS						
1.	Kenneth G.Budinski and Michael K.Budinski “Engineering Materials” Prentice - Hall of India Private Limited, 9 th Indian Reprint 2009.					
2.	Donald R. Askeland, Pradeep P. Fulay, Wendelin J. Wright The Science and Engineering of Materials 5 th Edition 2010.					
REFERENCES						
1	William D Callister “Material Science and Engineering”, John Wiley and Sons, 9th Edition, 2014.					
2	Raghavan.V “Materials Science and Engineering”, Prentice Hall of India Pvt., Ltd., 6th Edition 2015.					
3	Sydney H.Avner “Introduction to Physical Metallurgy” McGraw Hill Book Company, 3rd Edition, 2010.					
4	Dieter G.E.,” Mechanical Metallurgy”, McGraw Hill Book Company, 3rd Edition, 2013.					
5	Vijendra Singh., “Heat Treatment of Metals”, Standard Publishers Distributors, 3rd Edition, 2012.					
COURSE OUTCOMES						
At the end of the course student should be able to:						
CO1	Describe the deformation mechanism and mechanical properties.					
CO2	Explain the Constitution of Alloys, Microstructure and their Phase change					
CO3	Apply the Heat Treatment Concepts for various materials to meet the manufacturing requirements					
CO4	Choose the Ferrous and Non Ferrous Metals for various applications					
CO5	Select the Non Metallic Materials based on the properties to suit the applications.					

CO/PO Mapping**(S/M/W Indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak**

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO1	PSO2
CO 1	2			2										
CO2		2			3								1	
CO 3			2						1					1
CO 4						1	3					3	2	
CO 5							2					2		

23GET275	VQAR-I	L	T	P	J	C
	(Common to All B.E. / B. Tech. Courses)	2	0	0	0	2
UNIT I	QUANTITATIVE ABILITY I					8
Number theory- Shortcuts, Divisibility rule- Unit place deduction-LCM &HCF, Square root and Cube Root, Decimal & Fraction Percentage, Profit, loss and discount, Simple and compound interest, Ratio & Proportions, Mixtures & Allegation, Partnership.						
UNI II	QUANTITATIVE ABILITY II					6
Problems on Ages, Average, Clocks, Calendar, Data Interpretation- Bar chart- Pie chart- Line chart- Tables chart.						
UNIT III	VERBAL REASONING I					7
Analytical reasoning– Linear and circular arrangement, Blood relation, Direction Problems, Puzzles. Logical reasoning - Number and Alpha series, Odd man out, Element series and Logical series, Coding and decoding, Analogy, Classification, Logical sequence of words.						
UNIT IV	LINGUISTICS SKILLS I					6
Parts of Speech- Noun, Verb, Participle, Articles, Pronoun, Preposition, Adverb, Conjunction. Logical sequence of words, Tense & Voice, Comparison.						
UNIT V	LINGUISTICS SKILLS II					3
Comprehension - Comprehend and understand a paragraph, Paragraph writing.						
		L :30	T: 0	P: 0	J: 0	T: 30 PERIODS
TEXT BOOKS						
1	Rajesh Varma, “Fast Track Objective Arithmetic”, Arihant Publications.					
2	M. K. Panday, “Analytical Reasoning”, Magical Series.					
3	BS Sijwali- Indu Sijwali, A New Approach to “Reasoning Verbal, Non-Verbal & Analytical”, Arihant Publications.					
4	John Eastwood, “Oxford Practice Grammar”, Oxford.					
REFERENCES						
1	R.V.Praveen, “Quantitative Aptitude and Reasoning” PHI Publication.					
2	R.S.Agarwal, “Quantitative Aptitude for Competitive Examinations”,S.Chand & Company Pvt Limited.					
3	R.S.Agarwal, “A modern approach to Verbal & Non-verbal reasoning”, S.Chand & Company Pvt Limited.					
COURSE OUTCOMES :						
At the end of the course students should be able to						
CO 1	Apply the number system for solving application-orientated concepts in quantitative aptitude.					
CO 2	Apply the financial ability for solving application-orientated concepts in quantitative aptitude and in the data interpretation techniques.					
CO 3	Analyze the analytical reasoning and logical reasoning in verbal aptitude applications.					
CO 4	Apply appropriate grammar in both speaking and writing.					
CO 5	Analyze the given content and write a creative content.					

CO/PO Mapping**(S/M/W Indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak**

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO1	PSO2
CO 1	1	2				2	2	1	1			2	3	
CO2	2	1	1				1	1			2		2	
CO3	2	2		1			2		2			1	3	2
CO4	1							2		1			2	3
CO 5								2		1			3	3

23MEB201	FLUID MECHANICS AND MACHINERY	L	T	P	J	C
		3	0	2	0	4
UNIT-I	FLUID PROPERTIES AND FLOW CHARACTERISTICS					9 + 6
Units and dimensions - Properties of fluids -. Pascal's law and hydrostatic law. Absolute, gauge and vacuum pressures. Pressure measurement devices - U-tube manometers, pressure gauges. Flow characteristics -concept of control volume - application of continuity equation, energy equation and momentum equation.						
Lab Experiments:						
<ul style="list-style-type: none"> ➤ Verification of Bernoulli's equation ➤ Determination of the coefficient of discharge of given Orificemeter / Venturimeter. 						
UNIT-II	FLOW THROUGH CIRCULAR CONDUITS					9 + 6
Hydraulic and energy gradient - Laminar flow through circular conduits - Boundary layer concepts - types of boundary layer thickness -Darcy Weisbach equation –friction factor - Moody diagram commercial pipes - minor losses -Flow through pipes in series and parallel.						
Lab Experiments:						
<ul style="list-style-type: none"> ➤ Determination of friction factor for a given set of pipes ➤ Determination of major and minor losses in pipes 						
UNIT-III	DIMENSIONAL ANALYSIS AND SIMILITUDE					9
Need for dimensional analysis –dimensional analysis by using Buckingham's π theorem method- Similitude –types of similitude - Dimensionless parameters - Reynold's Number - Froude's Number - Euler's Number - Weber's Number - Mach's Number - application of dimensionless Parameters-Model analysis.						
UNIT-IV	PUMPS					9 + 6
Impact of jets -Euler's equation - Theory of rotodynamic machines- various efficiencies-velocity components at entry and exit of the rotor - velocity triangles -Centrifugal pumps-working principle - work done by the impeller - Reciprocating pump - working principle. Rotary pumps – classifications.						
Lab Experiments:						
<ul style="list-style-type: none"> ➤ Performance studies on centrifugal pump ➤ Performance studies on reciprocating pump 						
UNIT-V	TURBINES					9 + 12
Classification of turbines -heads and efficiencies -velocity triangles. Axial, radial and mixed flow turbines. Pelton wheel, Francis turbine and Kaplan turbines - working principles - work done by water on the runner -draft tube. Specific speed - unit quantities - performance curves for turbines - governing of turbines						
Lab Experiments:						
<ul style="list-style-type: none"> ➤ Performance studies on Pelton wheel ➤ Performance studies on Francis turbine ➤ Performance studies on of Kaplan turbine 						
		L : 45	T : 0	P : 30	J : 0	Total: 75 PERIODS
TEXT BOOKS						
1.	Yunus A. Çengel, John M. Cimbala., Fluid Mechanics: Fundamentals and Applications, McGraw - Hill Higher Education, 2010, 2 nd edition.					
2.	Bansal, R.K., Fluid Mechanics and Hydraulics Machines, Laxmi Publications (P) Ltd., New Delhi. 2011. 10 th Edition.					

REFERENCES	
1	Modi P.N. and Seth, S.M. "Hydraulics and Fluid Mechanics including Hydraulic Machines", Standard Book House, New Delhi 2013. 19th Edition
2	Robert W. Fox, Alan T. McDonald, Philip J. Pritchard, "Fluid Mechanics and Machinery", 2011
3	Kumar. K.L., Engineering Fluid Mechanics, Eurasia Publishing House (P) Ltd., New Delhi, 2010. 8th Edition
4	Streeter. V. L., and Wylie, E.B., Fluid Mechanics, McGraw Hill, 2010. 9th Edition
5	Rajput.R.K, "A text book of Fluid Mechanics and Hydraulic Machines", S.Chand & Company Ltd., New Delhi, sixth edition, 2010

COURSE OUTCOMES	
At the end of the course student should be able to:	
CO1	Explain the fundamental concepts of fluid mechanics with different properties of fluids.
CO2	Analyse and calculate major and minor losses associated with pipe flow in piping networks.
CO3	Predict the nature of physical quantities and to predict the behavior of the prototype/model by applying model laws
CO4	Analyse the performance of pumps.
CO5	Analyse the performance of hydraulic turbines.

CO/PO Mapping														
(S/M/W Indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak														
CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO1	PSO2
CO 1	3	3											3	
CO 2	3	3				2							3	
CO 3	3	3	3			2							3	2
CO 4	3	3			3								3	3
CO 5	3	3			3								2	2

23ITP204	PROGRAMMING IN PYTHON (Common to All B.E/B.Tech Programme Except CSE, IT and AIML)	L	T	P	J	C
		0	0	4	0	2
LIST OF EXPERIMENTS						
<ol style="list-style-type: none"> 1. Program for various base conversion functions. 2. Programs to demonstrate the usage of operators and conditional statements 3. Programs to demonstrate usage of control structures 4. Program using array operation 5. Programs to demonstrate the usage of String functions 6. Program using classes and functions 7. Program to implement recursive function. 8. Program to implement lambda function. 9. Program on file manipulation 10. Programs to demonstrate the usage of lists, sets, dictionaries and tuples. 11. Program to implement function template. 12. Program to implement class template 						
L: 0 T: 0 P: 60 J: 0 TOTAL: 60						
PERIODS						
HARDWARE / SOFTWARE REQUIRED FOR A BATCH OF 30 STUDENTS						
Hardware <ul style="list-style-type: none"> ▪ LAN System with 33 nodes (OR) Standalone PCs – 33 Nos. ▪ Printers – 3 Nos. Software <ul style="list-style-type: none"> ▪ OS – Windows ▪ Python 3.7.4 						
COURSE OUTCOMES						
At the end of the course student should be able to:						
CO 1	Write simple programs using built-in data types of Python.					
CO 2	Apply the conditional statements and loops for solving problems.					
CO 3	Implement arrays, strings and functions in Python					
CO 4	Identify the commonly used operations involving lists, sets, dictionaries, tuples and file handling in real time applications.					
CO 5	Implement exemplary applications related to templates for solving real time problems.					

23MEP201	COMPUTER AIDED MACHINE DRAWING	L	T	P	J	C
		0	0	4	0	2

List of Exercises using software capable of Drafting , Modeling ,and Assembly

1.DRAWING STANDARDS

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.

2.1D GEOMETRIC MODELLING

2.1 Introduction

3D Modeling software such as SOLIDEDGE/AUTOCAD/PRO-E

2.2 Real Components Drawing:

Simple components are given, such as Bolts & Nut, Hacksaw frame, Brake shoe, etc... and made to draw their views and to draw assembly drawing.

2.3 Creation of 3D assembly model of following machine elements using 3D Modelling software

1. Flange Coupling
2. Plummer Block
3. Screw Jack
4. Universal Joint
5. Machine Vice
6. Stuffing box
7. Crosshead
8. Safety Valves
9. Piston
10. Connecting rod

L : 0 T: 0 P: 0 J: 30 Total: 30 PERIODS

COURSE OUTCOMES

At the end of the course students should be able to

CO 1	Use the concept of drafting and modeling with help of software.
CO 2	Display various views of engineering objects.
CO 3	Apply the knowledge to read industry drawing
CO 4	Create 3D drawings of simple models.
CO 5	Assemble the 3D Component through assembly environment

MINIPROJECT

A batch of four students will carry out this mini project on Material testing under the guidance of a faculty advisor through Design Thinking Approach. The project outlines the involvement of the students to study the mechanical properties of combination of metals /alloys / influence of one metal over the other/ by creating a standard test piece and carrying out various tests to ascertain the same. A combined project report to be submitted along with a viva for end semester evaluation.

MATERIAL TESTING

Materials testing, measurement of the characteristics and behavior of metals, ceramics, or plastics under various conditions and for a particular application

The mini project shall be made under a combination of the following material testing methods:

1. Tension test on mild steel/ tor-steel/ high strength steel and cast iron using Universal Testing Machine and extensometers.
2. Compression Test on springs (Open and closed coiled).
3. Torsion pendulum (mild steel, aluminium and brass wires).
4. Hardness test (Brinell, Vickers and Rockwell).
5. Impact test (Izod and Charpy).
6. Torsion test on mild steel rods.
7. Shear test on mild steel rods.
8. Fatigue test on mild steel rods.
9. Bending test on wooden beams

L : 0 T: 0 P:2 J:0 30 Total: 30 PERIODS

SEMESTER IV

23MAT204	STATISTICS AND NUMERICAL METHODS	L	T	P	J	C
	(Common to AEROSPACE, AGRI, AUTO, EEE, FT, MECH)	3	0	0	0	3
UNIT I	TESTING OF HYPOTHESIS					9
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	DESIGNS OF EXPERIMENTS					9
One way and two-way classifications– Completely randomized design – Randomized block design – Latin square design– Applications of ANOVA.						
UNIT III	SOLUTIONS OF EQUATIONS					9
Newton Raphson method – Solution of linear system of equations – Gauss elimination method – Pivoting Gauss Jordan methods – Iterative methods of Gauss Jacobi and Gauss Seidal.						
UNIT IV	INTERPOLATION, NUMERICAL DIFFERENTIATION AND NUMERICAL INTEGRATION					9
Lagrange’s interpolation – Newton’s forward and backward difference interpolation – Approximation of derivatives using interpolation polynomials – Numerical single integration using Trapezoidal and Simpson’s 1/3 rules.						
UNIT V	NUMERICAL SOLUTION OF ORDINARY DIFFERENTIAL EQUATIONS					9
Single step methods: Taylor’s series method – Euler’s method – Modified Euler’s Method – Fourth order Runge- Kutta method for solving first order equations – Multi step methods: Milne’s predictor-corrector methods for solving first order equations.						
		L : 45	T:0	P: 0	J: 0	Total: 45 PERIODS
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, Freund J., “Miller and Freund’s Probability and statistics for Engineers”, and I Pearson Education Asia, 9th Edition, 2018.					
REFERENCES						
1.	Walpole. R.E., Myers. R.H., Myers. S.L. and Ye. K., “Probability and Statistics for Engineers and Scientists”, 9 th Edition, Pearson Education, Asia, 2010.					
2.	Burden, R.L and Faires, J.D, "Numerical Analysis", 9 th Edition, Cengage Learning, 2016.					
3.	Devore. J.L., "Probability and Statistics for Engineering and the Sciences", Cengage Learning, New Delhi, 8 th Edition, 2014.					
4.	Gerald. C.F. and Wheatley. P.O. "Applied Numerical Analysis" Pearson Education, Asia, New Delhi, 7 th Edition, 2007.					
5.	Spiegel, M. R., Schiller, J. and Srinivasan, R. A., "Schaum’s Outlines on Probability and Statistics”, Tata McGraw Hill edition, 4th Edition, 2012.					

COURSE OUTCOMES

At the end of the course students should be able to

CO 1	Test a hypothesis concerning variances and proportions.
CO 2	Apply the basic concepts of classifications of design of experiments in the field of agriculture.
CO 3	Solve a set of algebraic equations representing steady state models formed in engineering problems
CO 4	Appreciate the numerical techniques of interpolation in various intervals and apply the numerical techniques of differentiation and integration for engineering problems.
CO 5	Predict the system dynamic behavior through solution of ODEs modelling the system

CO/PO Mapping**(S/M/W Indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak**

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO1	PSO2
CO 1	2	3	3	2									3	
CO2	3	2	3		2		2					3	3	2
CO3	3	3	3	3									3	
CO4	3	2	2	2								3	3	2
CO 5	3	2	2				2					2	3	2

23MET205	STRENGTH OF MATERIALS				L	T	P	J	C
		3	1	0	0	4			
UNIT I	STRESS, STRAIN DEFORMATION OF SOLIDS						12		
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	BEAMS -SHEAR FORCE, BENDING MOMENT AND THEORY OF BENDING						12		
Types of beams: Supports and Loads - Shear force and Bending Moment in beams - Cantilever simply supported and Overhanging beams -Point of contra Flexure - Stresses in beams: Bending and shear stress.									
UNIT III	TORSION AND SPRINGS						12		
Torsion formulation stresses and deformation in circular and hollows shafts – Stepped shafts– Deflection in shafts fixed at the both ends – Stresses in helical springs – Deflection of helical springs- Leaf springs.									
UNIT IV	DEFLECTION OF BEAMS AND BUCKLING OF COLUMNS						12		
Elastic curve of Neutral axis of the beam under normal loads - Evaluation of beam deflection and slope: Macaulay Method - Columns- Strength of column- End conditions -equivalent length of a column -Euler equation -Slenderness ratio -Rankine formula for columns.									
UNIT V	THIN CYLINDERS, SPHERES AND THICK CYLINDERS						12		
Stresses in thin cylindrical shell due to internal pressure circumferential and longitudinal stresses and deformation in thin and thick cylinders – spherical shells subjected to internal pressure – Deformation in spherical shells.									
L : 45					T: 15	P: 0	J: 0	Total: 60 PERIODS	
TEXT BOOKS									
1.	R.K.Bansal, "Strength of Materials", Laxmi Publications (P) Ltd., 2020.								
2.	R.K.Rajput, “Strength of Materials”, S.Chand and Company Ltd., New Delhi 2022.								
REFERENCES									
1	R.S.Khurmi, “Strength of Materials”, S.Chand and Company Ltd. New Delhi 2019.								
2	Ray Hulse, Keith Sherwin & Jack Cain, “Solid Mechanics”, Palgrave ANE Books, 2020.								
3	Ryder G.H, “Strength of Materials, Macmillan India Ltd”., Third Edition, 2019								
4	Ferdinand P. Beer, Russell Johnson, J.r. and John J. Dewole "Mechanics of Materials", Tata McGraw Hill Publishing 'co. Ltd., New Delhi, 2018								
5	Jindal U.C., "Strength of Materials", Asian Books Pvt. Ltd., New Delhi, 2019								
COURSE OUTCOMES									
At the end of the course student should be able to:									
CO1	Describe the fundamentals about the simple stresses, strains and deformation in components due to external loads								
CO2	Draw the shear force and bending moment diagrams for various beams								
CO3	Explain the effect of torsion on shaft and springs.								
CO4	Determine the deflection of the beams and buckling of columns.								
CO5	Evaluate the stresses in cylindrical and spherical components.								

CO/PO Mapping

(S/M/W Indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO1	PSO2
CO 1	3												3	2
CO2	2	2	3										3	
CO3	2	3		2									3	2
CO4	3	2	2		2							2	3	
CO 5	3	2	2	2								2	3	2

23MET206	METROLOGY AND MEASUREMENTS	L	T	P	J	C
		2	0	0	0	2
UNIT I	BASICS OF METROLOGY					5
Introduction to Metrology - Needs – Elements of measuring system - Types of standards - Performance of measuring instruments - Errors in Measurements – Calibration-Deterministic, Scientific, Legal and Applied metrology.						
UNIT II	LINEAR AND ANGULAR MEASUREMENTS					7
Linear Measuring Instruments (Vernier Caliper, Micrometer, Comparator) - Types - Angular measuring instruments -Types - Sine bar - Autocollimator -Applications.						
UNIT III	FORM MEASUREMENT					6
Basic principles of geometrical features and Symbols -Thread measurement -Gear measurement - Surface finish Measurement - Introduction to 3D surface metrology- Parameters						
UNIT IV	ADVANCES IN METROLOGY					6
Basic concept of CMM -Types of CMM - Constructional features -Probes -Accessories -Software - Applications -Basic concepts of Machine Vision System –TRIMOS measuring instruments – Nano Measurements - Computed tomography – Advancement in data analytics.						
UNIT V	MEASUREMENT OF POWER AND TEMPERATURE					6
Power – Force measurement (Mechanical, Pneumatic, Hydraulic and Electrical Type) – Torque sensor - Temperature measurement -Thermocouples Temperature sensors -Electrical resistance thermometer-Langmuir probes – Change of State Sensors.						
		L : 30	T : 0	P : 0	J : 0	Total: 30 PERIODS
TEXT BOOKS						
1.	Jain R.K. “Engineering Metrology”, Khanna Publishers, 2022 (New Edition).					
2.	John H. Lienhard V Thomas G. Beckwith, Roy D. Marangoni, “Mechanical Measurements”, Pearson Education, Sixth Revised Edition 2020.					
REFERENCES						
1	Dr.Venkat Reddy “Basics In Metrology And Measurements”, Invincible Publisher, 2021.					
2	Dr. Dhananjay K. Theckedath, Vaibhavi A. Sonetha, “Mechanical Measurements and Controls ”, Tech Knowledge Publications, 2023.					
3	Apeksha Thombre-Patil and Vinod Thombre-Patil “Mechanical Engineering Measurements ”, NiraliPrakashan, 2020.					
4	Mrinal Kaushik, “Instrumentation and Measurements in Compressible Flows”, CRC Publisher 2023.					
5	S. S. Chikshe Dr. M. M. Bhoomkar ., “engineering Metrology And Quality Control”, NiraliPrakashan, 2023.					
COURSE OUTCOMES						
At the end of the course student should be able to:						
CO1	Relate the concepts of measurements and errors.					
CO2	Demonstrate the linear and angular measurement devices.					
CO3	Select the form measurement devices for industrial application.					
CO4	Demonstrate the working of advanced measuring instruments used in Metrology.					
CO5	Calculate the parametric measurements.					

CO/PO Mapping														
(S/M/W Indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak														
CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO1	PSO2
CO 1	3		3			3		2			2			
CO2					3								3	
CO3	2							2						2
CO4		3				2					3		2	
CO 5		3				3					2			

23MET207	INTERNET OF THINGS FOR PRODUCTION SYSTEM				L	T	P	J	C			
		3	0	0	0	3						
UNIT I	FUNDAMENTALS OF IoT						9					
IoT, Architectures of IoT and IIoT, IIoT System components: Sensors, Gateways, Routers, Modem, Cloud brokers, WSN, WSN network design for IoT. Wireless communication of IoT microcontrollers, Introduction to hardware and software components in IoT, Microcontrollers – Arduino, Raspberry pi, Sensors, GPIO pins and specifications.												
UNIT II	IoT IN PRODUCTION SYSTEM						9					
Automation overview, Requirement of automation systems - Basic elements of an automated system – Advanced automated functions – Levels of Automation - Fundamentals of Automated Production Lines –Role of IIOT in Manufacturing Processes.												
UNIT III	IoT IN PRODUCTION AUTOMATION						9					
IoT enabling technologies: Wireless sensor networks, Cloud computing –Big Data - Machine to machine communication – Components of M2M – Features of M2M - Architecture and requirements of M2M– challenges and Standardization effort for M2M –Automated Storage and Retrieval system.												
UNIT IV	SMART PRODUCTION SYSTEM						9					
IoT controlled automated guided vehicle systems - Shop floor control - Use of IIoT in shop floor production and maintenance practices - Computer based data acquisition system, Internet of things (IoT) for plant automation - Industrial automation using robots. Advantages & Limitations in Automation. IoT smart energy management, Cybersecurity in Industry 4.0												
UNIT V	APPLICATIONS OF IoT IN PRODUCTION SYSTEM						9					
IoT for Plant automation - Case study: Industrial control and smart health of machineries. Quality control – IoTbased inventory management architecture – Predictive maintenance of machineries – Factory Digitalization - Product flow Monitoring. Smart metering – energy, water and other fuels – Optimal scheduling of machines - Smart tracking of components in production line												
L : 45					T: 0		P: 0		J: 0		Total: 45 PERIODS	
TEXT BOOKS												
1.	Mikell.P. Groover “Automation, Production Systems and Computer Integrated Manufacturing”, Prentice Hall of India, New Delhi, 2024											
2	Vijay Madiseti and Arshdeep Bahga, “Internet of Things (A Hands-on Approach)”, 1 st Edition, VPT, 2020											
REFERENCES												
1	N. Vengurlekar and P. Bagal, “Database Cloud Storage: The Essential Guide to Oracle Automatic Storage Management”, 1st edition, McGraw-Hill Education, 2023, ISBN-10: 0071790152.											
2	Bedworth, David, "Computer Integrated Design and Manufacturing", Tata McGraw-Hill, New Delhi, 4th Edition 2021											
3	Machine- to-machine communications edited by vojislav B. misic, Jelenamiscic, CRS press Taylor & francis group – 2021											
4	Giacomo Veneri, “Hands-on Industrial Internet of things”, Packt Publishing Ltd, FirstEdition, November 2018											
5	S. Jeschke, C. Brecher, H. Song, and D. B. Rawat, “Industrial Internet of Things: Cyber manufacturing Systems”, Springer, 1st edition, 2022, ISBN: 978-3319425580 (UNIT I,V)											

COURSE OUTCOMES	
At the end of the course student should be able to:	
CO 1	Acquire the knowledge on fundamentals of IIoT for application in industries.s
CO 2	Describe the concept of integration of IoT in production line.
CO 3	Examine the concept of machine-to-machine communication for industry automation.
CO 4	Recognize the methods of factory automation at shop floor level and apply it.
CO 5	Develop understanding and create methods to better align the future industrial needs.

CO/PO Mapping														
(S/M/W Indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak														
CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO1	PSO2
CO 1			2				3				3		2	
CO 2			2				3						3	
CO 3				2										
CO 4							3						2	3
CO 5	3						3			3		3		2

23GET276	VQAR-II	L	T	P	J	C
	(Common to All B.E. / B. Tech. Courses)	2	0	0	0	2
UNIT I	QUANTITATIVE ABILITY III					6
Time, speed & distance-Average speed- Relative speed- Train problems- Boats and streams- Races, Chain rule, Time and work -Pipes and cisterns						
UNIT II	QUANTITATIVE ABILITY IV					4
Permutation & Combination, Probability, Mensuration						
UNIT III	VERBALREASONING II					7
Machine Input and Output, Coded Inequalities, syllogisms, Problems on Cubes, Data sufficiency. Critical Reasoning -Statement and Argument, Statement and Assumption, Statement and Conclusion, Cause and effect, Course of action.						
UNIT IV	NON- VERBAL REASONING					5
Figure series, Odd man out, Mirror Image, Water image, Embedded Image, Cubes and Dices, Insert the Missing Characters, Analytical reasoning.						
UNIT V	LINGUISTICS SKILLSIII					8
Sentences - Simple, Compound, Complex & Mixed sentences, Sentence Rearrangement, Idioms & Phrases, Reading Comprehension at higher level, Word Substitution, Synonyms & Antonyms, Error Spotting.						
		L :30	T: 0	P: 0	J: 0	T: 30 PERIODS
TEXT BOOKS						
1	Rajesh Varma, “Fast Track Objective Arithmetic”, Arihant Publications.					
2	M.K.Panday, “Analytical Reasoning”, MagicalSeries.					
3	BS Sijwali- Indu Sijwali, A New Approach to “Reasoning Verbal, Non-Verbal & Analytical”, Arihant Publications.					
4	S.P.Bakshi, “Objective English” Arihant Publications.					
REFERENCES						
1	R.V.Praveen, “Quantitative Aptitude and Reasoning” PHI Publication.					
2	R.S.Agarwal, “Quantitative Aptitude for Competitive Examinations”,S.Chand & Company Pvt Limited.					
3	R.S.Agarwal, “A modern approach to Verbal & Non-verbal reasoning”, S.Chand & Company PvtLimited.					
COURSE OUTCOMES :						
At the end of the course students should be able to						
CO1	Learn the time and distance for solving application orientated concepts in quantitative aptitude					
CO2	Apply the financial ability for solving application orientated concepts in quantitative aptitude					
CO3	Analyze the verbal reasoning and the critical reasoning in quantitative aptitude.					
CO4	Analyze the non-verbal reasoning in verbal aptitude applications					
CO5	Apply appropriate LSRW skills					

CO/PO Mapping**(S/M/W Indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak**

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO1	PSO2
CO 1	3	3	3	2									3	
CO2	3	3	2	2									2	
CO3	3	3	3	2	2								3	2
CO4	3	3	2	2									2	2
CO 5	3	3	2									2	3	

23MEB202	THERMAL ENGINEERING	L	T	P	J	C
	(Use of standard thermodynamic tables, Mollier diagram, Psychrometric chart and refrigerant property tables are permitted)	2	0	2	0	3
UNIT I	FUELS AND COMBUSTION					6+6
Theory Fuels - Types - Calorific Values of fuels. combustion of fuels-Flue gas analysis, Bomb calorimeter and boys gas calorimeter-Ethanol Blending in Fuels-Indian Emission norms Practical 1. Determination of Viscosity -Red Wood Viscometer. 2. Determination of Flash Point and Fire Point.						
UNIT II	INTERNAL COMBUSTION ENGINES					6+9
Theory Introduction - Classification - Components and their function - Two stroke and four stroke engines - Valve Timing and Port Timing Diagrams - Petrol and Diesel engine - Carburetor system - Diesel pump and injector system - Lubrication system and Cooling system Practical 1. Conduct test Performance Test and Heat Balance Test on 4 - stroke Diesel Engine. 2. Conduct a Emission test on IC Engines using Exhaust gas analyzer						
UNIT III	STEAM BOILER, NOZZLES AND TURBINES					6+3
Theory BOILERS: Types and comparison, Mountings and Accessories. STEAM NOZZLES: Types of Nozzles, steam ejector, flow of steam through nozzles STEAM TURBINE: Impulse and reaction -principles -Compounding of turbine -Governing of turbine Practical: Analyze the flue gas circuit and steam circuit in Boilers						
UNIT IV	AIR COMPRESSOR					6+6
Theory RECIPROCATING AIR COMPRESSOR: Working principle-terminology, volumetric efficiency, multistage compressor ROTARY COMPRESSORS: Rotary positive displacement compressor- types-Roots Blower, Sliding Vane Compressor, Screw Compressor. Practical: Performance test on Reciprocating Air Compressor						
UNIT V	REFRIGERATION AND AIR CONDITIONING					6+6
Theory Refrigerants - Vapour compression refrigeration cycle - superheat -sub cooling -- working principle of vapour absorption system - Ammonia –Water - Lithium bromide -water systems (Description only). Air conditioning system -Processes - Types and Working Principles. Practical 1. Determination of COP of a Refrigeration system 2. Experiments on Air-conditioning system						
		L : 30	T: 0	P: 30	J: 0	Total: 60 PERIODS

TEXT BOOKS

1. Kothandaraman.C.P, Domkundwar.S, Domkundwar.A.V, "A course in thermal Engineering" Dhanpat Rai & sons, 6th edition, 2016.
2. Ganesan.V, " Internal Combustion Engines" 4th Edition, Tata McGraw Hill, 2017.

REFERENCES

- 1 Rajput. R. K., "Thermal Engineering" Chand Publishers, 10th edition 2020
- 2 Arora.C.P, "Refrigeration and Air Conditioning," Tata McGraw - Hill Publishers,4th edition, 2021
- 3 R S Kurmi,J K Gupta "Thermal Engineering" ,S Chand publications,2020
- 4 Rudramoorthy, R, "Thermal Engineering", Tata McGraw - Hill, New Delhi, 2017.
- 5 Sarkar, B.K, "Thermal Engineering" Tata McGraw - Hill Publishers,2017

COURSE OUTCOMES

At the end of the course student should be able to:

- CO 1** Evaluate the fuel properties and arrive at proximate and ultimate analysis of fuels.
- CO 2** Analyze the working of IC engines and various auxiliary systems present in IC engines
- CO 3** Analyze the performance of steam nozzle, calculate critical pressure ratio
- CO 4** Evaluate the performance parameters of an air compressor
- CO 5** Sketch the working principles of Refrigeration & Air conditioning systems.

CO/PO Mapping														
(S/M/W Indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak														
CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO1	PSO2
CO 1	2	3	3	2									3	
CO 2	3	2	3		2		2					3	3	2
CO 3	3	3	3	3									3	
CO 4	3	2	2	2								3	3	2
CO 5	3	2	2				2					2	3	2

23EEB210	ELECTRICAL MACHINES AND DRIVES					L	T	P	J	C	
						3	0	2	0	4	
UNIT-I	OVERVIEW OF ELECTRICAL DRIVE								9		
Basic Elements – Types of Electric Drives – factors influencing the choice of electrical drives – heating and cooling curves – power rating - classes of duty											
UNIT-II	ELECTRICAL MOTORS								9		
Review of DC motor and Induction motor, Constructional details, principle of operation and mechanical characteristics of synchronous motor, universal motor, servo motor, stepper motor and reluctance motor											
UNIT-III	SPEED CONTROL TECHNIQUES								9		
Armature and flux control method of D.C shunt motor, starting methods of D.C. motor and three-phase induction motor–electrical braking and its types.											
UNIT-IV	SOLID STATE SPEED CONTROL OF D.C DRIVES								9		
Review of Power devices, Single phase half and full controlled rectifier fed DC drives, Two and four quadrant operation of chopper fed DC drives – Digital control DC motor drive											
UNIT-V	SOLID STATE SPEED CONTROL OF A.C DRIVES								9		
Single phase voltage regulator fed AC drive, Three phase voltage / frequency controlled AC drive - slip power recovery schemes using inverters – Digital control of induction motor, reluctance motor and stepper motor drives											
LIST OF EXPERIMENTS										P: 30	
<ol style="list-style-type: none"> 1. Load test on DC shunt motor 2. Load test on three phase Induction motor 3. Speed control of DC shunt motor 4. Speed Control of DC motor using solid state controlled rectifier drive 5. Speed Control of three phase Induction motor using solid state controlled inverter drive 											
					L : 45	T: 0	P:30	J: 0	Total: 75 PERIODS		
TEXT BOOKS											
1	D.P.Kothari and I.J.Nagrath, “Basic Electrical Engineering”, Tata McGraw Hill publishing company ltd, second edition, 2018.										
2.	S.K.Pillai, “A First Course on Electrical Drives” New age publishing Ltd, 2016.										
REFERENCES											
1	Metha. V.K. &RohitMetha, "Principle of Electrical Engineering", S.Chand & Co 2012.										
2	Vedam Subramaniam. "Electric Drives", Tata McGraw Hill, New Delhi, 2017.										
3	P.S Bimbhra, “Power Electronics”, Khanna Publishers, Pvt Ltd, 2015.										
4	Dubey.G.K. “Fundamental Electrical Drives” 2nd Edition, Narosa Publications, 2017.										
5	Bhattacharya S.K. &Brijinder Singh, "Control of Electrical Machines", New Age International Publishers, 2009.										
COURSE OUTCOMES											
At the end of the course student should be able to:											
CO 1	Apply the concept of selection of different electrical motors for drives.										
CO 2	Understand the principle of operation of AC and DC motors.										
CO 3	Recognize the conventional method of speed control for DC and AC motors.										
CO 4	Employ the implementation of solid-state speed control for DC and AC motors.										
CO 5	Understand various speed control techniques (solid state and conventional) practically										

CO/PO Mapping														
(S/M/W Indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak														
CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO1	PSO2
CO 1	3	3	3	2									3	
CO 2	3	2	3		2		2					3	3	2
CO 3	3	3	3	3									3	
CO 4	3	2	2	2								3	3	2
CO 5	3	2	2				2					2	3	2

23GEP275	PERSONAL BRANDING (PRACTICAL)				L	T	P	C
					0	0	4	2
UNIT-I	SELF-AWARENESS & PERSONAL DEVELOPMENT							
Self-Awareness: Key Areas -Personality, Values, Habits, Needs & Emotions, Impact of Self-Awareness on Personal Development Personality –Definition, Elements, Determinants, Needs and Benefits, Personality traits. Personality development skills, Positive traits for effective people, SWOT :Analyzing Strength and weakness (SWOT), Building Esteem & Self-Confidence, Working on attitudes (aggressive, assertive, submissive), Self-Motivation								
UNIT-II	BODY LANGUAGE							
Body Language and Gestures, Personal Grooming, Personal Hygiene, Social Effectiveness, Business Etiquette								
UNIT-III	INTERVIEW AND LEADERSHIP SKILLS							
Resume Building, Video Resume, Leadership Styles, Leadership Traits, Group Dynamics- Conflict management								
UNIT-IV	SOCIAL IMAGE TRAITS							
Social etiquettes -Positive Social Image, Social Graces, Online Etiquettes, Dining Etiquettes, Voice Modulation, – Networking: Case Study and Company website references.								
UNIT-V	PERSONALITY TEST							
Big Five Personality Test, Open DISC Assessment Test.								
L : 45					T: 0	P: 60	J: 0	Total: 60 PERIODS

Course Outcome

- To evaluate the quality of personality for self-development in a career perspective.
- To apply the body language in his professional interview modes.
- Apply the communication and leadership styles in public speaking.
- Apply the social imaging qualities in their presentation skill.
- Demonstrate personal branding skills in mock interviews

TEXT BOOKS

1. Hurlock, E.B (2006). Personality Development, 28th Reprint. New Delhi: Tata McGraw Hill.
2. Stephen P. Robbins and Timothy A. Judge (2014), Organizational Behavior 16th Edition: Prentice Hall.

REFERENCES

1. Smith, B. Body Language. Delhi: Rohan Book Company. 2004
2. Personality Development and Career management: By R.M.Onkar (S Chand Publications)

Sl. No.	List of Exercises
1	Swot Analysis
2	Grooming, Dressing and Photo-shoot
3	Body Language, Handshaking
4	Art of Storytelling, Marketing & selling yourself
5	Self-Discipline: Goal setting (Qualitative and Quantitative)
6	Teamwork & Leadership Activity
7	Dealing with Pressure, Failure & Decision Making
8	Psychological/Personality test
9	Video Resume
10	Business Card creation
11	Social Profiling in FB/Insta/Linked In/Personal Website
12	Online Interview
13	Speed Interview
14	Networking Event-Online/Offline

23MEP202	MANUFACTURING AND MEASUREMENTS LABORATORY	L	T	P	J	C
		0	0	4	0	2

LIST OF EXPERIMENTS

1. LATHE

1.1 Exercise on Step turning, Taper Turning process using Compound rest / Tailstock set over/ Taper Turning attachments.

1.2 Making of External and Internal Thread Cutting process.

1.3 Making of Drilling, Boring and Eccentric Turning process.

2. SPECIAL MACHINES

2.1 Making of hexagonal shaped components by Horizontal/Vertical Milling process using Milling machine.

2.2 Making of Gear cutting processes using Horizontal Milling machine.

2.3 Exercise on cutting Key way and Splines using Slotting machine.

2.4 To grind the flat and Circular components using Plain Surface grinding and Cylindrical grinding machines.

2.5 Exercises on making Dovetail/spline shaping process in Reciprocating Machines such as Shaper/Planer.

2.6 Exercises on Drilling, Boring and Reaming in Upright and Radial Drilling machines.

3. Measurement of thread parameters using Profile projector

4.(a) Checking the limits of dimensional tolerances using comparators (Mechanical/Pneumatic/ Electrical)

(b) Measurement of Linear and angular Dimensions of apart using slip gauges / sine bars

5.(a) Measurement of Gear tooth dimensions using Gear Tooth Tester

(b) Measurement of height using Vernier height gauge

(c) Measurement of bore diameter.

6. (a) Measurement of Temperature using Thermocouple / Pyrometer

7. (a) Measurement of Force using load cell/ proving ring

(b) Measurement of Torque using Torque sensor

8. Measurement of straightness and flatness using auto – collimator.

9. Surface Roughness Tester (Demo)

10.3D Printing (Demo)

L:0 T:0 P:60 TOTAL: 30 PERIODS

COURSE OUTCOMES

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

CO 1	Learn various machining techniques to make engineering products.
CO 2	Demonstrate the various machining process sequence in a machined component.
CO 3	Compare the various component dimensions and intricate profiles with proper calibration.
CO 4	Appraise the tolerances of manufacturing component by using comparator.
CO 5	Evaluate the straightness and flatness.

CO/PO Mapping**(S/M/W Indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak**

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO1	PSO2
CO 1		3	3			3		2			3			3
CO 2					2								3	
CO 3	2		2	2				3						2
CO 4		3				2					3		2	
CO 5		3									2			

23MEP203	INTERNSHIP II	L	T	P	J	C
		-	-	-	-	2
	<ul style="list-style-type: none"> The Internship is provided for the students to update themselves with the recent Technologies and professional skills for better prospects in the future. Internship in industry subjected to permissions from Government and concern Industry subject to the conditions of following the SOP issued by the concern and written consent of the student and parents. Student is supposed to produce joining letter and relieving letter once the internship is over in case of offline internship in any industry. Online internship in industry / other agencies. Seminar by student under mentorship of a faculty. .A detailed report shall be submitted based on his Internship and shall be done by only one student. A Mini Project- on some suitable topic related to mechanical branch. It can be small fabrication / experimental results/ simulations / Programmes/ application development etc depending on the branch of the student. Preferably, a single student should do it. <p>Student has to prepare detailed report and submit to his/her college.</p> <ul style="list-style-type: none"> A copy of report can be kept in the departments for record. Each student must be assigned a faculty as a mentor from the college and an Industry expert as co-mentor. The internal and external examiner will carry the evaluation of the work done by students. External examiner will evaluate for 80 marks and internal examiner will evaluate for 20 marks. The presentation by student in the presence of all students is desirable. Student should produce successful completion certificate in case of offline / online internship in industry. 					
	2 Weeks					

CO/PO Mapping

(S/M/W Indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO1	PSO2
CO 1	2	3	3	2									3	
CO 2	3	2	3		2		2					3	3	2
CO 3	3	3	3	3									3	
CO 4	3	2	2	2								3	3	2
CO 5	3	2	2				2					2	3	2