B.E. Degree

in

Mechanical Engineering

CURRICULUM & SYLLABUS (CBCS)

(Innovation and product development for Sustainability)

(For students admitted from the Academic Year 2026-2027)

DEPARTMENT OF MECHANICAL ENGINEERING

St. XAVIER'S CATHOLIC COLLEGE OF ENGINEERING

CHUNKANKADAI, NAGERCOIL – 629 003.

KANYAKUMARI DISTRICT, TAMIL NADU, INDIA

Inconsonance to the vision of our College,

An engineering graduate we form would be a person with optimal human development, i.e. physical, mental, emotional, social and spiritual spheres of personality.

He/she would be also a person mature in relationships, especially knowing how to treat everyone with respect, including persons of complementary gender with equality and gender sensitivity guided by clear and pro-social values.

He would be patriotic and would hold the Indian Constitution and all the precepts it outlays close to his heart and would have a secular spirit committed to safeguard and cherish the multi-cultural, multi-religious and multi-linguistic ethos of Indian Society.

Academically, he/she would be a graduate with a strong engineering foundation with proficient technical knowledge and skills. He would have enough exposure and experience into the ethos of relevant industry and be industry ready to construct a successful career for himself and for the benefit of the society.

He would have been well trained in research methodology and would have established himself as a researcher having taken up many research projects, with sound ethical standards and social relevance. He would be a person with a passion for technical innovations committed to lifelong learning and research.

He would be well prepared and confident to develop ingenuous solutions to the problems people face as an individual and as a team and work for the emancipation of our society with leadership and courage.

VISION OF THE INSTITUTION

To be a centre of excellence in engineering education and research for a technically empowered humane society.

MISSION OF THE INSTITUTION

M1. Foster a vibrant academic environment for learning fundamental concepts, emerging technologies, and research-oriented practices.

M2. Cultivate personal maturity and professional skills through stimulating coaching and practical training.

M3. Provide inspiring high calibre faculty to mentor students from diverse backgrounds, especially the underprivileged.

M4. Create ample opportunities to transform rural youth into top class professionals and technocrats, capable of serving at the local and global levels with ethical integrity.

VISION OF THE PROGRAMME

Developing technically sound mechanical engineering professionals to serve the global community with academic excellence and innovative research.

MISSION OF THE PROGRAMME

M 1. To transform the students into mechanical technocrats with clear conceptual understanding and hands-on experience.

M 2. To integrate the fundamentals with recent concepts through technical gatherings, research and industry interactions.

M 3. To impart managerial quality and develop soft skills through leadership and personality development programs.

M 4. To inculcate core human values through ethical practices and inspire them to serve the society.

PROGRAMME EDUCATIONAL OBJECTIVES

PEO1. Have ability to understand, analyse and solve real case problems in core mechanical engineering as well as in other allied fields.

PEO2. Have ability to adapt well into career in mechanical related Industries and to perceive higher studies.

PEO3. Contribute for R&D efforts in technological development to meet international standards and future needs.

PEO4. Provide leadership in government, public and private sectors by upholding ethical values with social responsibility.

PEO5. Assimilate with the spirit of entrepreneurship and innovation.

PROGRAMME OUTCOMES

PO 1. Engineering Knowledge: Apply knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to solve complex engineering problems.

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

PO 3. Design/Development of Solutions: Design solutions for complex engineering problems and design system components or processes that meet specified needs with appropriate consideration for public health, safety, and the environment.

PO 4. Conduct Investigations of Complex Problems: Use research-based knowledge and methods including design of experiments, analysis and interpretation of data, and synthesis of information to provide valid conclusions.

PO 5. Modern Tool Usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools for prediction and modeling of complex engineering activities.

PO 6. The Engineer and Society: Apply reasoning informed by contextual knowledge to assess societal, health, safety, legal, and cultural issues relevant to engineering practice.

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

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

PO 9. Individual and Team Work: Function effectively as an individual, and as a member or leader in diverse teams and in multidisciplinary settings.

PO 10. Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large through reports, design documentation, presentations, and effective instruction.

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

KNOWLEDGE AND ATTITUDE PROFILE (WK)

PROGRAMME SPECIFIC OUTCOMES

On completion of B.E. Mechanical Engineering program, the student will have the

PSO1. Ability to utilize state-of-art IT tools to analyse, design and evaluate mechanical components.

PSO2. Ability to design and evaluate the performance of thermal systems and execute processes to manufacture various components and system with quality assurance.

PSO3. Ability to apply modern management techniques with a concern for environment upholding ethical values.

SUSTAINABLE DEVELOPMENT GOALS

Goal 1: No Poverty – Eradicating poverty in all its forms.

Goal 2: Zero Hunger – Achieving food security and sustainable agriculture.

Goal 3: Good Health and Well-being – Ensuring healthy lives for all ages.

Goal 4: Quality Education – Inclusive and equitable lifelong learning opportunities.

Goal 5: Gender Equality – Empowering all women and girls.

Goal 6: Clean Water and Sanitation – Sustainable management of water resources.

Goal 7: Affordable and Clean Energy – Access to modern, sustainable energy.

Goal 8: Decent Work and Economic Growth – Productive employment for all.

Goal 9: Industry, Innovation, and Infrastructure – Building resilient infrastructure.

Goal 10: Reduced Inequalities – Reducing inequality within and among countries.

Goal 11: Sustainable Cities and Communities – Making settlements safe and inclusive.

Goal 12: Responsible Consumption and Production – Ensuring sustainable patterns.

Goal 13: Climate Action – Taking urgent action to combat climate change.

Goal 14: Life Below Water – Conserving oceans and marine resources.

Goal 15: Life on Land – Protecting ecosystems and biodiversity.

Goal 16: Peace, Justice, and Strong Institutions – Promoting inclusive societies.

Goal 17: Partnerships for the Goals – Strengthening global implementation

KNOWLEDGE AND ATTITUDE PROFILE (WK)

WK1:	A systematic, theory-based understanding of the natural sciences applicable to the discipline and awareness of relevant social sciences.
WK2:	Conceptually-based mathematics, numerical analysis, data analysis, statistics and formal aspects of computer and information science to support detailed analysis and modelling applicable to the discipline.
WK3:	A systematic, theory-based formulation of engineering fundamentals required in the engineering discipline.
WK4:	Engineering specialist knowledge that provides theoretical frameworks and bodies of knowledge for the accepted practice areas in the engineering discipline; much is at the forefront of the discipline.
WK5:	Knowledge, including efficient resource use, environmental impacts, whole-life cost, re use of resources, net zero carbon, and similar concepts, that supports engineering design and operations in a practice area.
WK6:	Knowledge of engineering practice (technology) in the practice areas in the engineering discipline.
WK7:	Knowledge of the role of engineering in society and identified issues in engineering practice in the discipline, such as the professional responsibility of an engineer to public safety and sustainable development.
WK8:	Engagement with selected knowledge in the current research literature of the discipline, awareness of the power of critical thinking and creative approaches to evaluate emerging issues.
WK9:	Ethics, inclusive behavior and conduct. Knowledge of professional ethics, responsibilities, and norms of engineering practice. Awareness of the need for diversity by reason of ethnicity, gender, age, physical ability etc. with mutual understanding and respect, and of inclusive attitudes.

PROGRAMME ARTICULATION MATRIX

Year	Semester	Course name	PO											PSO		
			1	2	3	4	5	6	7	8	9	10	11	1	2	3
I	I	IP26C01	1	1	-	-	1	1	1	2	2	2	1	-	-	-
		MA26C01	3	2	1	1	1	-	-	-	-	-	1	-	1	-
		PH26C01	3	2	-	-	1	-	-	1	-	-	1	-	-	-
		CH26C01	3	2	2	2	2	2	-	1	-	-	1	-	1	-
		CS26C02	1	2	2	1	1	-	-	-	-	-	1	-	-	-
		ME26101	3	2	2	-	-	-	-	-	-	-	-	-	2	-
		EN26C01	-	-	-	-	-	-	-	2	3	-	2	-	-	-
		ME26C01	3	3	3	-	3	-	-	-	3	-	1	2	2	1
		TA26C01	2	2	1	-	-	2	1	1	2	-	1	-	-	-
		SD26C01	2	2	1	1	1	1	1	1	2	3	1	-	-	-
	II	IP26C02	2	1	-	-	-	2	2	3	1	2	1	2	1	-
		MA26C02	3	2	1	1	1	-	-	-	-	-	1	-	1	-
		PH26C04	3	2	-	-	-	-	-	1	-	-	1	-	1	-
		CH26C02	2	3	3	2	1	2	2	1	-	-	1	-	-	-
		EE26C01	3	3	-	-	-	-	-	-	-	-	-	-	-	-
		ME26201	3	3	2	2	2	1	-	-	-	-	1	2	-	-
		ME26202	1	-	-	-	2	-	-	-	1	1	-	1	2	-
		ME26C02	3	2	1	-	3	2	2	3	1	1	1	-	-	-
		EN26C02	-	-	-	-	-	-	-	2	3	-	2	-	-	-
		SD26C02	2	2	2	1	1	1	-	1	2	2	1	-	-	-
		TA26C02	2	2	2	1	1	2	-	-	1	-	1			

SEMESTER: I

Number of Courses: 9
Total Credits: 23

Course Code	Course Title	Course Type	Classroom Instruction(CI) (in Hours per Semesters)		Lab Instruction (LI) (in Hours per Semesters)	Term Worm (TW) and Self Learning (SL) (in Hours per Semesters)	Total Number of Hours (in Hours per Semesters)	Total Credits (C) = (Total Hours /30)	SDG Goal Mapped	Category
			L	T	P					
IP26C01	Induction Programme***	IP	40	16	24	40	120	0	3,4,8,16	MNC
MA26C01	Matrices and Applied Calculus (Lab Integrated)	TCP	45	0	30	45	120	4	4,9	BSC
PH26C01	Engineering Physics (Lab Integrated)	TCP	30	0	30	30	90	3	3,4,9	BSC
CH26C01	Applied Chemistry (Lab Integrated)	TCP	30	0	30	30	90	3	3,6,7,9, 11,12 & 13	BSC
CS26C02	Fundamentals of Computer Programming (Lab integrated)	TCP	30	0	30	30	90	3	4, 8, 9,12	ESC
ME26101	Fundamentals of Mechanical Engineering	TC	45	0	0	45	90	3	9	ESC
EN26C01	Technical Communication	TC	15	15	0	30	60	2	4,8,10	HSMC
ME26C01	Engineering Drawing	TCP	15	0	60	15	90	3	4,9,11, 12	ESC
TA26C01	Heritage of Tamils	TC	15	0	0	15	30	1	3,4,10,11 ,12,13,15 ,16	HSMC
SD26C01	Employability skills - I*	PC	0	0	30	30	60	1	3,4,5, 8,16	SDC
	NSS/NCC/NSO/ YRC**		-	-	-	-	-	-	-	MNC
	Total	-	265	31	234	310	840	23	-	-

* - Continuous Assessment. The evaluation procedure is detailed in the syllabus.
** - Refer clause 17.13 in the regulation 2026
*** - Refer clause 6 in regulation 2026. The evaluation procedure is detailed in the syllabus

SEMESTER: II

Number of Courses: 10
Total Credits: 23

Course Code	Course Title	Course Type	Classroom Instruction(CI) (in Hours per Semesters)		Lab Instruction(LI) (in Hours per Semesters)	Team Work(TW) and Self Learning(SL) (in Hours per Semesters)	Total Number of Hours (in Hours per Semesters)	Total Credits (C)=(Total Hours/30)	STG Goal Mapped	Category
			L	T	P					
IP26C02	Universal Human Values-II **	IP	15	0	0	15	30	0	2,4,13, 16	MNC
MA26C02	Statistics and Numerical Methods (Lab Integrated)	TCP	45	0	30	45	120	4	4,9,13	BSC
PH26C04	Physics for Civil and Mechanical Engineers	TC	30	0	0	30	60	2	3,4,9,11,12	BSC
CH26C02	Environmental Science	TC	30	0	0	30	60	2	3,4,6,7,9, 11,12,13,	BSC
EE26C01	Basic Electrical and Instrumentation Engineering (Lab Integrated)	TCP	30	0	30	30	90	3	4,9,11,12	ESC
ME26201	Engineering Mechanics	TCP	30	0	60	30	120	4	9	PCC
ME26202	Computer Aided Machine Drawing	PC	0	0	60	0	60	2	9	PCC
ME26C02	Engineering Workshop and Makerspace	PC	0	0	60	0	60	2	4,9	ESC
EN26C02	Professional Communication	TCP	15	0	30	15	60	2	4,8,9	HSMC
SD26C02	Employability skills - II*	PC	0	0	60	60	120	1	3,4, 8,9,16	SDC
TA26C02	Tamils and Technology	TC	15	0	0	15	30	1	2,4,6,8,9, 11,12,14	HSMC
	Total	-	210	15	300	285	810	23	-	-

* - Continuous Assessment. The evaluation procedure is detailed in the syllabus.
** - Refer clause 6 in regulation 2026. The evaluation procedure is detailed in the syllabus.

SEMESTER 1

IP26C01	INDUCTION PROGRAMME	L	T	P	TW/ SL	Total	C	SDG
		40	16	24	40	120	0	3,4,8, 16

COURSE OBJECTIVES:

- To help students transition smoothly into college life
- To build confidence, communication, and interpersonal skills
- To introduce human values and ethical living
- To familiarize students with institutional environment and departments
- To promote physical and mental well-being

COURSE CONTENT:

UNIT 1	PROFICIENCY MODULES	8	4	5	8	34		4

Language proficiency (English communication basics & LSRW skills) -Vocabulary building and sentence formation - Fundamentals of Science(Mathematics, Physics & Chemistry)-Basic Computer Knowledge.

Activities:

Ice-breaker self-introduction (1–2 minutes per student) to build confidence, followed by a listening activity using an audio/video clip with MCQs.

UNIT 2	UNIVERSAL HUMAN VALUES -I	8	3	5	8	23		16

Concept and Significance of Value Education- Self-exploration -Human Aspirations and Concerns- Understanding the Human Being as Coexistence of Self and Body- Needs of the Self and the Body- Relationship between Self and Body- Health- Relationships- Society- Nature- Happiness and Prosperity

Activities:

Students think about their goals and discuss happiness and healthy living.

UNIT 3	SOFT SKILLS	8	3	5	8	23		8

Communication skills and interpersonal skills -Teamwork and collaboration- Time management and goal setting- Critical thinking and problem-solving- Professional etiquette and behavior

Activities:

Students work in small groups to complete a task and practice communication and teamwork.

UNIT 4	DEPARTMENT VISIT AND PROGRAMME FAMILIARIZATION	8	3	5	8	28		4,8

Introduction to department vision, mission, and facilities -Interaction with faculty members -Lab visits and infrastructure overview- Curriculum overview and career opportunities -Interaction with senior students .

Talks by industry experts and academicians -Career guidance and motivation -Emerging trends in engineering/technology -Ethics and professional responsibility- Entrepreneurship awareness

Activities:

Students visit labs and listen to expert talks to understand facilities, careers, and professional ethics.

UNIT 5	PHYSICAL ACTIVITIES	8	3	4	8	18		3

Yoga and meditation -Basic fitness exercises -Sports and games -Stress management techniques- Importance of physical and mental health **Activities:** Students practice simple yoga, exercises, or games to learn stress management and the importance of physical and mental health.	
COURSE OUTCOMES: At the end of the course, the students will be able to:	
1	Apply effective communication and language skills in academic and social contexts through proficiency modules.
2	Apply the principles of Universal Human Values to analyze self-behavior and build harmonious relationships.
3	Apply soft skills such as teamwork, time management, and interpersonal communication in collaborative activities.
4	Analyze and utilize institutional facilities and departmental resources to support academic learning and career planning.
5	Apply and evaluate physical wellness practices and insights from expert lectures for personal and professional development.
Weightage: Continuous Assessment: 100%	
Assessment Methodology: Active Participation (40%), Assignments(30%), Quiz(30%)	
TEXT BOOKS:	
1.	Debidutta Acharya, Amitabh Nanda, "*Universal Human Values: Navigating Ethics and the Environment with Case Studies Approach"*, S. Chand Publishing, 2025**.**
2.	Kuldeep S. Sharma, Sarveen Kaur Sachdeva, "*Universal Human Values"*, Books Clinic Publishing, 2023**.**
REFERENCES:	
1.	Rohit Manglik, "*Universal Human Values"*, EduGorilla Publication, 2024**.**
2.	Sarveen Kaur Sachdeva, "*Universal Human Values"*, Books Clinic Publishing, 2024**.**
3.	Mark Carney, "*Value(s): Building a Better World for All"*, William Collins, 2021**.**
4.	David Graeber, David Wengrow, "*The Dawn of Everything: A New History of Humanity"*, Allen Lane, 2021**.**
5.	David Attenborough, Jonnie Hughes, "*A Life on Our Planet"*, Ebury Publishing, 2020**.**

Mapping of Course Outcomes to Programme Outcomes and Programme Specific Outcomes

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

MA26C01	MATRICES AND APPLIED CALCULUS (LAB INTEGRATED)	L	T	P	TW /SL	Total	C	SDG
		45	0	30	45	120	4	4,9

COURSE OBJECTIVES:

- To develop the use of matrix algebra techniques used by engineers for practical applications.
- To introduce the basic concept of solving system of equations.
- To familiarize the students with differential calculus.
- To make the students understand various techniques in solving ordinary differential equations.
- To acquaint the students with the concept of vector calculus which naturally arise in many branches of engineering.

COURSE CONTENT:

UNIT I	MATRICES	9	0	6	9	24		4,9

Characteristic equation – Eigenvalues and eigenvectors of a real symmetric matrix – Problems based on properties of eigenvalues and eigenvectors – Problem solving using Cayley-Hamilton method – Orthogonal transformation of a symmetric matrix to diagonal form.

Practical: Computing eigenvalues and eigenvectors of a symmetric matrix using simulation software.

Activity: Principal component analysis for data reduction/Power system stability analysis/Vibration analysis of a two-mass spring system/Signal decorrelation and noise reduction using eigenvalues/Structural stability and mode shape analysis of a frame.

UNIT II	SOLUTION OF LINEAR EQUATION	9	0	6	9	24		4,9

Definition: Algebraic and transcendental equations – Solution of linear system of equations – Direct Methods: Gauss elimination and Gauss-Jordan methods – Diagonally dominant – Iterative methods: Gauss-Jacobi and Gauss-Seidel methods.

Practical: Solving the system of equations by Gauss-Seidel method and Gauss elimination method using simulation software.

Activities: Node voltage analysis in electronic circuits/Node voltages in an electrical circuit/Load flow analysis in power systems/Traffic flow analysis at an intersection/Page rank computation using iterative methods/Heat transfer application.

UNIT III	DIFFERENTIAL CALCULUS	9	0	6	9	24		4,9

Representation of functions – Limit of a function – Derivatives – Differentiation rules: sum, product, quotient and chain rules – Maximum and minimum values of polynomial functions: Critical point, Increasing and decreasing functions, First derivative test – Point of inflection – Concavity. **Practical:** Plotting of single variable functions and finding its extreme values using simulation software. **Activity:** Optimization of piston motion in an engine/Condition for maximum power dissipation in a resistive circuit/Algorithm performance optimization/Minimize cost or maximize strength using polynomial models in structural designs/Stress-strain curve approximation.								
UNIT IV	**ORDINARY DIFFERENTIAL EQUATIONS**	**9**	**0**	**6**	**9**	**24**		**4,9**
Order – Degree – Differential operator – Linear differential equations of second and higher order with constant coefficients – Methods for finding particular integrals of exponential (e^{ax}), trigonometric (sin *ax*,cos *ax*) and polynomial functions – Method of variation of parameter (trigonometric functions only). **Practical:** Solving higher order ordinary differential equations using simulation software. **Activity:** Vibration Analysis of a mass-spring-damper system/Transient response of current in a series RLC circuit supplied by a DC voltage source/Dynamic resource adjustment using differential equations/Structural response prediction using differential equation.								
UNIT V	**VECTOR CALCULUS**	**9**	**0**	**6**	**9**	**24**		**4,9**
Vector differential operator – Gradient, divergence and curl (excluding vector identities) – Directional derivative of a scalar point function – Irrotational and solenoidal vector fields – Integral theorem: Green's theorem and Gauss divergence theorem (Statement only) – Simple applications involving cubes and rectangular parallelopiped. **Practical:** Finding directional derivative of a function using simulation software. **Activities:** Rotation in image processing vector fields/Electric field from a scalar potential function/Seepage analysis in dams and foundations by computing total out flow/Power flow analysis in vector fields.								

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

1	Apply the Cayley-Hamilton theorem for matrix inversion and orthogonal transformation of symmetric matrices.
2	Solve system of linear equations using multiple methods.
3	Interpret differentiation techniques to determine the maximum and minimum values of polynomial functions.
4	Solve higher-order ordinary differential equations in engineering fields.
5	Utilize concepts of vector calculus in solving engineering problems.

Weightage: Continuous Assessment: 50%, End Semester Examinations: 50%

Assessment Methodology: Quiz (5%), Assignments (20%), Practical (25%), Internal Examinations (50%)

TEXT BOOKS:

1.	Narayanan. S. and Manicavachagom Pillai. T. K., "Calculus" Volume I and II, S. Viswanathan Publishers Pvt. Ltd., Chennai, Reprint 2021.

2.	Grewal. B.S., “Higher Engineering Mathematics”, Khanna Publishers, New Delhi, Forty fifth edition, Reprint 2024.
REFERENCES:	
1.	Ramana. B.V., "Higher Engineering Mathematics", McGraw Hill Education Pvt. Ltd, New Delhi, Twenty fifth edition, Reprint 2022.
2.	Anton. H. , Bivens. I. and Davis. S., "Calculus", Wiley, Twelfth edition, Reprint 2024.
3.	Jain. R.K. and Iyengar. S.R.K., “Advanced Engineering Mathematics”, Narosa Publications, New Delhi, Fifth edition, Reprint 2021.
4.	Kreyszig. E., “Advanced Engineering Mathematics”, Wiley India Publications, Eleventh edition, 2025.
5.	Bali. N., Goyal. M., “A Text book of Engineering Mathematics”, Firewall Media (An imprint of Lakshmi Publications Pvt., Ltd.,), New Delhi, Ninth edition, Reprint 2021.
E resources/E materials:	
1.	System of Linear Equations, Eigen values and Eigenvectors, nptel course - https://www.nptelvideos.com/lecture.php?id=134162
2.	Matrix Diagonalization, nptel course - https://www.nptelvideos.com/lecture.php?id=13481
3.	SCILAB - https://www.scilab.org/

Mapping of Course Outcomes to Programme Outcomes

Course Outcomes		Program Outcomes										Programme specific outcomes		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO 1	3	2	1	1	1	-	-	-	-	-	1	-	1	-
CO 2	3	2	1	1	1	-	-	-	-	-	1	-	1	-
CO 3	3	2	1	1	1	-	-	-	-	-	1	-	1	-
CO 4	3	2	1	1	1	-	-	-	-	-	1	-	1	-
CO 5	3	2	1	1	1	-	-	-	-	-	1	-	1	-
Average	3	2	1	1	1	-	-	-	-	-	1	-	1	-

PH26C01	ENGINEERING PHYSICS (LAB INTEGRATED)	L	T	P	TW/ SL	Total	C	SDG
		30	0	30	30	90	3	3,4,9

COURSE OBJECTIVES:

- To provide fundamental knowledge of physical principles relevant to engineering applications.
- To enable students to understand ultrasonic wave generation, propagation, and its industrial applications.
- To introduce quantum mechanics concepts essential for modern engineering materials and devices.
- To explain the principles of photonics, lasers, and fiber optics for communication and sensing applications.
- To strengthen the understanding of the mechanical properties of matter and their importance in structural engineering.

COURSE CONTENT:

UNIT 1	ULTRASONICS	6	0	6	6	18		3,4,9

Ultrasonics – properties - production: piezoelectric Oscillator –acoustic grating: wavelength and velocity of ultrasonic waves in liquids – applications: ultrasonic flaw detector - sonography.
Practical: Determination of velocity of ultrasonic waves in liquid medium
Activities:
Ultrasonics - Puzzle

UNIT 2	QUANTUM MECHANICS	6	0	6	6	18		4,9

Introduction - Black body radiation - Wien's displacement law - Rayleigh Jean's law - Planck's radiation law (Derivation) – Schrodinger's Time independent wave equation - particle confined in one dimensional infinite square well potential- eigen values and eigen functions - Introduction to Quantum Computing.
Practical: Photoelectric effect – Determination of Planck's constant
Activity: Light effect vs Electrons – Virtual lab

UNIT 3	PHOTONICS	6	0	6	6	18		3,4,9

Theory of laser action: stimulated absorption, spontaneous emission and stimulated emission - Einstein's A and B coefficients – population inversion and pumping mechanisms – laser systems: Nd-YAG laser, LIDAR in Archaeology – photo diode.
Practical: Laser - wavelength of laser using diffraction grating and particle size determination
Activity: LED vs Semiconductor laser – A comparison

UNIT 4	FIBER OPTICS	6	0	6	6	18		3,4,9

Optical fiber - principle – propagation of light through fiber - Fiber fabrication: Double crucible method – Fiber optic communication system - Endoscope - fiber optic pressure sensor.
Practical: Optical fiber - Numerical aperture and Acceptance angle of an optical fiber
Activity: Fiber optic temperature sensor - Demo

UNIT 5	PROPERTIES OF MATTER	6	0	6	6	18		4,9

Elasticity - stress, strain - types of elastic moduli – factors affecting elasticity – Internal bending moment - Determination of Young's modulus: Cantilever - uniform bending - weighing system.
Practical: Uniform bending - Young's modulus of the material of the beam
Activity: Case study – Compare how Young's modulus of materials influence their uses.

COURSE OUTCOMES:	
1	Use the principles of ultrasonic wave generation, their properties to identify and solve some industrial problems.
2	Calculate energy eigen values and wave functions of basic physical systems using quantum mechanical principles.
3	Apply the principle of stimulated emission in the operation of laser, its characteristics and applications.
4	Demonstrate the use of optical fibers in communication systems and Endoscopy.
5	Determine the elastic moduli of materials through experimental methods by using their mechanical properties.
Weightage: Continuous Assessment: 50%, End Semester Examinations: 50%	
Assessment Methodology: Internal Assessment Test (30%) Practical (10%), Activities (10%),	
TEXT BOOKS:	
1.	Shatendra Sharma & Jyotsna Sharma**,** "Engineering Physics*"*, Second edition, Pearson India Education Services Pvt Ltd., 2024.
2.	Gaur, R.K. & Gupta, S.L.**,** "Engineering Physics*"*, Eight edition, Dhanpat Rai Publications, 2024.
REFERENCES:	
1.	R Shankar**,** "Fundamentals of Physics II: Electromagnetism, Optics and Quantum Mechanics", Expanded edition, Yale University Press, 2020.
2.	David Halliday, Robert Resnick & Jearl Walker**,** "Principles of Physics", Twelfth edition, John Wiley & Sons, 2023.
3.	Young H D & Freedman R A, "University Physics with Modern Physics", Fifteenth edition, Pearson publishers, 2020.
4.	H.K. Malik & A.K. Singh**,** "Engineering Physics*"*, Second Edition, McGraw Hill Education (India) Pvt Ltd., 2021.
5.	Avadhanulu, M.N. & Kshirsagar, P.G.**,** "A Textbook of Engineering Physics*"*, Eleventh Edition, S. Chand & Company, 2024.
E resources/E materials:	
1.	Engineering Physics, nptel Course - https://nptel.ac.in/courses/122103011
2.	Virtual Labs – MHRD (Ultrasonics, Photonics, Fiber Optics) https://www.vlab.co.in/broad-area-physical-sciences
3.	MIT Open Course Ware – Introduction to Quantum Mechanics https://ocw.mit.edu/courses/5-73-quantum-mechanics-i-fall-2018/pages/lecture-notes/

4.	Virtual Labs – Young's Modulus: Bending Experiments https://amv-au.vlabs.ac.in/advanced-mechanics/Youngs_Modulus_Uniform_Bending/
5.	SPIE Digital Library – Introductory Photonics Tutorials https://www.spiedigitallibrary.org/search?term=Introductory+Photonics+Tutorials

Mapping of Course Outcomes to Programme Outcomes

Course Outcomes	Programme Outcomes											Program Specific Outcomes		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	2	-	-	1	-	-	1	-	-	1	-	-	-
CO2	3	2	-	-	1	-	-	1	-	-	1	-	-	-
CO3	3	2	-	-	1	-	-	1	-	-	1	-	-	-
CO4	3	2	-	-	1	-	-	1	-	-	1	-	-	-
CO5	3	2	-	-	1	-	-	1	-	-	1	-	-	-
Average	3	2	-	-	1	-	-	1	-	-	1	-	-	-

CH26C01	APPLIED CHEMISTRY (LAB INTEGRATED)	L	T	P	TW/ SL	Total	C	SDG
		30	0	30	30	90	3	3,6, 7, 9,11,12,13

COURSE OBJECTIVES:

- To make the students conversant with water quality and its treatment methods.
- To gain knowledge of polymers and their applications.
- To understand the concept of electrochemical cells and their applications.
- To understand the concept of corrosion and its protection methods.
- To familiarize with the principles of photochemistry.

COURSE CONTENT:

UNIT 1	WATER TECHNOLOGY	6	0	6	6	18	3	6,3,12

Water quality parameters – Hardness – Estimation (EDTA method) - Alkalinity – DO - Softening methods – Electrochemical water softening – Solar desalination of sea water – Reverse Osmosis.

Practical:

Determination of total hardness of water sample (EDTA method).

Estimation of Alkalinity in water sample.

Activity:

Case study on water quality analysis.

UNIT 2	POLYMER CHEMISTRY	6	0	6	6	18	3	9,12,13

Polymers – Engineering plastics - preparation, properties and uses of PET, PVC, Polyurethane, PTFE – Conducting polymers - Shape memory polymers - Biodegradable polymers - properties, applications.

Practical:

Determination of molecular weight of polymer by viscosity average method using Ostwald Viscometer.
Activity:
Preparation of poster comparing normal plastics with biodegradable plastics.

UNIT 3	**ELECTROCHEMISTRY**	**6**	**0**	**6**	**6**	**18**	**3**	**7,9,12**

Electrochemical cells- Electro chemical reactions- Electrodes – pH determination – Conductometric and Potentiometric titrations –Electroplating - Electroless plating.
Practical:
Determination of strength of HCl by pH meter.
Conductometric titration of mixture of acids (HCl and CH_3COOH).
Activity:
Electrochemical cell simulation.

UNIT 4	**CORROSION CHEMISTRY**	**6**	**0**	**6**	**6**	**18**	**3**	**9,11,12**

Corrosion –Theories and Preventive methods - Protective coatings – Paints - Components and their uses – Types - Nanotechnology based coating - Polymer modified asphalt coating.
Practical: Estimation of Ferrous ion in rust.
Activity:
Case study on factors influencing the corrosion in underground pipelines.

UNIT 5	**PHOTOCHEMISTRY**	**6**	**0**	**6**	**6**	**18**	**3**	**7,13,9**

Photochemical laws- Jablonski diagram- Fluorescence – Phosphorescence - Chemiluminescence – Photosensitization - Photo catalysis – Mechanism and applications.
Practical: Estimation of potassium Oxalate using Potassium Permanganate by a photochemical reaction.
Activity:
Report on the list of fluorescence and Phosphorescence in everyday life.

COURSE OUTCOMES:

1	Use water quality analysis techniques to implement water treatment, softening and desalination methods.
2	Apply polymer chemistry principles to select and use engineering and special polymers in practical applications.
3	Demonstrate electrochemical principles by operating electrochemical cells and industrial plating processes.
4	Apply corrosion principles to implement corrosion prevention and protective coating methods.
5	Perform and apply photochemical principles to carryout photochemical reactions for industrial applications.

Weightage: Continuous Assessment: 50%, End Semester Examinations: 50%

Assessment Methodology: Assignment (20%), Practical (30%), Internal examinations (40%), flipped class (10%).

TEXT BOOKS:	
2	Dara, S. S., "*A textbook of Engineering Chemistry",* Chand Publications, 2024.
4	Rohatgi-Mukherjee, K.K., "Fundamentals of Photochemistry", New Age International Private Limited, 2021.
REFERENCES:	
1	Wang, L. K., Sung, M.-H., & Shammas, N. K., "Water and wastewater engineering (Vols. 1–4). Forth edition, John Wiley & Sons, 2024.
2	Ahamed, S., Ali, R., & Osmani, "Handbook of biodegradable polymers", Jenny Standford Publishing, 2024.
3	Ravikrishnan, A., "Engineering chemistry", Sri Krishna Hitech Publishing Company Pvt. Ltd, 2021.
4	Revie, R. W., & Uhlig, H. H., "Corrosion and corrosion control" Fifth edition, Wiley, 2025.
5	Turro, N. J., Ramamurthy, V., & Scaiano, J. C., "Modern molecular photochemistry of organic molecules", University Science Books. 2010.
E resources/E materials:	
1.	Water and waste water treatment, nptel course - http://nptel/courses/video/105107207/L13.html
2.	Corrosion Protection Methods, nptel course - https://nptel.ac.in/courses/113104108

Mapping of Course Outcomes to Programme Outcomes and Programme Specific Outcomes

Course Outcomes	Programme Outcomes											Program Specific Outcomes		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	2	3	2	2	2	-	1	-	-	1	-	1	-
CO2	3	2	3	1	2	1	-	1	-	-	1	-	1	-
CO3	3	3	3	2	3	1	-	1	-	-	1	-	1	-
CO4	3	3	3	2	2	2	-	1	-	-	1	-	1	-
CO5	3	2	3	2	2	1	-	1	-	-	1	-	1	-
Average	3	2	2	2	2	2	-	1	-	-	1	-	1	-

CS26C02	FUNDAMENTALS OF COMPUTER PROGRAMMING (LAB INTEGRATED)	L	T	P	TW/ SL	Total	C	SDG
		30	0	30	30	90	3	4,8, 9,12

COURSE OBJECTIVES:

- To introduce the evolution and basic organization of computers and develop logical thinking skills through algorithm and flowchart design.
- To enable students to learn the fundamentals of C programming syntax, data types, operators, and control structures for solving simple computational problems.
- To develop the ability to design modular programs using functions and apply arrays for efficient data storage and processing.
- To provide understanding of string handling and pointer concepts to enhance program efficiency and memory management.
- To equip students with skills to use structures for data representation and implement basic searching and sorting techniques for information processing.

COURSE CONTENT:

UNIT 1	EVOLUTION OF COMPUTERS AND PROBLEM SOLVING BASICS	6	0	6	6	18		4,8,9

History and generations of computers - Basic computer organization – Classification of computer software – Generations of programming languages - Introduction to algorithms and flowcharts.

Practical:

1. Develop Algorithms and flowchart

Activities:

Chart preparation, Quiz

UNIT 2	BASICS OF C PROGRAMMING	6	0	6	6	18		4,8,9

Structure of a C program - C Keywords, Identifiers, Constants, Variables, Data types, Operators, Expressions – Operator precedence and associativity - Conditional statements - Looping structures - break, continue, goto statements.

Practical:

1. Programs using Conditional statements (maximum of three numbers, grading system)
2. Programs using Loops: (factorial, Fibonacci, prime numbers generation, sum of digits)

Activities:

Assignment – Simple C Programs, Code Debugging

UNIT 3	FUNCTIONS AND ARRAYS	6	0	6	6	18		4,8, 9,12

Concept of modular programming - Function definition, declaration, and calling – passing parameters to functions: call by value – call by reference – Recursion. Arrays: Declaration of Arrays – Accessing elements of the Array – Storing Values in Array - One-dimensional and two-dimensional arrays.

Practical:

1. Program using user-defined functions
2. Programs using Arrays (Finding sum and average of elements, Matrix addition and transpose)

Activities:

Think–Pair–Share (TPS) – Code Debugging

UNIT 4	STRINGS AND POINTERS	6	0	6	6	18		4,8, 9,12

Strings: Declaration and Initialization- Reading and writing strings - Standard Library Functions: strlen(), strcpy(), strcat(), strcmp(). Pointers: declaring pointer variables – pointer expressions and pointer arithmetic - passing pointers as arguments – pointers and arrays.

Practical:

1. String manipulation using library functions
2. Programs using Pointers (Swapping two numbers and Pointer arithmetic)

Activities:

Assignment, Pair programming

UNIT 5	**STRUCTURES AND SEARCHING, SORTING ALGORITHMS**	**6**	**0**	**6**	**6**	**18**		**4,8, 9,12**

Structures: Declaration, Definition, and Initialization - Accessing Structure Members, Nested Structures – Searching and sorting algorithms: linear search, binary search, bubble sort, selection sort

Practical:

1. Structure-based programs (student details, employee salary)
2. Implementation of linear and binary search
3. Implementation of bubble and selection sort

Activities:

Case Based Learning (real life scenario) - Code Debugging

COURSE OUTCOMES:

1	Apply knowledge of computer evolution, organization, and problem-solving techniques to develop algorithms and flowcharts for solving basic computational problems.
2	Implement basic C programming concepts such as data types, operators, and control structures to develop programs that solve simple computational problems.
3	Apply modular programming concepts using functions and effectively use arrays to store and manipulate data.
4	Implement programs involving string manipulation and pointer operations to manage memory efficiently.
5	Use structures to represent data and implement basic searching and sorting algorithms to process information.

Weightage: Continuous Assessment: 50%, End Semester Examinations: 50%

Assessment Methodology: Activities (10%), Practical (10%), Internal Assessment Test (30%)

TEXT BOOKS:

1.	Reema Thareja, “Programming in C”, Third Edition, Oxford University Press, 2023.
2.	Pradip Dey & Manas Ghosh, “Fundamentals of Computing and Programming in C”, Second Edition, Oxford University Press, 2023.

REFERENCES:

1.	E. Balagurusamy, “Programming in ANSI C”, Ninth Edition, McGraw Hill, 2024.

2.	Ashok N. Kamthane & Amit Ashok Kamthane, “Programming in C”, Third Edition, Pearson, 2025.
3.	Jignesh Shah, “Programming in C”, Second Edition, CPH Books, 2023.
4.	Yashavant Kanetkar, “Let Us C”, Twenty first Edition, BPB Publications, 2025.
5.	Herbert Schildt, “C: The Complete Reference”, Fourth Edition, McGraw Hill, 2017.
E resources/E materials:	
1.	Online Course: C for Everyone: Programming Fundamentals (Coursera) https://www.coursera.org/
2.	GeeksforGeeks – C Programming Tutorial. https://www.geeksforgeeks.org/

Mapping of Course Outcomes to Program Outcomes

Course Outcomes	Programme Outcomes											Program Specific Outcomes		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	2	2	1	1	1	–	–	–	–	–	2	-	-	-
CO2	2	2	1	1	1	–	–	–	–	–	1	-	-	-
CO3	1	2	2	2	1	–	–	–	–	–	1	-	-	-
CO4	1	2	2	1	1	–	–	–	–	–	1	-	-	-
CO5	1	2	3	2	1	–	–	–	–	–	2	-	-	-
Average	1	2	2	1	1	-	-	-	-	-	1	-	-	-

3–High, 2– Medium, 1–Low

ME26101	FUNDAMENTALS OF MECHANICAL ENGINEERING	L	T	P	TW/ SL	Total	C	SDG
		45	0	0	45	90	3	9

COURSE OBJECTIVES:

- To understand the fundamentals of Mechanical Engineering.
- To gain the basic knowledge of manufacturing processes.
- To comprehend the principles of power generation systems and I.C. engines.
- To develop the basic understanding of thermal and fluid engineering concepts.
- To explore emerging technologies in Mechanical Engineering.

COURSE CONTENT:

UNIT 1	BASICS OF MECHANICAL ENGINEERING	9	0	0	9	18		9

Definition and scope of Mechanical Engineering -Role of mechanical engineers in Industry and Society – Specialized subdivisions of Mechanical engineering-

Activities :

Case study analysis on Interdisciplinary areas of Mechanical Engineering

UNIT 2	**MANUFACTURING PROCESSES**	**9**	**0**	**0**	**9**	**0**		**9, 12**

Casting process and its types - Forming processes: Forging, Rolling -Machining processes: Turning, Drilling, Milling -Joining processes- Arc Welding and. Gas Welding.
Activities:
Flipped classroom**,** on the topic casting tools and process , welding, drilling and lathe.

UNIT 3	**POWER PLANTS AND I.C. ENGINES**	**9**	**0**	**0**	**9**	**18**		**7, 9**

Classification of Power Plants- Working principle of Steam, Hydroelectric and Nuclear Power plants- Internal Combustion engines– Working principle of Petrol and Diesel Engines – Four stroke and two stroke cycles – Comparison of four stroke and two stroke engines.
Activities :
Industrial Visit, Demonstration of the parts of an IC engine

UNIT 4	**BASICS OF THERMAL AND FLUID SYSTEMS**	**9**	**0**	**0**	**9**	**18**		**7, 9**

Introduction to thermodynamics- Laws of thermodynamics—Thermodynamic cycles-Otto and Diesel, Basics of Refrigeration - Introduction to Fluid Mechanics – Properties of Fluids - Types of fluid flow – Pumps – Turbines.
Activities:
Demonstration of Refrigeration and Air-conditioning system, Quiz on psychrometry.

UNIT 5	**EMERGING TRENDS IN MECHANICAL ENGINEERING**	**9**	**0**	**0**	**9**	**18**		**9**

Artificial Intelligence (AI) and Machine Learning in Mechanical systems- Smart Manufacturing- Robotics and Automation- Digital Twins- – Augmented and Virtual Reality
Activities:
Group discussion, Quiz on virtual reality , augmented reality.

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

1	Utilize fundamental mechanical engineering concepts to identify the roles, functions, and interdisciplinary applications of mechanical engineering.
2	Use manufacturing process principles to recommend suitable casting, forming, machining, welding, and joining operations for engineering applications.
3	Apply the working principles of various power plants and internal combustion engines to explain energy conversion and power generation processes.
4	Show how the thermodynamic and fluid mechanics principles are used to evaluate the operation of refrigeration systems, pumps, turbines, and fluid flow systems.
5	Demonstrate the application of emerging digital technologies in enhancing modern mechanical engineering systems and practices.

Weightage: Continuous Assessment: 40%, End Semester Examinations: 60%

Assessment Methodology: Assignments (70%), Activities (30%)

TEXT BOOKS:

1. R.K. Rajput, “Elements of Mechanical Engineering”, Laxmi Publications Pvt. Ltd , 2024.

2.	D. S. Kumar, “Fundamentals of Mechanical Engineering and Mechatronics”, S.K. Kataria & Sons, 2021.
REFERENCES:	
1	Mikell P. Groover, “Fundamentals of Modern Manufacturing: Materials, Processes and Systems”, Seventh edition, Wiley, 2021.
2	P K Nag & Sudipta De, “Engineering Thermodynamics”, Seventh edition, McGraw Hill India, 2025.
3	R.K. Bansal, “A Textbook of Fluid Mechanics and Hydraulic Machines”, Eleventh edition, Laxmi Publications Pvt. Ltd., 2025
4	Yunus A. Çengel, Michael A. Boles, Mehmet Kanoglu, “Thermodynamics: An Engineering Approach”, Tenth edition, McGraw Hill, 2025.
5	Serope Kalpakjian, Steven R. Schmid, “Manufacturing Engineering and Technology”, Ninth Edition, Pearson, 2023**.**
E resources/E materials:	
1.	NPTEL, “Manufacturing Processes I – Video Lectures and Course Materials”, IIT Kanpur, Government of India – SWAYAM/NPTEL Platform, 2021. https://nptel.ac.in/courses/112104268
2.	think3D, “Beginner’s Guide to 3D Printing”, think3D Technologies, Hyderabad, Free PDF Resource, 2019. https://www.think3d.in/beginners-guide-to-3d-printing/
3.	IIT Guwahati, “Metal Casting Processes – Lecture Notes”, Department of Mechanical Engineering, IIT Guwahati, 2017. http://www.iitg.ac.in/mech/
4	3D Printing Industry, “3D Printing: A Complete Guide”, 3DPrintingIndustry.com, Free Online PDF Resource, 2018. https://3dprintingindustry.com/3d-printing-basics-free-beginners-guide/

Mapping of Course Outcomes to Programme Outcomes

Course outcomes	**PO**											**PSO**		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**1**	**2**	**3**
CO1	3	1	-	-	-	-	-	-	-	-	-	-	1	-
CO2	3	2	2	-	-	-	-	-	-	-	-	-	2	-
CO3	3	2	1	-	-	-	-	-	-	-	-	-	2	-
CO4	3	2	1	-	-	-	-	-	-	-	-	-	3	-
CO5	2	2	2	-	-	-	-	-	-	-	-	-	3	-
CO	3	2	2	-	-	-	-	-	-	-	-	-	2	-

EN26C01	TECHNICAL COMMUNICATION	L	T	P	TW/ SL	Total	C	SDG
		15	15	0	30	60	2	1,2, 3,7

COURSE OBJECTIVES:

- To develop basic listening and speaking competence through interactive tasks
- To strengthen reading and writing abilities by exposing learners to diverse texts
- To equip students with practical communication skills
- To foster creativity, confidence, and presentation skills
- To build interpersonal and professional communication skills

COURSE CONTENT:

UNIT 1	FOUNDATIONS OF COMMUNICATION SKILLS	3	3	0	6	12		1

Listening : Listening for Local/Global Comprehension

Speaking : Introducing oneself (formal and informal), Introducing others

Reading : Reading Comprehension – methods - Blogs and Brochures

Writing : Hints Development

Language Study : Sentence/Types of sentences

Vocabulary : Parts of Speech

Self study : Process Description

UNIT II	EFFECTIVE COMMUNICATION	3	3	0	6	12		3

Listening : Summarizing News – Telephonic Conversation

Speaking : News report presentation

Reading : Biographies and Newspaper

Writing : Paragraph Writing (Narrative, Descriptive, Compare and Contrast)

Language Study : Types of questions, Question Tag – WH

Vocabulary : Synonyms , Antonyms and Word Formation

Self study : Vocabulary - Journal (Creating mini Word Bank)

UNIT III	ENGLISH FOR CONTEXTUAL COMMUNICATION	3	3	0	6	12		2

Listening : Listening to Instructions and Directions

Speaking : Giving Directions and Instructions

Reading : Advertisements and Process Manuals

Writing : Letter Writing (Formal and Informal)

Language Study : Punctuations and Capitalization

Vocabulary : One word substitution

Self study : Spell Bee

UNIT IV	INTERPERSONAL COMMUNICATION	3	3	0	6	12		2,7

Listening : Listening to Dialogues and Interviews

Speaking : Role Play (Professional Situations)

Reading : Articles and Short Stories

Writing : Technical Report Writing

Language Study : Auxiliary verbs and modal verbs

Vocabulary : Homonyms and Homophones

Self study : Dialogue Writing (Formal)

UNIT V	ENHANCING PRESENTATION SKILLS	3	3	0	6	12		7

Listening : Listening to Speeches and Presentations

Speaking : Public Speaking/Oral presentations

Reading : Reviews (Books and Projects)

Writing : Essay Writing and Creative Writing

Language Study : Concord

Vocabulary : Idioms and Phrases

Self study : Presentation on a technical topic

COURSE OUTCOMES:

1	Demonstrate foundational listening and speaking skills by participating with confidence and clarity
2	Apply effective reading strategies to comprehend, analyze, and interpret varieties of texts
3	Write grammatically accurate and coherent technical reports and e-mails
4	Use correct vocabulary and grammar to enhance presentation skills
5	Integrate interpersonal skills for ideal communication in professional contexts

Weightage: Continuous Assessment: 40%, End Semester Examinations: 60%

Assessment Methodology: Internal Assessment Test(70%), Activities(30%)

TEXT BOOKS:

1.	Meenakshi Raman, Sangeeta Sharma, "Technical Communication: Principles and Practice, Oxford University Press, 2020.
2.	Sanjay Kumar, Pushp Lata, "Communication Skills", Oxford University Press, 2021.

REFERENCES:

1.	Courtland L. Bovee, John V. Thill, "Business Communication Today", Pearson Education, 2022.
2.	John Seely, "Oxford Guide to Effective Writing and Speaking", Oxford University Press, 2020.
3.	Raymond Murphy, "English Grammar in Use", Cambridge University Press, 2023.
4.	M. Ashraf Rizvi, "Effective Technical Communication", McGraw Hill Education, 2022.

Mapping of Course Outcomes to Programme Outcomes

Course outcomes	Programme outcomes											Programme specific outcomes		
	CO1	CO2	CO3	CO4	CO5	CO6	CO7	CO8	CO9	CO10	CO11	PSO1	PSO2	PSO3
CO1	-	-	-	-	-	-	-	2	3	-	2	-	-	-
CO2	-	-	-	-	-	-	-	2	3	-	2	-	-	-
CO3	-	-	-	-	-	-	-	2	3	-	2	-	-	-
CO4	-	-	-	-	-	-	-	2	3	-	2	-	-	-
CO5	-	-	-	-	-	-	-	2	3	-	2	-	-	-
CO	-	-	-	-	-	-	-	2	3	-	2	-	-	-

ME26C01	ENGINEERING DRAWING	L	T	P	TW/ SL	Total	C	SDG
		15	0	60	15	90	3	4,9, 11,12

COURSE OBJECTIVES:

- To help students learn the basic concepts of engineering drawing and geometric constructions.
- To enable students to understand and draw orthographic projections of points, lines, planes, and solids.
- To develop the ability to draw sectional views and surface developments of various solids.
- To build skills in creating isometric drawings and freehand sketches of engineering objects.
- To improve students' visualization and drawing abilities for effective engineering communication.

COURSE CONTENT:

UNIT 1	PLANE CURVES	6	3	0	9	18		4,9

Basic Geometrical principle, Construction of ellipse, parabola and hyperbola by eccentricity method — construction of involutes of square and circle- Drawing of tangents and normal to the above curves.

Activities:

Virtual demonstration of conic sections (ellipse, parabola, hyperbola), Manual drawing practice using drawing instruments, CAD exercise for construction of plane curves.

UNIT 2	PROJECTION OF POINTS, LINES AND PLANES	6	3	0	9	18		4,9

First angle projection-projection of points. Projection of straight lines (only First angle projections) inclined to both the principal planes - Determination of true lengths and true inclinations by rotating line method. Projection of planes (Triangular plate, square plate, Pentagonal plate, hexagonal plate and circular surfaces) inclined to HP/VP.

Activities:

Drawing practice of projections of triangular, square, pentagonal, hexagonal and circular plates, Activity on identifying true shape and apparent shape of inclined planes, Quiz on principal planes and projection methods.

UNIT 3	PROJECTION OF SOLIDS	6	3	0	9	18		9,11

Projection of simple solids such as prisms, pyramids (square, pentagonal, hexagonal) and cylinder when the axis is inclined to horizontal plane and parallel to vertical plane by rotating object method.

Practicing three dimensional modelling of simple objects by CAD Software.
Activities:
Manual drawing of prisms, pyramids and cylinders in inclined positions, Group activity on visualization of solids in different orientations, Mini assignment on applications of projection of solids in design.

UNIT 4	**SECTION OF SOLIDS**	**6**	**3**	**0**	**9**	**18**		**9,12**

Sectioning of solids (Prisms, pyramids, cylinders and cones) in simple vertical position when the cutting plane is inclined to the horizontal planes and perpendicular to the vp —obtaining true shape of section.
Activities:
Virtual demonstration of sectioning of prisms, pyramids, cylinders and cones, Quiz on cutting plane positions and sectional concepts, Assignment on industrial applications of sectional drawings.

UNIT 5	**ISOMETRIC PROJECTIONS AND FREEHAND SKETCHING**	**6**	**3**	**0**	**9**	**18**		**4,9,11**

Principles of isometric projection - isometric scale - isometric projections of simple solids and truncated solids - Prisms, pyramids & cylinders, in simple vertical positions.

Representation of Three Dimensional objects - Layout of views- sketching of multiple views from pictorial views of objects.
Activities:
Drawing practice on isometric scale and isometric projections of solids, Freehand sketching practice of machine components and blocks, Activity on perspective projection basics with real object observation.

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

1	Apply geometric methods to generate conics, involutes, tangents, and normal.
2	Apply concepts of engineering drawing to develop a projections of lines and plane surfaces
3	Construct the projections of engineering solids with axes inclined to the principal planes.
4	Develop the sectioned solids and discover its true shape
5	Construct the isometric views and freehand multiview sketches for engineering communication.

Weightage: Continuous Assessment: 40%, End Semester Examinations: 60%

Assessment Methodology:
Activities (20%), Practical (60%), Assignment (20%)

TEXT BOOKS:

1.	Natrajan K.V., “A Text Book of Engineering Graphics”, Dhanalakshmi Publishers, Chennai, 2024.
2.	Venugopal K. and Prabhu Raja V., “Engineering Graphics", Sixteenth edition, New Age International (P) Limited, 2022.

REFERENCES:

1.	RK Dhawan “Engineering Graphics”, S Chand & Company, 2023.
2.	Bhatt N.D. and Panchal V.M., “Engineering Drawing”, Fifty fifth Edition, Charotar Publishing House, 2024.
3.	B.K. Goyal and Manoj Kumar “Engineering Graphics”, Asian Publishers Muzaffarnagar, 2023.
4.	H. G. Phakatkar, P. A. Panchal R. V. Mali., “Engineering Graphics”, Nirali Prakashan Publishing, 2024.
5.	Pradeep Jain., “Engineering Graphics & Design”, Khanna Book Publishing, 2022
E resources/E materials:	
1.	NPTEL, “Engineering Drawing and Computer Graphics – Video Lectures and Course Materials”, IIT Guwahati, SWAYAM/NPTEL Platform, 2020. https://nptel.ac.in/courses/112103019
2.	MIT OpenCourseWare, “Introduction to Engineering Drawing and Sketching”, Massachusetts Institute of Technology, OCW Online Resource, 2020. https://ocw.mit.edu/courses/2-007-design-and-manufacturing-i-spring-2009/pages/lecture-notes/drawing-and-sketching/
3.	IIT Bombay, “Orthographic and Isometric Projections – Online Tutorials”, IIT Bombay Spoken Tutorial Project, 2021. https://spoken-tutorial.org/tutorial-search/?search=engineering+drawing
4	Engineering Drawing Online, “Fundamentals of Technical Drawing – Web Resource”, EngineeringDrawingOnline.com, 2019. https://engineeringdrawingonline.com/

Mapping of Course Outcomes to Programme Outcomes and Programme Specific Outcomes

Course outcomes	Programme outcomes											Programme specific outcomes		
	CO1	CO2	CO3	CO4	CO5	CO6	CO7	CO8	CO9	CO10	CO11	PSO1	PSO2	PSO3
CO1	3	1	-	-	2	-	-	-	3	-	2	3	1	-
CO2	3	-	-	-	2	-	-	-	3	-	1	2	2	-
CO3	3	3	3	-	3	-	-	-	2	-	1	2	2	-
CO4	3	3	2	-	3	-	-	-	2	-	1	2	3	-
CO5	3	3	3	-	3	-	-	-	3	-	1	3	2	1
CO	3	3	3	-	3	-	-	-	3	-	1	2	2	1

TA26C01	HERITAGE OF TAMILS	L	T	P	TW/ SL	TOTAL	C	SDG
		15	0	0	15	30	1	3,4,10,11,12, 13 ,15,16

COURSE OBJECTIVES:

- To help students understand the history of Tamil literature.
- To help students understand the heritage of Tamils, including paintings and musical instruments.
- To help students understand the traditional arts of Tamils.
- To create awareness among students about the lifestyle of Tamils and its values.
- To understand the contribution and influence of Tamils in Indian culture.

COURSE CONTENT:

UNIT 1	LANGUAGE AND LITERATURE	3	0	0	3	6		4,10

Indian language families – Dravidian language family – Sangam literature – Pathinenkeezhkanakku texts – Management concepts in the Tirukkural – Tamil epics (The Five Great Epics) – Bhakti literature (Alvars and Nayanmars)

Activities:

Design a poster titled Tamil Literature.

UNIT 2	HERITAGE – FROM ROCK PAINTINGS TO MODERN PAINTING AND SCULPTURE ART	3	0	0	3	6		11,12

Minor literary works – Development of modern Tamil literature – Contributions of Subramania Bharati and Bharathidasan to Tamil literary growth – Sculptures – Panchaloha (five-metal) idols – Thiruvalluvar Statue – Tribal communities and their handicrafts – Chariot making art – Tamil musical instruments: Mridangam, Parai, Veena, Yazh, Nadaswaram

Activities:

Quiz Based on Literature

UNIT 3	FOLK ARTS AND GAMES	3	0	0	3	6		3,4

Therukoothu, Karagattam, Villupattu, Kaniyan Koothu, Oyilattam, Silambam, Valari – Folk deities – Traditional Tamil games: Jallikattu (bull embracing), Ilavattakkal, Sadugudu, Uriyadi, Slippery pole climbing, Bullock cart

Activities:

Role Play: Performing Arts

UNIT 4	TAMIL LANDSCAPE (THINAI) CONCEPTS	3	0	0	3	6		13,15

Akam and Puram concepts in Tolkappiyam and Sangam literature – Ethical principles followed by Tamils – Importance of education in the Sangam period – Sangam age cities and ports – Export and import during the Sangam period

Activities:

Preparing a Poster on the Theme Life in the Sangam Age

UNIT 5	INDIAN NATIONAL MOVEMENT AND CONTRIBUTION OF TAMILS TO INDIAN CULTURE	3	0	0	3	6		4,16

Role of Tamils in the Indian freedom struggle – Self-Respect Movement – Siddha medicine – Inscriptions – Manuscripts – Printing history of Tamil books

Activities:

Group Presentation: Freedom Struggle

COURSE OUTCOMES:	
1	Explain the importance of the Tamil language and the types of Tamil literature.
2	Describe their knowledge from rock paintings to modern art.
3	Demonstrate a strong foundational understanding of martial arts.
4	Explain the concept of Thinai and its values among the Tamils.
5	Describe the contribution of Tamils to Indian culture.
TEXT BOOKS:	
1	M. Hemamalini, D.Chitra, “Tamil Heritage”, VRB Publishers Pvt. Ltd., 2023
2	G. Jayanthi Ravikrishnan, “Tamil Heritage”, Sri Krishna Publication, 2023
REFERENCES:	
1	Bakkiyamary, “Literary History from the Perspective of Genre”, New Century Book House, 2011
2	K. K. Pillai, “History, People, and Culture of Tamil Nadu”, International Institute of Tamil Studies, 2002
3	Robert Caldwell, “A Comparative Grammar of the Dravidian Languages”, Vallavar Pannai, Chennai, 1959
4	Bakkiyamary, “Tamil Arts Through the Ages”, Paavendhan Publications, 2008
5	Th. Lourdes, “Some Fundamentals of Folklore Studies”, Folklore Research Centre, 2000

TA26C01	தமிழர் மரபு	L	T	P	TW /SL	Total	C	SDG
		15	0	0	15	30	1	3,4,10,11,12,13 ,15,16

COURSE OBJECTIVES:

- மாணவர்கள் தமிழ் இலக்கிய வரலாற்றை புரிந்துகொள்ள உதவுதல்.
- மாணவர்கள் தமிழர்களின் மரபு சார்ந்த,ஓவியங்கள் மற்றும் இசைக்கருவிகளை புரிந்துகொள்ள உதவுதல்.
- மாணவர்கள் தமிழர்களின் பாரம்பரிய கலைகளை புரிந்துகொள்ள உதவுதல்.
- மாணவர்கள் தமிழர்களின் வாழ்வியல் மற்றும் அதன் மதிப்புகள் குறித்து விழிப்புணர்வு உருவாக்குதல்.
- இந்திய கலாச்சாரத்தில் தமிழர்களின் பங்களிப்பு மற்றும் தாக்கத்தைப்

புரிந்துகொள்ளுதல்.

COURSE CONTENT:

Unit 1	**மொழி மற்றும் இலக்கியம்**	**3**	**0**	**0**	**3**	**6**		**4,10**

இந்திய மொழிக் குடும்பங்கள்- திராவிட மொழி குடும்பம் - சங்க இலக்கியங்கள் – பதினெண்கீழ்கணக்கு நூல்கள்- திருக்குறளில் மேலாண்மைக் கருத்துக்கள் - தமிழ்க் காப்பியங்கள்(ஐம்பெரும் காப்பியங்கள்) - பக்தி இலக்கியம், (ஆழ்வார்கள் மற்றும் நாயன்மார்கள்)

Activities: தமிழ் இலக்கியம் என்ற தலைப்பில் போஸ்டர் தயாரித்தல்.

Unit 2	**மரபு - பாறை ஓவியங்கள் முதல் நவீன ஓவி சிற்பக் கலை**	**3**	**0**	**0**	**3**	**6**		**11,12**

சிற்றிலக்கியங்கள் - தமிழில் நவீன இலக்கியத்தின் வளர்ச்சி - தமிழ் இலக்கிய வளர்ச்சியில் பாரதியார் மற்றும் பாரதிதாசன் ஆகியோரின் பங்களிப்பு- சிற்பங்கள் - ஐம்பொன் சிலைகள்- குமரிமுனையில் திருவள்ளுவர் சிலை-பழங்குடியினர் மற்றும் அவர்கள் தயாரிக்கும் கைவினைப் பொருட்கள், - தேர் செய்யும் கலை – தமிழர் இசைக் கருவிகள் - மிருதங்கம், பறை, வீணை, யாழ், நாதஸ்வரம்
Activities: இலக்கியம் அடிப்படையிலான வினாடி வினா

Unit 3	**நாட்டுப்புறக் கலைகள் மற்றும் விளையாட்டுகள்:**	**3**	**0**	**0**	**3**	**6**		**3,4**

தெருக்கூத்து, கரகாட்டம், வில்லுப்பாட்டு, கணியான் கூத்து, ஒயிலாட்டம், , சிலம்பாட்டம், வளரி, நாட்டுப்புறத் தெய்வங்கள்-தமிழர்களின் விளையாட்டுகள். ஏறு தழுவுதல்-இளவட்டக்கல்-சடுகுடு-உறியடித்தல்-வழுக்கு மரம்-மாட்டுவண்டி

Activities: பாத்திரப் பங்கு: கலைகளை நடித்தல்

Unit 4	**தமிழர்களின் திணைக் கோட்பாடுகள்**	**3**	**0**	**0**	**3**	**6**		**13,15**

தொல்காப்பியம் மற்றும் சங்க இலக்கியத்தில் அகம் மற்றும் புறக் கோட்பாடுகள் - தமிழர்கள் போற்றிய அறக்கோட்பாடு – சங்ககாலத்தில் கல்வியின் முக்கியத்துவம் - சங்ககால நகரங்களும் துறை முகங்களும் -சங்ககாலத்தில் ஏற்றுமதி மற்றும் இறக்குமதி.

Activities: சங்க கால வாழ்க்கை என்ற தலைப்பில் போஸ்டர் தயாரித்தல்

Unit 5	**இந்திய தேசிய இயக்கம் மற்றும் இந்திய பண்பாட்டிற்குத் தமிழர்களின் பங்களிப்பு**	**3**	**0**	**0**	**3**	**6**		**4,16**

இந்திய விடுதலைப்போரில் தமிழர்களின் பங்கு - சுயமரியாதை இயக்கம்- சித்த மருத்துவம் – கல்வெட்டுகள்- கையெழுத்துப்படிகள் - தமிழ்ப் புத்தகங்களின் அச்சு வரலாறு
Activities: குழு விளக்கம்: விடுதலைப் போராட்டம்

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

1	தமிழ் மொழியின் முக்கியத்துவத்தையும் தமிழ் இலக்கியத்தின் வகைகளையும் விவரிக்க முடியும்.
2	பாறை ஓவியங்களிலிருந்து நவீன கலை வரை தங்களின் அறிவை விவரிக்க முடியும்.
3	போர்க்கலைகளில் வலுவான அடிப்படை அறிவை வெளிப்படுத்த முடியும்.
4	தமிழர்களின் திணை கருத்தையும் அதன் மதிப்புகளையும் விளக்க முடியும்.
5	இந்திய கலாச்சாரத்தில் தமிழர்களின் பங்களிப்பை விவரிக்க இயலும்

TEXT BOOKS:

1.	முனைவர் ஆ. பூபாலன் , "தமிழர் மரபு", VRB Publishers Pvt Ltd, 2023
2.	ஜெயந்தி ரவிகிருஷ்ணன், "தமிழர் மரபு", Sri Krishna Publication, 2023

REFERENCES:

1.	முனைவர் பாக்கியமேரி ,"வகைமை நோக்கில் இலக்கிய வரலாறு", நியூ செஞ்சுரி புக் ஹவுஸ், 2011
2.	முனைவர் கே.கே. பிள்ளை , "தமிழக வரலாறும் மக்களும் பண்பாடும்", உலகத் தமிழராய்ச்சி நிறுவனம், 2002
3.	டாக்டர் மு. வரதராசனார், "மொழி வரலாறு", திருநெல்வேலித் தென்னிந்திய சைவசித்தாந்த நூற்பதிப்புக் கழகம் லிமிடெட், 1954
4.	கால்டுவெல், "திராவிட மொழிகளின் ஒப்பிலக்கணம், வள்ளுவர் பண்ணை" சென்னை,1959
5.	முனைவர் பாக்கியமேரி, "காலம்தோறும் தமிழர் கலைகள்", பாவேந்தன் பதிப்பகம், 2008.
6.	முனைவர் தே. லூர்து, நாட்டார் வழக்காற்றியல் சில அடிப்படைகள், நாட்டார் வழக்காற்றியல் ஆய்வு மையம், 2000

Mapping of Course Outcomes to Programme Outcomes and Programme Specific Outcomes

COURSE OUTCOMES	PO											PSO		
	1	2	3	4	5	6	7	8	9	10	11	1	2	3
CO 1	2	2	1	-	-	1	-	-	2	-	1	-	-	-
CO 2	2	2	2	-	-	1	-	-	2	-	1	-	-	-
CO 3	2	1	1	-	-	2	-	2	-	-	1	-	-	-
CO 4	1	2	1	-	-	3	2	-	-	-	1	-	-	-
CO 5	2	2	2	-	-	2	2	-	2	-	1	-	-	-
CO	2	2	1	-	-	2	1	1	2	-	1	-	-	-

SD26C01	EMPLOYABILITY SKILLS I	L	T	P	TW /SL	Total	C	SDG
		0	0	30	30	60	1	3,4,5, 8,16

COURSE OBJECTIVES:

- To develop students' oral and written communication skills through structured speaking, listening, and grammar activities.
- To enhance interpersonal and professional etiquette skills required for workplace readiness and team environments.
- To build critical thinking, logical reasoning, and analytical problem-solving abilities through debate and decision-making exercises.
- To strengthen English grammar fundamentals including parts of speech, tenses, punctuation, and sentence construction.
- To foster confidence, body language awareness, and non-verbal communication through experiential and theatrical activities.

COURSE CONTENT:

UNIT 1	COMMUNICATION FOUNDATIONS AND SELF-EXPRESSION	0	0	6	6	12		4,8

Introducing Your Friend – Self Introduction techniques and structure, Peer Introduction exercises and feedback, Confidence building strategies for public speaking, Speaking clarity – articulation, pace and tone, Extempore speaking – thinking on the spot, Structuring ideas quickly using mind maps, Public speaking basics – audience awareness and eye contact, Verbal communication – sentence formation and fluency improvement, Vocabulary usage in everyday and professional contexts, Communication activities and group interaction exercises, Reflective feedback sessions and self-assessment techniques

Activities

1. Self-Introduction and Peer Introduction

2. Extempore Speaking Session

UNIT 2	BODY LANGUAGE, PROFESSIONAL ETIQUETTE AND WORKPLACE READINESS	0	0	6	6	12		3,4

Body language fundamentals – posture and its impact, Eye contact – significance and practice, Gestures and facial expressions in communication, Theatrix – expression activities and role plays, Non-verbal communication signals and interpretation, Professional etiquette – workplace conduct and formal communication, Grooming and personal presentation standards, Dress code norms and first impression management, Mock professional scenarios – interviews, meetings and presentations, Practical activities for formal greeting and introduction, Feedback and reflection on professional behavior

Activities

1. Body Language and Non-Verbal Communication Workshop
2. Theatrix – Expression and Role Play Activity
3. Mock Professional Scenario Simulation

UNIT 3	INTERPERSONAL SKILLS, TEAM DYNAMICS AND CONFLICT RESOLUTION	0	0	6	6	12		5,16

Interpersonal skills – active listening techniques, Empathy in communication and relationship building, Team vs Wild – team collaboration and leadership roles, Decision making under pressure and group consensus, Conflict resolution strategies and de-escalation techniques, Handling feedback positively in workplace settings, Workplace communication – formal and informal registers, Effective written workplace communication – emails and memos, Team activities and group challenges for leadership development, Peer evaluation and constructive critique in team settings

Activities

1. Team vs Wild – Team Collaboration and Leadership Challenge
2. Conflict Resolution and Feedback Handling Role Play

UNIT 4	**CRITICAL THINKING, LOGICAL REASONING AND DEBATE**			**6**	**6**	**12**		**4, 8**

Who Gets the Heart – logical decision making scenarios, Ethical reasoning and value-based judgment activities, Debate fundamentals – argument building and structuring, Critical thinking skills – identifying assumptions and biases, Rebuttal techniques and counter-argument strategies, Analytical thinking and structured problem solving frameworks, Logical reasoning games and puzzle-based discussion activities, Cause-and-effect reasoning in communication contexts, Organizing ideas for persuasive communication, Group debate activities and moderated discussions

Activities

1. Who Gets the Heart – Logical Decision-Making Activity
2. Formal Debate Session

UNIT 5	**ENGLISH GRAMMAR ESSENTIALS FOR EFFECTIVE COMMUNICATION**	**0**	**0**	**6**	**6**	**12**		**3, 8**

Types of nouns – proper, common, countable and uncountable, Personal, reflexive and relative pronouns with usage exercises, Subject-verb agreement – rules and common errors, Sentence correction using agreement principles, Action, linking, helping and modal verbs – forms and usage, Regular and irregular verb forms and conjugation activities, Pronoun reference rules – agreement in number and gender, Types of prepositions – time, place and direction with practice, Present, past and future tenses – continuous and perfect forms, Synonyms, antonyms, word formation and paragraph writing, Types of adjectives and adverbs – comparative and superlative forms, Definite and indefinite articles, quantifiers and demonstratives, Common idioms and phrasal verbs with contextual usage, Active and passive voice transformation exercises, Punctuation rules – full stop, comma, colon, semicolon, apostrophe and quotation marks, Coordinating and subordinating conjunctions, interjections and sentence formation, Collocations, gerunds and infinitive forms with error correction

Activities

1. Grammar Practice – Nouns, Pronouns and Subject-Verb Agreement
2. Grammar Practice – Verbs, Tenses and Voice
3. Vocabulary Building and Paragraph Writing Activity
4. Grammar Practice – Articles, Prepositions and Adjectives
5. Idioms, Phrasal Verbs and Conversational English Activity
6. Punctuation, Conjunctions and Integrated Writing Exercise

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

1	Remember and recall key concepts of verbal communication, grammar rules, and

	professional etiquette norms required in workplace and academic contexts.
2	Understand and explain the principles of interpersonal communication, body language, active listening, and team collaboration in professional scenarios.
3	Apply grammar structures, vocabulary, sentence formation techniques, and punctuation rules accurately in spoken and written communication activities.
4	Analyze communication breakdowns, logical reasoning problems, conflict situations, and debate arguments to develop structured and effective responses.
5	Evaluate and create well-organized public speaking presentations, professional interaction scripts, and written paragraphs demonstrating integrated soft skills competencies.

Weightage: Continuous Assessment: 100%

Assessment Methodology:

Assessment Type	Weightage	Marks	Mode of Evaluation
Continuous Skill Assessment (CSA)	60%	60	Continuous, rubric-based evaluation through communication activities, grammar exercises, presentations and participation
Terminal Skill Assessment (TSA)	40%	40	Weekly assessment + communication practical + presentation/interview + portfolio viva
Total	100%	100	—

A. Continuous Skill Assessment (CSA)

Component	Description	CO(s)	Marks
Daily Topical Assessment	Short assessment at the close of each session evaluating communication concepts, grammar application, logical reasoning or professional etiquette, recorded continuously.	CO1, CO3	10
Communication Activities & Participation	Rubric-based evaluation of classroom activities including Self & Peer Introduction, Extempore, Theatrix, Team vs Wild, Who Gets the Heart, Role Plays and other communication exercises.	CO2, CO5	10
Group Discussion, Debate & Team Activities	Continuous assessment of participation in group discussions, debates, leadership activities, conflict resolution exercises and collaborative problem-solving.	CO2, CO4	10
Grammar & Written Communication Exercises	Evaluation of grammar worksheets, vocabulary activities, sentence correction, paragraph writing, email drafting and integrated writing tasks.	CO1, CO3	10
Presentation & Public Speaking	Assessment of extempore speaking, public speaking, persuasive presentations and audience engagement based on predefined rubrics.	CO3, CO5	10
Professional Portfolio & Reflective Journal	Evaluation of professional emails, reflective journal, self-assessment reports, peer feedback and communication portfolio.	CO4, CO5	10
Subtotal (CSA)			60

B. Terminal Skill Assessment

Component	Description	CO(s)	Marks
Weekly Assessment	Cumulative score of weekly consolidation tests assessing communication concepts, grammar,	CO1, CO3	10

	vocabulary, logical reasoning and workplace communication.		
Communication Practical Examination	Practical assessment comprising extempore speaking, role play, group discussion or workplace communication scenario demonstrating verbal and non-verbal communication skills.	CO2, CO5	15
Presentation / Professional Interview	Individual presentation or panel-based mock interview assessing communication, confidence, body language, professional etiquette and critical thinking.	CO3, CO4	10
Portfolio Viva-Voce	Review of communication portfolio, written assignments, reflective journal and professional communication artefacts through viva.	CO4, CO5	5
Subtotal (TSA)			40

C. Common Evaluation Rubrics

Evaluation Criterion	Descriptor	Weight
Knowledge & Application	Demonstrates understanding of concepts and applies them appropriately in communication activities, discussions and written tasks.	**25%**
Communication & Language	Uses appropriate grammar, vocabulary, fluency, articulation and clarity in spoken and written communication.	**25%**
Critical Thinking & Problem Solving	Demonstrates logical reasoning, analytical thinking, decision-making and the ability to respond effectively in different situations.	**20%**
Professionalism & Teamwork	Exhibits confidence, body language, etiquette, collaboration, leadership, active listening and respect for others.	**20%**
Participation & Presentation	Shows active participation, preparedness, creativity, organization, time management and overall presentation quality.	**10%**

TEXT BOOKS:

1.	Barun K. Mitra and Basundhara Mitra, *Personality Development and Soft Skills*, 3rd Edition, Oxford University Press, 2024.
2.	Wren, P.C. and Martin, H. *High School English Grammar and Composition*, Regular Edition, S. Chand Publishing, 2024.
3.	Sanjay Kumar and Pushp Lata, *Communication Skills*, 3rd Edition, Oxford University Press, 2024.

REFERENCES:

1.	Dr. K. Alex, *Soft Skills: Know Yourself and Know the World*, Revised Edition, S. Chand Publishing, 2025.
2.	Dale Carnegie, "*How to Win Friends and Influence People*", Revised Edition, Gallery Books (Simon and Schuster), 2022.
3.	Raymond Murphy, *English Grammar in Use: A Self-study Reference and Practice Book for Intermediate Learners of English*, 5th Edition, Cambridge University Press & Assessment, 2019.
4.	Meenakshi Raman and Sangeeta Sharma, *Technical Communication: Principles and*

	Practice, 4th Edition, Oxford University Press, 2024.
5.	Stephen R. Covey, *The 7 Habits of Highly Effective People*, 30th Anniversary Edition, Simon & Schuster, 2020.
Web / Online Resources	
1.	**Soft Skills Development – NPTEL Course (NPTEL) —** https://nptel.ac.in/courses/109/105/109105095/
2.	**Developing Your Personal and Professional Brand – Communication Skills (Coursera) —** https://www.coursera.org/learn/communication-skills
3.	**English Grammar and Essay Writing – UC Berkeley (Coursera) —** https://www.coursera.org/learn/grammar-punctuation

Mapping of Course Outcomes to Program Outcomes & Program Specific Outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	1	–	–	–	–	–	2	1	3	–	–	–	–
CO2	2	2	–	–	–	1	–	2	3	3	–	–	–	–
CO3	2	2	1	–	1	–	–	1	2	3	1	–	–	–
CO4	2	3	2	1	–	1	–	2	3	3	1	–	–	–
CO5	2	3	3	1	1	1	–	2	3	3	2	–	–	–
Avg	2.0	2.2	1.2	0.4	0.4	0.6	0.0	1.4	2.4	3.0	0.8	–	–	–

SEMESTER: II

IP26C02	UNIVERSAL HUMAN VALUES –II	L	T	P	TW /SL	Total	C	SDG
		15	0	0	15	30	0	2,4,13,16

COURSE OBJECTIVES:

- To understand harmony at different levels of existence—self, family, society, and nature.
- To develop the right understanding of human values.
- To promote ethical and responsible living.
- To enable holistic development and professional competence.

COURSE CONTENT:

UNIT 1	**HARMONY IN THE HUMAN BEING (SELF)**	**3**	**0**	**0**	**3**	**6**		**3**

Harmony in the self: feelings, thoughts, and expectations - Program for self-regulation **Activities:** Students identify and list the needs of the body and the self (mind).								
UNIT 2	**HARMONY IN THE FAMILY AND SOCIETY**	**3**	**0**	**0**	**3**	**6**		**16**
Harmony in families - Family as the basic unit of human interaction - Values in relationships Harmony in society: from family to world family **Activities:** Students share one example of trust or respect in their family or society.								
UNIT 3	**HARMONY IN NATURE**	**3**	**0**	**0**	**3**	**6**		**13**
Understanding nature: interconnectedness and mutual fulfillment - Coexistence in nature - Four orders of nature: Material, Plant, Animal, Human **Activities:** Students list daily habits affecting the Nature and suggest one improvement.								
UNIT 4	**HARMONY IN EXISTENCE**	**3**	**0**	**0**	**3**	**6**		**13**
Realizing existence as co-existence- Environmental sustainability - Role of humans in maintaining ecological balance **Activities:** Students list daily habits affecting the environment and suggest one improvement.								
UNIT 5	**IMPLICATIONS OF HUMAN VALUES IN PROFESSIONAL LIFE**	**3**	**0**	**0**	**3**	**6**		**16**
Ethical human conduct - Values in professional life - Social responsibility of engineers/professionals - Holistic development and competence - Case studies on ethical dilemmas **Activities:** Students analyze a simple ethical situation and decide whether it is right or wrong with justification.								

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

1	Apply the understanding of the self (I) and the body to maintain harmony within the human being.
2	Apply human values such as trust, respect, and mutual understanding to build harmonious relationships in family and society.
3	Apply the principles of coexistence to live in harmony with nature.
4	Apply the principles of coexistence to support environmental sustainability.
5	Apply ethical principles and human values in personal and professional decision-making for holistic development.

Weightage: Continuous Assessment: 100%

Assessment Methodology: Active Participation (40%), Assignments(30%), Quiz(30%)

TEXT BOOKS:

1.	Kuldeep S. Sharma, Sarveen Kaur Sachdeva, “Universal Human Values”, Books Clinic Publishing, 2023.
2.	Debidutta Acharya, Amitabh Nanda, “Universal Human Values: Navigating Ethics and the Environment with Case Studies Approach”, S. Chand Publishing, 2025.

REFERENCES:	
1.	Ritu Soryan, “Universal Human Values and Professional Ethics”, S.K. Kataria & Sons, 2022.
2.	Govind Narayan, “Human Values and Professional Ethics”, R. Narain Publishers & Distributors, 2022.
3.	Mark Carney, “Value(s): Building a Better World for All”, William Collins, 2021.
4.	William MacAskill, “What We Owe the Future”, Basic Books, 2022.
5.	Julio Montero, “Human Rights as Human Independence: A Philosophical and Legal Interpretation”, University of Pennsylvania Press, 2022.

Mapping of Course Outcomes to Programme Outcomes and Programme Specific Outcomes

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

MA26C02	**STATISTICS AND NUMERICAL METHODS (LAB INTEGRATED)**	**L**	**T**	**P**	**TW /SL**	**Total**	**C**	**SDG**
		30	**0**	**30**	**60**	**120**	**4**	**4,9,13**

COURSE OBJECTIVES:

- To acquire knowledge of hypothesis testing for both small and large samples, which plays an important role in real life problems.
- To encourage students to develop a practical understanding of Analysis of Variance.
- To acquaint the knowledge of non-parametric tests which plays an important role in real life problems.
- To acquaint the knowledge of various numerical methods of solving ordinary differential equations.
- To introduce numerical integration techniques used in engineering and technology disciplines.

COURSE CONTENT:

UNIT 1	**TESTING OF HYPOTHESIS**	**9**	**0**	**3**	**12**	**24**		**4,9,13**

Statistical hypothesis –Type I and Type II errors – Large sample test for single mean and difference of means – Test based on t distribution for single mean and equality of means – Test based on F distribution for equality of variances. Practical**:** Testing of hypothesis for equality of variances using simulation software. **Activities:** Comparison of manufacturing process variability/Vibration and noise analysis/Soil property analysis**.**								
UNIT 2	**DESIGN OF EXPERIMENTS**	**9**	**0**	**3**	**12**	**24**		**4,9,13**
General principles – Analysis of variance (ANOVA) – One-way classification – Completely randomized design (CRD) – Two-way classification – Randomized block design (RBD) – Three-way classification – Latin square design (LSD). Practical**:** Analysis of variance for randomized block design using simulation software. **Activities:** ANOVA in machine learning models/Network traffic analysis/Heat transfer experiments/ Concrete mix design.								
UNIT 3	**NON-PARAMETRIC TEST**	**9**	**0**	**3**	**12**	**24**		**4,13**
Chi square test for single variance – Independence of attributes – Contingency table: Analysis of $r \times c$ tables – Kolmogorov-Smirnov test for goodness of fit. Practical**:** Testing of hypothesis of independence of attributes using simulation software. **Activities:** Goodness of fit in software testing/Quality control in manufacturing/Structural damage analysis.								
UNIT 4	**NUMERICAL SOLUTION OF ORDINARY DIFFERENTIAL EQUATIONS**	**9**	**0**	**3**	**12**	**24**		**4,9,13**
Single-step methods: Euler's method – Modified Euler's method – Fourth order Runge-Kutta method for solving first order equations – Multi-step methods: Milne's predictor corrector method – Adam's Bashforth predictor corrector method for solving first order equations. Practical: Solving ordinary differential equations by fourth order Runge-Kutta method using simulation software. **Activities:** Gradient based learning equations/RLC circuit equations/Equation of motion/Simulate dynamic behavior of mechanisms.								
UNIT 5	**NUMERICAL SOLUTION OF INTEGRATION**	**9**	**0**	**3**	**12**	**24**		**4,9,13**
Numerical integration using Trapezoidal and Simpson's 1/3, 3/8 rules – Numerical double integration: Trapezoidal and Simpson's rules. Practical**:** Evaluating integration by Trapezoidal rule using simulation software. **Activities:** Area under frequency response curve/Numerical estimation of signal power using Simpson's rule/Work done by variable force/Velocity-distance calculation.								

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

1	Apply large sample test, t and F-tests to analyze real world engineering data and draw statistically valid conclusions.
2	Utilize one-way and multi-way ANOVA techniques for experimental data analysis and statistical decision making.
3	Interpret variance, goodness of fit and independence of attributes using Chi-square and Kolmogorov–Smirnov tests in real life problems.

4	Solve first order differential equations using single-step and multi-step methods.
5	Make use of Trapezoidal and Simpson's rules in numerical integration.
Weightage: Continuous Assessment: 50%, End Semester Examinations: 50%	
Assessment Methodology: Internal Examinations (30%), Practical (10%), Activity (10%)	
TEXT BOOKS:	
1.	Grewal. B.S. and Grewal. J.S., "Numerical Methods in Engineering and Science ", Khanna Publishers, New Delhi, Eleventh edition, Reprint 2021.
2.	Johnson. R.A., Miller. I. and Freund. J., "Miller and Freund's Probability and Statistics for Engineers", Pearson Education, Asia, Ninth edition, Reprint 2023.
REFERENCES:	
1.	Burden. R.L. and Faires. J.D., "Numerical Analysis", Cengage Learning, Tenth edition, Reprint 2024.
2.	Devore. J.L., "Probability and Statistics for Engineering and the Sciences", Cengage Learning, New Delhi, Ninth edition, Reprint 2023.
3.	Gerald. C.F., and Wheatley. P.O., "Applied Numerical Analysis", Pearson Education, Asia, New Delhi, Seventh edition, Reprint 2023.
4.	Spiegel. M.R., Schiller. J. and Srinivasan. R.A., "Schaum's Outlines on Probability and Statistics", Tata McGraw Hill, Fourth edition, Reprint 2024.
5.	Walpole. R.E., Myers. R.H., Myers. S.L. and Ye. K., "Probability and Statistics for Engineers and Scientists", Pearson Education, Asia, Tenth edition, Reprint 2024.
E resources/E materials:	
1.	https://onlinecourses.nptel.ac.in/noc19_bt19/preview
2.	https://onlinecourses.nptel.ac.in/noc23_bt13/preview

Mapping of Course Outcomes to Programme Outcomes

Course Outcomes		Program Outcomes										Programme Specific Outcomes		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO 1	3	2	1	1	1	-	-	-	-	-	1	-	1	-
CO 2	3	2	1	1	1	-	-	-	-	-	1	-	1	-
CO 3	3	2	1	1	1	-	-	-	-	-	1	-	1	-
CO 4	3	2	1	1	1	-	-	-	-	-	1	-	1	-

CO 5	3	2	1	1	1	-	-	-	-	-	1	-	1	-
Average	3	2	1	1	1	-	-	-	-	-	1	-	1	-

PH26C04	PHYSICS FOR CIVIL AND MECHANICAL ENGINEERS	L	T	P	TW/SL	Total	C	SDG
		30	0	0	30	60	2	3,4,7,9,11, 12

COURSE OBJECTIVES:

- To provide fundamental knowledge of conducting, magnetic, superconducting and novel engineering materials.
- To introduce composite materials used in modern industries.
- To familiarize students with magnetic and superconducting materials along with their applications in engineering field.
- To equip learners with the knowledge of acoustics and thermal physics to enhance their interdisciplinary engineering understanding.
- To give insight on structures, properties and applications of novel engineering materials.

COURSE CONTENT:

UNIT 1	CONDUCTING MATERIALS	6	0	0	6	12		3,4,9

Classical free electron theory – merits and limitations - expression for electrical conductivity - Fermi- Dirac distribution function – Density of energy states – Energy bands in solids –Electron effective mass (Concept only) - concept of holes - Computed Tomography scan.

Activity*: Temperature dependence of conductivity – Demo

UNIT 2	COMPOSITES	6	0	0	6	12		4,9,12

Composites – definition - properties: physical and mechanical properties - classification based on types of matrix and reinforcement (Qualitative) - Fibre reinforced plastics (FRP) and Fibre reinforced metals (FRM) – Advanced Composites – Industrial applications of composites.

Activity*: Smart composites – Poster

UNIT 3	MAGNETIC AND SUPERCONDUCTING MATERIALS	6	0	0	6	12		3,4,7,9

Magnetic materials: review of fundamental terms – Giant magneto resistance effect – GMR sensors – Superconductors – Meissner effect-critical field-critical current – Type I and Type II superconductors - Josephson effect - applications: Magnetic levitation, Superconducting qubits.

Activity*: Magnetic materials and Superconductors – Puzzle

UNIT 4	ACOUSTICS AND THERMAL PHYSICS	6	0	0	6	12		4,7,11

Classification and characteristics of sound - decibel - Weber–Fechner law–factors affecting the acoustics of buildings and their remedies- principles of acoustic design. Modes of heat transfer - heat conduction through compound media (series and parallel) - Solar water heater.

Activity*: Measuring sound level in different places using mobile sound meter app

UNIT 5	**NOVEL ENGINEERING MATERIALS**	**6**	**0**	**0**	**6**	**12**		**4,9**

Metallic glasses: types, preparation - melt spinning process, properties and applications – phase change materials (Qualitative) - Shape memory alloys: phases, shape memory effect, pseudo elastic effect, properties and applications - Carbon nanotubes: properties and applications.

Activity*: Day to day applications of Shape Memory alloys: Audio overview using Notebook LM

***** Students can do either a Mini project for the entire course or all the activities given in each unit.

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

1	Utilize free-electron theory and band theory to interpret the physics of electrical and thermal conduction in solids.
2	Classify different types of composites and employ their properties to resolve some industrial engineering problems.
3	Use the magnetic and superconducting properties of materials to demonstrate various applications of modern technology.
4	Apply the principles of acoustic design to improve the sound quality in auditorium and use the heat transfer mechanism to solve problems related to heat conduction in compound media.
5	Implement the properties of novel engineering materials to demonstrate their roles in engineering field.

Weightage: Continuous Assessment: 40%, End Semester Examinations: 60%

Assessment Methodology: Internal Assessment Test (70%) Activities (30%)

TEXT BOOKS:

1.	Shatendra Sharma & Jyotsna Sharma**,** *"Engineering Physics"*, Second edition, Pearson India Education Services Pvt Ltd., 2024.
2.	K. Thyagarajan, **"**Engineering Physics" Fourth edition, McGraw Hill Education (India) Pvt. Ltd., 2020.

REFERENCES:

1.	H.K. Malik & A.K. Singh**,** "*Engineering Physics"*, Second Edition, McGraw Hill Education (India) Pvt Ltd., 2021.
2.	Krishnan K Chawla, **"**Composite Materials: Science and Engineering", Fourth edition, Springer Nature, 2020.
3.	A S Vasudeva, "Modern Engineering Physics", Ninth Edition, S Chand & Company Ltd., 2024.
4.	Gaur, R.K. & Gupta, S.L.**,** "*Engineering Physics"*, Eight edition, Dhanpat Rai Publications, 2024.
5.	Kittel, C. "Introduction to Solid State Physics", Ninth Edition, Wiley, 2018

E resources/E materials:

1.	**Physics of Materials**, nptel Course, https://nptel.ac.in/courses/113106039

2.	Material Science and Engineering, Youtube, https://www.youtube.com/watch?v=2rxbxNem1iI
3.	Heat transfer lectures, Youtube, https://www.youtube.com/playlist?list=PL0BVemMdfiul3nRWXZaZWrx1lmdT3DPJk
4.	Sound and acoustics, Engineering tool box, https://www.engineeringtoolbox.com/
5.	Research articles on semiconductors, Superconductors, and nanomaterials, IEEE Xplore Digital Library, https://ieeexplore.ieee.org/Xplore/home.jsp

Mapping of Course Outcomes to Programme Outcomes

Course Outcomes	Programme Outcomes											Programme Specific Outcomes		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	2	-	-	-	-	-	1	-	-	1	-	-	-
CO2	3	2	-	-	-	-	-	1	-	-	1	-	-	-
CO3	3	2	-	-	-	-	-	1	-	-	1	-	-	-
CO4	3	2	-	-	-	-	-	1	-	-	1	-	1	-
CO5	3	2	-	-	-	-	-	1	-	-	1	-	-	-
Average	3	2	-	-	-	-	-	1	-	-	1	-	1	-

CH26C02	**ENVIRONMENTAL SCIENCE**	**L**	**T**	**P**	**TW /SL**	**Total**	**C**	**SDG**
		30	**0**	**0**	**30**	**60**	**2**	**3,4,6,7,9, 11,12,13,17**

COURSE OBJECTIVES:

- To provide knowledge of the components of the environment and the various processes within it.
- To explore green chemistry, sustainable practices and pollution prevention methods.
- To examine the effects of chemicals on ecosystem and human health.
- To evaluate the environmental risks and develop appropriate management strategies.
- To promote sustainable development and encourage social responsibility.

COURSE CONTENT:

UNIT 1	**ECOSYSTEM AND BIODIVERSITY**	**6**	**0**	**0**	**6**	**12**		**14,15,13**

Environment- Components of the environment - Ecosystem- Structure and function - Biodiversity- Values - Threats to biodiversity - Endemic and Endangered species - Conservation of biodiversity.
Activity - Chart preparation on conservation of biodiversity.

UNIT 2	**NATURAL RESOURCES**	**6**	**0**	**0**	**6**	**12**		**12,7,6,13**

Natural resources – Forest resources – Deforestation – causes, consequences and control measures. Water resources – Overexploitation – effects and control measures. Food resources –Impacts of modern agriculture – Land resources – Soil erosion, landslides – Effects and control measures. **Activity** – Case study on deforestation in India.								
UNIT 3	**ENVIRONMENTAL POLLUTION AND MANAGEMENT**	**6**	**0**	**0**	**6**	**12**		**3,6,11,13**
Pollution – Pollutants - Air pollution, Water pollution, Land pollution – causes, effects and control measures. Waste water treatment – Solid waste management – E-waste management. **Activity –** Prepare a report analyzing various alternatives to plastics and their significance.								
UNIT 4	**SOCIAL ISSUES AND THE ENVIRONMENT**	**6**	**0**	**0**	**6**	**12**		**9,11,13,17**
Climate change - Global warming – Climate change and public health – Climate change and food security. Food Adulteration – Common adulterants and the method to detect them – Sustainable food processing techniques. **Activity** – Prepare a report analyzing the presence of adulterants in five commonly used food items through appropriate testing methods.								
UNIT 5	**ENVIRONMENT AND SUSTAINABILITY**	**6**	**0**	**0**	**6**	**12**		**4,7,12,13**
Sustainable Development Goals (SDGs) –Environmental Impact Assessment (EIA) – Life cycle assessment – Risk assessment –Environment auditing –Concept of Carbon credit, Carbon foot print, Ecological foot print - Importance and applications - Environmental protection acts - Green chemistry –Principles and applications – Eco mark and Eco products. **Activity** – Creating models based on Eco products.								

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

1	Implement ecological and biodiversity methods to conserve ecosystems and species.
2	Use sustainable techniques to manage forests, water, Land and Agriculture.
3	Apply pollution control and waste management methods to reduce environmental hazards.
4	Implement climate change mitigation and food safety practices to assess risks and ensure food security.
5	Apply environmental and green strategies to minimize ecological impact.

Weightage: Continuous Assessment: 40%, End Semester Examinations: 60%

Assessment Methodology: Activity (30%), Internal Assessment Test (70%).

TEXT BOOKS:

1.	Gilbert M. Masters & Wendell P. Ela, “Introduction to Environmental Engineering and Science”, Third Edition, 2022

2.	Erach Barucha, “Text book of Environmental studies for under graduate courses”, Fourth Edition, Universities Press (I) PVT Ltd, Hyderabad, 2023.
REFERENCES:	
1.	Vir Singh, “Text book of Environment and Ecology”, Springer, 2024.
2.	Niko Roorda, “Fundamentals of Sustainable Development”, Fourth Edition.2025.
3.	Ravi K Jain, Lloyd V Urban, Stacey, “Environmental Impact Analysis – A new dimension”, Second Edition, Van Nostrand Reinhold Company. 2018.
4.	Ian C Shaco, “Food Safety- The Science of keeping food safe”, Second Edition, Wiley-Blackwell, 2018.
E resources/E materials:	
1.	Environment and Development, nptel course - https://nptel.ac.in/courses/109103186
2.	Biodiversity protection, Farmers and Breeders rights, nptel course, https://nptel.ac.in/course/129105008
3.	Sustainable Engineering Concepts and Life Cycle Analysis, nptel course, https://nptel.ac.in/courses/105105157

Mapping of Course Outcomes to Programme Outcomes

Course Outcomes	Programme Outcomes											Programme Specific Outcomes		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	2	2	2	1	-	2	2	1	-	-	1	-	-	-
CO2	2	2	3	1	-	2	2	1	-	-	1	-	-	-
CO3	2	3	3	2	2	2	2	1	-	-	1	-	-	-
CO4	2	3	2	3	2	2	2	1	-	-	1	-	-	-
CO5	2	2	3	1	1	2	2	1	-	-	1	-	-	-
Average	2	3	3	2	1	2	2	1	-	-	1	-	-	-

EE26C01	BASIC ELECTRICAL AND INSTRUMENTATION ENGINEERING (LAB INTEGRATED)	L	T	P	TW/ SL	Total	C	SDG
		30	0	30	30	90	3	4,9, 11,12

COURSE OBJECTIVES:

- To provide fundamental knowledge on DC and AC electrical circuits
- To explain the construction and working of DC Machines and Transformer
- To explain the construction and working of AC Rotating Machines
- To impart knowledge on the functional elements and Electrical measuring instruments
- To impart knowledge on various electrical wiring practices and earthing methods

COURSE CONTENT:

UNIT 1	DC AND AC CIRCUITS	6	0	6	6	24		4,9

DC circuit: Electrical circuit elements – Resistor, Capacitor and Inductor - Basic electrical circuit parameters – Charge, Current, Voltage, Power and Energy - Ohm's law – Kirchhoff's voltage and current law - Series resistance, Parallel Resistance - Current and Voltage Division.
Alternating current and voltage - Average value, RMS Value, Peak Value, Form Factor, Power and Power Factor
Lab Experiment(s):
1.Verification of Ohm's law
2.Verification of Kirchhoff's Current Law
3.Verification of Kirchhoff's Voltage Law
Activities:
Circuit element identification, Problem solving

UNIT 2	DC MACHINES & TRANSFORMERS	6	0	3	6	15		4,9

DC Generator and motor – Construction, working and generating emf, Types - Series, Shunt, Compound-applications, Single phase transformer - Construction, working, transformation ratio, emf equation and applications.
Practical: Identify the parts of DC motor and transformer.
Activities: Quiz

UNIT 3	AC MACHINES	6	0	3	6	15		4,9

Single phase and three phase Induction motor - Construction, working, slip, types and applications, Alternator - Construction, working and applications.
Practical: Identify the parts of induction motor.
Activities: Comparison Chart Preparation and group presentation.

UNIT 4	MEASUREMENTS AND INSTRUMENTATION	6	0	6	6	18		4,12

Functional elements of an instrument –Principles of electrical indicating instruments – Moving coil and moving iron instruments, DSO –Transducers: strain gauge, LVDT.
Practical: Measurement of electrical parameters using MI and MC instruments.
Activities: AC/DC Measurement Comparison using MC and MI instruments.

UNIT 5	ELECTRICAL WIRING	6	0	6	6	18		4,11

Electrical Safety, Types of domestic wiring, Cleat, casing and capping and Conduit wiring, Earthing: Pipe Earthing and Plate Earthing, Fuses: kit kat, Cartridge and HRC fuses.
Practical: Residential wiring, Series and parallel wiring
Activities: Build an electrical wiring layout for a room.

COURSE OUTCOMES:	
1	Solve complex DC and AC electrical circuits using fundamental laws.
2	Evaluate the performance of DC machines and transformers.
3	Examine the operational behaviour of AC rotating machines to assess their suitability for various industrial applications
4	Select appropriate electrical measuring instruments based on their operating principles and range requirements for precise data acquisition.
5	Design electrical wiring and earthing systems for residential or industrial installations.
Weightage: Continuous Assessment: 50%, End Semester Examinations: 50%	
Assessment Methodology: Internal Assessment Test – 30%, Practical – 10%, Activities– 10%	
TEXT BOOKS:	
1.	V. K. Mehta, Rohit Mehta "Principles of Electrical and Electronics Engineering", S.Chand & Company Pvt. Ltd, New Delhi, 2024.
2.	J.B. Gupta, "Fundamentals of Electrical Engineering and Electronics", S.K. Kataria & Sons, Tenth Edition, 2023.
REFERENCES:	
1.	Kothari DP and I.J Nagrath, "Basic Electrical and Electronics Engineering", Fourth Edition, McGraw Hill Education, 2024.
2.	M.S.Sukhja, T.K.Nagsarkar "Basic Electrical Engineering", Third Edition, Oxford Higher Education, 2020.
3.	B.L Theraja, Fundamentals of Electrical Engineering and Electronics. Chand & Co, 2022.
4.	S.K.Sahdev, "Basic of Electrical Engineering", Pearson, 2025
E resources/E materials:	
1.	https://nptel.ac.in/courses/108105053
2.	https://nptel.ac.in/courses/117106108
3.	https://ieeexplore.ieee.org/document/11024188

Mapping of Course Outcomes to Programme Outcomes

Course Outcomes	Programme Outcomes	Programme Specific Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	3	-	-	-	-	-	-	-	-	-	-	-	-
CO2	3	-	-	-	-	-	-	-	-	-	-	-	-	-
CO3	3	-	-	-	-	-	-	-	-	-	-	-	-	-
CO4	3	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	3	-	-	-	-	-	-	-	-	-	-	-	-	-
Average	3	3	-	-	-	-	-	-	-	-	-	-	-	-

ME26201	**ENGINEERING MECHANICS**	**L**	**T**	**P**	**TW/SL**	**Total**	**C**	**SDG**
		30	**0**	**60**	**30**	**120**	**4**	**9**

COURSE OBJECTIVES

- To introduce the fundamental principles of statics and dynamics for analyzing particle and rigid body systems.
- To enable students to draw free-body diagrams and apply equilibrium equations to practical engineering problems.
- To develop the ability to determine centroids, moments of inertia, and related properties of surfaces and solids.
- To understand and apply the laws of motion, energy, momentum, and impact in solving particle dynamics problems.
- To familiarize students with frictional effects and the basics of rigid body motion through theory and experiments.

COURSE CONTENT:

UNIT 1	**STATICS OF PARTICLES**	**6**	**0**	**12**	**6**	**18**		**9**

Introduction — Units and Dimensions — Laws of mechanics — Resolution of forces — Lami's theorem — Parallelogram law — Coplanar forces — Rectangular components — Equilibrium of a particle — Free body diagrams — Principle of transmissibility.

Practical:

- Force Polygon Experiment: Verification of polygon law of forces
- Inclined Plane Apparatus: Studies mechanical advantage, efficiency, and friction on an inclined plane.

Activity:

1. Real-Life Force Analysis on a real-life system (traffic signal, hanging banner, electric pole)
2. Case Study to analyze a two-cable support system and calculate tensions using equilibrium conditions

UNIT 2	**EQUILIBRIUM OF RIGID BODIES**	**6**	**0**	**18**	**6**	**24**		**9**

Free body diagrams — Types of supports — Action & reaction forces —Transmissibility - Moments and couples — Varignon's theorem — Equilibrium of rigid bodies in 2D — Single equivalent force.

Practical:

- Parallel Force Beam Setup: Equilibrium and reactions of parallel forces on a beam
- Jib Crane Apparatus: Determine forces in tension and compression members of a jib crane.
- Member Truss Apparatus: Forces in truss members using joints or sections method.

Activity:

1. Structural Study of a bridge/truss to identify force system.

2. Seesaw Balance: Understand moment of force apply balance conditions

UNIT 3	**PROPERTIES OF SURFACES AND SOLIDS**	**6**	**0**	**6**	**6**	**12**		**9**

Centroid and centre of mass of simple shapes (rectangle, triangle, circle) — Composite sections (T, L & I sections) — Area moment of inertia — Parallel axis theorem — Perpendicular axis theorem — Mass moment of inertia, Polar moment of inertia, Radius of Gyration (cylindrical bodies).

Practical:

- Center of Gravity Apparatus: CG of regular & composite shapes

Activity:

1. Prepare a **chart/model showing centroid locations**

UNIT 4	**DYNAMICS OF PARTICLES**	**6**	**0**	**6**	**6**	**12**		**9**

Newton's Second Law of Motion -Equations of Motions, Dynamic Equilibrium- D'Alembert principle—Work-energy method, Principle of Impulse and Momentum, Collision of elastic bodies, coefficient of restitution - Newton's law of collision of elastic bodies, direct impact of elastic bodies.

Practical:

- Impact and Collision Setup: Momentum and impulse demonstration

Activity:

1. Case Study to understand vehicle collision or sports impact and relate its theory
2. Marble Collision: Understand collision and momentum transfer and observe interaction between bodies

UNIT 5	**FRICTION AND RIGID BODY DYNAMICS**	**6**	**0**	**18**	**6**	**24**		**9**

Laws of friction — Coefficients of Friction — Angles of Friction — Types of Friction Problems — Wedges and Ladder friction — Belt friction.

Practical:

- Screw Jack setup: Verification of mechanical advantage & efficiency
- Worm and Worm wheel Apparatus: Shows motion transmission and efficiency of a worm gear system.
- Differential Wheel and Axle Apparatus: Witness Mechanical advantage using wheel.

Activity:

1. Inclined Plane Test: Tilt a board slowly to find angle at which object starts sliding
2. Shoe Grip Experiment: Compare friction using different surfaces (Eg. tile, sandpaper)
3. Rope & Pulley Demo: Wrap rope around a rod to experience Pull and feel resistance → belt friction idea

COURSE OUTCOMES:

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

1	Apply laws of mechanics to analyze forces on particles and determine conditions of equilibrium.
2	Construct free-body diagrams and solve problems related to equilibrium of rigid bodies in 2D
3	Compute centroid, centre of mass, moments of inertia for simple and composite geometric sections.
4	Apply principles of motion, work–energy, and impulse–momentum to solve dynamics problems involving particles.
5	Analyze frictional systems and explain elementary concepts of rigid body motion on inclined planes and rolling bodies.

Weightage: Continuous Assessment: 50%, End Semester Examinations: 50%

Assessment Methodology: Activities (20%), Practical (40%), Theory (40%)	
TEXT BOOKS:	
1.	Beer, F. P., Johnston, E. R., Mazurek, D. F. & Eisenberg, E. R., "Vector Mechanics for Engineers: Statics and Dynamics", Twelfth Edition, McGraw-Hill Education, 2020.
2.	Palanichamy M., "Engineering Mechanics: Statics & Dynamics", Third edition, McGraw Hill Education India, 2004.
REFERENCES:	
1.	Hibbeler, R. C., "Engineering Mechanics: Statics and Dynamics", Fourteenth Edition, Pearson Education, 2016.
2.	Timoshenko, S. P. & Young, D. H., "Engineering Mechanics", Fifth Edition, McGraw-Hill International Edition, 2012.
3.	Meriam, J. L. & Kraige, L. G., "Engineering Mechanics: Statics and Dynamics", Ninth Edition, Wiley India, 2018.
4.	Bansal, R. K., "A Textbook of Engineering Mechanics", Revised Edition, Laxmi Publications, 2018.
5.	R. K. Rajput, "Engineering Mechanics", Revised Edition, S. Chand Publishing, 2016.
E resources/E materials:	
1.	NPTEL, "Engineering Mechanics – Statics and Dynamics", Video Lectures by IIT Madras / IIT Delhi / IIT Kanpur, Available on NPTEL Online Learning Platform. https://nptel.ac.in/
2.	MIT OpenCourseWare, "Engineering Mechanics / Statics and Dynamics", Massachusetts Institute of Technology, Open Learning Resources. https://ocw.mit.edu/
3.	eGyanKosh (IGNOU), "Engineering Fundamentals and Mechanics", National Digital Repository, Indira Gandhi National Open University. https://egyankosh.ac.in/
4.	LearnEngineering, "Engineering Mechanics – Animated Video Lessons", Educational Media Resource. https://learnengineering.org/

Mapping of Course Outcomes to Programme Outcomes and Programme Specific Outcomes

Course outcomes	**PO**											**PSO**		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**1**	**2**	**3**
CO1	3	3	2	2	2	-	-	-	-	-	1	2	-	-
CO2	3	3	2	2	1	1	-	-	-	-	1	2	-	-
CO3	3	2	2	2	2	-	-	-	-	-	2	2	-	-
CO4	3	3	2	2	2	1	-	-	-	-	1	2	-	-

CO5	3	3	2	2	2	1	-	-	-	-	2	2	-	-
CO	3	3	2	2	2	1	-	-	-	-	1	2	-	-

ME26202	COMPUTER AIDED MACHINE DRAWING	L	T	P	TW/SL	Total	C	SDG
		0	0	60	0	60	2	9

COURSE OBJECTIVES:

- To learn the standard drawing practices using fits and tolerances.
- To prepare assembly drawings both manually and using standard CAD packages.
- To prepare standard drawing layout for modeled parts.
- To prepare standard drawing layout for assemblies with BoM
- To acquaint the skills and practical experience in handling 2D drafting and 3D modeling software system

LIST OF ACTIVITIES:

PART-1 DRAWING STANDARDS & FITS AND TOLERANCES

Code of practice for Engineering Drawing, BIS specifications - Welding symbols, riveted joints, keys, fasteners - Reference to hand book for the selection of standard components like bolts, nuts, screws, keys etc. - Limits, Fits Tolerancing of individual dimensions - Specification of Fits - Preparation of production drawings and reading of part and assembly drawings, basic principles of Geometric Dimensioning & Tolerancing. Introduction to SP46-2003.

PART- II 2D DRAFTING

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

1. Bearings-Bush Bearing.

2. Valves Safety and Non-return Valves.

3. Couplings Flange couplings.

4. Joints-Universal. Knuckle. Gib & Cotter, Sleeve & Cotter joints.

5. Engine parts Piston, Connecting Rod, Crosshead (vertical and horizontal), and Stuffing box.

6. Machine Components Screw Jack, Machine Vice, Plummer Block

7. Prepare the relevant views of the parts of a given assembly drawing needed for the purpose of production.

COURSE OUTCOMES:

At the end of the course, the students will be able to:
CO1: Apply standard drawing practices using fits and tolerances.
CO2: Sketch orthogonal views of machine components.
CO3: Sketch orthogonal views of assembled components.

CO4: Prepare standard drawing layout for assembled parts. CO5: Prepare bill of materials for assembled drawing.
Weightage: Continuous Assessment: 60%, End Semester Examinations: 40%
Assessment Methodology: Evaluation of Student's work, Observation, Record, Activities etc..: 75% Test : 25%
REFERENCES:

1.	David A. Madsen and David P. Madsen, Engineering Drawing and Design, 6th edition, Cengage Learning, 2017
2.	K. L. Narayana and P. Kannaiah, Machine Drawing, 6th Edition, New Age International Publishers, 2019
3.	James D. Bethune, Engineering Graphics with AutoCAD 2022, 1st Edition, Pearson Education, 2022
4.	Gene R. Cogorno, Geometric Dimensioning and Tolerancing for Mechanical Design, 3rd Edition, McGraw Hill, 2022
5.	K. Mahadevan and K. Balaveera Reddy, Design Data Handbook for Mechanical Engineers, Latest Edition, CBS Publishers and Distributors, 2020

E resources/E materials:

1.	James D. Bethune, E-Book / Digital Textbook, Online technical learning resource, 2022
2.	Gene R. Cogorno, Online GD&T Learning Resource, Digital engineering learning material, 2022. E-Resource: Online GD&T tutorials and reference modules (ASME / ISO standards based)
3.	Naresh Varma Datla and S. R. Kale, Engineering Graphics and Design (Online Course), Video Lectures / Online Course (E-learning), SWAYAM / NPTEL, 2022

Mapping of Course Outcomes to Programme Outcomes and Programme Specific Outcomes

Course outcomes	**PO**											**PSO**		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**1**	**2**	**3**
CO1	1	-	-	-	2	-	-	-	1	1	-	1	2	-
CO2	1	-	-	-	2	-	-	-	1	1	-	1	2	-
CO3	1	-	-	-	2	-	-	-	1	-	-	-	2	-
CO4	1	-	-	-	2	-	-	-	1	1	-	1	2	-
CO5	1	-	-	-	2	-	-	-	-	1	-	1	2	-
CO	1	-	-	-	2	-	-	-	1	1	-	1	2	-

ME26C02	ENGINEERING WORKSHOP AND MAKERSPACE	L	T	P	TW /SL	Total	C	SDG
		0	0	60	0	60	2	4,9

COURSE OBJECTIVES:

- To provide fundamental knowledge of tools, equipment, fastening methods, and safe handling practices used in basic engineering operations.
- To develop the ability to disassemble, analyze, and reassemble common household appliances with an understanding of their components and functions.
- To impart practical skills in carpentry, plumbing, and machining operations for fabrication and maintenance tasks.
- To introduce modern manufacturing techniques such as additive manufacturing (3D printing) and laser cutting for basic component fabrication.
- To familiarize students with basic electronics, PCB soldering, circuit simulation, and Arduino-based interfacing for simple engineering applications.

LIST OF ACTIVITIES:

1. **Tools, Equipment, and Handling Techniques**
   1.1. Understanding various hand tools, power tools, and measuring instruments used in mechanical dis-assembly, assembly, fabrication, plumbing, and digital manufacturing operations.
   1.2. Safety guidelines and practices, maintenance of tools, and correct usage techniques.
   1.3. Overview of fastening methods and plumbing fittings.
   1.4. Introduction to Machine Tools:
      1.4.1. Familiarization with Drilling Machine – components, working principles, and basic exercise.
      1.4.2. Familiarization with Cutting Machine – components, working principles, and basic exercise.
2. **Dis-assembly and Assembly of Home Appliances**
   2.1. Study, dis-assembly, and assembly procedures for household electrical appliances:
      2.1.1. Mixer Grinder
      2.1.2. Ceiling Fan/Table Fan
   2.2. Identification of key components, functional study, and common fault diagnosis.
   2.3. Practical re-assembly ensuring correct alignment, balance, and operation testing.
3. **Carpentry, Plumbing and Machining Practices**

   Carpentry Practice:
   3.1. Introduction to carpentry: study of woodworking tools, materials, wood joints and safety measures.
   3.2. Overview of carpentry hand tools and power tools.
   3.3. Preparation of marking wood surfaces, measurement techniques and cutting practice.
   3.4. Hands-on practice in:
      3.4.1 Cutting, chiseling, planning and filing wood operations.
      3.4.2 Fabrication of simple wood joints (Lap Joint and T – Joint)
   3.5. Demonstration of Basic Operations using CNC Router.

   Plumbing Practice
   3.6. Familiarization with pipes, fittings, valves, plumbing materials, and tools.
   3.7. Hands-on practice in pipe cutting, threading, joining, and leak-proof connections.

   Machining Practice
   3.8. Introduction to lathe machine: study of lathe components, cutting tools, work piece materials, basic machining operations, and safety measures.

3.9. Hands-on practice in turning, drilling and tapping operations in the given work piece

4. **Additive Manufacturing and Laser Cutting**

3D Printing

4.1. Understanding the principles of 3D printing.

4.2. Machine setup and slicing process.

4.3. Demonstration on preparing and printing mechanical parts.

Laser Cutting

4.4. Introduction to laser cutting principles and safety precautions.

4.5. Setting up the machine, material selection, and cutting parameters.

4.6. Demonstration of simple and complex Shapes using Laser Cutting Machine.

5. **Electronic Engineering Practices**

Basic Electronics Practices

5.1. Introduction to active and passive components.

5.2. Hands-on session of Soldering Practices in a Printed Circuit Board.

5.3. Simulation of Simple Electronic Circuits.

Arduino Interfacing and PCB

5.4. Introduction to Arduino and sensors.

5.5. Hands-on session using Arduino: Blinking LED and Relay Switching.

5.6. Demonstration of PCB fabrication machine, including basic operation, layout transfer, drilling, and safety practices.

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

CO1:	Identify and use various hand tools, power tools, measuring instruments, fastening methods, and machine tools following appropriate safety practices.
CO2:	Demonstrate the disassembly, inspection, fault diagnosis, and reassembly of common household appliances.
CO3:	Perform basic carpentry, plumbing, and machining operations, including wood joint fabrication, pipe fitting, and lathe operations.
CO4:	Apply principles of additive manufacturing and laser cutting to prepare and fabricate simple components.
CO5:	Develop and test basic electronic circuits, perform PCB soldering, and implement simple Arduino-based interfacing applications.

Weightage: Continuous Assessment: 60%, End Semester Examinations: 40%

Assessment Methodology: Evaluation of Student's work, Observation, Record, Activities etc.(75%), Model Practical Test(25%)

REFERENCES:

1.	Kalpakjian, S., and Schmid, S. R., Manufacturing Engineering and Technology, Seventh Edition, Pearson Education, 2021.

2.	Raghuwanshi, B. S., Workshop Technology, Vol. 1 & 2, Dhanpat Rai Publications, 2021.
3.	Kaplan, D. M., Hands-On Electronics: A Practical Introduction to Analog and Digital Circuits, Cambridge University Press, 2020.
4.	Blum, J., Exploring Arduino: Tools and Techniques for Engineering Wizardry, Wiley, 2020.
5.	Chua, C. K., Leong, K. F., and Lim, C. S., 3D Printing and Additive Manufacturing: Principles and Applications, Fifth Edition, World Scientific, 2021.
E resources/E materials:	
1.	MIT FABLAB Tutorials, (n.d.). *Massachusetts Institute of Technology*, https://fablab.mit.edu/
2.	3D Printing Basics – 3D Systems Learning Center, (n.d.). *3D Systems*, https://www.3dsystems.com/learn
3.	Carpentry and Woodworking Basics – Carpentry.edu, (n.d.). *Carpentry Training Resources*, https://www.carpentry.edu/
4	Machine Tools and Workshop Practice – NPTEL, 2022. *NPTEL Online Courses*, https://nptel.ac.in/

Mapping of Course Outcomes to Programme Outcomes and Programme Specific Outcomes

Course outcomes	**PO**											**PSO**		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**1**	**2**	**3**
CO1	3	2	1	-	3	2	2	3	1	1	-	-	-	-
CO2	3	3	2	2	2	1	1	2	2	1	-	-	-	-
CO3	3	2	3	1	2	2	2	2	2	1	1	-	-	-
CO4	3	2	3	2	3	1	2	2	1	1	1	-	-	-
CO5	3	3	3	2	3	1	1	2	2	2	1	-	-	-
CO	3	2	1	-	3	2	2	3	1	1	1	-	-	-

EN26C02	**PROFESSIONAL COMMUNICATION**	**L**	**T**	**P**	**TW /SL**	**Total**	**C**	**SDG**
		15	**0**	**30**	**15**	**60**	**2**	**4,8,9**

COURSE OBJECTIVES:

- To enhance interactive and analytical communication skills
- To develop critical and purposeful communication abilities
- To apply language skills and enhance their creative expression
- To equip learners with employability and workplace communication skills
- To strengthen technical and service-oriented communication

COURSE CONTENT

UNIT I	**INTERACTIVE COMMUNICATION**	**3**	**3**	**0**	**6**	**12**		**4**
Listening: Listening to panel discussions **Speaking:** Group discussion **Reading**: Reading technical documents **Writing:** Email writing **Language Study:** Tenses **Vocabulary:** Connectives, Articles **Self study**: Poster Presentation								
UNIT 2	**TECHNICAL WRITING**	**3**	**3**	**0**	**6**	**12**		**4**
Listening: Listening to Ted Talks **Speaking:** Extempore **Reading**: Case studies **Writing:** Instructions **Language Study:** Active and Passive Voice **Vocabulary:** Purpose statement **Self study**: Case Study								
UNIT 3	**ENGLISH FOR CREATIVITY**	**3**	**3**	**0**	**6**	**12**		**8**
Listening: Short Documentaries/Podcast **Speaking:** Narrating events, vlog **Reading**: Travelogues **Writing:** Checklist, Note making **Language Study:** Reported Speech **Vocabulary:** Spotting the errors **Self study**: Creating Portfolio (Short story/Poem)								
UNIT 4	**ENGLISH FOR EMPLOYABILITY**	**3**	**3**	**0**	**6**	**12**		**8**
Listening: Listening to Job interviews **Speaking:** Mock Interview **Reading**: Workplace Etiquettes **Writing:** Job application Letter and Resume, Preparing Professional Portfolio **Language Study:** Sentence Structures (Simple, Compound and Complex) **Vocabulary:** Technical Vocabulary **Self study**:Preparing a Resume								
UNIT 5	**ENGLISH FOR TECHNICAL INTERACTION**	**3**	**3**	**0**	**6**	**12**		**9**
Listening: Product reviews **Speaking:** Reviewing a Product **Reading**: Gadget reviews and User manuals **Writing:** Interpretation of Charts and Graphs **Language Study:** Cause and Effect expressions **Vocabulary:** Technical Abbreviations and Acronyms **Self study**: FAQ sheet for a commonly used gadget								

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

1	Display active listening and analytical speaking to present logical arguments in professional settings.
2	Apply critical and purposeful communication skills to express ideas logically.
3	Demonstrate cross-cultural awareness and innovative thinking to create inclusive, effective and ethically sound technical communication.
4	Use appropriate formats and effective writing to prepare documents and handle interviews effectively.

5	Employ technical vocabulary appropriately in professional communication.

Weightage: Continuous Assessment: 40%, End Semester Examination: 60%

Assessment Methodology: Internal Assessment Test (70%), Activities (30%)

TEXT BOOKS:

1.	Swan, Michael. Practical English Usage. Fourth Edition, Oxford University Press, 2021.
2.	Kumar, Sanjay & Pushp Lata. Communication Skills. Third Edition, Oxford University Press, 2020.

REFERENCES:

1.	Murphy, Raymond. English Grammar in Use. Fifth Edition, Cambridge University Press, 2022.
2.	Hewings, Martin. Advanced Grammar in Use. Cambridge University Press, 2021.
3.	Guffey, Mary Ellen & Loewy, Dana. Business Communication: Process and Product. 10th Edition, Cengage Learning, 2021.
4.	Lannon, John M. & Gurak, Laura J. Technical Communication. Fifteenth Edition, Pearson, 2022.
5.	Mitra, Barun K. Personality Development and Soft Skills. Second Edition, Oxford University Press, 2020.

E resources/E materials:

1.	British Council, Learn English, https://learnenglish.britishcouncil.org
2.	NPTEL, Technical Communication Courses – India, https://nptel.ac.in
3.	BBC Learning English, https://www.bbc.co.uk/learningenglish

Mapping of Course Outcomes to Programme Outcomes and Programme Specific Outcomes

Course outcomes	PO											PSO		
	1	2	3	4	5	6	7	8	9	10	11	1	2	3
CO1	-	-	-	-	-	-	-	2	3	-	2	-	-	-
CO2	-	-	-	-	-	-	-	2	3	-	2	-	-	-
CO3	-	-	-	-	-	-	-	2	3	-	2	-	-	-
CO4	-	-	-	-	-	-	-	2	3	-	2	-	-	-
CO5	-	-	-	-	-	-	-	2	3	-	2	-	-	-
CO	-	-	-	-	-	-	-	2	3	-	2	-	-	-

SD26C02	EMPLOYABILITY SKILLS -II	L	T	P	TW /SL	Total	C	SDG
		0	0	60	60	120	1	3,4, 8,9,16

COURSE OBJECTIVES:

- To develop students' professional communication skills including verbal, non-verbal, and written communication essential for engineering careers.
- To enhance students' creative thinking, storytelling, emotional intelligence, and interpersonal skills through experiential learning activities.
- To build quantitative aptitude and mental arithmetic proficiency using Vedic math techniques and shortcut calculation methods for competitive examinations.
- To introduce logical thinking, algorithmic problem-solving, and no-code application development as foundational computational skills.
- To prepare students for career readiness through resume building, LinkedIn optimization, mock interviews, and professional self-presentation.

COURSE CONTENT:

Unit 1	**CREATIVE COMMUNICATION AND STORYTELLING**			12	12	24		4,8

Introduction to professional communication and its importance in engineering careers, Story Mason framework – story building blocks and narrative structure, Creativity and imagination exercises for engineering contexts, Picture Connector – visual thinking and observation techniques, Pattern linking and symbolic interpretation, Tourism Pitch – structure of a persuasive presentation, Persuasion principles and storytelling for professional pitching, Non-verbal communication – body language, eye contact, posture, Active listening skills and their role in effective communication, Group presentation dynamics and collaborative communication strategies

Activities

1. Story Mason – Story Building and Imagination Exercise
2. Picture Connector – Visual Thinking and Pattern Linking
3. Tourism Pitch – Persuasive Presentation and Storytelling
4. Reporter Activity – Questioning, Listening, and Summarization
5. Shopping Role Play – Negotiation and Real-World Communication
6. Insane Inventor – Creative Thinking and Product Pitching

Unit 2	**EMOTIONAL INTELLIGENCE AND PERSONAL DEVELOPMENT**			12	12	24		3,16

Emotional Quotient (EQ) – definition, components, and relevance in professional settings, Self-awareness – identifying strengths, weaknesses, and emotional triggers, Empathy – understanding perspectives and building interpersonal trust, Emotional control techniques – managing stress, conflict, and pressure at workplace, Habit formation – Atomic Habits framework and behavioral change science, Discipline and consistency in professional growth, Positive behavioral practices for engineering students, SMART Goal Setting – Specific, Measurable, Achievable, Relevant, Time-bound framework, Short-term and long-term career planning strategies, Reflection activities and journaling for personal development

Activities 1. Emotional Quotient Workshop – Self-Awareness and Empathy Activities 2. Habit Formation and SMART Goal Setting Workshop								
Unit 3	**SPEED ARITHMETIC AND QUANTITATIVE APTITUDE – PART I**			12	12	24		4,8
Introduction to Vedic mathematics and mental arithmetic principles, Speed addition techniques and fast subtraction methods, Shortcut calculations and mental arithmetic practice drills, Quick multiplication tricks using base values (10, 100, 1000), Rapid multiplication using cross-multiplication and multi-digit shortcuts, Fast division techniques and reverse calculation methods, Multiplication shortcuts using 5-based and 9-based calculations, Quick percentage estimations and simplified arithmetic tricks, Approximation techniques and logical calculation shortcuts, Prime factorization, shortcut methods for HCF and LCM, Divisibility rules and their application in aptitude problems, Common percentage-to-fraction conversions and memorization strategies **Activities** 1. Speed Arithmetic Practice – Addition, Subtraction, and Multiplication Shortcuts 2. Speed Arithmetic Practice – Division, Percentages, HCF, LCM, and Fraction Shortcuts							
Unit 4	**CRITICAL THINKING, LOGICAL REASONING AND DEBATE**			12	12	24		4, 8
Finding square roots quickly using Vedic math and approximation strategies, Cube root shortcut methods and cube pattern recognition, Fast cube calculation techniques and cube multiplication shortcuts, Fraction addition and subtraction shortcuts using LCM-based methods, Multi-step arithmetic shortcuts and nested calculation techniques, Logical simplification approaches for competitive aptitude problems, Advanced number manipulation tricks and rapid comparison techniques, Mental computation strategies for competitive examinations, Error checking techniques and divisibility validation methods, Quick verification methods for arithmetic accuracy, Advanced mental calculation techniques and rapid arithmetic simplifications, Speed math assessment preparation and timed practice strategies **Activities** 1. Vedic Math and Advanced Arithmetic – Squares, Cubes, and Mental Computation							
Unit 5	**COMPUTATIONAL THINKING, NO-CODE DEVELOPMENT, AND CAREER READINESS**			12	12	24		8,9
Understanding problems and solution approaches in engineering contexts, Steps in problem solving and basics of algorithms and flowcharts, Logical thinking exercises and real-world problem-solving activities, Number patterns, mathematical reasoning, and number-based puzzles, Visual reasoning concepts, grid-based thinking, and pathfinding activities, Pattern recognition and introductory graph and maze-solving exercises, Sequential thinking and writing simple pseudocode, Conditional statements, decision-making logic, and looping concepts, Introduction to no-code platforms – UI design basics and drag-and-drop app development, Creating simple workflows, publishing and testing basic apps, Resume building – structure, content, ATS optimization, and formatting, LinkedIn profile optimization – headline, summary, skills, and connections, Reporter technique – questioning, listening, and summarization skills, HR and technical interview simulation and career readiness frameworks							

Activities

1. Logical Thinking, Flowchart Design, and Pseudocode Writing
2. No-Code App Development – UI Design and Workflow Creation
3. Resume Building and LinkedIn Profile Optimization
4. Mock Interview, Feedback Session, and Career Readiness Assessment

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

1	Remember and recall key concepts of professional communication, emotional intelligence, habit formation, and goal-setting frameworks relevant to engineering workplace scenarios
2	Understand and explain mental arithmetic techniques, Vedic math shortcuts, percentage-fraction conversions, and quantitative aptitude concepts applicable to competitive examinations
3	Apply storytelling, creative thinking, presentation skills, negotiation strategies, and role-play techniques to real-world professional communication contexts.
4	Analyze logical problems, design step-by-step algorithms, construct flowcharts, and develop solutions using no-code platforms and computational thinking approaches.
5	Evaluate personal career readiness and create professional artifacts including resumes, LinkedIn profiles, and interview responses through simulated HR and technical interview assessments.

Weightage: Continuous Assessment: 100%

Assessment Methodology:

Assessment Type	Weightage	Marks	Mode of Evaluation
Continuous Skill Assessment (CSA)	60%	60	Continuous, rubric-based evaluation through communication activities, aptitude practice, computational thinking exercises and career readiness tasks
Terminal Skill Assessment (TSA)	40%	40	Weekly assessment + practical skill demonstration + presentation/interview + portfolio viva
Total	100%	100	—

A. Continuous Skill Assessment

Component	Description	CO(s)	Marks
Daily Topical Assessment	Short assessment at the close of each session evaluating communication concepts, emotional intelligence, speed arithmetic, logical reasoning and computational thinking.	CO1, CO2	10
Creative Communication Activities & Participation	Rubric-based evaluation of Story Mason, Picture Connector, Tourism Pitch, Reporter Activity, Shopping Role Play and Insane Inventor through presentations, storytelling and collaborative communication.	CO1, CO3	10
Personal Development & Team Engagement	Evaluation of participation in Emotional Intelligence workshops, SMART Goal Setting, Habit Formation activities, reflective journaling and collaborative learning exercises.	CO1, CO5	10
Speed Mathematics & Logical Reasoning Practice	Continuous assessment through Vedic Mathematics exercises, mental arithmetic drills, aptitude worksheets and timed calculation challenges.	CO2, CO4	10

Computational Thinking & No-Code Development	Assessment of flowcharts, pseudocode, logical reasoning exercises, no-code application development and workflow implementation activities.	CO4, CO5	10
Career Readiness Portfolio	Evaluation of resume, LinkedIn profile, no-code project documentation, interview preparation, reflective journal and professional development portfolio.	CO3, CO5	10
Subtotal (CSA)			60

B. Terminal Skill Assessment (TSA)

Component	Description	CO(s)	Marks
Weekly Assessment	Cumulative score of weekly consolidation tests covering communication, emotional intelligence, speed mathematics, computational thinking and career readiness concepts.	CO1, CO2	10
Integrated Practical Assessment	Practical assessment comprising communication presentation, speed mathematics problem solving, computational thinking task, algorithm/flowchart design or no-code application development.	CO2, CO4	15
Professional Presentation / Mock Interview	Individual presentation, product pitch or HR/technical interview simulation assessing communication, creativity, confidence, problem-solving and professionalism.	CO3, CO5	10
Portfolio Viva-Voce	Evaluation of resume, LinkedIn profile, no-code project, reflective journal and career readiness portfolio through viva.	CO4, CO5	5
Subtotal (TSA)			40

C. Common Evaluation Rubric

Evaluation Criterion	Descriptor	Weight
Knowledge & Application	Demonstrates understanding and effective application of communication, emotional intelligence, quantitative aptitude, computational thinking and career readiness concepts in practical situations.	**25%**
Communication & Presentation	Communicates ideas clearly with appropriate language, confidence, presentation skills, active listening and effective interpersonal interaction.	**20%**
Critical Thinking & Problem Solving	Demonstrates logical reasoning, analytical thinking, creativity and systematic problem-solving while selecting appropriate solution strategies.	**25%**
Professionalism & Collaboration	Exhibits teamwork, leadership, emotional intelligence, ethical behaviour, responsibility, workplace etiquette and positive participation.	**20%**
Innovation & Task Completion	Demonstrates originality, creativity, organization, timely completion and quality of assigned tasks and deliverables.	**10%**

TEXT BOOKS:

1.	Meenakshi Raman and Sangeeta Sharma, *Technical Communication: Principles and Practice*, 4th Edition, Oxford University Press, 2022.
2.	Asha Kaul, *Effective Business Communication*, 3rd Edition, PHI Learning, 2023.
3.	R. S. Aggarwal, *Quantitative Aptitude for Competitive Examinations*, Revised Edition, S. Chand Publishing, 2025.

REFERENCES:	
1.	Rajendra Pal and J. S. Korlahalli, "*Essentials of Business Communication*", 16th Edition, Sultan Chand and Sons, 2019.
2.	Arun Sharma, "*Quantitative Aptitude for Competitive Examinations*", 7th Edition, McGraw Hill Education, 2018
3.	Dale Carnegie, *How to Win Friends and Influence People: Updated for the Next Generation of Leaders*, Revised Edition, Gallery Books (Simon & Schuster), 2022.
4.	James Clear, *Atomic Habits: An Easy and Proven Way to Build Good Habits and Break Bad Ones*, 1st Edition, Penguin Random House, 2018.
5.	Nishit K. Sinha, *Quantitative Aptitude for CAT*, 7th Edition, Pearson Education, 2025.
Web / Online Resources	
1.	**Soft Skills – Communication and Personality Development** (NPTEL) — https://nptel.ac.in/courses/109/104/109104183/
2.	**Effective Business Communication** (Coursera) — https://www.coursera.org/learn/effective-business-communication
3.	**Aptitude – Quantitative Aptitude Tutorials and Practice** (GeeksforGeeks) — https://www.geeksforgeeks.org/aptitude-questions-and-answers/

Mapping of Course Outcomes to Program Outcomes & Program Specific Outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	2	1	–	–	–	1	–	2	2	3	1	-	-	-
CO2	3	3	1	1	–	–	–	–	–	1	–	-	-	-
CO3	2	2	2	–	1	1	–	1	3	3	1	-	-	-
CO4	3	3	3	2	3	–	–	–	1	1	1	-	-	-
CO5	2	2	2	1	1	1	–	2	2	3	2	-	-	-
Avg	2	2	2	1	1	1	-	1	2	2	1	-	-	-

TA26C02	TAMILS AND TECHNOLOGY	L	T	P	TW/SL	Total	C	SDG
		15	0	0	15	30	1	2,4,6,8,9,11,12,14
COURSE OBJECTIVES:								

- To help students understand the weaving and pottery (ceramic) technology of the Sangam period.
- To create awareness among students about the architectural designs of the Tamils during the Sangam period.
- To help students differentiate between the various stages of ancient production technologies.
- To understand the ancient knowledge in agriculture and irrigation technology.
- To enable students to understand the digitalization of the Tamil language.

COURSE CONTENT:

UNIT 1	**WEAVING AND POTTERY TECHNOLOGY**	**3**	**0**	**0**	**3**	**6**		**8,12**

Weaving industry during the Sangam period – Pottery technology – Black and red ware – Terracotta sculptures – Graffiti marks on pottery – Archaeological evidence.

Activities: Quiz: Based on artifacts and concepts

UNIT 2	**DESIGN AND CONSTRUCTION TECHNOLOGY**	**3**	**0**	**0**	**3**	**6**		**9,11**

Constructions during the Sangam period – Hero stones (Nadukal) – Stage setting in the Silappathikaram – Sculptures and temples of Mamallapuram – Great temples of the Chola period such as the Brihadeeswarar Temple (Thanjai Periya Kovil), Gangaikonda Cholapuram Temple, and Airavatesvara Temple – Temples of the Nayak period – Thirumalai Nayakkar Mahal – Meenakshi Amman Temple – Indo-Saracenic architecture during the British period.

Activities: Each group presents a building from a particular historical period.

UNIT 3	**PRODUCTION TECHNOLOGY**	**3**	**0**	**0**	**3**	**6**		**8,9**

Metallurgy – Iron industry – Smelting of iron – Steel – Historical evidence such as coins – Minting of coins – Methods of bead making – Stone beads – Glass beads – Terracotta beads – Conch shell beads – Bone fragments – Types of beads mentioned in the Silappathikaram.
Activities: Identifying coins and beads.

UNIT 4	**AGRICULTURAL AND IRRIGATION TECHNOLOGY**	**3**	**0**	**0**	**3**	**6**		**2,6,14**

Dams, lakes, ponds, and sluices – Importance of the Kumizhi (sluice system) during the Chola period – Wells – Cattle maintenance – Agriculture and allied activities – Maritime knowledge – Ancient knowledge of the ocean – Shipbuilding technology – Fisheries – Pearls and pearl diving – Knowledge-based society.

Activities: Map Activity: Drawing maritime trade routes.

UNIT 5	**SCIENTIFIC TAMIL AND COMPUTER TAMIL**	**3**	**0**	**0**	**3**	**6**		**4.9**

Development of Scientific Tamil – Development of Computer Tamil – Digitization of Tamil texts – Development of Tamil software – Tamil Virtual Academy – Tamil Digital Library – Tamil dictionaries on the internet – Lexicon (Sorkuvai) project.

Activities: Project: The Digital World of Tamil.	
COURSE OUTCOMES: At the end of the course, the students will be able to:	
1	Able to explain the importance of weaving and pottery technology during the Sangam period.
2	Able to describe the knowledge of architectural design of the Tamils during the Sangam period.
3	Able to demonstrate a strong foundational understanding of the production technologies of ancient Tamils.
4	Able to explain the importance of ancient Tamil agricultural and irrigation technologies.
5	Able to explain the concept of digitalization of the Tamil language.
TEXT BOOKS:	
1.	Dr. N. Kavitha, **"**Tamils and Technology" VRB Publishers Pvt. Ltd., 2023.
2.	Mrs. G. Jayanthi Ravikrishnan, **"**Tamils and Technology" Sri Krishna Publication, 2023
REFERENCES:	
1.	Dr. Ka. Rajan, "Sangam Age from an Archaeological Perspective", International Institute of Tamil Studies, 2010.
2.	Dr. K. Deivanayagam, "Architecture of the Tamils, International Institute of Tamil Studies", 2002.
3.	Department of Archaeology, Keeladi – Sangam Age Urban Civilization on the Banks of the Vaigai River, Tamil Nadu State Department of Archaeology Publication, 2019.
4.	Department of Archaeology, Porunai (Tamiraparani) River Valley Civilization, Tamil Nadu State Department of Archaeology Publication, 2021.
5.	Dr. Il. Sundaram, "Computer Tamil", Vikatan Publications, 2018.

TA26C02	**தமிழரும் தொழில்நுட்பமும்**	**L**	**T**	**P**	**TW/SL**	**Total**	**C**	**SDG**
		15	**0**	**0**	**15**	**30**	**1**	**2,4,6,8,9,11,12,14**
COURSE OBJECTIVES:								
Obj1: சங்ககால நெசவு மற்றும் பானை (செராமிக்) தொழில்நுட்பத்தை மாணவர்கள் புரிந்துகொள்ள உதவுதல். Obj2: சங்ககாலத்தில் தமிழர்களின் கட்டிட வடிவமைப்பைப் பற்றி விழிப்புணர்வு ஏற்படுத்துதல் Obj3: பழங்கால உற்பத்தித் தொழில்நுட்பத்தின் பல்வேறு நிலைகளை மாணவர்கள்								

வேறுபடுத்திக் காண உதவுதல்.
Obj4: வேளாண்மை மற்றும் பாசனத் தொழில்நுட்பத்தில் உள்ள பண்டைய அறிவை புரிந்துகொள்ளுதல்
Obj5: தமிழ்மொழியின் டிஜிட்டல்மயத்தை (Digitalization) மாணவர்கள் புரிந்துகொள்ளச் செய்தல்.

COURSE CONTENT:

UNIT 1	**நெசவு மற்றும் பானைத் தொழில்நுட்பம்**	**3**	**0**	**0**	**3**	**6**		**8,12**

சங்க காலத்தில் நெசவுத் தொழில் - பானைத் தொழில்நுட்பம் - கருப்பு சிவப்பு பாண்டங்கள் - சுடுமண் சிற்பங்கள் -பாண்டங்களில் கீறல் குறியீடுகள். தொல்லியல் சான்றுகள்

Activities: பாட அடிப்படையிலான வினாடி வினா

UNIT 2	**வடிவமைப்பு மற்றும் கட்டிடத் தொழில்நுட்பம்**	**3**	**0**	**0**	**3**	**6**		**9,11**

சங்க காலத்தில் கட்டுமானங்கள்-நடுகல்-சிலப்பதிகாரத்தில் மேடை அமைப்பு - மாமல்லபுரச் சிற்பங்களும், கோவில்களும் - சோழர் காலத்துப் பெருங்கோயில்கள், தஞ்சை பெரியக்கோயில், கங்கை கொண்ட சோழபுரம் கோயில், தாராசுரம் கோயில் - நாயக்கர் காலக் கோயில்கள்- திருமலை நாயக்கர் மகால் - மதுரை மீனாட்சி அம்மன் கோயில் -ஆங்கிலேயர் கால இந்தோ-சாரோசெனிக் கட்டிடக் கலை.

Activities: ஒவ்வொரு குழுவும் ஒரு கால கட்டிடத்தை விளக்குதல்

UNIT 3	**உற்பத்தித் தொழில் நுட்பம்:**	**3**	**0**	**0**	**3**	**6**		**8,9**

உலோகவியல், இரும்புத் தொழிற்சாலை - இரும்பை உருக்குதல், எஃகு -வரலாற்றுச் சான்றுகளான நாணயங்கள் - நாணயங்கள் அச்சடித்தல் - மணி உருவாக்கும் முறைகள் - கல்மணிகள், கண்ணாடி மணிகள் - சுடுமண் மணிகள் - சங்கு மணிகள் - எலும்புத்துண்டுகள் - சிலப்பதிகாரத்தில் மணிகளின் வகைகள்

Activities: நாணயங்கள் & மணிகள் அடையாளம் காணுதல்.

Unit 4	**வேளாண்மை மற்றும் நீர்ப்பாசனத் தொழில் நுட்பம்**	**3**	**0**	**0**	**3**	**6**		**2,6,14**

அணை, ஏரி, குளங்கள், மதகு - சோழர்காலக் குமுழித் தூம்பின் முக்கியத்துவம்- கிணறுகள் - கால்நடை பராமரிப்பு - வேளாண்மை மற்றும் வேளாண்மைச் சார்ந்த செயல்பாடுகள் - கடல்சார் அறிவு - பெருங்கடல் குறித்த பண்டைய அறிவு – கப்பல் கட்டும் கலை - மீன்வளம் - முத்து மற்றும் முத்துக்குளித்தல் - அறிவுசார் சமூகம்.

Activities: Map Activity: கடல் வர்த்தக பாதை வரைதல்

UNIT 5	**அறிவியல் தமிழ் மற்றும் கணித்தமிழ்**	**3**	**0**	**0**	**3**	**6**		**4.9**

அறிவியல் தமிழின் வளர்ச்சி - கணித்தமிழ் வளர்ச்சி - தமிழ் நூல்களை மின்பதிப்பு செய்தல் - தமிழ் மென்பொருட்கள் உருவாக்கம் - தமிழ் இணையக் கல்விக்கழகம் - தமிழ் மின் நூலகம் - இணையத்தில் தமிழ் அகராதிகள் - சொற்குவைத் திட்டம். **Activities:** Project: தமிழ் டிஜிட்டல் உலகம்.
COURSE OUTCOMES:
At the end of the course, the students will be able to: CO1: சங்க கால நெசவு மற்றும் பானை தொழில்நுட்பத்தின் முக்கியத்துவத்தை விவரிக்க முடியும். **CO2:** சங்க காலத்தில் தமிழர்களின் கட்டிட வடிவமைப்புக்கான அறிவை விவரிக்க முடியும். **CO3:** பண்டைய தமிழர்களின் உற்பத்தித் தொழில்நுட்பத்தில் வலுவான அடிப்படை அறிவை வெளிப்படுத்த முடியும் **CO4:** தமிழர்களின் பண்டைய வேளாண்மை மற்றும் பாசனத் தொழில்நுட்பத்தின் முக்கியத்துவத்தை விவரிக்க முடியும் **CO5:** தமிழ் மொழியின் டிஜிட்டல்மயமாக்கல் (Digitalization) என்ற கருத்தை விளக்க முடியும்
TEXT BOOKS:

1.	முனைவர் ஆ. பூபாலன், “தமிழரும் தொழில்நுட்பமும்”, VRB Publishers Pvt Ltd, 2023.
2.	ஜெயந்தி ரவிகிருஷ்ணன், “தமிழரும் தொழில்நுட்பமும்”, Sri Krishna Publication, 2023

REFERENCES:

1.	முனைவர் கா. ராஜன், “தொல்லியல் நோக்கில் சங்ககாலம்”, உலகத் தமிழாராய்ச்சி நிறுவனம்,2010
2.	முனைவர் கோ. தெய்வநாயகம், “தமிழர் கட்டிடக் கலை”, உலகத் தமிழாராய்ச்சி நிறுவனம்,2002
3.	தொல்லியல் துறை , “கீழடி-வைகை நதிக்கரையில் சங்ககால நகர நாகரிகம்”, தமிழ்நாடு அரசு தொல்லியல் துறை வெளியீடு, 2019
4.	தொல்லியல் துறை, பொருணை- ஆற்றங்கரை நாகரிகம், தமிழ்நாடு அரசு தொல்லியல் துறை வெளியீடு, 2021
5.	முனைவர் இல. சுந்தரம், “கணிணித் தமிழ்”, விகடன் பிரசுரம்,2018

Mapping of Course Outcomes to Programme Outcomes and Programme Specific Outcomes

COURSE OUTCOMES	PO											PSO		
	1	2	3	4	5	6	7	8	9	10	11	1	2	3
CO 1	2	2	1	-	-	2	-	-	-	-	1	-	-	-

CO 2	2	2	2	-	-	2	-	-	-	-	1	-	-	-
CO 3	3	2	2	2	2	1	-	-	-	-	1	-	-	-
CO 4	2	2	1	-	-	3	-	-	-	-	1	-	-	-
CO 5	2	1	2	-	3	1	-	-	2	-	2	-	-	-
CO	2	2	2	1	1	2	-	-	1	-	1			