

B.E. Degree
in
ELECTRONICS AND COMMUNICATION ENGINEERING
CURRICULUM & SYLLABUS (CBCS)

(Innovation and Product Development for sustainability)

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



**DEPARTMENT OF ELECTRONICS AND COMMUNICATION
ENGINEERING**

St. XAVIER'S CATHOLIC COLLEGE OF ENGINEERING

CHUNKANKADAI, NAGERCOIL – 629 003.

KANYAKUMARI DISTRICT, TAMIL NADU, INDIA

St. XAVIER'S CATHOLIC COLLEGE OF ENGINEERING,
Chunkankadai, Nagercoil – 629 003
AUTONOMOUS COLLEGE AFFILIATED TO ANNA UNIVERSITY
ACADEMIC REGULATIONS 2026
B. E. ELECTRONICS AND COMMUNICATION ENGINEERING CURRICULUM
CHOICE BASED CREDIT SYSTEM

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 competent Electronics and Communication Engineers with academic excellence, innovative research, ethical standards and international outlook to serve the society.

MISSION OF THE PROGRAMME

M1. To provide quality teaching in order to produce graduates with academic excellence, technical competence and ethical values.

M2. To develop advanced professionalism and exceptional career growth through inspiring faculty members and excellent infrastructure.

M3. To create awareness on state-of-the-art technologies through research and industry-institute collaboration.

M4. To inculcate a sense of innovation and commitment among the students to apply knowledge and technologies for the benefit of the society.

PROGRAMME EDUCATIONAL OBJECTIVES

PEO1: To enable graduates to pursue research, or have a successful career in academia or industries associated with Electronics and Communication Engineering, or as entrepreneurs.

PEO2: To provide students with strong foundational concepts and also advanced techniques and tools in order to enable them to build solutions or systems of varying complexity.

PEO3: To prepare students to critically analyze existing literature in an area of specialization and ethically develop innovative and research-oriented methodologies to solve the problems identified.

PROGRAMME OUTCOMES

PO1: Engineering Knowledge: Apply knowledge of mathematics, natural science, computing, engineering fundamentals and an engineering specialization as specified in WK1 to WK4 respectively to develop to the solution of complex engineering problems. **(Cognitive Level: Apply)**

PO2: Problem Analysis: Identify, formulate, review research literature and analyze complex engineering problems reaching substantiated conclusions with consideration for sustainable development. (WK1 to WK4) **(Cognitive Level: Analyze)**

PO3: Design/Development of Solutions: Design creative solutions for complex engineering problems and design/develop systems/components/processes to meet identified needs with consideration for the public health and safety, whole-life cost, net zero carbon, culture, society and environment as required. (WK5) **(Cognitive Level: Evaluate/Create)**

PO4: Conduct Investigations of Complex Problems: Conduct investigations of complex engineering problems using research-based knowledge including design of experiments, modelling, analysis & interpretation of data to provide valid conclusions. (WK8). **(Cognitive Level: Create)**

PO5: Engineering Tool Usage: Create, select and apply appropriate techniques, resources and modern engineering & IT tools, including prediction and modelling recognizing their limitations to solve complex engineering problems. (WK2 and WK6) **(Psychomotor: Mechanism, Complex Overt Response, Adaptation and Origination)**

PO6: The Engineer and The World: Analyze and evaluate societal and environmental aspects while solving complex engineering problems for its impact on sustainability with reference to economy, health, safety, legal framework, culture and environment. (WK1, WK5, and WK7).

PO7: Ethics: Apply ethical principles and commit to professional ethics, human values, diversity and inclusion; adhere to national & international laws. (WK9)

PO8: Individual and Collaborative Team work: Function effectively as an individual, and as a member or leader in diverse/multi-disciplinary teams.

PO9: Communication: Communicate effectively and inclusively within the engineering community and society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations considering cultural, language, and learning differences

PO10: Project Management and Finance: Apply knowledge and understanding of engineering management principles and economic decision-making and apply these to one's own work, as a member and leader in a team, and to manage projects and in multidisciplinary environments.

PO11: Life-Long Learning: Recognize the need for, and have the preparation and ability for i) independent and life-long learning ii) adaptability to new and emerging technologies and iii) critical thinking in the broadest context of technological change. (WK8)

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 SPECIFIC OUTCOMES

PSO1: Design and implement efficient, reliable electronic circuits using modern tools.

PSO2: Apply communication engineering concepts to analyze and develop advanced communication systems.

PSO3: Develop signal processing solutions, AI & IoT models for real-time applications.

PEOs – POs & PSOs MAPPING

PEO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
I.	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2
II.	2	1	2	2	3	1	1	1	1	1	1	2	2	1	1
III.	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

PROGRAMME ARTICULATION MATRIX

Ye ar	Sem ester	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	3	2	3	1	-	-	-
		MA26C01	3	2	1	1	1	-	-	-	-	-	1	1	-	-
		PH26C01	3	2	-	-	1	-	-	1	-	-	1	1	-	-
		CH26C01	3	2	2	2	2	2	-	1	-	-	1	-	-	-
		CS26C01	1	2	1	1	1	-	-	-	-	-	1	3	-	-
		EC26101	3	2	1	2	2	1	1	1	1	1	2	2	2	1
		EN26C01	-	-	-	-	-	-	-	2	3	-	2	-	-	-
		TA26C01	2	2	1	-	-	2	2	2	2	-	1	-	-	-
		CS26C03	1	2	2	2	1	-	-	-	-	-	1	3	-	2
		SD26C01	2	2	1	1	1	1	-	2	3	3	1	2	2	1
I	II	IP26C02	2	2	-	-	-	2	2	3	3	2	1	-	-	-
		MA26C02	3	2	1	1	1	-	-	-	-	-	1	1	1	1
		PH26C03	3	2	-	-	-	-	-	1	-	-	1	-	1	-
		CH26C02	2	3	3	2	1	2	2	1	-	-	1	-	-	-
		EC26201	3	2	2	1	1	1	1	1	1	1	2	3	1	-
		EC26202	3	2	2	1	1	1	-	1	1	-	2	2	1	-
		AI26202	3	2	3	-	2	-	-	-	-	-	1	-	-	2
		EN26C02	-	-	-	-	-	-	-	2	3	-	2	-	-	-
		TA26C02	2	2	2	2	3	2	-	-	2	-	1	-	-	-
		ME26C02	3	2	1	-	3	2	2	3	1	1	1	-	-	-
		SD26C01	2	2	2	1	1	1	0	1	2	2	1	2	2	2

SUSTAINABLE DEVELOPMENT GOALS

GOAL 1: No Poverty

End poverty in all its forms everywhere

GOAL 2: Zero Hunger

End hunger, achieve food security and improved nutrition and promote sustainable agriculture

GOAL 3: Good Health and Well-being

Ensure healthy lives and promote well-being for all at all ages

GOAL 4: Quality Education

Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all

GOAL 5: Gender Equality

Achieve gender equality and empower all women and girls

GOAL 6: Clean Water and Sanitation

Ensure availability and sustainable management of water and sanitation for all

GOAL 7: Affordable and Clean Energy

Ensure access to affordable, reliable, sustainable and modern energy for all

GOAL 8: Decent Work and Economic Growth

Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all

GOAL 9: Industry, Innovation and Infrastructure

Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation

GOAL 10: Reduced Inequality

Reduce inequality within and among countries

GOAL 11: Sustainable Cities and Communities

Make cities and human settlements inclusive, safe, resilient and sustainable

GOAL 12: Responsible Consumption and Production

Ensure sustainable consumption and production patterns

GOAL 13: Climate Action

Take urgent action to combat climate change and its impacts

GOAL 14: Life Below Water

Conserve and sustainably use the oceans, seas and marine resources for sustainable development

GOAL 15: Life on Land

Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss

GOAL 16: Peace and Justice Strong Institutions

Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels

GOAL 17: Partnerships to achieve the Goal

Strengthen the means of implementation and revitalize the global partnership for sustainable development.

SEMESTER I

Number of Courses : **09**

Total Credits : **22**

Course Code	Course Title	Course Type	Classroom Instruction(CI) (in Hours per Semesters)		Lab Instruction(LI) (in Hours per Semesters)	Term Work(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	3,4,8,1	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
CS26C01	Problem Solving using C	TC	45	0	0	45	90	3	4,8,9,12	ESC
EC26101	Fundamentals of Electronics Engineering (Lab Integrated)	TCP	30	0	30	30	90	3	4,7,8,9,11,12	ESC
EN26C01	Technical Communication	TC	15	15	0	30	60	2	4,8,10	HSMC
TA26C01	Heritage of Tamils	TC	15	0	0	15	30	1	3,4,10,11,12,13,15,16	HSMC
CS26C03	C Programming Laboratory	PC	0	0	60	0	60	2	4,8,9,12	ESC
SD26C01	Employability Skills-1*	PC	0	0	30	30	60	1	3,4,5,8,16	SDC

	NSS/NCC/NSO/ YRC**	-	-	-	-	-	-	-	-	MNC
Total			250	31	234			22		

* - 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 : **25**

Course Code	Course Title	Course Type	Classroom Instruction(CI) (in Hours per Semesters)		Lab Instruction(LI) (in Hours per Semesters)	Term Work(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					
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
PH26C03	Physics for Electronics Engineers	TC	30	0	0	30	60	2	3,4,7	BSC
CH26C02	Environmental Science	TC	30	0	0	30	60	2	3,4,6,7,9,11,12,13,17	BSC
EC26201	Electronic Devices Theory and Characteristics (Lab Integrated)	TCP	30	0	30	30	90	3	4,7,8,9,11,12,13	PCC
EC26202	Passive Electronic Circuits and Networks Theorems (Lab Integrated)	TCP	30	15	30	45	120	4	4,7,8,9,12	PCC
AI26202	Applied Data Analytics using Python (Lab Integrated)	TCP	30	0	30	30	90	3	4,8,9,17	PCC

EN26C02	Professional Communication	TC	15	0	30	15	60	2	4,8,9	HSMC
TA26C02	Tamils and Technology	TC	15	0	0	15	30	1	2,4,6,8,9,11,12,14	HSMC
ME26C02	Engineering Workshop and MakerSpace	PC	0	0	60	0	60	2	4,9	ESC
SD26C02	Employability Skills - II*	PC	0	0	60	60	120	1	3,4,8,9,16	SDC
Total			240	15	270			24		

* - 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 I

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	10	4	6	8	28		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	4	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	7	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	10	4	6	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	5	2	3	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: CO1: Apply effective communication and language skills in academic and social contexts through proficiency modules. CO2: Apply the principles of Universal Human Values to analyze self-behavior and build harmonious relationships. CO3: Apply soft skills such as teamwork, time management, and interpersonal communication in collaborative activities. CO4: Analyze and utilize institutional facilities and departmental resources to support academic learning and career planning. CO5: 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.
E resources/E materials:	
1.	https://www.aicte-india.org/Initiatives/Induction-Programme
2.	https://fdp-si.aicte-india.org
3	https://uhv.org.in

Mapping of Course Outcomes to Programme Outcomes and Programme Specific Outcomes

Course Outcomes	Programme Outcomes											PSO		
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PSO1	PSO2	PSO3
CO1	1	-	-	-	-	-	-	-	2	3	-	-	-	-
CO2	1	1	-	-	-	2	1	3	2	2	-	-	-	-
CO3	1	-	-	-	-	1	-	-	3	3	-	-	-	-
CO4	2	2	-	-	1	1	-	-	-	-	1	-	-	-
CO5	1	1	-	-	-	-	1	2	1	2	-	-	-	-
CO	1	1	-	-	1	1	1	3	2	3	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 that is needed by engineers for practical applications. - To introduce the basic concepts 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 concepts 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: CO1: Apply the Cayley-Hamilton theorem for matrix inversion and orthogonal transformation of symmetric matrices. CO2: Solve system of linear equations using direct and iterative methods. CO3: Interpret differentiation techniques to determine the maximum and minimum values of polynomial functions. CO4: Solve higher order ordinary differential equations in engineering fields. CO5: Utilize concepts of vector calculus in solving engineering problems.								
Weightage: Continuous Assessment: 50%, End Semester Examinations: 50%								
Assessment Methodology: Internal Examinations (30%), Practical (10%), Activity (10%)								
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: https://www.nptelvideos.com/lecture.php?id=134162
2.	Matrix Diagonalization: https://www.nptelvideos.com/lecture.php?id=13481
3.	SCILAB: https://www.scilab.org/

Mapping of Course Outcomes to Programme Outcomes and Programme Specific Outcomes

Course Outcomes	Programme Outcomes											PSO		
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PSO1	PSO2	PSO3
CO1	3	2	1	1	1	-	-	-	-	-	1	1	-	-
CO2	3	2	1	1	1	-	-	-	-	-	1	1	-	-
CO3	3	2	1	1	1	-	-	-	-	-	1	1	-	-
CO4	3	2	1	1	1	-	-	-	-	-	1	1	-	-
CO5	3	2	1	1	1	-	-	-	-	-	1	1	-	-
CO	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 Activity: 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:	
At the end of the course, the students will be able to: CO1: Use the principles of ultrasonic wave generation, their properties to identify and solve some industrial problems. CO2: Calculate energy eigen values and wave functions of basic physical systems using quantum mechanical principles. CO3: Apply the principle of stimulated emission in the operation of laser, its characteristics and applications. CO4: Demonstrate the use of optical fibers in communication systems and Endoscopy. CO5: 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", Eighth 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 and Programme Specific Outcomes

Course Outcomes	Programme Outcomes											PSO		
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PSO1	PSO2	PSO3
CO1	3	2	-	-	1	-	-	1	-	-	1	1	-	-
CO2	3	2	-	-	1	-	-	1	-	-	1	-	-	-
CO3	3	2	-	-	1	-	-	1	-	-	1	-	-	-
CO4	3	2	-	-	1	-	-	1	-	-	1	1	-	-
CO5	3	2	-	-	1	-	-	1	-	-	1	-	-	-
CO	3	2	-	-	1	-	-	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 enable students to understand water quality and its treatment methods.
- To provide knowledge of polymers and their applications.
- To develop an understanding of electrochemical cells and their applications.
- To impart knowledge of corrosion and its protection methods.
- To familiarize students with the principles of photochemistry.

COURSE CONTENT:								
Unit 1	Water Technology	6	0	6	6	18		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: 1. Determination of total hardness of water sample (EDTA method). 2. Estimation of Alkalinity in water sample. Activity: Case study on water quality analysis.								
Unit 2	Polymer Chemistry	6	0	6	6	18		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: 1. 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		7,9,12
Electrochemical cells- Electro chemical reactions- Electrodes – pH determination – Conductometric and Potentiometric titrations –Electroplating - Electroless plating. Practical: 1. Determination of strength of HCl by pH meter. 2. Conductometric titration of mixture of acids (HCl and CH₃COOH). Activity: Electrochemical cell simulation.								
Unit 4	Corrosion chemistry	6	0	6	6	18		9,11,12
Corrosion –Theories and Preventive methods - Protective coatings – Paints - Components and their uses – Types - Nanotechnology based coating - Polymer modified asphalt coating. Practical: 1. 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		7,13,9
Photochemical laws- Jablonski diagram- Fluorescence – Phosphorescence - Chemiluminescence – Photosensitization - Photo catalysis – Mechanism and applications. Practical:								

1. 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:	
At the end of the course, the students will be able to: CO1: Use water quality analysis techniques to implement water treatment, softening and desalination methods. CO2: Apply polymer chemistry principles to select and use engineering and special polymers in practical applications. CO3: Demonstrate electrochemical principles by operating electrochemical cells and industrial plating processes. CO4: Apply corrosion principles to implement corrosion prevention and protective coating methods. CO5: Perform and apply photochemical principles to carryout photochemical reactions for industrial applications.	
Weightage: Continuous Assessment: 50%, End Semester Examinations: 50%	
Assessment Methodology: Activity (10%), Practical (10%), Internal Assessment Test (30%).	
TEXT BOOKS:	
1.	Jain P. C., & Jain M, “Engineering Chemistry”, Seventeenth edition, Dhanpat Rai Publishing Company (P) Ltd, 2025.
2.	Umare S.S., Dara S. S, “A textbook of Engineering Chemistry”, Chand Publications, 2024.
REFERENCES:	
1.	Wang L. K, Sung M.-H, & Shammass N. K, “Water and wastewater engineering”, Fourth Edition, John Wiley & Sons, 2024.
2.	Ahamed S, Ali R, & Osmani, “Handbook of biodegradable polymers - Applications in Biomedical Sciences, Industry, and the Environment”, Jenny Stanford 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.	Rohatgi-Mukherjee K.K, “Fundamentals of Photochemistry”, New Age International Private Limited, 2021.

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											PSO		
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PSO1	PSO2	PSO3
CO1	3	2	3	2	2	2	-	1	-	-	1	-	-	-
CO2	3	2	3	1	2	1	-	1	-	-	1	-	-	-
CO3	3	3	3	2	3	1	-	1	-	-	1	-	-	-
CO4	3	3	3	2	2	2	-	1	-	-	1	-	-	-
CO5	3	2	3	2	2	1	-	1	-	-	1	-	-	-
CO	3	2	2	2	2	2	-	1	-	-	1	-	-	-

CS26C01	Problem Solving using C	L	T	P	TW/SL	Total	C	SDG
		45	0	0	45	90	3	4,8,9,12

COURSE OBJECTIVES:

- To develop clarity in problem solving methods and understanding program structure, syntax rules, and execution flow.
- To enable students to implement decision-making using branching statements.
- To develop skills in writing reusable functions for modular code design.
- To enable learners to declare, initialize, and manipulate arrays, structures and Union.
- To enable students to design and implement programs that combines pointers and file handling techniques.

COURSE CONTENT:

Unit 1	Problem Solving Techniques and Basics of C	9	0	0	9	18		4,9
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Problem Solving Strategies: Algorithm, Flowchart and Pseudocode - Structure of C Program - Compiling and Executing C Programs - Comments - C tokens - Character Set - Data Types - Keywords - Identifiers - Variables - Constants - Formatted/Unformatted Input Output Statements - Operators - Expression - Operator Precedence - Preprocessor Directives.

Activities: Chart Preparation, Quiz

Unit 2	Decision Control and Looping Statements	9	0	0	9	18		9
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Conditional Statements: if, if-else, if-else-if, switch case - Iterative Statements: while, do-while, for loop - Nested Loops - break and continue statements - goto statement.

Activities: Quiz, Code Debugging

Unit 3	Functions and Strings	9	0	0	9	18		8
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Function: Declaration/Prototype - Definition - Function Call - return statement - Passing Parameters to Functions: Call by Value - Function Invocation Types - Storage Classes – Recursion. Strings: Reading and Writing - Operations on Strings – String functions.

Activities: Code Debugging, Think-Pair-Share

Unit 4	Arrays, Structure and Union	9	0	0	9	18		9
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Arrays: Declaration of 1D,2D Arrays - Initialization - Accessing the elements of an Array - Linear Search & Binary Search - Matrix Operations - Structure: Declaration - Initialization - Access the members of Structure - Nested Structure - Array of Structure - Union: Declaration - Initialization - Access the members.

Activities: Quiz, Pair Programming

Unit 5	Pointers and Files	9	0	0	9	18		4,12
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Pointers: Declaration - Pointer Arithmetic - Null Pointers - Generic Pointers - Array of Pointers - Passing Parameters to Functions: Call by reference - Dynamic Memory Allocation - Files: Types - Modes - Open, Close, Read and Write Functions - Sequential and Random File Processing.

Activities: Case Based Learning, Assignment

COURSE OUTCOMES:

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

- CO1** : Use problem-solving methods to design algorithms and develop basic C programs for solving simple computational problems.
- CO2** : Develop C programs that integrate branching and looping statements.
- CO3** : Solve simple problems using functions and strings.
- CO4** : Implement solutions that combine arrays, structures and union.

CO5 : Develop programs by using pointers and file handling techniques.	
Weightage: Continuous Assessment: 40%, End Semester Examinations: 60%	
Assessment Methodology: Activities (30%), Internal Assessment Test (70%)	
TEXT BOOKS:	
1.	Reema Thareja, “Programming in C”, Third Edition, Oxford University Press, 2023.
2.	Balagurusamy, “Programming in ANSI C”, Ninth Edition, McGraw Hill, 2024.
REFERENCES:	
1.	Slobodan Dmitrović , “Modern C for Absolute Beginners: A Friendly Introduction to the C Programming Language”, Second Edition, Apress (Springer Nature), 2024.
2.	Robert C. Seacord, “Effective C”, Second Edition, No Starch Press, 2024.
3.	Jens Gustedt, “Modern C”, Third Edition, Manning Publications, 2025.
4.	Jignesh Shah, “Programming in C”, Second Edition, CPH Books, 2023.
5.	Yashvant Kanetkar , “Let Us C”, Twenty-first Edition, BPB Publications, 2025.
E resources/E materials:	
1.	https://nptel.ac.in/courses/106104128
2.	https://beginnersbook.com/2014/01/c-tutorial-for-beginners-with-examples/
3.	https://www.geeksforgeeks.org/c/c-programming-language/
4.	https://www.learn-c.org/
5.	https://www.programiz.com/c-programming

Mapping of Course Outcomes to Programme Outcomes and Programme Specific Outcomes

Course Outcomes	Programme Outcomes											PSO		
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PSO1	PSO2	PSO3
CO1	2	2	1	1	1	–	–	–	–	–	1	3	–	–
CO2	2	2	1	1	1	–	–	–	–	–	1	3	–	–
CO3	1	2	1	1	1	–	–	–	–	–	1	3	–	–
CO4	1	2	2	1	1	–	–	–	–	–	1	3	–	–
CO5	1	2	2	2	2	–	–	–	–	–	2	3	–	–
CO	1	2	1	1	1	–	–	–	–	–	1	3	–	–

EC26101	Fundamentals of Electronics Engineering (Lab Integrated)	L	T	P	TW/SL	Total	C	SDG
		30	0	30	30	90	3	4,7,8,9, 11, 12

COURSE OBJECTIVES:

- To familiarize students with the evolution of electronics from early discoveries to modern intelligent systems.
- To introduce students to fundamental passive components such as resistors, capacitors, inductors used in electronic circuits.
- To make students understand and apply fundamental concepts of electric and magnetic fields, forces, potential, and energy acting on electrons.
- To make students understand semiconductor materials and basic active components, including the operation and characteristics of p–n junctions and transistors.
- To develop practical skills among students in using electronic instruments for accurate measurement and testing.

COURSE CONTENTS:

Unit 1	History of Electronics	5	0	6	5	16		4,7,9,11,12
Electronics history, Early Discoveries, Vacuum Tube Era, Semiconductor Revolution, Integrated Circuits - SSI, MSI, LSI, VLSI concepts, Microprocessors and Digital Revolution, Communication and Consumer Electronics, Modern Electronics - Nanotechnology, IoT, AI in Electronics Practical: 1. Study of laboratory equipment, symbols, standards, safety rules, and handling of electronic devices. Activities: Quiz on familiarization with Electronics Laboratory and Safety Practices								
Unit 2	Passive Components	6	0	9	6	21		4,7,8,9,12
Resistors - Color coding, Types (fixed, variable, thermistor), power rating, Series and parallel combinations and								

application in circuits for current and voltage division, Capacitors –Types: ceramic, electrolytic, film, Charging and discharging behavior and applications in filtering/coupling, Inductors - Basic principle, Types: Air-core, iron-core, toroidal, variable inductors.

Practical:

1. Identification of electronic components, power sources and measuring instruments
2. Experimental verification using resistors in series and parallel combination.
3. Charging and Discharging characteristics of a Capacitor.
4. Soldering and de-soldering of passive components

Activities: Electronics Worksheet

Unit 3	Electron Ballistics	6	0	3	6	15		3,4,7,8,11
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Force, Field intensity, Potential and Energy, Two-dimensional motion of electrons, motion of electrons in magnetic field, Motion under parallel and perpendicular electric and magnetic fields, Electric and magnetic deflection in CRT

Practical:

1. Simulation of electron beam deflection under an electric field (Virtual Lab)

Activities: Think-Pair-Share

Unit 4	Semiconductor Basics	7	0	6	7	20		4,7,8,9,12
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Classification of Semiconductor- Intrinsic and extrinsic semiconductors, Doping, p-n junction characteristics, Current-voltage characteristics, Structure and operation of NPN/PNP transistors.

Practical:

1. V-I Characteristics of PN Junction Diode

Activities: Think-Pair-Share

Unit 5	Electronic Measuring Instruments	6	0	6	6	18		4,7,8,9,11, 12
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Cathode Ray Oscilloscope, Ammeter, DC Voltmeter, Digital Multimeter, Function generator, Digital Storage Oscilloscope, Standards and calibration

Practical:

1. Measurement of amplitude, time and frequency using a Digital Storage Oscilloscope.

Activities: Quiz / Think Pair Share

COURSE OUTCOMES:

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

CO1: Apply electronics evolution concepts to analyze modern devices and systems, including Microprocessor-based and emerging applications like IoT and AI.

CO2: Apply concepts of resistors, capacitors, and inductors to design and analyze basic electronic circuits.

CO3: Apply electric and magnetic field principles to analyze electron motion and beam deflection, including applications in Cathode Ray Tube.

CO4: Apply semiconductor concepts to solve basic electronic circuits.

CO5: Apply electronic measuring instruments such as Digital Storage Oscilloscope and Digital Multimeter to measure and analyze electrical parameters.

Weightage: Continuous Assessment: 50%, End Semester Examinations: 50%	
Assessment Methodology: Internal Assessment Test (30%), Practical (10%), Activities (10%)	
TEXT BOOKS:	
1.	S.Salivahanan and N.Suresh Kumar, “Electronic Devices and Circuits”, Fourth Edition, McGraw Hill Education (India) Pvt. Ltd, 2020.
2	Boylestad R.L. and Nashelsky L., “Electronic Devices and Circuit Theory”, Twelfth Edition, Pearson Education, 2021.
REFERENCES:	
1.	Robert I. Scace, “Electronics”, Fifteenth Edition, Encyclopedia Britannica, 2024.
2.	S.K. Bhattacharya, “Basic Electronics: Principles and Applications”, Second Edition, Pearson, 2021.
3.	Albert Paul Malvino and David J. Bates, “Electronic Principles”, Ninth Edition, McGraw Hill, 2021.
4.	Arun K. Ghosh, “Foundations of Electronics”, Cengage Learning, Second Edition, 2022.
5.	Paul Horowitz, Winfield Hill, “The Art of Electronics”, Third Edition, Cambridge University Press, 2021.
E resources/E materials:	
1.	https://onlinecourses.nptel.ac.in/noc21_ee55/preview - NPTEL Course on Basic Electronics

Mapping of Course Outcomes to Programme Outcomes and Programme Specific Outcomes

Course Outcomes	Programme Outcomes											PSO		
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PSO1	PSO2	PSO3
CO1	3	2	1	1	2	2	1	1	1	1	3	2	2	2
CO2	3	2	2	1	2	1	1	1	1	1	2	2	2	1
CO3	3	2	1	2	2	1	1	1	1	1	2	3	2	1
CO4	3	2	2	1	2	1	1	1	1	1	2	3	2	1
CO5	3	2	1	3	3	1	1	2	2	1	2	2	2	1
CO	3	2	1	2	2	1	1	1	1	1	2	2	2	1

EN26C01	Technical Communication	L	T	P	TW/SL	Total	C	SDG
		15	15	0	30	60	2	4,8, 10
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		4
Listening: Listening for Local/Global Comprehension Speaking: Introducing oneself (formal and informal), Introducing others Reading: Reading Comprehension, Brochures, Advertisements 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		4
Listening: Summarizing News 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		8
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		8
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		10
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:	
At the end of the course, the students will be able to:	
Course Outcomes (COs)	
CO1: Demonstrate confidence and clarity in professional seeking and active listening.	
CO2: Apply effective reading strategies to comprehend, analyze, and interpret varieties of texts.	
CO3: Write grammatically accurate and coherently technical reports and letters.	
CO4: Use appropriate vocabulary and grammar to enhance presentation skills	
CO5: Integrate interpersonal skills for ideal communication in professional contexts	
Weightage: Continuous Assessment: 40%, End Semester Examination: 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.
E resources/E materials:	
1.	British Council, Learn English, https://learnenglish.britishcouncil.org
2.	Purdue University, Purdue OWL (Online Writing Lab), https://owl.purdue.edu
3.	BBC, BBC Learning English, https://www.bbc.co.uk/learningenglish

Mapping of Course Outcomes to Programme Outcomes and Programme Specific Outcomes

Course Outcomes	Programme Outcomes											PSO		
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PSO1	PSO2	PSO3
CO1	-	-	-	-	-	-	-	2	3	-	2	-	-	-
CO2	-	-	-	-	-	-	-	2	3	-	2	-	-	-
CO3	-	-	-	-	-	-	-	2	3	-	2	-	-	-
CO4	-	-	-	-	-	-	-	2	3	-	2	-	-	-
CO5	-	-	-	-	-	-	-	2	3	-	2	-	-	-
Average	-	-	-	-	-	-	-	2	3	-	2	-	-	-

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
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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 ஓவிய சிற்பக் கலை	3	0	0	3	6		11,12
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சிற்பிலக்கியங்கள் - தமிழில் நவீன இலக்கியத்தின் வளர்ச்சி - தமிழ் இலக்கிய வளர்ச்சியில் பாரதியார் மற்றும் பாரதிதாசன் ஆகியோரின் பங்களிப்பு- சிற்பங்கள் - ஐம்பொன் சிலைகள்- குமரிமுனையில் திருவள்ளூர் 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
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தெருக்கூத்து, கரகாட்டம், வில்லுப்பாட்டு, கணியான் கூத்து, ஓயிலாட்டம், , 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 அச்ச வரலாறு Activities: குழு விளக்கம்: விடுதலைப் போராட்டம்								
COURSE OUTCOMES:								
At the end of the course, the students will be able to: CO1: தமிழ் மொழியின் முக்கியத்துவத்தையும் தமிழ் இலக்கியத்தின் வகைகளையும் விவரிக்க முடியும். CO2: பாறை ஓவியங்களிலிருந்து நவீன கலை வரை தங்களின் அறிவை விவரிக்க முடியும். CO3: போர்க்கலைகளில் வலுவான அடிப்படை அறிவை வெளிப்படுத்த முடியும். CO4: தமிழர்களின் திணை கருத்தையும் அதன் மதிப்புகளையும் விளக்க முடியும். CO5: 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 பக் 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.	காட்டுவெல், "திராவிட மொழிகளின் ஒப்பிலக்கணம்", வள்ளுவர் பண்ணை : சென்னை,1959
5.	முனைவர் பாக்கியமேரி, "காலம்தோறும் தமிழர் கலைகள்", பாவேந்தன் பதிப்பகம், 2008.
6.	முனைவர் தே. லார்து, "நாட்டார் வழக்காற்றியல் சில அடிப்படைகள்", நாட்டார் வழக்காற்றியல் ஆய்வு மையம், 2000

E resources/E materials:

1.	https://www.tamilvu.org/
2.	https://tamildigitallibrary.in/

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:								
At the end of the course, the students will be able to: CO1: Explain the importance of the Tamil language and the types of Tamil literature. CO2: Describe their knowledge from rock paintings to modern art. CO3: Demonstrate a strong foundational understanding of martial arts. CO4: Explain the concept of Thinai and its values among the Tamils. CO5: Describe the contribution of Tamils to Indian culture.								
TEXT BOOKS:								
1.	Dr. M. Hemamalini and Dr.D.Chitra, “Tamil Heritage”, VRB Publishers Pvt. Ltd., 2023							
2.	Mrs. G. Jayanthi Ravikrishnan, “Tamil Heritage”, Sri Krishna Publication, 2023							
REFERENCES:								
1.	Dr. Bakkiyamary, “Literary History from the Perspective of Genre”, New Century Book House, 2011							
2.	Dr. K. K. Pillai, “History, People, and Culture of Tamil Nadu”, International Institute of Tamil Studies, 2002							
3.	Dr. Mu. Varadarasanar, “History of Language”, Tirunelveli South India Saiva Siddhanta Publishing Society Ltd., 1954							

4.	Robert Caldwell, “A Comparative Grammar of the Dravidian Languages” Vallavar Pannai, Chennai, 1959
5.	Dr. Bakkiyarnary, “Tamil Arts Through the Ages”, Paavendhan Publications, 2008
6.	Dr. Th. Lourdes, “Some Fundamentals of Folklore Studies”, Folklore Research Centre, 2000
E resources/E materials:	
1.	https://www.tamilvu.org/
2.	https://tamildigitallibrary.in/

Mapping of Course Outcomes to Programme Outcomes and Programme Specific Outcomes

Course Outcomes	Programme Outcomes											PSO		
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PSO1	PSO2	PSO3
CO1	2	2	1	-	-	1	-	-	2	-	1	-	-	-
CO2	2	2	2	-	-	1	-	-	2	-	1	-	-	-
CO3	2	1	1	-	-	2	-	2	-	-	1	-	-	-
CO4	1	2	1	-	-	3	2	-	-	-	1	-	-	-
CO5	2	2	2	-	-	2	2	-	2	-	1	-	-	-
CO	2	2	1	-	-	2	2	2	2	-	1	-	-	-

CS26C03	C Programming Laboratory	L	T	P	TW/SL	Total	C	SDG
		0	0	60	0	60	2	4,8,9,12

COURSE OBJECTIVES:

- To familiarize students with using office software for documenting algorithms and flowchart.
- To develop skills in writing C programs using conditional statements and loops for decision-making and iteration.
- To train students to handle arrays, pointers, and structures for efficient data manipulation and memory management.
- To implement searching (linear, binary) and sorting (bubble, selection) algorithms to solve real-world problems.
- To build proficiency in creating modular programs using functions, string operations, and structures in C.

PRACTICAL EXPERIMENTS:

1. Design algorithms and draw flowcharts for given problems using office software tools.
2. Write C programs using conditional statements (if, if-else, switch) to solve simple problems.
3. Develop C programs using looping constructs (for, while, do-while) for iterative computations.
4. Write programs to perform operations on arrays such as traversal, searching, and basic manipulations.
5. Develop programs using pointers:
 - a. Swapping two numbers using pointers
 - b. Demonstrating pointer arithmetic
6. Implement searching techniques:
 - a. Linear Search
 - b. Binary Search
7. Implement sorting techniques:
 - a. Bubble Sort
 - b. Selection Sort
8. Write programs using user-defined functions with different parameter passing and return types.
9. Develop programs for string manipulation using standard library functions (strlen, strcpy, strcmp, strcat).
10. Write structure-based programs to store and process grouped data.

COURSE OUTCOMES:

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

- CO1** : Apply knowledge of the evolution and organization of computers to design algorithms and flowcharts for solving simple problems.
- CO2** : Apply conditionals, loops for decision-making & iteration.
- CO3** : Apply arrays, pointers for efficient data handling.
- CO4** : Design search & sort algorithms.
- CO5** : Create modular C programs using functions, strings, structures.

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

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

TEXT BOOKS:

- | | |
|----|--|
| 1. | Reema Thareja, "Programming in C", Third Edition, Oxford University Press, 2023. |
|----|--|

2.	Balagurusamy, “Programming in ANSI C”, Ninth Edition, McGraw Hill, 2024.
REFERENCES:	
1.	Slobodan Dmitrović , “Modern C for Absolute Beginners: A Friendly Introduction to the C Programming Language”, Second Edition, Apress (Springer Nature), 2024.
2.	Robert C. Seacord, “Effective C”, Second Edition, No Starch Press, 2024.
3.	Jens Gustedt, “Modern C”, Third Edition, Manning Publications, 2025.
4.	Jignesh Shah, “Programming in C”, Second Edition, CPH Books, 2023.
5.	Yashvant Kanetkar , “Let Us C”, Twenty-first Edition, BPB Publications, 2025.
E resources/E materials:	
1.	https://nptel.ac.in/courses/106104128
2.	https://beginnersbook.com/2014/01/c-tutorial-for-beginners-with-examples/
3.	https://www.geeksforgeeks.org/c/c-programming-language/
4.	https://www.learn-c.org/
5.	https://www.programiz.com/c-programming

Mapping of Course Outcomes to Programme Outcomes and Programme Specific Outcomes

Course Outcomes	Programme Outcomes											PSO		
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PSO1	PSO2	PSO3
CO1	2	2	1	1	1	–	–	–	–	–	2	3	-	-
CO2	2	2	1	1	1	–	–	–	–	–	1	3	-	-
CO3	1	2	2	2	1	–	–	–	–	–	1	3	-	-
CO4	1	2	3	2	1	–	–	–	–	–	2	3	-	-
CO5	1	2	2	2	1	–	–	–	–	–	1	3	-	-
CO	1	2	2	2	1	-	-	-	-	-	1	3	-	-

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			6	6	12		4,8
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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			6	6	12		3,4
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Body language fundamentals – posture and its impact, Eye contact – significance and practice, Gestures and facial expressions in communication, Theatrical – 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. Theatrical – Expression and Role Play Activity 3. Mock Professional Scenario Simulation								
Unit 3	INTERPERSONAL SKILLS, TEAM DYNAMICS AND CONFLICT RESOLUTION			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			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, apos-								

trophe 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:

CO1: Remember and recall key concepts of verbal communication, grammar rules, and professional etiquette norms required in workplace and academic contexts.

CO2: Understand and explain the principles of interpersonal communication, body language, active listening, and team collaboration in professional scenarios.

CO3: Apply grammar structures, vocabulary, sentence formation techniques, and punctuation rules accurately in spoken and written communication activities.

CO4: Analyze communication breakdowns, logical reasoning problems, conflict situations, and debate arguments to develop structured and effective responses.

CO5: 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, Theatrical, 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, vocabulary, logical reasoning and workplace communication.	CO1, CO3	10
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”, fifth Edition, Cambridge University Press & Assessment, 2019.
4.	Meenakshi Raman and Sangeeta Sharma,” Technical Communication: Principles and Practice”, fourth Edition, Oxford University Press, 2024.
5.	Stephen R. Covey, “The 7 Habits of Highly Effective People”, thirtieth Anniversary Edition, Simon & Schuster, 2020.

E resources/E materials:

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
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Mapping of Course Outcomes to Program Outcomes & Program Specific Outcomes

Course Outcomes	Programme Outcomes											PSO		
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PSO1	PSO2	PSO3
CO1	2	1	–	–	–	–	–	2	2	3	–	1	1	–
CO2	2	2	–	–	–	1	–	2	3	3	–	1	1	1
CO3	2	2	1	–	1	–	–	1	2	3	1	2	2	1
CO4	2	3	2	1	–	1	–	2	3	3	1	2	2	2
CO5	2	3	3	1	1	1	–	2	3	3	2	2	3	2
CO	2	2	1	1	1	1	–	2	3	3	1	2	2	1

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: CO1: Apply the understanding of the self (I) and the body to maintain harmony within the human being. CO2: Apply human values such as trust, respect, and mutual understanding to build harmonious relationships in family and society. CO3: Apply the principles of coexistence to live in harmony with nature. CO4: Apply the principles of coexistence to support environmental sustainability. CO5: 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.

E resources/E materials:

1.	https://uhv.org.in/UHV-II_Course_Material
2.	https://www.youtube.com/channel/UCo8MpJB_aaVwB4LWLAx6AhQ

Mapping of Course Outcomes to Programme Outcomes and Programme Specific Outcomes

Course Outcomes	Programme Outcomes											PSO		
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PSO1	PSO2	PSO3
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	2	-	-	-	2	2	3	3	2	1	-	-	-

MA26C02	Statistics and Numerical Methods (Lab Integrated)	L	T	P	TW/SL	Total	C	SDG
		45	0	30	45	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:

CO1: Apply large sample test, t and F-tests to analyze real world engineering data and draw statistically valid conclusions.

CO2: Utilize one-way and multi-way ANOVA techniques for experimental data analysis and statistical decision making.

CO3: Interpret variance, goodness of fit and independence of attributes using Chi-square and Kolmogorov–Smirnov tests in real life problems.

CO4: Solve first order differential equations using single-step and multi-step methods.

CO5: 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 and Programme Specific Outcomes

Course Outcomes	Programme Outcomes											PSO		
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PSO1	PSO2	PSO3
CO1	3	2	1	1	1	-	-	-	-	-	1	1	1	1
CO2	3	2	1	1	1	-	-	-	-	-	1	1	1	1
CO3	3	2	1	1	1	-	-	-	-	-	1	1	1	1
CO4	3	2	1	1	1	-	-	-	-	-	1	1	1	1
CO5	3	2	1	1	1	-	-	-	-	-	1	1	1	1
CO	3	2	1	1	1	-	-	-	-	-	1	1	1	1

PH26C03	Physics for Electronics Engineers	L	T	P	TW/SL	Total	C	SDG
		30	0	0	30	60	2	3,4,7,9, 12, 13

COURSE OBJECTIVES:

- To provide fundamental knowledge of conducting, semiconducting, magnetic, dielectric, and superconducting materials essential for electronics engineering.
- To introduce semiconductor physics and basic electronic devices used in modern electronic systems.
- To familiarize students with magnetic and superconducting materials along with their applications in engineering field.
- To give insight into optoelectronic components through the study of band theory and material properties.
- To equip learners with knowledge of modern energy harvesting and storage materials to enhance their interdisciplinary engineering understanding.

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	Semiconducting Materials	6	0	0	6	12		4,9
Introduction - intrinsic and extrinsic semiconductors - direct and indirect band gap semiconductors, Carrier concentration: intrinsic semiconductors – Hall effect: Determination of Hall coefficient - Display technology: OLED.								

Activity*: Semiconductor market mapping activity – 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	Dielectrics and electronic materials	6	0	0	6	12		4,7,9
Dielectrics - dielectric constant – Polarization (Qualitative) –dielectric loss– dielectric breakdown and its types - Classification of optical materials – carrier generation and recombination, Optoelectronic devices: LED, Single electron Transistor – Introduction to 3 nm technology. Activity*: Recent advances in LED display technologies – Review assignment								
Unit 5	Energy Harvesting and Storage Application	6	0	0	6	12		4,7,9,12,13
Introduction - Criteria for choosing the nanomaterials for energy harvesting and storage applications – Nanogenerators: Types of Nanogenerators - Energy storage: Nanomaterials used for energy storage - Type of energy storages (Qualitative) - Supercapacitor – Electric vehicle technology. Activity*: Comparison of different nanomaterials used in battery electrodes – Case study * 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: CO1: Utilize free-electron theory and band theory to interpret the physics of electrical and thermal conduction in solids. CO2: Apply the properties of semiconductors, carrier concentrations and Hall effect, in basic semiconductor devices. CO3: Use the magnetic and superconducting properties of materials to various applications of modern technology. CO4: Implement the optical properties in optoelectronic devices and interpret the dielectric properties of materials. CO5: Demonstrate the properties and roles of nanomaterials in energy harvesting and storage mechanisms.								
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.	S. O. Kasap, “Principles of Electronic Materials and Devices”, Fourth edition, McGraw-Hill, 2020.
REFERENCES:	
1.	Donald A Neamen, “Semiconductor Physics and Devices”, Fourth Edition, McGraw-Hill, 2021.
2.	H.K. Malik & A.K. Singh, “Engineering Physics”, Second Edition, McGraw Hill Education (India) Pvt Ltd., 2021.
3.	K. K. Chattopadhyay & A. N. Banerjee, “Introduction to Nanoscience and Nanotechnology”, PHI Learning, 2022.
4.	Kittel, C. “Introduction to Solid State Physics”, Ninth Edition, Wiley, 2018
5.	Piyush Kumar Sonkar & Vellaichamy Ganesan, “Advancements in Nanomaterials for Energy Conversion and Storage” CRC press, 2024
E resources/E materials:	
1.	Physics of Materials, nptel Course, https://nptel.ac.in/courses/113106039
2.	Solid State Physics, MIT Open Course Ware, https://ocw.mit.edu/courses/8-231-physics-of-solids-i-fall-2006/download/
3.	Solid State Physics , nptel Course, https://nptel.ac.in/courses/115104109
4.	Research articles on semiconductors, Superconductors, and nanomaterials, IEEE Xplore Digital Library, https://ieeexplore.ieee.org/Xplore/home.jsp
5.	Band theory, semiconductors, and material science modules, Khan Academy, https://www.khanacademy.org/

Mapping of Course Outcomes to Programme Outcomes and Programme Specific Outcomes

Course Outcomes	Programme Outcomes											PSO		
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	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	-	-	-
CO	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 CO1 – Implement ecological and biodiversity methods to conserve ecosystems and species. CO2 – Use sustainable techniques to manage forests, water, Land and Agriculture. CO3 – Apply pollution control and waste management methods to reduce environmental hazards. CO4 – Implement climate change mitigation and food safety practices to assess risks and ensure food security. CO5 – 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, Pearson education India, January 2022							
2.	Erach Barucha, “Text book of Environmental studies for under graduate courses”, Fourth Edition, Universities Press (I) PVT Ltd, Hyderabad, 2023.							
REFERENCES:								
1.	William P. Cunningham, Mary Ann Cunningham, “Principles of Environmental Science: Inquiry & Applications”, Tenth Edition, McGraw –Hill Education, 2025.							
2.	Vir Singh, “Text book of Environment and Ecology”, Springer, 2024.							

3.	Gopal Kumar Sharma et al, “Food adulterants and contaminants”, New India Publishing Agency, 2024.
4.	Niko Roorda, “Fundamentals of Sustainable Development”, Fourth Edition, Routledge, 2025.
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 and Programme Specific Outcomes

Course Outcomes	Programme Outcomes											PSO		
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	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	-	-	-
CO	2	3	3	2	1	2	2	1	-	-	1	-	-	-

EC26201	Electronic Devices Theory and Characteristics (Lab Integrated)	L	T	P	TW/SL	Total	C	SDG
		30	0	30	30	90	3	4,7,8,9,11, 12,13

COURSE OBJECTIVES:

- To understand the construction, characteristics, and operation of various types of semiconductor diodes.
- To understand different configurations of transistors and biasing methods.
- To analyze the small-signal model of BJTs and the behaviour of CE, CB, and CC amplifiers in terms of gain, impedance, and frequency response.
- To understand the construction, working, and characteristics of JFETs and MOSFETs.
- To understand the structure, working, and characteristics of various Special Semiconductor and Optoelectronic Devices.

COURSE CONTENT:

Unit 1	Semiconductor Diodes	6	0	6	6	18		4,7,8,9, 11,12,13
PN junction - formation, working principle, V–I characteristics, Zener diode-working principle, V–I characteristics, Rectifiers – half-wave, full-wave, bridge –with and without filters, Voltage regulation using Zener diode. Practical: - V–I characteristics of Zener diodes. - Design and analysis of half-wave, full-wave rectifier circuits. Activities: Think Pair Share								
Unit 2	Bipolar Junction Transistors (BJT) and Biasing	6	0	6	6	18		4,7,8,9, 11,12,13
Transistor configurations – CB, CE, and CC - Input and output characteristics, DC load line and operating point, Biasing methods: fixed bias, collector-to-base bias, and voltage divider bias, CE transistor as an amplifier Practical: - Input and output characteristics of a BJT in CE configuration. - Input and output characteristics of a BJT in CB configuration. Activities: Comparative Study – CE Vs CB Vs CC configuration - Chart Preparation								
Unit 3	AC Analysis of BJT Amplifier	6	0	6	6	18		4,7,8,9, 11,12,13
Small-signal model of BJT, Analysis of CE, CB and CC amplifier using hybrid pi model - voltage and current gain, input/output impedance, frequency response and bandwidth, Practical: CE amplifier design and frequency response measurement. Activities: Applications of CE, CB, CC configuration - Chart/ Poster presentation								
Unit 4	Field Effect Transistors	6	0	6	6	18		4,7,8,9, 11,12,13
JFET - Construction, operation, and characteristics, MOSFET – n channel, p channel - depletion and enhancement–working, characteristics, JFET as voltage variable resistor Practical: Characteristics of enhancement-type MOSFET. Activities: Quiz activity								
Unit 5	Special Semiconductor and Opto electronic Devices	6	0	6	6	18		4,7,8,9, 11,12,13
UJT, SCR, DIAC, TRIAC – structure, operation, and characteristics, Photodiode, phototransistor, LED, LDR, LASER diode and Solar Cell – construction and working principle, Practical: Characteristics of SCR. Activities: Applications of SCR - Chart / PPT Preparation								
COURSE OUTCOMES:								
At the end of the course, the students will be able to:								

CO1: Apply the characteristics and operating principles of semiconductor diodes in circuits.	
CO2: Apply the construction, operation, and characteristics of BJT in CE, CB, and CC configurations in circuits.	
CO3: Analyze CE, CB, and CC amplifiers to determine their gain, input / output impedance, and bandwidth.	
CO4: Apply FET and MOSFET principles in basic electronic circuits.	
CO5: Apply the operation and characteristics of power electronic and optoelectronic devices in circuits.	
Weightage: Continuous Assessment: 50%, End Semester Examinations: 50%	
Assessment Methodology: Internal Assessment Test (30%), Practical (10%), Activity (10%)	
TEXT BOOKS:	
1.	Millman J. and Halkias C.C., “Electronic Devices and Circuits”, Fourth Edition (Reprint), McGraw Hill, 2024.
2.	Sedra A.S. & Smith K.C., “Microelectronic Circuits”, Eighth Edition, Oxford University Press, 2020.
REFERENCES:	
1.	Boylestad R.L. and Nashelsky L., “Electronic Devices and Circuit Theory”, Twelfth Edition, Pearson Education, 2023.
2.	Malvino A.P., Bates D.J., Patrick Hoppe, “Electronic Principles”, Ninth Edition, McGraw Hill Education, 2020.
3.	Floyd T.L., “Electronic Devices”, Eleventh Edition, Pearson Education, 2024.
4.	David A. Bell, “Fundamentals of Electronic Devices and Circuits”, Fifth Edition (Reprint), Oxford / PHI, 2021.
5.	Salivahanan, S. and Suresh Kumar, N., “Electronic Devices and Circuits”, Fifth Edition, McGraw Hill Education (India), 2022.
E resources/E materials:	
1.	https://onlinecourses.swayam2.ac.in/ntr26_ed101/preview
2.	https://onlinecourses.nptel.ac.in/noc21_ee80/preview

Mapping of Course Outcomes to Programme Outcomes and Programme Specific Outcomes

Course Outcomes	Programme Outcomes											PSO		
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PSO1	PSO2	PSO3
CO1	3	2	1	1	1	1	1	1	1	-	2	3	1	-
CO2	3	2	2	1	1	1	1	1	1	-	2	3	1	-
CO3	3	3	2	2	1	1	1	1	2	-	2	3	1	-
CO4	3	2	2	1	1	1	1	1	1	-	2	3	1	-
CO5	3	2	2	2	1	2	1	2	2	1	2	3	1	-
CO	3	2	2	1	1	1	1	1	1	1	2	3	1	-

EC26202	Passive Electronic Circuits and Network Theorems (Lab Integrated)	L	T	P	TW/SL	Total	C	SDG
		30	15	30	45	120	4	4,7,8,9,12
COURSE OBJECTIVES:								
- To understand the fundamental concepts and laws governing electrical circuits. - To analyze DC circuits using mesh and node analysis techniques. - To verify network theorems in practical circuits. - To familiarize students with transient response and resonance. - To determine Z, Y, h, and ABCD parameters for T and π network configurations.								
COURSE CONTENT:								
Unit 1	Basic Circuit Concepts and Laws	6	3	6	9	24		4,7,8,9,12
Charge, current, voltage, and power, Ohm’s Law, Kirchhoff’s current and voltage laws, Series and parallel combinations of resistors and sources, Star-delta and delta-star transformations. Practical: 1. Verification of Ohm’s and Kirchhoff’s Laws. 2. Measurement of voltage and current in series and parallel circuits Activities: Kirchhoff’s Laws Problem-Solving								
Unit 2	DC Analysis using KCL and KVL	6	3	3	9	21		4,7,8,9,12
Mesh current and nodal voltage methods, Supermesh and supernode concepts - elaborate Practical: 1 Nodal analysis of resistive circuits. Activities: Loop/Mesh Analysis- Problem Solving								
Unit 3	Network Theorems for DC circuits	6	3	9	9	27		4,7,8,9,12
Thevenin’s and Norton’s theorems, Superposition and Reciprocity theorems, Maximum Power Transfer theorem Practical: 1. Verification of Thevenin’s theorem. 2. Verification of Norton’s theorem. 3. Verification of Maximum Power Transfer theorem Activities: Theorem Activity – Experimental + Analytical								
Unit 4	Transient Analysis and Resonance	6	3	6	9	24		4,7,8,9,12
Phasor, phasor relationship of R, L, C, Transient response of first-order RL and RC circuits to DC excitation, Steady-state analysis of RL, RC and RLC circuits under sinusoidal excitation, Resonance – Series, Parallel, Q factor Practical: 1. Transient response of RL circuits. 2. Transient response of RC circuits Activities: Transient and Steady State analysis – Problem Solving								

Unit 5	Two-Port Networks	6	3	6	9	24		4,7,8,9,12
Two-port networks and parameters, Impedance (Z), Admittance (Y), Hybrid (h), and Transmission (ABCD) parameters for single stage T and Pi networks. Practical: 1. Determination of Z and Y parameters of a two-port T network. Activities: Experimental Verification								
COURSE OUTCOMES:								
At the end of the course, the students will be able to: CO1: Apply Ohm’s and Kirchhoff’s laws to solve simple electrical circuits. CO2: Analyze DC circuits using nodal, mesh analysis techniques. CO3: Apply various network theorems for circuit simplification. CO4: Examine transient and steady-state behavior of RL, RC, and RLC circuits. CO5: Determine Z, Y, h, and ABCD parameters for basic T and π circuits.								
Weightage: Continuous Assessment: 50%, End Semester Examinations: 50%								
Assessment Methodology: Internal Assessment Test (30%), Practical (10%), Activity (10%)								
TEXT BOOKS:								
1.	Sudhakar A. and Shyam Mohan S.P., “Circuits and Network Analysis and Synthesis”, Sixth Edition, McGraw Hill, 2023.							
2.	Hayt W.H., Kemmerly J.E., and Durbin S.M., “Engineering Circuit Analysis”, Ninth Edition, McGraw Hill, 2020.							
REFERENCES:								
1.	Nilsson J.W. and Riedel S., “Electric Circuits”, Twelveth Edition, Pearson Education, 2022.							
2.	Chakrabarti A., “Circuit Theory – Analysis and Synthesis”, Revised Edition, Dhanpat Rai & Co.,2023.							
3.	Alexander C.K. and Sadiku M.N.O., “Fundamentals of Electric Circuits”, Sixth Edition, McGraw Hill, 2021.							
4.	A. Nagoor Kani, “Circuit Analysis”, Second Edition, McGraw Hill Education, 2018.							
5.	Kuo, F., “Network Analysis and Synthesis”, Wiley India, Reprint 2021							
E resources/E materials:								
1.	https://nptel.ac.in/courses/108105159							
2.	https://www.khanacademy.org/science/electrical-engineering							
3.	https://nptel.ac.in/courses/108102042							

Mapping of Course Outcomes to Programme Outcomes and Programme Specific Outcomes

Course Outcomes	Programme Outcomes											PSO		
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PSO1	PSO2	PSO3
CO1	3	2	1	1	-	1	-	1	1	-	2	2	1	-
CO2	2	3	2	1	-	1	-	1	1	-	2	2	1	-
CO3	3	2	2	1	1	1	-	1	1	-	2	2	1	-
CO4	3	3	2	2	-	1	-	1	1	-	2	2	1	-
CO5	3	2	2	2	1	1	-	1	1	-	2	2	1	-
CO	3	2	2	1	1	1	-	1	1	-	2	2	1	-

AI26202	Applied Data Analytics using Python	L	T	P	TW/SL	Total	C	SDG
		30	0	30	30	90	3	4, 8, 9, 17

COURSE OBJECTIVES

- To provide students with the basics of Python programming.
- To enable students to develop Python programs using functions and data structures.
- To familiarize students with file handling, exception handling, and Python modules.
- To introduce students to basic concepts of data analytics and data preprocessing.
- To train students to use NumPy, Pandas, and Matplotlib for data analysis and visualization.

Unit 1	Basics of Python and Control Flow	6	0	6	6	18		4, 8, 9, 17
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Features of Python – Variables and Data Types – Type Conversion -Operators and Expressions – Conditional Statements: if, if-else, elif – Looping Structures: for, while – Loop Control Statements: break, continue, pass.

Experiments:

1. Programs using different Datatypes, Operators and Expressions
2. Programs using Conditional and Looping Constructs

Activities:

1. Flowchart creation for conditional and looping problems
2. Think–Pair–Share on control flow logic

Unit 2	Functions, Strings, and Data Collections	6	0	6	6	18		4, 8, 9, 17
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Functions: Definition, Function Call, Return Statements, Scope, Lambda Functions, Recursive Functions – Strings: Basic Operations, Slicing, Methods – Lists: Access, Update, Operations, Methods, Nested Lists – Tuples: Basic Operations, Nested Tuples – Dictionaries: Creation, Access, Update, Delete.

Experiments:

1. Programs using Functions and Strings
2. Programs using Lists, Tuples, and Dictionaries

Activities:

1. Group activity: Build a small menu-driven program								
Unit 3	File Handling and Modules	6	0	6	6	18		4, 8, 9, 17
Files: Reading and Writing Text and CSV Files, JSON Files – Opening and Closing Files – Renaming and Deleting Files – Exceptions: Handling Errors using try-except – Packages and Modules: Importing Modules, Standard Libraries, User Defined Modules Experiments: - File Handling – Text and CSV File Operations - Program using Exception Handling Activities: - Mini Project: Student Record Management using Files								
Unit 4	Foundations of Data Analytics	6	0	6	6	18		4, 8, 9, 17
Introduction to Data Analytics – Applications of Data Analytics – Facets of Data – Types of Variables – Statistical Description of Data – Describing Data using Tables and Graphs – Data Analytics Process: Overview, Defining Research Goals, Retrieving Data – Data Preparation: Data Wrangling – Handling Missing Data – Data Transformation – Outlier Detection, Noise and Anomalies. Experiments: - Practice Data Wrangling and Handling Missing Data using Real Dataset - Detect Outliers and Transform Data for Analysis Activities: Case Study: Data Cleaning and Preprocessing Tasks								
Unit 5	Data Analysis using Python Libraries	6	0	6	6	18		4, 8, 9, 17
Numpy: Creating Arrays – Attributes of NumPy Arrays – Basic Operations: Array Join, Split, Search, Sort – Indexing – Slicing – Iterating – Copying Arrays – Shape Manipulation – Identity Array – eye() Function. Pandas: Exploring Data using Series – Exploring Data using Data Frames – Index Objects – Reindex – Drop Entry – Selecting Entries – Data Alignment – Rank and Sort – Summary Statistics – Index Hierarchy. Data Visualization: Introduction to Matplotlib – Line Chart – Bar Chart – Pie Chart – Histogram – Scatter Plot. Experiments: - Creation of 1D, 2D, and 3D NumPy Arrays - Array Slicing and Indexing Operations - Data Analysis using Pandas Data Frames - Data Visualization using Matplotlib Activities: - Assignment on NumPy Array Operations and Data Manipulation - Pair Programming Activity for Data Analysis using Pandas and Visualization Tools.								
COURSE OUTCOMES								

At the end of the course, the students will be able to: CO1: Develop Python programs using operators, control statements, and looping constructs. CO2: Apply functions, strings, lists, tuples, and dictionaries to solve programming problems using Python. CO3: Implement file handling, exception handling, and Python modules for managing and processing data files. CO4: Execute data analytics techniques such as data wrangling, missing data handling, and outlier detection for preprocessing datasets. CO5: Use NumPy, Pandas, and Matplotlib libraries for data manipulation, analysis, and visualization.	
Weightage: Continuous Assessment: 50%, End Semester Examinations: 50%	
Assessment Methodology: Internal Assessment Test (30%), Practical (10%), Activities (10%)	
TEXT BOOKS	
1.	Reema Thareja, “Python Programming using Problem Solving Approach”, third Edition, Oxford University Press, 2025.
2.	Wes McKinney, “Python for Data Analysis”, third Edition, O’Reilly Media, 2022.
REFERENCES	
1.	Mark Lutz, “Learning Python”, fifth Edition, O’Reilly Media, 2013.
2.	Bharti Motwani, “Data Analytics using Python”, Wiley India Publications, 2023.
3.	Charles Severance, “Python for Everybody”, CreateSpace Independent Publishing Platform, 2016.
4.	Jake VanderPlas, “Python Data Science Handbook”, O’Reilly Media, 2017.
5.	Reema Thareja, “Data Science and Machine Learning Using Python”, Tata McGraw Hill, 2022.
E-Resources/E materials	
1.	nptel.ac.in/semester
2.	https://www.coursera.org/learn/python-data-analysis
3.	https://www.kaggle.com/learn/python
4.	https://www.freecodecamp.org/learn/scientific-computing-with-python/

Mapping of Course Outcomes to Programme Outcomes and Programme Specific Outcomes

Course Outcomes	Programme Outcomes											PSO		
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PSO1	PSO2	PSO3
CO1	3	1	-	-	-	-	-	-	-	-	1	-	-	2

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

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: Course Outcomes (COs) CO1: Display active listening and analytical speaking to present logical arguments in professional settings. CO2: Apply critical and purposeful communication skills to express ideas logically. CO3: Demonstrate cross-cultural awareness and innovative thinking to create inclusive, effective and ethically sound technical communication. CO4: Use appropriate formats and effective writing to prepare documents and handle interviews effectively. CO5: 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 ”. Tenth 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	Programme Outcomes											PSO		
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	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	-	-	-

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:

- சங்ககால நெசவு மற்றும் பானை (செராமிக்) தொழில்நுட்பத்தை மாணவர்கள் புரிந்துகொள்ள உதவுதல்.
- சங்ககாலத்தில் தமிழர்களின் கட்டிட வடிவமைப்பைப் பற்றி விழிப்புணர்வு ஏற்படுத்துதல்
- பழங்கால உற்பத்தித் தொழில்நுட்பத்தின் பல்வேறு நிலைகளை மாணவர்கள் வேறுபடுத்திக் காண உதவுதல்.
- வேளாண்மை மற்றும் பாசனத் தொழில்நுட்பத்தில் உள்ள பண்டைய அறிவை புரிந்துகொள்ளுதல்
- தமிழ்மொழியின் டிஜிட்டல்மயத்தை (Digitalization) மாணவர்கள் புரிந்துகொள்ளச் செய்தல்.

COURSE CONTENT:

Unit 1	நெசவு மற்றும் பானைத் தொழில்நுட்பம்	3	0	0	3	6		8,12
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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 குழுவித் 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 பாணை 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

E resources/E materials:

1.	https://www.tamilvu.org/
2.	https://tamildigitallibrary.in/

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: CO1: Able to explain the importance of weaving and pottery technology during the Sangam period.								

CO2: Able to describe the knowledge of architectural design of the Tamils during the Sangam period.
 CO3: Able to demonstrate a strong foundational understanding of the production technologies of ancient Tamils.
 CO4: Able to explain the importance of ancient Tamil agricultural and irrigation technologies.
 CO5: 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.

E resources/E materials:

1.	https://www.tamilvu.org/
2.	https://tamildigitallibrary.in/

Mapping of Course Outcomes to Programme Outcomes and Programme Specific Outcomes

Course Outcomes	Programme Outcomes											PSO		
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PSO1	PSO2	PSO3
CO1	2	2	1	-	-	2	-	-	-	-	1	-	-	-
CO2	2	2	2	-	-	2	-	-	-	-	1	-	-	-
CO3	3	2	2	2	2	1	-	-	-	-	1	-	-	-
CO4	2	2	1	-	-	3	-	-	-	-	1	-	-	-
CO5	2	1	2	-	3	1	-	-	2	-	2	-	-	-
CO	2	2	2	2	3	2	-	-	2	-	1	-	-	-

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.). <i>Massachusetts Institute of Technology</i> , https://fablab.mit.edu/
2.	3D Printing Basics – 3D Systems Learning Center, (n.d.). <i>3D Systems</i> , https://www.3dsystems.com/learn
3.	Carpentry and Woodworking Basics – Carpentry.edu, (n.d.). <i>Carpentry Training Resources</i> , https://www.carpentry.edu/
4	Machine Tools and Workshop Practice – NPTEL, 2022. <i>NPTEL Online Courses</i> , https://nptel.ac.in/

Mapping of Course Outcomes to Programme Outcomes and Programme Specific Outcomes

Course Outcomes	Programme Outcomes											PSO		
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PSO1	PSO2	PSO3
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	1	3	2	2	3	1	1	1	-	-	-

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
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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 check-								

ing 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
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derstanding 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:

CO1: Remember and recall key concepts of professional communication, emotional intelligence, habit formation, and goal-setting frameworks relevant to engineering workplace scenarios

CO2: Understand and explain mental arithmetic techniques, Vedic math shortcuts, percentage-fraction conversions, and quantitative aptitude concepts applicable to competitive examinations

CO3: Apply storytelling, creative thinking, presentation skills, negotiation strategies, and role-play techniques to real-world professional communication contexts.

CO4: Analyze logical problems, design step-by-step algorithms, construct flowcharts, and develop solutions using no-code platforms and computational thinking approaches.

CO5: 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”, fourth Edition, Oxford University Press, 2022.		
2.	Asha Kaul, “Effective Business Communication”, third 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", sixteenth Edition, Sul-tan Chand and Sons, 2019.		
2.	Arun Sharma, "Quantitative Aptitude for Competitive Examinations", seventh 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”, Penguin Random House, 2018.		
5.	Nishit K. Sinha, “Quantitative Aptitude for CAT ”, seventh 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/

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CO2	3	3	1	1	–	–	–	–	–	1	–	2	1	2
CO3	2	2	2	–	1	1	–	1	3	3	1	2	2	2
CO4	3	3	3	2	3	–	–	–	1	1	1	3	3	3
CO5	2	2	2	1	1	1	–	2	2	3	2	3	3	3
CO	2	2	2	1	1	1	0	1	2	2	1	2	2	2