B.Tech. Degree

in

INFORMATION TECHNOLOGY

CURRICULUM & SYLLABUS (CBCS)

Innovation and Product Development for Sustainability

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

DEPARTMENT OF INFORMATION TECHNOLOGY

St. XAVIER'S CATHOLIC COLLEGE OF ENGINEERING

CHUNKANKADAI, NAGERCOIL – 629 003.

KANYAKUMARI DISTRICT, TAMIL NADU, INDIA

VISION OF THE INSTITUTION

To be an institution of eminence of optimal human development, excellent engineering education and pioneering research towards developing a technically–empowered humane society.

MISSION OF THE INSTITUTION

To transform the (rural) youth into top-class professionals and technocrats willing to serve local and global society with ethical integrity, by providing vibrant academic experience of learning, research and innovation and stimulating opportunities to develop personal maturity and professional skills, with inspiring and high-caliber faculty in a quality and serene infrastructural environment.

VISION OF THE PROGRAMME

Creating top-notch Information Technology Engineers, innovative researchers and successful entrepreneurs towards developing a technically-empowered humane society.

MISSION OF THE PROGRAMME

M1. Providing quality technical education and high-caliber skill training that meets the needs of society and the latest technical expectations of the industry.

M2. Fostering innovative and rigorous research culture among staff and students to find optimal solutions for complex problems.

M3. Imparting value-based education to imbibe ethical principles and act with social responsibility, team spirit, and leadership.

M4. Promoting and developing entrepreneurial skills of the students and handhold them towards commercial success.

PROGRAMME EDUCATIONAL OBJECTIVES

PEO1: To equip graduates with the analytical and critical thinking skills for a successful career that caters to the diversified needs of industrial sector, academic institutions, and research fields.

PEO2: To prepare graduates to integrate software computing and operation tools to provide a consistent and continuous solution to real time problems.

PEO3: To empower graduates to design and develop software and hardware products that enhance the human experience, addressing the requirements of society, business, and the environment.

PEO4: To make graduates to uphold ethical standards in their professional pursuits and equip them to adapt themselves to address complex engineering problems across multi-disciplinary domain.

PEO5: To equip graduates into professionals with the capacity to effectively apply their skill set in diverse environments.

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 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: Formulate optimal solutions to tackle the obstacles in information and communication engineering by utilizing programming expertise.

PSO2: Build and manage IT infrastructure to solve real world problems with modelling, analytical and prediction tools, techniques and resources.

PSO3: Develop computing systems using the agile and integrated software development practices to enhance the lifestyle of the public.

PEOs – POs & PSOs MAPPING

PEOs	POs											PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
PEO1	3	3	2	1	-	1	-	-	-	-	-	2	-	1
PEO2	3	2	2	2	3	1	-	-	-	-	-	1	3	1
PEO3	-	-	3	2	2	2	3	-	-	-	1	1	3	1
PEO4	3	2	3	3	1	-	-	3	-	2	-	1	2	1
PEO5	-	-	-	-	-	1	-	-	3	3	3	-	-	2

PROGRAMME ARTICULATION MATRIX

Year	Semester	Course Name	PO											PSO		
			1	2	3	4	5	6	7	8	9	10	11	1	2	3
I	I	IP26C01	1	1	-	-	1	2	1	2	2	2	1	-	-	-
I	I	MA26C01	3	2	1	1	1	-	-	-	-	-	1	1	-	-
I	I	PH26C02	3	2	-	-	-	-	-	1	-	-	1	-	-	-
I	I	CH26C02	2	3	3	2	1	2	2	1	-	-	1	-	-	-
I	I	CS26C01	1	2	1	1	1	-	-	-	-	-	1	3	-	-
I	I	IT26101	1	3	2	-	2	-	-	-	-	-	-	3	-	-
I	I	EN26C01	-	-	-	-	-	-	-	2	3	-	2	-	-	-
I	I	TA26C01	2	2	1	-	-	2	2	2	2	-	1	-	-	-
I	I	CS26C03	1	2	2	2	1	-	-	-	-	-	1	3	-	-
I	I	ME26C02	3	2	2	2	3	1	2	2	2	1	1	-	-	-
I	I	SD26C01	2	2	2	1	1	1	-	-	-	-	-	-	-	-
I	II	IP26C02	2	2	-	-	-	2	2	3	3	2	-	-	-	-
I	II	MA26C02	3	2	1	1	1	-	-	-	-	-	1	1	-	-

I	II	PH26C01	3	2	-	-	1	-	-	1	-	-	1	-	-	-
I	II	CH26C01	3	2	2	2	2	2	-	1	-	-	1	-	-	-
I	II	EE26C02	3	3	-	-	-	-	-	-	-	-	-	-	-	-
I	II	IT26201	3	2	3	-	2	-	-	-	-	-	1	3	-	-
I	II	EN26C02	-	-	-	-	-	-	-	2	3	-	2	-	-	-
I	II	TA26C02	2	2	2	2	3	2	-	-	2	-	1	-	-	-
I	II	SD26C02	2	2	2	1	2	1	-	2	2	2	1	-	-	-

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: 12
Total Credits: 22

Course Code	Course Title	Course Type	Classroom Instruction (CI) (in Hours per Semester)		Lab Instruction (LI) (in Hours per Semester)	Term Work (TW) and Self Learning (SL) (in Hours per Semester)	Total Number of Hours (in Hours per Semester)	Total Credits (C) = (Total Hours/ 30)	SDG Goal Mapped	Category
			L	T	P					
IP26C01	Induction Programme (Lab Integrated) ***	IP	40	16	24	40	120	0	3,4,8, 16	MNC
MA26C01	Matrices and Applied Calculus (Lab Integrated)	TCP	45	0	30	45	120	4	4,9	BSC
PH26C02	Physics for Computer 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
CS26C01	Problem Solving using C	TC	45	0	0	45	90	3	4,8,9, 12	ESC
IT26101	Information Technology Fundamentals (Lab Integrated)	TCP	30	0	30	30	90	3	4, 8, 9	ESC
EN26C01	Technical Communication	TC	15	15	0	30	60	2	4,8,10	HSMC
TA26C01	Heritage of Tamil	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	0	2	4,8,9, 12	ESC
ME26C02	Engineering Workshop and Makerspace	PC	0	0	60	0	60	2	4,9	ESC

SD26C01	Employability Skills – I *	PC	0	0	30	30	60	1	3,4,5,8,16	SDC
-	NSS/NCC/NSO/YRC***	-	-	-	-	-	-	-	-	MNC
	Total		210	15	210			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: 09
Total Credits: 21

Course Code	Course Title	Course Type	Classroom Instruction (CI) (in Hours per Semester)		Lab Instruction (LI) (in Hours per Semester)	Term Work (TW) and Self Learning (SL) (in Hours per Semester)	Total Number of Hours (in Hours per Semester)	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
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
EE26C02	Basic Electrical and Electronics Engineering (Lab Integrated)	TCP	30	0	30	30	90	3	4,7,9,11,12	ESC
IT26201	Objected Oriented Programming Techniques (Lab Integrated)	TCP	45	0	30	45	120	4	4,9	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
SD26C02	Employability Skills - II*	PC	0	0	60	60	120	1	3,4,8,9,16	SDC
	Total		210	0	240			21		

* - 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	26	14	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 I	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:
1. 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 II	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:
1. Students think about their goals and discuss happiness and healthy living.

UNIT III	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:** 1. Students work in small groups to complete a task and practice communication and teamwork.								
UNIT IV	**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:** 1. Students visit labs and listen to expert talks to understand facilities, careers, and professional ethics.								
UNIT V	**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:** 1. 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.	AICTE - https://www.aicte-india.org/Initiatives/Induction
2.	AICTE Induction Program Cell - https://fdp-si.aicte-india.org
3.	Universal Human Values Foundation - https://uhv.org.in

Mapping of Course Outcomes to Programme Outcomes and Programme Specific Outcomes

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

3 - High, 2 - Medium, 1 – Low

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 are needed by engineers for practical applications.
- To introduce the basic concepts of solving systems 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:

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

Activities:

1. 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 Equations	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:

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

Activities:

1. 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, chain rules - Maximum and Minimum values of polynomial functions: Critical Point, Increasing and Decreasing functions - First derivative test - Point of inflection - Concavity.

Practical:
1. Plotting of single variable functions and finding its extreme values using simulation software.
Activities:
1. 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:
1. Solving higher-order ordinary differential equations using simulation software.
Activities:
1. 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:
1. Finding directional derivative of a function using simulation software.
Activities:
1. 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 systems 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: Activity (10%), Practical (10%), Internal Examinations (30%)	
TEXT BOOKS:	
1.	S. Narayanan, T. K. Manicavachagom Pillai, “Calculus” - Volume I and II, S. Viswanathan Publishers Pvt. Ltd., Chennai, Reprint 2021.
2.	B. S. Grewal, “Higher Engineering Mathematics”, Khanna Publishers, New Delhi, Forty-Fifth Edition, Reprint 2024.
REFERENCES:	
1.	B. V. Ramana, "Higher Engineering Mathematics", McGraw Hill Education Pvt. Ltd., New Delhi, Twenty-Fifth Edition, Reprint 2022.
2.	H. Anton, I. Bivens, S. Davis, "Calculus", Wiley, Twelfth Edition, Reprint 2024.
3.	R.K. Jain, S. R. K. Iyengar, “Advanced Engineering Mathematics”, Narosa Publications, Fifth Edition, Reprint 2021.
4.	E. Kreyszig, “Advanced Engineering Mathematics”, Wiley India Publications, Eleventh Edition, 2025.
5.	N. Bali, M. Goyal, “A Textbook of Engineering Mathematics”, Firewall Media (An imprint of Lakshmi Publications Pvt. Ltd.), Ninth Edition, Reprint 2021.
E-RESOURCES/E-MATERIALS:	
1.	System of Linear Equations, Eigenvalues and Eigenvectors - https://www.nptelvideos.com/lecture.php?id=134162
2.	Matrix Diagonalization, NPTEL Course - https://www.nptelvideos.com/lecture.php?id=13481
3.	SCILAB - https://www.scilab.org/

Mapping of Course Outcomes to Programme Outcomes and Programme Specific Outcomes

Course Outcomes	PO											PSO		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**1**	**2**	**3**
CO1	3	2	1	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	-	-

Course Outcomes	PO											PSO		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**1**	**2**	**3**
CO5	3	2	1	1	1	-	-	-	-	-	1	1	-	-
CO	3	2	1	1	1	-	-	-	-	-	1	1	-	-

3 - High, 2 - Medium, 1 - Low

PH26C02	**PHYSICS FOR COMPUTER ENGINEERS**	**L**	**T**	**P**	**TW/SL**	**Total**	**C**	**SDG**
		30	0	0	30	60	2	3,4,7,9, 12

COURSE OBJECTIVES:

- To provide fundamental knowledge of conducting, semiconducting, magnetic and superconducting materials essential for engineering applications.
- 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 on quantum structure and quantum computing.
- To equip learners with knowledge of nanomaterials and nanodevices.

COURSE CONTENT:

UNIT I	**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.

Activities*:

1. Temperature dependence of conductivity - Demo.

UNIT II	**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.

Activities*:

1. Semiconductor market mapping activity - Poster.

UNIT III	**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. **Activities*:** 1. Magnetic materials and Superconductors - Puzzle.								
UNIT IV	**Quantum Computing**	6	0	0	6	12		4,7,9
Introduction - Quantum confinement - Quantum structures: quantum wells, wires and dots - Quantum system for information processing - Quantum states - Classical bits - qubits - Single qubits - Bloch sphere - CNOT gate. **Activities*:** 1. Quantum structures and Quantum Computing **-** Quiz.								
UNIT V	**Nano materials**	6	0	0	6	12		3,4,9, 12
Introduction to nanomaterials - Synthesis by sol-gel method - properties: Physical, Optical, and Magnetic properties - Coulomb blockade effect - Single-electron transistor - Carbon nanotubes: Properties and Applications - Nanotechnology application in electric vehicle. **Activities*:** 1. Nano vs Micro vs Macro - size comparison with common objects.								
* 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 the Hall effect in basic semiconductor devices.							
CO3:	Use the magnetic and superconducting properties of materials in various applications of modern technology.							
CO4:	Demonstrate the use of quantum structures, classical bits, and qubits in solving problems related to quantum information processing.							
CO5:	Integrate the properties of nanomaterials in explaining the working principles of nanoscale devices.							
Weightage: Continuous Assessment: 40%, End Semester Examinations: 60%								
Assessment Methodology: Activity (30%), Internal Assessment Test (70%)								
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", First Edition, PHI Learning, 2022.
4.	C. Kittel, "Introduction to Solid State Physics", Ninth Edition, Wiley, 2018.
5.	Chris Bernhardt, "Quantum computing for everyone", MIT Press, 2020.
E-RESOURCES/E-MATERIALS:	
1.	NPTEL, Physics of Materials - IIT Madras - https://nptel.ac.in/courses/113106039
2.	MIT Open Course Ware - Solid State Physics - https://ocw.mit.edu/courses/8-231-physics-of-solids-i-fall-2006/download/
3.	IEEE Xplore Digital Library - Research articles on semiconductors, Superconductors, and nanomaterials - https://ieeexplore.ieee.org/Xplore/home.jsp
4.	Khan Academy, Band theory, semiconductors, and material science modules - https://www.khanacademy.org/
5.	Basics of Quantum Computing - http://lab.quantumflytrap.com

Mapping of Course Outcomes to Programme Outcomes and Programme Specific Outcomes

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

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

3 - High, 2 - Medium, 1 - Low

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 I	Ecosystem and Biodiversity	6	0	0	6	12		13,14,15

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

UNIT II	Natural resources	6	0	0	6	12		7,6,12,13

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.
Activities:
1. Case study on deforestation in India.

UNIT III	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.
Activities:

1. Prepare a report analyzing various alternatives to plastics and their significance.								
UNIT IV	**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. **Activities:** 1. Prepare a report analyzing the presence of adulterants in five commonly used food items through appropriate testing methods.								
UNIT V	**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 footprint, Ecological footprint - Importance and applications - Environmental protection acts - Green chemistry - Principles and applications - Eco mark and Eco products. **Activities:** 1. Creating models based on Eco products.								

COURSE OUTCOMES:	
At the end of the course, the 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, 2022.
2.	Erach Barucha, “Text book of Environmental studies for undergraduate 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, "Textbook of Environment and Ecology", Springer, 2024.
3.	Gopal Kumar Sharma, Janifer Raj Xavier, Ajay Singh, "Food adulterants and contaminants", New India Publishing Agency, 2024.
4.	Niko Roorda, "Fundamentals of Sustainable Development", Fourth Edition, Earthscan from Routledge, 2025.
E-RESOURCES/E-MATERIALS:	
1.	NPTEL - Environment and Development - https://nptel.ac.in/courses/109103186
2.	NPTEL - Biodiversity protection, Farmers and Breeders rights - https://nptel.ac.in/course/129105008
3.	NPTEL - Sustainable Engineering Concepts and Life Cycle Analysis - https://nptel.ac.in/courses/105105157

Mapping of Course Outcomes to Programme Outcomes and Programme Specific Outcomes

Course Outcomes	PO											PSO		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**1**	**2**	**3**
CO1	2	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	-	-	-

3 - High, 2 - Medium, 1 – Low

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 combine pointers and file handling techniques.

COURSE CONTENT:

UNIT I	Problem Solving Techniques and Basics of C	9	0	0	9	18		4,9

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:

1. Chart Preparation, Quiz

UNIT II	Decision Control and Looping Statements	9	0	0	9	18		9

Conditional Branching 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:

1. Quiz, Code Debugging

UNIT III	Functions and Strings	9	0	0	9	18		8

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:

1. Code Debugging, Think-Pair-Share

UNIT IV	Arrays, Structure and Union	9	0	0	9	18		9

Arrays: Declaration of 1D, 2D Arrays - Initialization - Accessing the elements of an Array - Linear Search & Binary Search - Matrix Operations - Structure: Declaration - Initialization - Accessing the

members of a Structure - Nested Structure - Array of Structure - Union: Declaration - Initialization - Accessing the members. **Activities:** 1. Quiz, Pair Programming								
UNIT V	**Pointers and Files**	9	0	0	9	18		4,12
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:** 1. 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 unions.
CO5:	Develop programs by using pointers and file handling techniques.
Weightage: Continuous Assessment: 40%, End Semester Examinations: 60%	
Assessment Methodology: Activity (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.

6.	Ashok N. Kamthane, “Programming in C”, Second Edition, Pearson India, 2024.
E-RESOURCES/E-MATERIALS:	
1.	NPTEL, Introduction to Programming in C - https://nptel.ac.in/courses/106104128
2.	Beginners Book, C Tutorial - Learn C Programming with examples - https://beginnersbook.com/2014/01/c-tutorial-for-beginners-with-examples/
3.	Geeks for Geeks, C Programming Tutorial - https://www.geeksforgeeks.org/c/c-programming-language/
4.	Learn C - https://www.learn-c.org/
5.	Programiz - Learn C Programming - https://www.programiz.com/c-programming
6.	C Tutorial - https://www.cprogramming.com/tutorial/c-tutorial.html
7.	CodeChef, Learn C - https://www.codechef.com/learn/course/c
8.	W3Schools, C Tutorial - https://www.w3schools.com/c/
9.	W3Resource, C Programming Exercises, Practice, Solution - https://www.w3resource.com/c-programming-exercises/

Mapping of Course Outcomes to Programme Outcomes and Programme Specific Outcomes

Course Outcomes	PO											PSO		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**1**	**2**	**3**
CO1	2	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	-	-

3 - High, 2 - Medium, 1 – Low

IT26101	INFORMATION TECHNOLOGY FUNDAMENTALS (Lab Integrated)	L	T	P	TW/SL	Total	C	SDG
		30	0	30	30	90	3	4,8,9

COURSE OBJECTIVES:

- Introduce fundamental concepts of computer systems, hardware, software, networking, and digital systems.
- Develop basic programming and computational thinking skills.
- Familiarize students with operating systems, databases, and web technologies.
- Provide essential skills in multimedia, animation, and computer graphics.
- Bridge the gap between school-level computing and engineering-level IT education.

COURSE CONTENT:

UNIT I	Fundamentals of Computers and Digital Systems	6	0	6	6	18		4

History and Generations of Computers - Classification of Computers - The Computer System - CPU, Memory, I/O devices - Number Systems and Binary Arithmetic - Logic Gates and Digital Circuits.

Practical:

1. Assemble a PC using virtual simulator.
2. Digital logic simulation using simulation software.

Activities:

1. Worksheets on number systems and binary arithmetic.
2. Digital logic game (truth table activity).

UNIT II	Software, OS and System Architecture	6	0	6	6	18		4,8

Types of Software: System Software and Application Software - Generations of Computer Programming languages - OS Basics: Process management, Memory management, File systems - Virtualization and Cloud**.**

Practical:

1. Deployment of Windows/Linux OS in a Virtual Machine and working with basic Linux commands.

Activities:

1. OS comparison chart presentation.
2. A comparative case study on cloud services offered by cloud providers.
3. Group discussion on open-source software.

UNIT III	Networking and Programming Fundamentals	6	0	6	6	18		4,8

Network Basics: Components of Network, Types of Networks, Topology - Program Development Life Cycle - Program Design Tools: Algorithms, Flowcharts, Pseudocode - Programming Paradigms and Logics.

Practical:

1. Develop algorithms, flowcharts, and pseudocode to solve problems involving operators, conditional statements, and looping constructs.

Activities:

1. Design different types of networks (LAN, MAN, WAN) using network components.
2. Design simple network for a computer lab or small office using network simulation software.

UNIT IV	**Database and Web Technologies**	6	0	6	6	18		4,8

DBMS Concepts and Data Models - SQL Basics - HTML, CSS and Web Page Design - Internet Protocols and Client-Server Architecture.

Practical:

1. Retrieval of data from the database using SQL Queries.
2. Create web page using HTML/CSS.

Activities:

1. Design and develop a personal website to showcase the academic achievements, projects, skills, and career aspirations.
2. Draw an Entity Relationship diagram for any application.

UNIT V	**Graphics and Multimedia**	6	0	6	6	18		8,9

Multimedia Components: Text, Image, Audio, Video, Animation - Types: Linear and Non-linear Multimedia - Applications of Multimedia, Definition of Computer Graphics - Image Formats - Animation and Video Fundamentals - Case Studies.

Practical:

1. Use image editing tool to perform resizing, transformation, cropping, and contrast adjustment.
2. Perform audio and video recording and editing operations.

Activities:

1. Digital poster creation using multimedia tools.
2. Logo design using multimedia tools.
3. Storyboard generation - creating animated narratives.

COURSE OUTCOMES:

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

CO1:	Utilize fundamental computer concepts to solve basic computational problems.
CO2:	Apply the concepts of system software, application software, and operating system functions to select appropriate solutions.
CO3:	Develop problem-solving logic using structured programming approaches.
CO4:	Implement database and web concepts to develop simple applications.

CO5:	Operate multimedia and computer graphics tools to create and edit digital content.
Weightage: Continuous Assessment: 50%, End Semester Examinations: 50%	
Assessment Methodology: Activity (10%), Practical (10%), Internal Assessment Test (30%)	
TEXT BOOKS:	
1.	Anita Goel, "Computer Fundamentals", Pearson Education / The World Book Depot, 2020.
2.	Reema Thareja, "Programming in C: A Practical Approach", OUP, Third Edition, June 2023.
REFERENCES:	
1.	V. Rajaraman, "Fundamentals of Computers", PHI Learning, Seventh Edition, 2025.
2.	Behrouz A. Forouzan, "Data Communications and Networking", Sixth Edition, McGraw-Hill, 2022.
3.	Abraham Silberschatz, Peter B. Galvin, Greg Gagne, "Silberschatz's Operating System Concepts", Wiley, Tenth Edition, 2020.
4.	Ramez Elmasri, Shamkant B. Navathe, "Fundamentals of Database Systems", Pearson, Seventh Edition, 2021.
5.	Thomas Powell, "HTML & CSS: The Complete Reference", McGraw Hill Education, Fifth Edition, 2020.
6.	Ze-Nian Li, Mark S. Drew, Jiangchuan Liu, "Fundamentals of Multimedia", Springer, Third Edition, 2021.
E-RESOURCES/E-MATERIALS:	
1.	Fundamentals of Computer Systems - https://onlinecourses.swayam2.ac.in/nou26_cs01 - CIT-001
2.	Introduction to IT fundamentals, Infosys Springboard - https://infyspringboard.onwingspan.com
3.	HarvardX: CS50's Introduction to Computer Science - https://www.edx.org/learn/computer-science/harvard-university-cs50-s-introduction-to-computer-science
4.	Google IT Support Professional Certificate, Coursera - https://www.coursera.org/professional-certificates/google-it-support
5.	Introduction to Software, Programming, and Databases, Coursera - https://www.coursera.org/learn/introduction-software-programming-and-databases

6.	Web development tutorials - https://www.w3schools.com
7.	Programming and networking - https://www.geeksforgeeks.org
8.	IT fundamentals - https://www.tutorialspoint.com
9.	Free MIT course materials - https://ocw.mit.edu

Mapping of Course Outcomes to Programme Outcomes and Programme Specific Outcomes

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

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 I	**Foundations of Communication Skills**	3	3	0	6	12		1

Listening: Listening for Local/Global Comprehension
Speaking: Introducing oneself (formal and informal), Introducing others
Reading: Reading Comprehension, 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		3
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		2
Listening: Listening to Dialogues and Interviews **Speaking:** Giving Directions and Instructions **Reading**: Advertisements and Process Manuals **Writing:** Letter Writing (Formal and Informal) **Language Study:** Punctuation and Capitalization **Vocabulary:** One word substitution **Self-study**: Spell Bee								
UNIT IV	**Interpersonal Communication**	3	3	0	6	12		2,7
Listening: Listening to Dialogues and Interviews **Speaking:** Role Play (Professional Situations) **Reading**: Articles and Short Stories **Writing:** Technical Report Writing **Language Study:** Auxiliary verbs and modal verbs **Vocabulary:** Homonyms and Homophones **Self-study**: Dialogue Writing (Formal)								
UNIT V	**Enhancing Presentation Skills**	3	3	0	6	12		7
Listening: Listening to Speeches and Presentations **Speaking:** Public Speaking/Oral presentations **Reading**: Reviews (Books and Projects) **Writing:** Essay Writing and Creative Writing **Language Study:** Concord **Vocabulary:** Idioms and Phrases **Self-study**: Presentation on a technical topic								
COURSE OUTCOMES:								
At the end of the course, the students will be able to:								

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 coherent 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 Examinations: 60%	
Assessment Methodology: Activity (30%), Internal Assessment Test (70%)	
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 Learning English - https://www.bbc.co.uk/learningenglish

Mapping of Course Outcomes to Programme Outcomes and Programme Specific Outcomes

Course Outcomes	PO											PSO		
	1	2	3	4	5	6	7	8	9	10	11	1	2	3
CO1	-	-	-	-	-	-	-	2	3	-	2	-	-	-
CO2	-	-	-	-	-	-	-	2	3	-	2	-	-	-

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

3 - High, 2 - Medium, 1 - Low

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 I	மொழி மற்றும் இலக்கியம்	3	0	0	3	6		4,10

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

Activities: தமிழ் இலக்கியம் என்ற தலைப்பில் போஸ்டர் தயாரித்தல்.

UNIT II	**மரபு - பாறை ஓவியங்கள் முதல் நவீன ஓவி சிற்பக் கலை**	3	0	0	3	6		11,12
சிற்றிலக்கியங்கள் - தமிழில் நவீன இலக்கியத்தின் வளர்ச்சி - தமிழ் இலக்கிய வளர்ச்சியில் பாரதியார் மற்றும் பாரதிதாசன் ஆகியோரின் பங்களிப்பு- சிற்பங்கள் - ஐம்பொன் சிலைகள்- குமரிமுனையில் திருவள்ளுவர் சிலை- பழங்குடியினர் மற்றும் அவர்கள் தயாரிக்கும் கைவினைப் பொருட்கள், - தேர் செய்யும் கலை – தமிழர் இசைக் கருவிகள் - மிருதங்கம், பறை, வீணை, யாழ், நாதஸ்வரம் **Activities:** இலக்கியம் அடிப்படையிலான வினாடி வினா								
UNIT III	**நாட்டுப்புறக் கலைகள் மற்றும் விளையாட்டுகள்**	3	0	0	3	6		3,4
தெருக்கூத்து, கரகாட்டம், வில்லுப்பாட்டு, கணியான் கூத்து, ஒயிலாட்டம், , சிலம்பாட்டம், வளரி, நாட்டுப்புறத் தெய்வங்கள்-தமிழர்களின் விளையாட்டுகள். ஏறு தழுவுதல்-இளவட்டக்கல்-சடுகுடு-உறியடித்தல்-வழுக்கு மரம்-மாட்டுவண்டி **Activities:** பாத்திரப் பங்கு: கலைகளை நடித்தல்								
UNIT IV	**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 V	**இந்திய தேசிய இயக்கம் மற்றும் இந்திய பண்பாட்டிற்குத் தமிழர்களின் பங்களிப்பு**	3	0	0	3	6		4,16
இந்திய விடுதலைப்போரில் தமிழர்களின் பங்கு - சுயமரியாதை இயக்கம்- சித்த மருத்துவம் – கல்வெட்டுகள்- கையெழுத்துப்படிகள் - தமிழ்ப் புத்தகங்களின் அச்சு வரலாறு **Activities:** குழு விளக்கம்: விடுதலைப் போராட்டம்								
COURSE OUTCOMES:								

At the end of the course, the students will be able to:	
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.
Weightage: Continuous Assessment: 40%, End Semester Examinations: 60%	
Assessment Methodology: Activity (30%), Internal Assessment Test (70%)	
TEXT BOOKS:	
1.	முனைவர் ஆ. பூபாலன் , "தமிழர் மரபு", VRB Publishers Pvt Ltd, 2023.
2.	ஜெயந்தி ரவிகிருஷ்ணன், "தமிழர் மரபு", Sri Krishna Publication, 2023.
REFERENCES:	
1.	முனைவர் பாக்கியமேரி, "வகைமை நோக்கில் இலக்கிய வரலாறு", நியூ செஞ்சுரி புக் ஹவுஸ், 2011.
2.	முனைவர் கே.கே. பிள்ளை, "தமிழக வரலாறும் மக்களும் பண்பாடும்", உலகத் தமிழராய்ச்சி நிறுவனம், 2002.
3.	டாக்டர் மு. வரதராசனார், "மொழி வரலாறு", திருநெல்வேலித் தென்னிந்திய சைவசித்தாந்த நூற்பதிப்புக் கழகம் லிமிடெட், 1954.
4.	கால்டுவெல், "திராவிட மொழிகளின் ஒப்பிலக்கணம்", வள்ளுவர் பண்ணை :சென்னை,1959.
5.	முனைவர் பாக்கியமேரி, "காலம்தோறும் தமிழர் கலைகள்" , பாவேந்தன் பதிப்பகம், 2008.
6.	முனைவர் தே. லூர்து, நாட்டார் வழக்காற்றியல் சில அடிப்படைகள், நாட்டார் வழக்காற்றியல் ஆய்வு மையம், 2000.
E-RESOURCES/E-MATERIALS:	
1.	Tamil Virtual Academy - https://www.tamilvu.org/

2.	Tamil Digital Library - 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 I	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:

1. Design a poster titled Tamil Literature.

UNIT II	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:

1. Quiz Based on Literature.

UNIT III	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:

1. Role Play: Performing Arts.

UNIT IV	**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:** 1. Preparing a Poster on the Theme Life in the Sangam Age.								
UNIT V	**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:** 1. 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.
Weightage: Continuous Assessment: 40%, End Semester Examinations: 60%	
Assessment Methodology: Activity (30%), Internal Assessment Test (70%)	
TEXT BOOKS:	
1.	Dr. M. Hemamalini, Dr. D. Chitra, “Tamil Heritage”, VRB Publishers Pvt. Ltd., 2023.
2.	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. Bakkiyamary, "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.	Tamil Virtual Academy - https://www.tamilvu.org/
2.	Tamil Digital Library - https://tamildigitallibrary.in/

Mapping of Course Outcomes to Programme Outcomes and Programme Specific Outcomes

Course Outcomes	PO											PSO		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**1**	**2**	**3**
CO1	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	1	-	-	2	2	-	-	-	1	-	-	-
CO	2	2	1	-	-	2	2	2	2	-	1	-	-	-

3 - High, 2 - Medium, 1 - Low

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 flowcharts.
- 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 and loops for decision-making & iteration.
CO3:	Apply arrays and pointers for efficient data handling.

CO4:	Design search and 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 Dmitrovic, "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.	NPTEL, Introduction to Programming in C - https://nptel.ac.in/courses/106104128
2.	Beginners Book, C Tutorial, Learn C Programming with examples - https://beginnersbook.com/2014/01/c-tutorial-for-beginners-with-examples/
3.	Geeks for Geeks, C Programming Tutorial - https://www.geeksforgeeks.org/c/c-programming-language/
4.	Learn C - https://www.learn-c.org/
5.	Programiz, Learn C Programming - https://www.programiz.com/c-programming
6.	C Tutorial - https://www.cprogramming.com/tutorial/c-tutorial.html
7.	Code Chef, Lear C - https://www.codechef.com/learn/course/c
8.	W3School, C Tutorial - https://www.w3schools.com/c/
9.	W3resourcs, C Programming Exercises, Practice, Solution - https://www.w3resource.com/c-programming-exercises/

Mapping of Course Outcomes to Programme Outcomes and Programme Specific Outcomes

Course Outcomes	PO											PSO		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**1**	**2**	**3**
CO1	2	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**	-	-

3 - High, 2 - Medium, 1 - Low

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.

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, Activity (75%), Model Practical Test (25%)	
REFERENCES:	
1.	S. Kalpakjian, S. R. Schmid, "Manufacturing Engineering and Technology", Seventh Edition, Pearson Education, 2021.
2.	B. S. Raghuwanshi, "Workshop Technology", Vol. 1 and 2, Dhanpat Rai Publications, 2021.
3.	D. M. Kaplan, "Hands-On Electronics: A Practical Introduction to Analog and Digital Circuits", Cambridge University Press, 2020.
4.	J. Blum, "Exploring Arduino: Tools and Techniques for Engineering Wizardry", Wiley, 2020.
5.	C. K. Chua, K. F. Leong, C. S. Lim, "3D Printing and Additive Manufacturing: Principles and Applications", Fifth Edition, World Scientific, 2021.
E-RESOURCES/E-MATERIALS:	
1.	MIT FABLAB Tutorials, (n.d.). Massachusetts Institute of Technology, https://fablab.mit.edu/
2.	3D Printing Basics – 3D Systems Learning Center, (n.d.). 3D Systems, https://www.3dsystems.com/learn
3.	Carpentry and Woodworking Basics – Carpentry.edu, (n.d.). Carpentry Training Resources,

	https://www.carpentry.edu/
4.	Machine Tools and Workshop Practice – NPTEL, 2022. NPTEL Online Courses, https://nptel.ac.in/

Mapping of Course Outcomes to Programme Outcomes and Programme Specific Outcomes

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

3 - High, 2 - Medium, 1 - Low

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 I	**Communication Foundations and Self-Expression**	0	0	6	6	12		4,8

Introducing Your Friend – Self Introduction techniques and structure, Peer Introduction exercises and feedback, Confidence building strategies for public speaking, Speaking clarity – articulation,

pace and tone, Extempore speaking – thinking on the spot, Structuring ideas quickly using mind maps, Public speaking basics – audience awareness and eye contact, Verbal communication – sentence formation and fluency improvement, Vocabulary usage in everyday and professional contexts, Communication activities and group interaction exercises, Reflective feedback sessions and self-assessment techniques

Activities

1. Self-Introduction and Peer Introduction
2. Extempore Speaking Session

UNIT II	**Body Language, Professional Etiquette and Workplace Readiness**	0	0	6	6	12		3,4

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

Activities

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

UNIT III	**Interpersonal Skills, Team Dynamics and Conflict Resolution**	0	0	6	6	12		5,16

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

Activities

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

UNIT IV	**Critical Thinking, Logical Reasoning and Debate**	0	0	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 V	**English Grammar Essentials for Effective Communication**	0	0	6	6	12		3,8

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

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

COURSE OUTCOMES:

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

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, Theatrix, Team vs Wild, Who Gets the Heart, Role Plays and other communication exercises.	CO2, CO5	10
Group Discussion, Debate & Team Activities	Continuous assessment of participation in group discussions, debates, leadership activities, conflict resolution exercises and collaborative problem-solving.	CO2, CO4	10
Grammar & Written Communication Exercises	Evaluation of grammar worksheets, vocabulary activities, sentence correction, paragraph writing, email drafting and integrated writing tasks.	CO1, CO3	10
Presentation & Public Speaking	Assessment of extempore speaking, public speaking, persuasive presentations and audience engagement based on predefined rubrics.	CO3, CO5	10
Professional Portfolio & Reflective Journal	Evaluation of professional emails, reflective journal, self-assessment reports, peer feedback and communication portfolio.	CO4, CO5	10
Subtotal (CSA)			60

B. Terminal Skill Assessment

Component	Description	CO(s)	Marks
Weekly Assessment	Cumulative score of weekly consolidation tests assessing communication concepts, grammar, 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, Basundhara Mitra, “Personality Development and Soft Skills”, Third Edition, Oxford University Press, 2024.
2.	P. C. Wren, H. Martin, “High School English Grammar and Composition”, Regular Edition, S. Chand Publishing, 2024.
3.	Sanjay Kumar, Pushp Lata, “Communication Skills”, Third Edition, Oxford University Press, 2024.

REFERENCES:

1.	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 and Assessment, 2019.
4.	Meenakshi Raman, 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 and Schuster, 2020.
E-RESOURCES/E-MATERIALS:	
1.	NPTEL, Soft Skills Development - https://nptel.ac.in/courses/109/105/109105095/
2.	Coursera, Developing Your Personal and Professional Brand – Communication Skills - https://www.coursera.org/learn/communication-skills
3.	Coursera, English Grammar and Essay Writing – UC Berkeley - https://www.coursera.org/learn/grammar-punctuation

Mapping of Course Outcomes to Programme Outcomes and Programme Specific Outcomes

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

3 - High, 2 - Medium, 1 - Low

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 I	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:
1. Students identify and list the needs of the body and the self (mind).

UNIT II	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:
1. Students share one example of trust or respect in their family or society.

UNIT III	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:
1. Students list daily habits affecting nature and suggest one improvement.

UNIT IV	Harmony in Existence	3	0	0	3	6		13

Realizing existence as co-existence - Environmental sustainability - Role of humans in maintaining ecological balance.
Activities:

1. Students list daily habits affecting the environment and suggest one improvement.								
UNIT V	**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:** 1. 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%), Assignment (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.	UHV Foundation - https://uhv.org.in/UHV-II_Course_Material
2.	AICTE-SIP - https://www.youtube.com/channel/UCo8MpJB_aaVwB4LWLAx6AhQ

Mapping of Course Outcomes to Programme Outcomes and Programme Specific Outcomes

Course Outcomes	PO											PSO		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**1**	**2**	**3**
CO1	2	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	3	1	-	-	-	-
CO	2	2	-	-	-	2	2	3	3	2	-	-	-	-

3 - High, 2 - Medium, 1 - Low

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 I	**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:

1. Testing of hypothesis for equality of variances using simulation software.

Activities:

1. Comparison of manufacturing process variability/Vibration and noise analysis/Soil property analysis**.**

UNIT II	**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:

1. Analysis of variance for randomized block design using simulation software.

Activities:

1. ANOVA in machine learning models/Network traffic analysis/Heat transfer experiments/ Concrete mix design.

UNIT III	**Non-Parametric Test**	9	0	3	12	24		4,13

Chi-square test for single variance - Independence of attributes - Contingency table: Analysis of r X c tables - Kolmogorov-Smirnov test for goodness of fit.

Practical:

1. Testing of hypothesis of independence of attributes using simulation software.

Activities:

1. Goodness of fit in software testing/Quality control in manufacturing/Structural damage analysis.

UNIT IV	**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:** 1. Solving ordinary differential equations by fourth order Runge-Kutta method using simulation software. **Activities:** 1. Gradient based learning equations/RLC circuit equations/Equation of motion/Simulate dynamic behavior of mechanisms.								
UNIT V	**Numerical Solution of Integration**	9	0	6	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:** 1. Evaluating integration by Trapezoidal rule using simulation software. **Activities:** 1. 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 tests, 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: Activity (10%), Practical (10%), Internal Examinations (30%)								
TEXT BOOKS:								
1.	B. S. Grewal, J. S. Grewal, "Numerical Methods in Engineering and Science ", Khanna							

	Publishers, New Delhi, Eleventh edition, Reprint 2021.
2.	R. A. Johnson, I. Miller, J. Freund, "Miller and Freund's Probability and Statistics for Engineers", Pearson Education, Asia, Ninth edition, Reprint 2023.
REFERENCES:	
1.	R. L. Burden, J. D. Faires, "Numerical Analysis", Cengage Learning, Tenth edition, Reprint 2024.
2.	J. L. Devore. J.L, "Probability and Statistics for Engineering and the Sciences", Cengage Learning, New Delhi, Ninth edition, Reprint 2023.
3.	C. F. Gerald, P. O. Wheatley, "Applied Numerical Analysis", Pearson Education, Asia, New Delhi, Seventh edition, Reprint 2023.
4.	M. R. Spiegel, J. Schiller, R. A. Srinivasan, "Schaum's Outlines on Probability and Statistics", Tata McGraw Hill, Fourth edition, Reprint 2024.
5.	R. E. Walpole, R. H. Myers, S. L. Myers, K. Ye, "Probability and Statistics for Engineers and Scientists", Pearson Education, Asia, Tenth edition, Reprint 2024.
E-RESOURCES/E-MATERIALS:	
1.	NPTEL, Introduction to Biostatistics by IIT Bombay - https://onlinecourses.nptel.ac.in/noc19_bt19/preview
2.	NPTEL, Biostatistics and Design of Experiments, by IIT Madras - https://onlinecourses.nptel.ac.in/noc23_bt13/preview

Mapping of Course Outcomes to Programme Outcomes and Programme Specific Outcomes

Course Outcomes	PO											PSO		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**1**	**2**	**3**
CO1	3	2	1	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	-	-

3 - High, 2 - Medium, 1 - Low

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 I	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:

1. Determination of velocity of ultrasonic waves in liquid medium

Activities:

1. Ultrasonics - Puzzle

UNIT II	Quantum Mechanics	6	0	6	6	18		4,9

Introduction - Blackbody radiation - Wien's displacement law - Rayleigh-Jean's law - Planck's radiation law (Derivation) - Schrödinger's time-independent wave equation - particle confined in one-dimensional infinite square well potential - eigenvalues and eigenfunctions - Introduction to Quantum Computing.

Practical:

1. Photoelectric effect - Determination of Planck's constant.

Activities:

1. Light effect vs Electrons - Virtual lab.

UNIT III	Photonics	6	0	6	6	18		3,4,9

Theory of laser action: simulated 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 – photodiode. **Practical:** 1. Laser - wavelength of laser using diffraction grating and particle size determination. **Activities:** 1. LED vs Semiconductor laser - A comparison								
UNIT IV	**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:** 1. Optical fiber - Numerical aperture and Acceptance angle of an optical fiber. **Activities:** 1. Fiber optic temperature sensor - Demo.								
UNIT V	**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:** 1. Uniform bending - Young's modulus of the material of the beam. **Activities:** 1. 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 and their properties to identify and solve some industrial problems.
CO2:	Calculate energy eigenvalues and wave functions of basic physical systems using quantum mechanical principles.
CO3:	Apply the principle of stimulated emission in the operation of a 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: Activity (10%), Practical (10%), Activities (10%)	
TEXT BOOKS:	
1.	Shatendra Sharma, Jyotsna Sharma**,** "Engineering Physics", Second edition, Pearson India Education Services Pvt. Ltd., 2024.
2.	R. K. Gaur, S. L. Gupta**,** "Engineering Physics", Eight edition, Dhanpat Rai Publications, 2024.
REFERENCES:	
1.	R. Shankar**,** "Fundamentals of Physics II: Electromagnetism, Optics and Quantum Mechanics", Expanded edition, Yale University Press, 2020.
2.	David Halliday, Robert Resnick, Jearl Walker**, "**Principles of Physics", Twelfth edition, John Wiley & Sons, 2023.
3.	H. D. Young, R. A. Freedman, "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.	M. N. Avadhanulu, P. G. Kshirsagar, "A Textbook of Engineering Physics", Eleventh Edition, S. Chand & Company, 2024.
E-RESOURCES/E-MATERIALS:	
1.	NPTEL, Engineering Physics - 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	PO											PSO		
	1	2	3	4	5	6	7	8	9	10	11	1	2	3
CO1	3	2	-	-	1	-	-	1	-	-	1	-	-	-
CO2	3	2	-	-	1	-	-	1	-	-	1	-	-	-
CO3	3	2	-	-	1	-	-	1	-	-	1	-	-	-
CO4	3	2	-	-	1	-	-	1	-	-	1	-	-	-
CO5	3	2	-	-	1	-	-	1	-	-	1	-	-	-
CO	3	2	-	-	1	-	-	1	-	-	1	-	-	-

3 - High, 2 - Medium, 1 - Low

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 I	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.

Activities:

1. Case study on water quality analysis.

UNIT II	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.

Activities:

1. Preparation of a poster comparing normal plastics with biodegradable plastics.

UNIT III	**Electrochemistry**	6	0	6	6	18		7,9,12

Electrochemical cells - Electrochemical 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 CH_3COOH).

Activities:

1. Electrochemical cell simulation.

UNIT IV	**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 ions in rust.

Activities:

1. Case study on factors influencing corrosion in underground pipelines.

UNIT V	**Photochemistry**	6	0	6	6	18		7,9,13

Photochemical laws - Jablonski diagram - Fluorescence - Phosphorescence - Chemiluminescence - Photosensitization - Photocatalysis - Mechanism and applications.

Practical:

1. Estimation of potassium Oxalate using Potassium Permanganate by a photochemical reaction.

Activities:

1. 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 carry out photochemical reactions for industrial applications.
Weightage: Continuous Assessment: 50%, End Semester Examinations: 50%	
Assessment Methodology: Activity (10%), Practical (10%), Internal Examinations (30%)	
TEXT BOOKS:	
1.	P. C. Jain, M. Jain, "Engineering Chemistry", Seventeenth edition, Dhanpat Rai Publishing Company Pvt. Ltd.,2015.
2.	S.S. Umare, S. S. Dara, "A textbook of Engineering Chemistry", Chand Publications, 2024.
REFERENCES:	
1.	L. K. Wang, M. H. Sung, N. K. Shammas, "Water and wastewater engineering", Fourth Edition, Vols. 1- 4, John Wiley & Sons, 2024.
2.	S. Ahamed, R. Ali, Osmani, "Handbook of Biodegradable Polymers - Applications in Biomedical Sciences, Industry, and the Environment", Jenny Stanford Publishing, 2024.
3.	A. Ravikrishnan, "Engineering chemistry", Sri Krishna Hitech Publishing Company Pvt. Ltd., 2021.
4.	R. W. Revie, H. H. Uhlig, "Corrosion and Corrosion Control", Fifth Edition, Wiley, 2025.
5.	Rohatgi, K. K. Mukherjee, "Fundamentals of Photochemistry", New Age International Private Limited, 2021.
E-RESOURCES/E-MATERIALS:	
1.	NPTEL, Water and wastewater treatment - https://nptel.ac.in/courses/105107207

2.	NPTEL, Corrosion Protection Methods - https://nptel.ac.in/courses/113104108

Mapping of Course Outcomes to Programme Outcomes and Programme Specific Outcomes

Course Outcomes	PO											PSO		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**1**	**2**	**3**
CO1	3	2	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	-	-	-

3 - High, 2 - Medium, 1 - Low

EE26C02	**BASIC ELECTRICAL AND ELECTRONICS ENGINEERING (Lab Integrated)**	**L**	**T**	**P**	**TW/SL**	**Total**	**C**	**SDG**
		30	0	30	30	90	3	4,7,9,11,12

COURSE OBJECTIVES:

- To introduce the principles of DC and AC circuits and their essential characteristics.
- To describe the construction and characteristics of major power semiconductor devices.
- To introduce the basic elements and functions of a generalized measurement system.
- To provide a basic understanding of the main components of an electrical power system and their functions.
- To provide basic knowledge of electrical wiring components and their applications.

COURSE CONTENT:

UNIT I	**DC and AC Circuits**	6	0	6	6	18		4,9

DC circuit: Electrical circuit elements - Resistor, Capacitor and Inductor - Basic electrical circuit parameters - Charge, Current, Voltage, Power and Energy - Ohm's law - Kirchhoff's voltage and current law - Series resistance, Parallel Resistance - Current and Voltage Division.

AC circuit: Alternating current and voltage - Average value, RMS Value, Peak Value, Form Factor, Power and Power Factor.

Practical:

1. Verification of Ohm's law.
2. Verification of Kirchhoff's Current Law.
3. Verification of Kirchhoff's Voltage Law.

Activities:

1. Circuit element identification, Problem solving.

UNIT II	**Analog Electronics**	6	0	6	6	18		4,9

Classification of Semiconductors - Construction, Characteristics and working - PN Junction Diode - Zener Diode - IGBT- SCR- MOSFET - Applications.

Practical:

1. Find the V-I characteristics of PN junction diode and MOSFET.

Activities:

1. Identification of various semiconductor devices.

UNIT III	**Measurements and Instrumentation**	6	0	12	6	24		4,12

Functional elements of an instrument - Principles of electrical indicating instruments - Moving coil and moving iron instruments, DSO -Transducers: strain gauge, LVDT.

Practical:

1. Measurement of electrical parameters using MI and MC instruments, Strain gauge.

Activities:

1. AC/DC Measurement Comparison using MC and MI instruments.

UNIT IV	**Power System**	6	0	0	6	12		4,7

Components of Power System - Single Line Diagram - Layout and Operation of Thermal Power Plant, Hydro Power Plant and Wind Energy Conversion System.

Activities:

1. Case study of environmental impact of conventional energy generation, Visit to Sub-Station.

UNIT V	**Electrical Wiring**	6	0	6	6	18		4,11

Electrical Safety, Types of domestic wiring: Cleat, casing and capping, Conduit wiring, Earthing: Pipe Earthing and Plate Earthing, Fuses: kit kat, Cartridge and HRC fuses.

Practical:

1. Residential wiring, Series and parallel wiring.

Activities:

1. Build an electrical wiring layout for a room.

COURSE OUTCOMES:

At the end of the course, the students will be able to:	
CO1:	Solve complex DC and AC electrical circuits using fundamental laws.
CO2:	Analyze the operational characteristics of semiconductor devices to determine their suitability for specific electronic applications.
CO3:	Select appropriate electrical measuring instruments based on their operating principles and range requirements for precise data acquisition.
CO4:	Evaluate the integration and functionality of various power system components within different types of power generation plants.
CO5:	Design electrical wiring and earthing systems for residential or industrial installations.
Weightage: Continuous Assessment: 50%, End Semester Examinations: 50%	
Assessment Methodology: Activity (10%), Practical (10%), Internal Examinations (30%)	
TEXT BOOKS:	
1.	J. B. Gupta, "Fundamentals of Electrical Engineering and Electronics", Tenth Edition, S.K. Kataria & Sons, 2023.
2.	V. K. Mehta, Rohit Mehta, "Basic Electrical Engineering", S. Chand & Company Pvt. Ltd., New Delhi, 2024.
REFERENCES:	
1.	B. L. Theraja, A. K. Theraja, "A Text Book of Electrical Technology", Volume-I, S. Chand & Company Ltd., New Delhi, 2023.
2.	D. P. Kothari, I. J. Nagrath, "Basic Electrical and Electronics Engineering", Fourth Edition, McGraw Hill Education, 2024.
3.	R. K. Rajput, "Basic Electrical and Electronics Engineering", Second Edition, Laxmi Publications, 2020.
4.	M. Morris Mano, "Digital Logic and Computer Design", Pearson India Education Services Pvt. Ltd., New Delhi, 2023.
5.	W. H. Hayt, J. E. Kemmerly, "Engineering Circuit Analysis", Ninth Edition, McGraw Hill Education, 2024.
E-RESOURCES/E-MATERIALS:	

1.	AC Circuits: Alternating Current, Waveforms, and Formulas - https://techweb.rohm.com/product/circuit-design/electric-circuit-design/19487/
2.	NPTEL, Analog electronic circuits - https://nptel.ac.in/courses/108/105/108105104
3.	All about Circuits, Tutorials - https://www.allaboutcircuits.com/technical-articles/category/semiconductors/
4.	NPTEL, Power plant engineering - https://nptel.ac.in/courses/108/108/108108076
5.	Bureau of Energy Efficiency - https://beeindia.gov.in/

Mapping of Course Outcomes to Programme Outcomes and Programme Specific Outcomes

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

3 - High, 2 - Medium, 1 - Low

IT26201	OBJECT ORIENTED PROGRAMMING TECHNIQUES	L	T	P	TW/SL	Total	C	SDG
		45	0	30	45	120	4	4,9

COURSE OBJECTIVES:

- To learn the principles of Object-Oriented Programming and explain basic C++ constructs
- To familiarize the concepts of classes, objects, constructors, destructors, and object-handling techniques
- To implement polymorphism, operator overloading, type conversions, and various forms of inheritance
- To work on C++, I/O stream classes to perform console and file operations, including reading, writing, and updating data efficiently

- To know about generic programming with templates, handle exceptions, and effectively use STL components for building robust applications

COURSE CONTENT:

UNIT I	**Object-Oriented Programming and C++ Fundamentals**	9	0	6	9	24		4

OOP Fundamentals: Object Oriented Programming Paradigm, Basic Concepts of OOP, Benefits and Applications of OOP - C++ Basics: Structure of C++ Program, Tokens - Keywords, Identifiers and Constants, Data Types, Operators, Control Structures - Functions in C++: Function Prototyping, Call by Reference, Return by Reference, Inline Functions, Default and const Arguments, Recursion.

Practical:

1. Implement the concept of keywords, identifiers, constants, and operators using C++ program.
2. Implement the concept of call by reference and return by reference using C++ functions.

Activities:

1. Create a mind map for the basic concepts of Object-Oriented Programming (OOP).
2. Draw the flowchart and write the pseudocode to solve a problem using function concepts.

UNIT II	**Classes And Objects**	9	0	6	9	24		4

Classes: Specifying a Class, Defining Member Functions - Arrays within a Class - Objects: Memory Allocation for Objects, Static Data Members and Static Member Functions, Array of Objects, Object as Function Arguments, Friendly Functions, Returning Objects - Constructors: Parameterized Constructors, Multiple Constructors, Copy Constructor, Dynamic Constructors - Destructors.

Practical:

1. Write a C++ program using an array of objects of a class.
2. Write a C++ program to demonstrate parameterized constructor and copy constructor.

Activities:

1. Draw a class diagram showing attributes and methods.
2. Group Discussion: “Constructor vs Destructor in C++”

UNIT III	**Polymorphism and Inheritance**	9	0	6	9	24		9

Polymorphism - Friend and Virtual Functions - Function Overloading - Operator Overloading - Type Conversions - Inheritance: Defining Derived Classes, Various forms of Inheritance: Single, Multilevel, Multiple, Hierarchical and Hybrid Inheritance - Virtual Base Classes and Abstract Classes - Constructors in Derived classes.

Practical:

1. Write a C++ program to demonstrate runtime polymorphism using virtual functions.
2. Write a C++ program to overload unary and binary operators.
3. Write a C++ program to demonstrate single inheritance and multiple inheritance.

Activities:

1. Think-Pair-Share: Type conversion.
2. Prepare a poster on types of inheritance with one real-life example for each.

UNIT IV	**I/O Operations and File Handling**	6	0	6	9	24		9

I/O Operations: C++ Stream Classes, Unformatted I/O operations, Formatted Console I/O Operations - Working with Files: Classes for File Stream Operations, Opening and Closing a File, Sequential I/O operations, Updating a File: Random Access.

Practical:

1. Write a C++ program to create a file, write data into it and then read the contents.

Activities:

1. Prepare a comparative chart for unformatted I/O operations and formatted console I/O operations in C++.
2. Create a mind map for file stream classes hierarchy in C++.

UNIT V	**Exception Handling, Templates and Standard Template Library**	6	0	6	9	24		9

Exception Handling: Exception Handling Mechanism - Templates: Class Templates, Function Templates - Standard Template Library (STL): Components of STL, Containers and Iterators.

Practical:

1. Write a C++ program to demonstrate exception handling.
2. Write a C++ program using function templates.

Activities:

1. Case Study on Templates, Exception Handling, and STL.

COURSE OUTCOMES:

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

CO1:	Apply the fundamental concepts of Object-Oriented Programming (OOP) and explain basic C++ constructs, including operators, control structures, and functions.
CO2:	Implement C++ programs using classes, objects, constructors, destructors, and object-handling techniques for efficient program design.
CO3:	Use polymorphism, operator overloading, type conversions, and various forms of inheritance to achieve code reusability and flexibility in C++.

CO4:	Utilize C++ I/O stream classes to perform console and file operations, including reading, writing, and updating data efficiently.
CO5:	Apply templates and exception handling to build robust and reusable C++ programs.
Weightage: Continuous Assessment: 50%, End Semester Examinations: 50%	
Assessment Methodology: Activity (10%), Practical (10%), Internal Examinations (30%)	
TEXT BOOKS:	
1.	E. Balaguruswamy, "Object-oriented programming with C++", Eighth Edition, McGraw-Hill Osborne Media, 2021.
2.	D. Ravichandran, "Programming with C++", Third Edition, Tata McGraw Hill Education Private Limited, 2017.
3.	Reema Thareja, "Object Oriented Programming with C++", Second Edition, Oxford University Press, 2025.
REFERENCES:	
1.	Bjarne Stroustrup, "The C++ Programming Language", Fourth Edition, Pearson Education, 2022.
2.	Behrouz A. Forouzan, Richard F. Gilberg, "C++ Programming: An Object-Oriented Approach", First Edition, McGraw Hill, 2022.
3.	Bjarne Stroustrup, "C++ Programming Language", Fourth Edition, Pearson Education, 2022.
4.	Yashavant Kanetkar, "Let Us C++", BPB Publications, 2020.
5.	Bhave, Patekar, "Object oriented programming with C++", Second Edition, Pearson, 2024.
E-RESOURCES/E-MATERIALS:	
1.	Geeks for Geeks, Object Oriented Programming in C++ - https://www.geeksforgeeks.org/cpp/object-oriented-programming-in-cpp/
2.	Coursera, Object Oriented Programming with C++ - https://www.coursera.org/learn/c-plus-plus-object-oriented-programming
3.	Udemy, Object Oriented Programming in C++ - https://www.udemy.com/course/object-

	oriented-programming-in-cpp/

Mapping of Course Outcomes to Programme Outcomes and Programme Specific Outcomes

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

3 - High, 2 - Medium, 1 - Low

EN26C02	**PROFESSIONAL COMMUNICATION**	**L**	**T**	**P**	**TW/SL**	**Total**	**C**	**SDG**
		15	15	0	30	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 II	**Technical Writing**	3	3	0	6	12		4

Listening: Listening to Ted Talk **Speaking:** Extempore **Reading**: Case studies **Writing:** Instructions **Language Study:** Active and Passive Voice **Vocabulary:** Purpose statement **Self-study**: Case Study								
UNIT III	**English for Creativity**	3	3	0	6	12		8
Listening: Short Documentaries/Podcast **Speaking:** Narrating events **Reading**: Travelogues **Writing:** Checklist, Note making **Language Study:** Reported Speech **Vocabulary:** Error Spotting **Self-study**: Creating Portfolio (Short story/Poem)								
UNIT IV	**English for Employability**	3	3	0	6	12		8
Listening: Listening to Job interviews **Speaking:** Mock Interview **Reading**: Workplace Etiquette **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 V	**English for Technical Interaction**	3	3	0	6	12		8
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:								
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 accurately in professional communication.
Weightage: Continuous Assessment: 40%, End Semester Examinations: 60%	
Assessment Methodology: Activity (30%), Internal Examinations (70%)	
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, M. John, Gurak, J. Laura, "Technical Communication", Fifteenth Edition, Pearson, 2022.
5.	Mitra, K. Barun, "Personality Development and Soft Skills", Second Edition, Oxford University Press, 2020.
E-RESOURCES/E-MATERIALS:	
1.	British Council, Learn English - https://learnenglish.britishcouncil.org
2.	NPTEL, Technical Communication Courses - India - https://nptel.ac.in
3.	BBC Learning English - https://www.bbc.co.uk/learningenglish

Mapping of Course Outcomes to Programme Outcomes and Programme Specific Outcomes

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

3 - High, 2 - Medium, 1 - Low

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 I	நெசவு மற்றும் பானைத் தொழில்நுட்பம்	3	0	0	3	6		8,12

சங்க காலத்தில் நெசவுத் தொழில் - பானைத் தொழில்நுட்பம் - கருப்பு சிவப்பு பாண்டங்கள் - சுடுமண் சிற்பங்கள் - பாண்டங்களில் கீறல்

குறியீடுகள் - தொல்லியல் சான்றுகள்.
Activities:
1. பாட அடிப்படையிலான வினாடி வினா.

UNIT II	**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:
1. ஒவ்வொரு குழுவும் ஒரு கால கட்டிடத்தை விளக்குதல்.

UNIT III	**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:
1. நாணயங்கள் & மணிகள் அடையாளம் காணுதல்.

UNIT IV	**வேளாண்மை மற்றும் நீர்ப்பாசனத் தொழில் நுட்பம்**	3	0	0	3	6		2,6,14

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

1. Map Activity: கடல் வர்த்தக பாதை வரைதல்								
UNIT V	**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:** 1. Project: தமிழ் டிஜிட்டல் உலகம்.								
COURSE OUTCOMES:								
At the end of the course, the students will be able to:								
CO1:	சங்க கால நெசவு மற்றும் பானை தொழில்நுட்பத்தின் முக்கியத்துவத்தை விவரிக்க முடியும்.							
CO2:	சங்க காலத்தில் தமிழர்களின் கட்டிட வடிவமைப்புக்கான அறிவை விவரிக்க முடியும்.							
CO3:	பண்டைய தமிழர்களின் உற்பத்தித் தொழில்நுட்பத்தில் வலுவான அடிப்படை அறிவை வெளிப்படுத்த முடியும்.							
CO4:	தமிழர்களின் பண்டைய வேளாண்மை மற்றும் பாசனத் தொழில்நுட்பத்தின் முக்கியத்துவத்தை விவரிக்க முடியும்.							
CO5:	தமிழ் மொழியின் டிஜிட்டல்மயமாக்கல் (Digitalization) என்ற கருத்தை விளக்க முடியும்.							
Weightage: Continuous Assessment: %, End Semester Examinations: %								
Assessment Methodology: Activity (%), Practical (%), Internal Examinations (%)								
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.	Tamil Virtual Academy - https://www.tamilvu.org/
2.	Tamil Digital Library - 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 I	**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:** 1. Quiz: Based on artifacts and concepts								
UNIT II	**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:** 1. Each group presents a building from a particular historical period.								
UNIT III	**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:** 1. Identifying coins and beads.								
UNIT IV	**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:** 1. Map Activity: Drawing maritime trade routes.								
UNIT V	**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:** 1. 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.
Weightage: Continuous Assessment: 40%, End Semester Examinations: 60%	
Assessment Methodology: Activity (30%), Internal Assessment Test (70%)	
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.	Tamil Virtual Academy - https://www.tamilvu.org/
2.	Tamil Digital Library - https://tamildigitallibrary.in/

Mapping of Course Outcomes to Programme Outcomes and Programme Specific Outcomes

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

3 - High, 2 - Medium, 1 - Low

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 I	Creative Communication and	0	0	12	12	24		4,8

	Storytelling							
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 II	**Emotional Intelligence and Personal Development**	0	0	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 III	**Speed Arithmetics and Quantitative Apptitude – Part I**	0	0	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 IV	**Critical Thinking, Logical Reasoning and Debate**	0	0	12	12	24		4,8

Finding square roots quickly using Vedic math and approximation strategies, Cube root shortcut methods and cube pattern recognition, Fast cube calculation techniques and cube multiplication shortcuts, Fraction addition and subtraction shortcuts using LCM-based methods, Multi-step arithmetic shortcuts and nested calculation techniques, Logical simplification approaches for competitive aptitude problems, Advanced number manipulation tricks and rapid comparison techniques, Mental computation strategies for competitive examinations, Error checking techniques and divisibility validation methods, Quick verification methods for arithmetic accuracy, Advanced mental calculation techniques and rapid arithmetic simplifications, Speed math assessment preparation and timed practice strategies

Activities

1. Vedic Math and Advanced Arithmetic – Squares, Cubes, and Mental Computation

UNIT V	**Computational Thinking**	0	0	12	12	24		8,9

Understanding problems and solution approaches in engineering contexts, Steps in problem solving and basics of algorithms and flowcharts, Logical thinking exercises and real-world problem-solving activities, Number patterns, mathematical reasoning, and number-based puzzles, Visual reasoning concepts, grid-based thinking, and pathfinding activities, Pattern recognition and introductory graph and maze-solving exercises, Sequential thinking and writing simple pseudocode, Conditional statements, decision-making logic, and looping concepts, Introduction to no-code platforms – UI design basics and drag-and-drop app development, Creating simple workflows, publishing and testing basic apps, Resume building – structure, content, ATS optimization, and formatting, LinkedIn profile optimization – headline, summary, skills, and connections, Reporter technique – questioning, listening, and summarization skills, HR and technical interview simulation and career readiness frameworks

Activities

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

COURSE OUTCOMES:

At the end of the course, the students will be able to:	
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	CO1, CO5	10

	activities, reflective journaling and collaborative learning exercises.		
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, 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 Pa, J. S. Korlahalli, "Essentials of Business Communication", Sixteenth Edition, Sultan 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.

E-RESOURCES/E-MATERIALS:

1.	NPTEL, Soft Skills – Communication and Personality Development - https://nptel.ac.in/courses/109/104/109104183/
2.	Coursera, Effective Business Communication - https://www.coursera.org/learn/effective - business-communication
3.	GeeksforGeeks, Aptitude – Quantitative Aptitude Tutorials and Practice -

	https://www.geeksforgeeks.org/aptitude-questions-and-answers/

Mapping of Course Outcomes to Programme Outcomes and Programme Specific Outcomes

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

3 - High, 2 - Medium, 1 - Low