NANDHA COLLEGE OF TECHNOLOGY

(An Autonomous Institution Affiliated to Anna University Chennai)

Erode-52

www.nandhatech.org

REGULATIONS – 2026

CURRICULUM AND SYLLABUS

B.E - ELECTRICAL AND ELECTRONICS ENGINEERING

VISION

- To be a centre of excellence in the field of Electrical and Electronics Engineering with Global standards of Academic and Research for the need of Society and Industry.

MISSION

- To provide value based Electrical Engineering education and produce innovative, competent and high quality Electrical and Electronics Engineering professionals for the growing demand of society and Industry.
- To facilitate the students for the constant upgradation of technical expertise and perform research activities to solve the real-world problems.

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

PEO1: Achieve excellence in industrial careers or advanced studies in Electrical Engineering and related disciplines.

PEO2: Uphold ethical standards in professional practice and actively contribute to the growth and responsibilities of the profession.

PEO3: Embrace emerging technologies and continuously update knowledge to remain relevant in the field.

PROGRAM OUTCOMES (POs)

1. **Engineering Knowledge**: Apply math, science, and engineering fundamentals to complex problems.
2. **Problem Analysis**: Identify and analyze complex problems using research and sustainability principles.
3. **Design Solutions**: Design systems and processes considering health, safety, cost, culture, and environment.
4. **Investigations**: Use experiments, modelling, and data analysis to reach valid conclusions.
5. **Engineering Tools**: Apply modern tools for modelling and problem-solving, recognizing their limits.
6. **Society & Environment**: Assess societal, legal, and environmental impacts of engineering solutions.
7. **Ethics**: Commit to ethics, human values, diversity, and legal compliance.

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8. **Teamwork**: Work effectively as an individual and in multidisciplinary teams.
9. **Communication**: Communicate clearly in reports, presentations, and documentation across diverse groups.
10. **Management & Finance**: Apply management and economic principles in projects and teamwork.
11. **Lifelong Learning**: Engage in continuous learning, adapt to new technologies, and think critically.

PROGRAM SPECIFIC OUTCOMES (PSOs)

PSO1: Apply the fundamentals of electrical and electronics engineering to analyze, design, and develop systems in power, control, electronics, and energy applications.

PSO2: Utilize modern engineering tools and emerging technologies to solve complex electrical engineering problems and develop sustainable solutions.

PSO3: Demonstrate research aptitude, professional ethics, teamwork, and lifelong learning to adapt to advancements in electrical engineering.

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B.E - ELECTRICAL AND ELECTRONICS ENGINEERING

CURRICULUM AND SYLLABUS

SEMESTER–I

S No.	Course Code	Course Title	Category	Periods Per week				Contact Periods
				L	T	P	C	
Theory Courses								
1	26MAT102	Linear Algebra and Differential Calculus	BSC	3	1	0	4	**4**
2	26PHT101	Physics for Engineers	BSC	3	0	0	3	**3**
3	26CCT101	Climate Change and Environmental Sustainability	ESC	2	0	0	2	**2**
4	26CST101	Programming in C	ESC	3	0	0	3	**3**
5	26TAT101	Heritage of Tamils – தமிழர் மரபு	HSMC	1	0	0	1	**1**
Integrated Courses								
6	26ENI101	Foundational English	HSMC	2	0	2	3	**4**
7	26GEI101	Engineering Graphics	ESC	3	0	2	4	**5**
Practical Courses								
8	26CSL101	Programming in C Laboratory	ESC	0	0	4	2	**4**
9	26GEL101	Basic Engineering Laboratory	ESC	0	0	4	2	**4**
Employability Enhancement Course								
10	26SDC101	Career Skills Development-I	EEC	1	0	0	1	**1**
			TOTAL	**18**	**1**	**12**	**25**	**31**

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SEMESTER–II

S No.	Course Code	Course Title	Category	Periods Per week				Contact Periods
				L	T	P	C	
Theory Courses								
1	26MAT203	Transforms and Complex Functions	BSC	3	1	0	4	4
2	26PHT202	Material Science	BSC	3	0	0	3	3
3	26CST201	Object Oriented Programming	ESC	3	0	0	3	3
4	26CHT101	Chemistry for Engineers	BSC	3	0	0	3	3
5	26TAT201	Tamils & Technology– தமிழரும் தொழில்நுட்பமும்	HSMC	1	0	0	1	1
Integrated Course								
6	26ENI201	Professional English	HSMC	2	0	2	3	4
7	26EEI201	Electric Circuit Analysis	PCC	3	0	2	4	5
Practical Course								
8	26CSL201	Object Oriented Programming Laboratory	ESC	0	0	4	2	4
9	26PCL101	Physics and Chemistry Laboratory	BSC	0	0	4	2	4
Employability Enhancement Course								
10	26SDC201	Career Skills Development-II	EEC	1	0	0	1	1
			TOTAL	**19**	**1**	**12**	**26**	**32**

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SEMESTER–III

S No.	Course Code	Course Title	Category	Periods Per week				Contact Periods
				L	T	P	C	
Theory Courses								
1	26MAT301	Probability and Statistics	BSC	3	1	0	4	4
2	26CST301	Data Structures	ESC	3	0	0	3	3
3	26EET301	Electromagnetic Theory	PCC	3	0	0	3	3
4	26EET302	Digital Electronics	PCC	3	0	0	3	3
5	26EET303	DC Machines and Transformers	PCC	3	0	0	3	3
Integrated Course								
6	26EEI301	Electronic Devices and Circuits	PCC	3	0	2	4	5
Practical Courses								
7	26CSL305	Data Structures Laboratory	PCC	0	0	4	2	4
8	26EEL301	DC Machines and Transformers Laboratory	ESC	0	0	4	2	4
Employability Enhancement Course								
9	26SDC301	Career Skills Development-III	EEC	1	0	0	1	1
			TOTAL	**19**	**1**	**10**	**25**	**30**

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SEMESTER–IV

S No.	Course Code	Course Title	Category	Periods Per week				Contact Periods
				L	T	P	C	
Theory Courses								
1	26EET401	Generation, Transmission & Distribution	PCC	3	0	0	3	**3**
2	26EET402	Power System Analysis	PCC	3	0	0	3	**3**
3	26EET403	Measurements and Instrumentation	PCC	3	0	0	3	**3**
4	26EET404	Control Systems	PCC	3	0	0	3	**3**
5	26EET405	AC Machines	PCC	3	0	0	3	**3**
Integrated Course								
6	26EEI401	Linear Integrated Circuits	PCC	3	0	2	4	**5**
Practical Course								
7	26EEL401	AC Machines Laboratory	PCC	0	0	4	2	**4**
8	26EEL402	Control and Instrumentation Laboratory	PCC	0	0	4	2	**4**
Employability Enhancement Course								
9	26SDC401	Career Skills Development-IV	EEC	1	0	0	1	**1**
			TOTAL	**19**	**0**	**10**	**24**	**29**

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SEMESTER–V

S No.	Course Code	Course Title	Category	Periods Per week				Contact Periods
				L	T	P	C	
Theory Courses								
1	26EET501	Power System Protection and Switch Gear	PCC	3	0	0	3	3
2	26EET502	Microprocessor and Microcontroller	PCC	3	0	0	3	3
3	26EET503	Power Electronics	PCC	3	0	0	3	3
4		Professional Elective I	PEC	3	0	0	3	3
5		Professional Elective II	PEC	3	0	0	3	3
6		Open Elective - I	OE	3	0	0	3	3
Practical Courses								
7	26EEL501	Power Electronics Laboratory	PCC	0	0	4	2	4
8	26EEL502	Microprocessors and Microcontroller Laboratory	PCC	0	0	4	2	4
Mandatory Course								
9	26MDC501	Design Thinking	MAN	2	0	0	0	2
			TOTAL	**20**	**0**	**8**	**22**	**28**

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SEMESTER–VI

S No.	Course Code	Course Title	Category	Periods Per week				Contact Periods
				L	T	P	C	
Theory Courses								
1	26HST601	Technology Management and Commercialization	HSMC	3	0	0	3	**3**
2	26EET601	Power System Operation and Control	PCC	3	0	0	3	**3**
3		Professional Elective III	PEC	3	0	0	3	**3**
4		Professional Elective IV	PEC	3	0	0	3	**3**
5		Open Elective II	OE	3	0	0	3	**3**
Practical Courses								
6	26EEL601	Power System Laboratory	PCC	0	0	4	2	**4**
7	26EEP601	Mini Project	EEC	0	0	4	2	**4**
Mandatory Course								
8	26MDC601	Professional Development Activities	MAN	2	0	0	0	**2**
			TOTAL	**17**	**0**	**8**	**19**	**25**

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SEMESTER–VII

S No.	Course Code	Course Title	Category	Periods Per week				Contact Periods
				L	T	P	C	
Theory Courses								
1	26HST701	Universal Human Values	HSMC	3	0	0	3	3
2	26EET701	High Voltage Engineering	PCC	3	0	0	3	3
3		Professional Elective V	PEC	3	0	0	3	3
4		Open Elective III	OE	3	0	0	3	3
Practical Course								
5	26EEP701	Project Phase I / Industry Project	EEC	0	0	6	3	6
			TOTAL	**12**	**0**	**6**	**15**	**18**

SEMESTER–VIII

S No.	Course Code	Course Title	Category	Periods Per week				Contact Periods
				L	T	P	C	
Practical Course								
1	26EEP801	Project Phase II / Industry Project	EEC	0	0	20	10	20
			TOTAL	**0**	**0**	**20**	**10**	**20**

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BREAKUP OF CREDITS:

S.No.	Category	Breakup of Credits (AICTE)	NCT
1	Humanities & Social Science Courses-HSMC	12	**14**
2	Basic Science Courses -BSC	32	**23**
3	Engineering Science Courses - ESC	29	**23**
4	Program Core Courses (Branch specific) -PCC	64	**63**
5	Professional Elective Courses (Branch specific)-PEC	15	**15**
6	Open Elective Courses (Cross Discipline Subjects)-OEC	09	**9**
7	Project work, Seminar and Internship in Industry or elsewhere-EEC	15	**19**
8	Audit Courses [Environmental Sciences, Indian Constitution]	0	-
Total		**176**	**166**

Breakup of Credits Semester Wise:

S.No.	Category	I	II	III	IV	V	VI	VII	VIII	Total
1	HSMC	4	4	-	-	-	3	3	-	**14**
2	BSC	7	12	4	-	-	-	-	-	**23**
3	ESC	13	5	5	-	-	-	-	-	**23**
4	PCC	-	4	15	23	13	5	3	-	**63**
5	PEC	-	-	-	-	6	6	3	-	**15**
6	OEC	-	-	-	-	3	3	3	-	**9**
7	EEC	1	1	1	1	-	2	3	10	**19**
8	Audit Courses	-	-	-	-	-	-	-	-	-
Total		**25**	**26**	**25**	**24**	**22**	**19**	**15**	**10**	**166**

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PROFESSIONAL ELECTIVE COURSES: VERTICALS

VERTICAL I	VERTICAL II	VERTICAL III	VERTICAL IV	VERTICAL V
POWER ENGINEERING	**POWER ELECTRONIC CONVERTERS AND DRIVES**	**EMBEDDED SYSTEMS**	**ELECTRIC VEHICLE TECHNOLOGY**	**DIVERSIFIED COURSES**
Utilization and Conservation of Electrical Energy	Special Electrical Machines	Embedded System and IoT	Electric Vehicle Architecture	Energy Storage Systems
Substation Engineering and Automation	Analysis of Electrical Machines	Embedded System Design	Design of Motor and Power Converters for Electric Vehicles	Hybrid Energy Technology
HVDC and FACTS	Modern Power Converters	Embedded Processors	Design of Electric Vehicle Charging System	Design and Modelling of Renewable Energy Systems
Power System Transients	Electrical Drives and Control	Embedded Control for Electric Drives	Electric Vehicle Design, Mechanics and Control	Grid Integrating Techniques and Challenges
Grid Integration Techniques	SMPS and UPS	Smart System Automation	Battery Management Systems	Sustainable and Environmental Friendly HV Insulation System
Smart Grids	Power Electronics for Renewable Energy Systems	Embedded System for Automotive Applications	EV Charging Infrastructure	Energy Management and Auditing
Condition Monitoring and Testing of Electrical Equipment	Control of Power Electronics Circuits	MEMS and NEMS	Safety and Testing of Electric Vehicles	PLC Programming
Restructured Power Market	Power Quality	Embedded Communication Protocols	Hybrid Electric Vehicles	Power Plant Engineering

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PROFESSIONAL ELECTIVE COURSES VERTICAL I – POWER ENGINEERING								
S. No.	Course Code	Course Title	Category	Hours/Week				Credits
				L	T	P	Total Hours	
Theory								
1	26EEE501	Utilization and Conservation of Electrical Energy	PEC	3	0	0	3	3
2	26EEE502	Substation Engineering and Automation	PEC	3	0	0	3	3
3	26EEE503	HVDC and FACTS	PEC	3	0	0	3	3
4	26EEE504	Power System Transients	PEC	3	0	0	3	3
5	26EEE505	Grid Integration Techniques	PEC	3	0	0	3	3
6	26EEE506	Smart Grids	PEC	3	0	0	3	3
7	26EEE507	Condition Monitoring and Testing of Electrical Equipment	PEC	3	0	0	3	3
8	26EEE508	Restructured Power Market	PEC	3	0	0	3	3

VERTICAL II – POWER ELECTRONIC CONVERTERS AND DRIVES								
S. No.	Course Code	Course Title	Category	Hours/Week				Credits
				L	T	P	Total Hours	
Theory								
1	26EEE509	Special Electrical Machines	PEC	3	0	0	3	3
2	26EEE510	Analysis of Electrical Machines	PEC	3	0	0	3	3
3	26EEE511	Modern Power Converters	PEC	3	0	0	3	3
4	26EEE512	Electrical Drives and Control	PEC	3	0	0	3	3
5	26EEE513	SMPS and UPS	PEC	3	0	0	3	3
6	26EEE514	Power Electronics for Renewable Energy Systems	PEC	3	0	0	3	3
7	26EEE515	Control of Power Electronics Circuits	PEC	3	0	0	3	3
8	26EEE516	Power Quality	PEC	3	0	0	3	3

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VERTICAL III – EMBEDDED SYSTEMS								
S. No.	Course Code	Course Title	Category	Hours/Week				Credits
				L	T	P	Total Hours	
Theory								
1	26EEE601	Embedded System and IoT	PEC	3	0	0	3	3
2	26EEE602	Embedded System Design	PEC	3	0	0	3	3
3	26EEE603	Embedded Processors	PEC	3	0	0	3	3
4	26EEE604	Embedded Control for Electric Drives	PEC	3	0	0	3	3
5	26EEE605	Smart System Automation	PEC	3	0	0	3	3
6	26EEE606	Embedded System for Automotive Applications	PEC	3	0	0	3	3
7	26EEE607	MEMS and NEMS	PEC	3	0	0	3	3
8	26EEE608	Embedded Communication Protocols	PEC	3	0	0	3	3

VERTICAL IV – ELECTRIC VEHICLE TECHNOLOGY								
S. No.	Course Code	Course Title	Category	Hours/Week				Credits
				L	T	P	Total Hours	
Theory								
1	26EEE609	Electric Vehicle Architecture	PEC	3	0	0	3	3
2	26EEE610	Design of Motor and Power Converters for Electric Vehicles	PEC	3	0	0	3	3
3	26EEE611	Electric Vehicle Design, Mechanics and Control	PEC	3	0	0	3	3
4	26EEE612	Design of Electric Vehicle Charging System	PEC	3	0	0	3	3
5	26EEE613	Battery Management Systems	PEC	3	0	0	3	3
6	26EEE614	EV Charging Infrastructure	PEC	3	0	0	3	3
7	26EEE615	Safety and Testing of Electric Vehicles	PEC	3	0	0	3	3
8	26EEE616	Hybrid Electric Vehicles	PEC	3	0	0	3	3

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VERTICAL V – DIVERSIFIED COURSES								
S. No.	Course Code	Course Title	Category	Hours/Week				Credits
				L	T	P	Total Hours	
Theory								
1	26EEE701	Energy Storage Systems	PEC	3	0	0	3	3
2	26EEE702	Hybrid Energy Technology	PEC	3	0	0	3	3
3	26EEE703	Design and Modelling of Renewable Energy Systems	PEC	3	0	0	3	3
4	26EEE704	Grid Integrating Techniques and Challenges	PEC	3	0	0	3	3
5	26EEE705	Sustainable and Environmental Friendly HV Insulation System	PEC	3	0	0	3	3
6	26EEE706	Energy Management and Auditing	PEC	3	0	0	3	3
7	26EEE707	PLC Programming	PEC	3	0	0	3	3
8	26EEE708	Power Plant Engineering	PEC	3	0	0	3	3

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OPEN ELECTIVE I								
S. No.	Course Code	Course Title	Category	Hours/Week				Credits
				L	T	P	Total Hours	
1	26MEO001	Green Energy Systems	OEC	3	0	0	3	3
2	26MEO002	Industrial Management	OEC	3	0	0	3	3
3	26ITO003	IT in Agricultural System	OEC	3	0	0	3	3
4	26ADO004	UI/UX Design	OEC	3	0	0	3	3
5	26ECO005	Principles of Modern Communication Systems	OEC	3	0	0	3	3
6	26ECO006	Electronics in Medicine	OEC	3	0	0	3	3

OPEN ELECTIVE II								
S. No.	Course Code	Course Title	Category	Hours/Week				Credits
				L	T	P	Total Hours	
1	26MEO007	Industrial Safety	OEC	3	0	0	3	3
2	26MEO008	Environmental and Social Impact Assessment	OEC	3	0	0	3	3
3	26CSO009	Information Security	OEC	3	0	0	3	3
4	26CSO010	Cloud Essentials	OEC	3	0	0	3	3
5	26ECO011	Medical Image Analysis	OEC	3	0	0	3	3
6	26ECO012	WearableDevices	OEC	3	0	0	3	3

OPEN ELECTIVE III								
S. No.	Course Code	Course Title	Category	Hours/Week				Credits
				L	T	P	Total Hours	
1	26MEO013	Air pollution and Control Engineering	OEC	3	0	0	3	3
2	26MEO014	Mechatronics	OEC	3	0	0	3	3
3	26ADO015	Big Data Analytics	OEC	3	0	0	3	3
4	26ADO016	Cloud Computing	OEC	3	0	0	3	3
5	26ECO017	Sensors and Transducers	OEC	3	0	0	3	3
6	26ECO018	Principles of Telemedicine	OEC	3	0	0	3	3

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SEMESTER I

26MAT102 – LINEAR ALGEBRA AND DIFFERENTIAL CALCULUS	L	T	P	C
	3	1	0	4

Course Objective:	• To impart foundational knowledge in linear algebra is essential for analyzing and solving problems in engineering applications. • To provide knowledge of inner product spaces, norms, and orthogonalization techniques and transform techniques.

Course Outcomes: The student will be able to		**Cognitive Level**
CO1	Analyze vector spaces, subspaces, linear dependence, basis, and dimension to solve algebraic problems.	**An**
CO2	Apply linear transformations, matrix representations, and eigen concepts to determine diagonalizability.	**Ap**
CO3	Apply inner product concepts, norms, and Gram–Schmidt process to construct orthogonal vectors in $\mathbb{R}^3$.	**Ap**
CO4	Analyze multivariable functions using partial derivatives, Jacobians, and optimization techniques.	**An**
CO5	Apply Laplace transforms and inverse methods to solve differential equations and engineering problems.	**Ap**

UNIT I – VECTOR SPACES	**9+3**
Introduction to Vector Spaces, Examples, Subspaces, Linear Combinations, Span, Generating Sets, Linear Dependence and Independence, Basis and Dimension, Dimension of Subspaces.	
UNIT II – LINEAR TRANSFORMATION AND DIAGONALIZATION	**9+3**
Null space, Range, Dimension Theorem (statement only), Matrix representation of a linear transformation, Eigenvalues & Eigenvectors, Diagonalizability.	
UNIT III – INNER PRODUCT SPACE	**9+3**
Inner product, Norms, Cauchy, Schwarz inequality, Gram, Schmidt orthogonalization, Simple problems (up to $R3$).	
UNIT IV – FUNCTIONS OF SEVERAL VARIABLES	**9+3**
Partial derivatives-Euler's theorem on homogeneous function-Jacobian-Maxima and Minima of functions of Two Variables-Constrained Maxima and Minima by Lagrange's multiplier method.	
UNIT V – LAPLACE TRANSFORM	**9+3**
Existence conditions, Properties of Laplace transform, Laplace transform of standard functions, Laplace transform of periodic functions; Inverse Laplace transform: Partial fraction technique, Convolution theorem. Solution of second order ordinary differential equations using Laplace transforms.	
	TOTAL PERIODS : 60

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TEXTBOOKS:

1. Friedberg, S.H.,Insel,A.J., & Spence,L.E. Linear Algebra, Pearson, 5th Edition , 2022
2. Grewal, B.S. Higher Engineering Mathematics, 44th edition, Khanna Publications,2022

REFERENCE BOOKS:

1. Kreyszig, G.E., Advanced Engineering Mathematics. 9th Edition, John Wiley & Sons Ltd.,2018.
2. Strang, G., Linear Algebra and Its Applications, Brooks/Cole Publishing Company, 4th Edition, 2007.
3. Anton, H., &Rorres, C., Elementary Linear Algebra: Applications Version, Wiley India Pvt. Ltd., 11th Edition, 2014.
4. Kolman, B., & Hill, D.R., Elementary Linear Algebra with Applications, 9th Edition, Pearson Education, New Delhi, 2015.

COs	POs											PSOs		
	1	2	3	4	5	6	7	8	9	10	11	1	2	3
1	3	2	1	1	2	-	-	-	-	-	-	3	-	-
2	3	3	3	2	3	-	-	-	-	-	-	3	2	-
3	3	2	1	2	2	-	-	-	-	-	-	3	-	-
4	3	3	3	3	2	-	-	-	-	-	-	2	2	-
5	3	3	2	3	2	-	-	-	-	-	3	3	3	2
CO (W.A)	**3.0**	**2.6**	**2.0**	**2.2**	**2.2**	-	-	-	-	-	**3.0**	**2.8**	**2.3**	**2.0**

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26PHT101 - PHYSICS FOR ENGINEERS	L	T	P	C
	3	0	0	3

Course Objective	• To impart knowledge and expose the essentials of physics in various engineering applications

Course Outcomes: The Student will be able to		Cognitive Level
CO1	Analyze the fundamental properties of matter and their engineering significance.	An
CO2	Explain the basic concepts of laser and fiber optics and their applications.	U
CO3	Analyze the different structures, defects and growth of crystalline materials.	An
CO4	Describe the principle and propagation of ultrasonic waves and electromagnetic waves.	U
CO5	Apply the concepts of quantum mechanics to explain the behavior of microscopic particles to engineering applications.	U

UNIT I – PROPERTIES OF MATTER	9
Elasticity: Stress- strain diagram and its uses - factors affecting elastic modulus and tensile strength Young's modulus - non-uniform bending - twisting couple - torsion pendulum. Girders: Bridges and buildings. Viscosity: Stokes method, Surface tension: drop weight method, Thermal expansion, Thermal stress, Bimetallic strips, Expansion joints.	
UNIT II –APPLIED OPTICS	**9**
Fiber optics: Structure of a fiber, Numerical aperture and acceptance angle. Applications- Fiber optic communication system, Fiber optic sensors - displacement, pressure and temperature sensor. Lasers: Interaction of light with matter - Einstein coefficients - conditions for Laser action - Types of laser- Nd:YAG laser, CO_2 laser –applications.	
UNIT III – CRYSTAL PHYSICS	**9**
Crystalline and amorphous materials – unit cell – primitive cell, ccrystal systems- Bravais lattices – Miller indices – interplanar distance for a cubic structure, Packing factor for SC, BCC, FCC and HCP structures. Crystal imperfections: point and line defects – Burger vector. Growth of single crystals: melt growth techniques - Czochralski method.	
UNIT IV – WAVES	**9**
Waves: Waves on a stretched string - Energy and Power - standing waves. Ultrasonic: piezo-electric method, Acoustic grating - determination of velocity of ultrasonic waves in a liquid. Electromagnetic waves: Maxwell equations, Production of EM waves by dipole antenna, Propagation of EM waves in free space, wave equation, Cell phone reception.	
UNIT V – QUANTUM PHYSICS	**9**
Black body radiation, Photoelectric effect, wave particle duality – electron diffraction – concept of wave function and its physical significance – Schrödinger's wave equation – time independent and time dependent equations, Particle in a one-dimensional box - Barrier penetration and quantum tunneling - scanning tunneling microscope.	
TOTAL PERIODS	**45**

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TEXT BOOK:

1. Avadhanulu M.N., Kshirsagar P.G. and Arun Murthy T.V.S., "A Textbook of Engineering Physics",
2. 12th Edition, S. Chand & Company Pvt. Ltd., New Delhi, 2020.

REFERENCES:

1. Young, H. D., & Freedman, R. A. (2020). University physics with modern physics. Pearson.
2. Gaur, R. K., & Gupta, S. L. (2022). Engineering physics. Dhanpat Rai Publications.
3. Mathur, D. S. (2010). Elements of properties of matter. S. Chand Publishing.
4. Griffiths, D. J. (2018). Introduction to quantum mechanics. Cambridge University Press.

Mapping of COs with POs / PSOs

COs	POs											PSOs		
	1	2	3	4	5	6	7	8	9	10	11	1	2	3
1	3	1	-	-	-	-	-	1	-	-	1	-	-	-
2	3	1	-	-	2	-	-	1	-	-	1	-	-	-
3	3	1	-	-	-	-	-	1	-	-	1	-	-	-
4	3	1	-	-	-	-	-	1	-	-	1	-	-	-
5	3	1	-	-	-	-	-	1	-	-	1	-	-	-
CO (W.A)	3.0	1.0	-	-	2.0	-	-	1.0	-	-	1.0	-	-	-

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26CCT101– CLIMATE CHANGE AND ENVIRONMENTAL SUSTAINABILITY	L	T	P	C
	2	0	0	2

Course Objective	To provide knowledge on climate change, its causes and impacts, and to develop an understanding of sustainability principles and practices for environmental protection.

Course Outcomes: The Student will be able to		**Cognitive Level**
CO1	Elaborate on the features of ecosystem and biodiversity to find the need for conservation.	**U**
CO2	Analyze the existing environmental challenges related to pollution and its management	**An**
CO3	Explain and analyze renewable and non-renewable energy resources and their role in sustainable energy development.	**Ap**
CO4	Describe key social issues, environmental challenges, and related protection measures and legislation.	**U**
CO5	Apply the knowledge of sustainability practices in the environment.	**Ap**

UNIT I – INTRODUCTION TO ENVIRONMENT	**6**
Environment - Definition, scope and importance. Types and composition of atmospheres – particles, ions and radicals. Ozone layer- significance, formation and depletion. Ecosystems- Structure and functions, components, energy flow, food chains, food web, Biodiversity-levels, values and threats - India as a mega-diversity nation - hotspots of biodiversity - endangered and endemic species of India – conservation of biodiversity.	
UNIT II – ENVIRONMENTAL POLLUTION	**6**
Definition -Sources, causes, impacts and control measures of (a) Air pollution - global warming, acid rain, ozone layer depletion (b) Water pollution (c) Soil pollution (d) Noise pollution -Solid, hazardous and E waste management- Environmental protection act.	
UNIT III - ENERGY RESOURCES	**6**
Introduction -National and International status -Energy resources: Growing energy needs, non-renewable energy sources (coal and petroleum) and renewable energy sources- solar energy - introduction, harnessing strategies. Wind energy - availability, wind power plants, wind energy conversion systems – ocean thermal energy- tidal energy- geothermal energy.	
UNIT IV – SOCIAL ISSUES AND SUSTAINABILITY	**6**
Urban problems related to energy – water conservation, rainwater harvesting – resettlement and rehabilitation of people; its problems and concerns, case studies –environmental ethics. - Sustainability and Management: Introduction - concept, needs and challenges –economic and social aspects of sustainability –millennium development goals and protocols – Sustainable Development Goals-targets, indicators and intervention areas. Environmental management in industry – A case study.	

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UNIT V – SUSTAINABILITY PRACTICES IN THE ENVIRONMENT	6
Zero waste and R concept –Circular economy – ISO 14000 Series – Material Life cycle assessment. Climate change-case study. Concept of Carbon Credit – Carbon Footprint –Environmental Impact Assessment. Sustainable habitat: Green buildings, green materials, Energy efficiency, Sustainable transport. Green Engineering: Sustainable urbanization.	
TOTAL PERIODS	**30**

TEXT BOOK:

1. Benny Joseph, 'Environmental Science and Engineering', Tata McGraw-Hill, New Delhi, 2006.
2. Gilbert M.Masters, 'Introduction to Environmental Engineering and Science', 3rd edition, Pearson Education, 2023/2024.

REFERENCES:

1. Raven, P.H., Hassenzahl, D.M. & Berg, L.R., *Environment*, 8th edition, John Wiley & Sons, 2012.
2. Dharmendra S. Sengar, *Environmental Law*, PHI Learning Pvt. Ltd., New Delhi, latest reprint edition. KoteswaraRao MVR, "Energy Resources: Conventional & Non-Conventional", BSP Publications, 2nd edition, New Delhi, latest reprint.

Mapping of COs with POs / PSOs

COs	POs											PSOs		
	1	2	3	4	5	6	7	8	9	10	11	1	2	3
1	2	-	-	-	-	2	2	-	-	-	1	-	-	-
2	2	3	-	-	-	2	3	-	-	-	1	-	-	-
3	2	2	-	-	-	2	3	-	-	-	1	-	-	-
4	2	2	-	-	-	3	2	1	-	-	1	-	-	-
5	2	2	-	-	-	3	3	1	-	-	2	-	-	-
CO (W.A)	2.0	2.3	-	-	-	2.4	2.6	1.0	-	-	1.2	-	-	-

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26CST101 - PROGRAMMING IN C	L	T	P	C
	3	0	0	3

Course Objective	• To introduce the basics of C programming, problem solving techniques, control structures, arrays, and functions and to develop logical thinking and the ability to write structured programs. • To explore pointers, user-defined data types, file handling, and real-time applications, and to apply C programming concepts to solve practical and computational problems

Course Outcomes: The Student will be able to		**Cognitive Level**
CO1	Apply C fundamentals and problem solving techniques for Computational Problems.	**Ap**
CO2	Apply control structures, arrays, and algorithms to solve real-world problems.	**Ap**
CO3	Design modular programs using functions and implement searching and sorting techniques.	**Ap**
CO4	Inscribe programs using pointers and to allocate memory for user defined data types using dynamic memory management functions	**An**
CO5	Develop file-based applications and apply C programming in real-time and competitive scenarios.	**C**

UNIT I – PROBLEM SOLVING AND PROGRAMMING BASICS	**9**
Problem solving techniques – Algorithm design – Flowcharts and pseudocode – Program structure – Compilation and execution – Data types – Variables – Constants – Operators – Input/output – Debugging basics – Introduction to computational thinking – Basic aptitude-based problem solving.	
UNIT II - CONTROL STRUCTURES	**9**
Problem solving using control structures – Conditional statements – Looping constructs – Nested loops – Arrays: One-dimensional and Multi-dimensional Arrays– Array operations – Basic algorithmic problems – Introduction to time complexity – Case Study.	
UNIT III – FUNCTIONS	**9**
Functions – Parameter passing – Recursion – Modular programming – Searching: Linear Search – Binary Search. Sorting: Bubble Sort – Selection Sort. Code optimization basics – Introduction to reusable code and libraries.	
UNIT IV - POINTERS	**9**
Pointers – Pointer arithmetic – Arrays and pointers – Dynamic memory allocation – Structures, unions, enumerations – Implementation of real-time applications – Introduction to memory management concepts.	
UNIT V - FILE HANDLING OPERATIONS	**9**
File operations – Text and binary files – Error handling – File-based applications – Introduction to data persistence – Basics of command line arguments – Introduction to version control concepts.	
TOTAL PERIODS	**45**

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TEXT BOOK:

1. Brian W. Kernighan and Dennis M. Ritchie, "The C Programming Language (ANSI C)", Pearson Education, 2nd Edition, 2015.
2. Stephen G. Kochan, "Programming in C", Pearson Education,8th Edition, 2020.

REFERENCES:

1. K. N. King, "C Programming: A Modern Approach", W. W. Norton & Company, 2nd Edition, 2020.
2. Yashavant Kanetkar, "Let Us C", BPB Publications, 17th Edition, 2023.

Mapping of COs with POs / PSOs

COs	POs											PSOs		
	1	2	3	4	5	6	7	8	9	10	11	1	2	3
1	3	2	1	1	1	-	-	-	-	-	1	2	1	1
2	3	3	2	1	2	-	-	-	-	-	1	3	1	1
3	3	2	3	2	2	-	-	1	-	-	2	3	1	1
4	3	2	2	2	3	-	-	-	-	-	2	3	2	2
5	3	2	2	2	3	1	1	-	1	2	2	3	2	3
CO (W.A)	**3.0**	**2.2**	**2.0**	**1.6**	**2.2**	**1.0**	**1.0**	**1.0**	**1.0**	**2.0**	**1.6**	**2.8**	**1.4**	**1.6**

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26TAT101- HERITAGE OF TAMILS	L	T	P	C
	1	0	0	1

Course Objective:	To provide an overview of Tamil language, classical and modern literature, cultural heritage, folk and martial arts, the Thinai concept, and the contributions of Tamils to Indian culture and the freedom movement.

Course Outcomes		Cognitive Level
CO1	To explain the Indian language families, the emergence of religions in Tamil Nadu, and the moral concepts reflected in Sangam literature.	R
CO2	To understand the evolutionary development of Tamil sculpture from rock paintings to modern sculptural art.	U
CO3	To compile and present information about folk arts in Tamil culture.	R
CO4	To describe the Tinai (ecological) concepts and trade practices in the lifestyle of Tamil people.	R
CO5	To create awareness about the contributions of Tamils to the Indian freedom struggle.	U

UNIT I - LANGUAGE AND LITERATURE	3
Language Families in India – Dravidian Languages – Tamil as a Classical Language -Classical Literature in Tamil – Secular Nature of Sangam Literature – Distributive Justice in Sangam Literature - Management Principles in Thirukkural - Tamil Epics and the Impact of Buddhism & Jainism in Tamil Land - Bhakti Literature – Azhwars and Nayanmars - Forms of Minor Poetry - Development of Modern Literature in Tamil - Contribution of Bharathiyar and Bharathidasan.	
UNIT II - HERITAGE – ROCK ART PAINTINGS TO MODERN ART – SCULPTURE	**3**
Hero Stones to Modern Sculpture - Bronze Icons - Tribes and their Handicrafts - Art of Temple Car Making - Massive Terracotta Sculptures, Village Deities, Thiruvalluvar Statue at Kanyakumari - Making of Musical Instruments – Mridangam, Parai, Veena, Yazh, and Nadaswaram - Role of Temples in Social and Economic Life of Tamils.	
UNIT III - FOLK AND MARTIAL ARTS	**3**
Therukoothu, Karagattam, Villi Paattu, Kaniyan Koothu, Oyillattam - Leather Puppetry - Silambattam, Valari, Tiger Dance - Sports and Games of Tamils.	
UNIT IV - THINAI CONCEPT OF TAMILS	**3**
Flora and Fauna of Tamils - Akam and Puram Concept from Tholkappiyam and Sangam Literature - Aram Concept of Tamils - Education and Literacy during the Sangam Age - Ancient Cities and Ports of Sangam Age - Export and Import during Sangam Age - Overseas Conquest of the Cholas.	
UNIT V - CONTRIBUTION OF TAMILS TO INDIAN NATIONAL MOVEMENT AND INDIAN CULTURE	**3**
Contribution of Tamils to Indian Freedom Struggle - The Cultural Influence of Tamils over the Other Parts of India - Self-Respect Movement - Role of Siddha Medicine in Indigenous Systems of Medicine - Inscriptions and Manuscripts - Print History of Tamil Books.	
TOTAL PERIODS	**15**

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TEXT – CUM- REFERENCE BOOKS

1. **தமிழக வரலாறு - மக்களும் பண்பாடும்** - கே.கே.பிள்ளை (வெளியீடு தமிழ்நாடு பாடநூல் மற்றும் கல்வியியல் பணிகள் கழகம்)
2. **கணினித்தமிழ்** - முனைவர் இல.சுந்தரம் (விகடன் பிரசுரம்)
3. **கீழடி** - வைகை நதிக்கரையில் சங்க கால நகர நாகரிகம் (தொல்லியல் துறை வெளியீடு)
4. **பொருநை** - ஆற்றங்கரை நாகரிகம் (தொல்லியல் துறை வெளியீடு)
5. **Social Life of Tamils** – Dr. K.K. Pillay (A joint publication of TNTB & ESC and RMRL – In print)
6. **Social Life of the Tamils** – The Classical Period – Dr. S. Singaravelu (Published by: International Institute of Tamil Studies)
7. **Historical Heritage of the Tamils** – Dr. S.V. Subramanian, Dr. K.D. Thirunavukkarasu (Published by: International Institute of Tamil Studies)
8. **The Contributions of the Tamils to Indian Culture** – Dr. M. Vannanthi (Published by: International Institute of Tamil Studies)
9. **Keeladi – Sangam City Civilization on the Banks of River Vaigai** (Jointly published by: Department of Archaeology & Tamil Nadu Textbook and Educational Services Corporation, Tamil Nadu)
10. **Studies in the History of India with Special Reference to Tamil Nadu** – Dr. K.K. Pillay (Published by: The Author)
11. **Porunai Civilization** (Jointly published by: Department of Archaeology & Tamil Nadu Textbook and Educational Services Corporation, Tamil Nadu)
12. **Journey of Civilization: Indus to Vaigai** – R. Balakrishnan (Published by: RMRL)

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26TAT101 – தமிழர் மரபு	L	T	P	C
	1	0	0	1

Course Objective:	சங்க இலக்கியத்தில் தமிழ் - மொழிக்குடும்பங்கள் - தமிழர்களின் பண்பாடு, கலை, பக்தி - அகம் மற்றும் புறத்திணைக் கோட்பாடுகள் - சுதந்திரப் போரில் தமிழர்களின் பங்கு ஆகியவற்றினை எடுத்துரைப்பது இப்பாடத்தின் நோக்கம் ஆகும்.

Course Outcomes		**Cognitive Level**
CO1	இந்திய மொழிக் குடும்பங்கள், தமிழகத்தில் தோன்றிய சமயங்கள் மற்றும் சங்க இலக்கியத்தின் அறக்கருத்துக்களை விளக்குதல்.	**R**
CO2	தமிழர் பாரம்பரியத்தில் பாறை ஓவியங்கள் முதல் நவீன சிற்பக்கலை வரை உள்ள பரிணாம வளர்ச்சியினைப் பற்றி அறிதல்.	**U**
CO3	தமிழர் கலாச்சாரத்தில் நாட்டுப்புறக் கலைகள் பற்றிய தகவல்களைத் தொகுத்துரைத்தல்.	**R**
CO4	தமிழ் மக்களின் வாழ்க்கை முறையில் தினைக் கோட்பாடுகள் மற்றும் வாணிபங்களைப் பற்றி விவரித்தல்.	**R**
CO5	இந்திய விடுதலைப் போராட்டத்தில் தமிழர்களின் பங்களிப்பைப் பற்றி உணர்த்துதல்.	**U**

அலகு I - மொழி மற்றும் இலக்கியம்	**3**
இந்திய மொழிக்குடும்பங்கள் - திராவிட மொழிகள் - தமிழ் ஒரு செம்மொழி - தமிழ் செவ்விலக்கியங்கள் - சங்க இலக்கியத்தின் சமயச்சார்பற்ற தன்மை - சங்க இலக்கியத்தில் பகிர்தல் அறம் - திருக்குறளில் மேலாண்மை கருத்துக்கள் - தமிழ்க் காப்பியங்கள், தமிழகத்தில் சமண, பௌத்த சமயங்களின் தாக்கம் - பக்தி இலக்கியம், ஆழ்வார்கள் மற்றும் நாயன்மார்கள் - சிற்றிலக்கியங்கள் - தமிழில் நவீன இலக்கியத்தின் வளர்ச்சி - தமிழ் இலக்கிய வளர்ச்சியில் பாரதியார் மற்றும் பாரதிதாசன் ஆகியோரின் பங்களிப்பு.	
அலகு II - மரபு - பாறை ஓவியங்கள் முதல் நவீன ஓவியங்கள் வரை,சிற்பக் கலை	**3**
நடுகல் முதல் நவீன சிற்பங்கள் வரை - ஐம்பொன் சிலைகள் - பழங்குடியினர் மற்றும் அவர்கள் தயாரிக்கும் கைவினைப் பொருட்கள், பொம்மைகள் - தேர் செய்யும் கலை - சுடுமண் சிற்பங்கள் - நாட்டுப்புறத் தெய்வங்கள் - குமரிமுனையில் திருவள்ளுவர் சிலை - இசைக்கருவிகள் - மிருதங்கம், பறை, வீணை, யாழ், நாதஸ்வரம் - தமிழர்களின் சமூக மற்றும் பொருளாதார வாழ்வில் கோவில்களின் பங்கு.	
அலகு III - நாட்டுப்புறக் கலைகள் மற்றும் வீரவிளையாட்டுகள்	**3**
தெருக்கூத்து, கரகாட்டம், வில்லுப்பாட்டு, கணியான் கூத்து, ஒயிலாட்டம், தோல்பாவைக் கூத்து, சிலம்பாட்டம், வளரி, புலியாட்டம் – தமிழர்களின் விளையாட்டுகள்.	
அலகு IV - தமிழர்களின் திணைக் கோட்பாடுகள்	**3**
தமிழகத்தின் தாவரங்களும், விலங்குகளும் - தொல்காப்பியம் மற்றும் சங்க இலக்கியத்தில் அகம் மற்றும் புறக் கோட்பாடுகள் - தமிழர்கள் போற்றிய அறக் கோட்பாடு - சங்க காலத்தில் தமிழகத்தில் எழுத்தறிவும் கல்வியும் - சங்ககால நகரங்களும் துறைமுகங்களும் - சங்க காலத்தில் ஏற்றுமதி மற்றும் இறக்குமதி - கடல்கடந்த நாடுகளில் சோழர்களின் வெற்றி.	
அலகு V - இந்திய தேசிய இயக்கம் மற்றும் இந்தியப் பண்பாட்டிற்குத் தமிழர்களின் பங்களிப்பு	**3**
இந்திய விடுதலைப் போரில் தமிழர்களின் பங்கு - இந்தியாவின் பிற்பகுதிகளில் தமிழ்ப் பண்பாட்டின் தாக்கம் - சுயமரியாதை இயக்கம் - இந்திய மருத்துவத்தில் சித்த மருத்துவத்தின் பங்கு - கல்வெட்டுகள், கையெழுத்துப்படிகள் - தமிழ்ப் புத்தகங்களின் அச்சு வரலாறு.	
மொத்த வகுப்புகள்	**15**

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பாடநூல் - குறிப்பு நூல்கள்

1. **தமிழக வரலாறு - மக்களும் பண்பாடும்** - கே.கே.பிள்ளை (வெளியீடு தமிழ்நாடு பாடநூல் மற்றும் கல்வியியல் பணிகள் கழகம்)
2. **கணினித்தமிழ்** - முனைவர் இல.சுந்தரம் (விகடன் பிரசுரம்)
3. **கீழடி** - வைகை நதிக்கரையில் சங்க கால நகர நாகரிகம் (தொல்லியல் துறை வெளியீடு)
4. **பொருநை** - ஆற்றங்கரை நாகரிகம் (தொல்லியல் துறை வெளியீடு)
5. **Social Life of Tamils –** Dr. K.K. Pillay (A joint publication of TNTB & ESC and RMRL – In print)
6. **Social Life of the Tamils –** The Classical Period – Dr. S. Singaravelu (Published by: International Institute of Tamil Studies)
7. **Historical Heritage of the Tamils** – Dr. S.V. Subramanian, Dr. K.D. Thirunavukkarasu (Published by: International Institute of Tamil Studies)
8. **The Contributions of the Tamils to Indian Culture –** Dr. M. Vannanthi (Published by: International Institute of Tamil Studies)
9. **Keeladi –** Sangam City Civilization on the Banks of River Vaigai (Jointly published by: Department of Archaeology & Tamil Nadu Textbook and Educational Services Corporation, Tamil Nadu)
10. **Studies in the History of India with Special Reference to Tamil Nadu –** Dr. K.K. Pillay (Published by: The Author)
11. **Porunai Civilization** (Jointly published by: Department of Archaeology & Tamil Nadu Textbook and Educational Services Corporation, Tamil Nadu)
12. **Journey of Civilization: Indus to Vaigai –** R. Balakrishnan (Published by: RMRL)

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26ENI101 - FOUNDATIONAL ENGLISH	L	T	P	C
	2	0	2	3

Course Objectives	• Develop learners' ability to communicate confidently in academic, professional, and social situations through integrated listening, speaking, reading, and writing activities. • Strengthen learners' vocabulary, grammar, verbal aptitude, and communication skills required for higher education, competitive examinations, and future employment. • Integrate employability competencies through authentic and context-based language-learning tasks. • Foster higher-order thinking skills through authentic communication tasks that require analysis, evaluation, and problem-solving. • Enable learners to comprehend, interpret, evaluate, and present information effectively using appropriate language in diverse communication contexts.

Course Outcomes: On completion of the course, the students will be able to:		**Cognitive Level**
CO1	Apply grammar, vocabulary, and verbal reasoning skills to communicate effectively in academic and professional contexts.	**Ap**
CO2	Interpret spoken information by identifying main ideas, purpose, tone, attitude, and implied meaning.	**U**
CO3	Communicate confidently by adapting language to different audiences and situations.	**Ap**
CO4	Analyze written and spoken texts by distinguishing facts, opinions, evidence, and viewpoints.	**An**
CO5	Produce coherent oral and written responses demonstrating critical thinking, empathy, creativity, and professionalism.	**Ap**

UNIT I – SELF PRESENTATION AND LANGUAGE FOUNDATIONS	**6+6**
Grammar: Parts of Speech in context, Articles & Determiners; **Vocabulary:** Academic Word List (AWL) Vocabulary and Context Vocabulary; **Listening:** Listening to Introductions and Identifying Key Information; **Speaking:** Professional Self-Introduction, Observation-based Description; **Reading:** Reading for purpose and Identifying Main Ideas; **Writing:** Professional Email and Learning Log.	
UNIT II – LISTENING, INQUIRY AND MEANING MAKING	**6+6**
Grammar: Question formation & Question Tags; **Vocabulary:** Word formation; **Listening:** Listening for Main Ideas, Tone, Purpose and Implied Meaning; **Speaking:** Asking Effective Questions and Seeking Clarification; **Reading:** Reading between the lines and Making inferences; **Writing:** Observation Notes.	

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UNIT III – COLLABORATIONAND PROFESSIONAL INTERACTION	6+6

Grammar: Functional grammar for Professional communication; **Vocabulary:** Professional Expressions and Workplace Vocabulary; **Listening:** Listening to Discussions and Professional Conversations; **Speaking:** Role plays & collaborative Decision-Making Discussions; **Reading:** Fact vs. Opinion; **Writing:** Formal letters and Professional Requests.

UNIT IV – ORGANIZING IDEAS AND EFFECTIVE EXPRESSION	6+6

Grammar: Tenses in context; **Vocabulary:** Precision in Word Choice and Sentence Variety; **Listening:** Listening andNote-taking; **Speaking:** Retelling and Summarizing; **Reading:** Information mapping; **Writing:** Paragraph Writing, Process description.

UNIT V – CRITICAL THINKING ANDREFLECTIVECOMMUNICATION	6+6

Grammar: Error Correction & Editing Skills; **Vocabulary:** Verbal Reasoning and Advanced Word Usage; **Listening:** TED-style Talks and Motivational/Life-Skills Talks; **Speaking:** Guided Opinion Sharing, Reflection Discussion; **Reading:** Critical reading; **Writing:** Critical Response Writing, SWOT analysis.

Communication Tasks/ Experiments:

1. Academic and Professional Self-Introduction
2. Picture Observation and Description
3. Professional Email Simulation
4. Peer Interview
5. Information-gap Conversation
6. Audio-based Inference and Discussion
7. Role Play (Academic/Professional Scenarios)
8. Collaborative Problem-Solving Discussion
9. Professional Conversation in Digital Context
10. Listening, Note-taking and Retelling
11. Information Synthesis and Presentation
12. Process Explanation and Demonstration
13. TED-Style Talk: Personal Reflection and Opinion Sharing
14. Podcast Listening and Reflection Discussion
15. Personal SWOT Presentation

HARDWARE / SOFTWARE REQUIRED FOR A BATCH OF 30 STUDENTS:

HARDWARE REQUIRED:

- Computer System with minimum Intel Core i5 Processor- 30 (1 per Student)
- RAM: Minimum 8 GB
- LAN / Wi-FiInternet Connectivity
- Headphones with Microphone – 30 (for listening & speaking activities)
- LCD Projector / Smart Board – 1
- Audio System / Speakers

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SOFTWARE REQUIRED:

- Operating System – Windows 10/11 or Linux (Ubuntu)
- Web Browser – Google Chrome / Mozilla Firefox
- Office Suite – MS Office / LibreOffice (Word, PowerPoint)
- AI-assisted language learning and feedback tools
- Any standard language lab software (e.g., Orell, Wordsworth, Sanako) or web-based tools for listening and speaking practice.

TOTAL PERIODS	**60**

TEXT BOOK:

1. ***Sudharshana, N. P., & Savitha, C.*** English for Technical Communication. *2nd Edition, Cambridge University Press, New Delhi, 2016.*

REFERENCES:

1. Raman, M., & Sharma, S. Technical Communication: Principles and Practice. Oxford University Press.
2. Rizvi, Ashraf M. Effective Technical Communication. 2nd Edition. McGraw-Hill Education.
3. Dhanavel, S. P. English and Communication Skills for Students of Science and Engineering. Orient BlackSwan.
4. Cottrell, Stella. Critical Thinking Skills: Effective Analysis, Argument and Reflection. 4th Edition. Bloomsbury Academic.
5. Rao, D. Praveen Sam. Soft Skills: Enhancing Employability. Pearson Education.
6. Khera, Shiv. You Can Win: A Step-by-Step Tool for Top Achievers. Bloomsbury Publishing.
7. Goleman, Daniel. Emotional Intelligence: Why It Can Matter More Than IQ. Bantam Books.

Mapping of COs with POs / PSOs

COs	POs											PSOs		
	1	2	3	4	5	6	7	8	9	10	11	1	2	3
1	-	-	-	-	-	-	-	2	3	-	-	-	-	-
2	-	-	-	-	-	-	-	2	2	-	-	-	-	-
3	-	-	-	-	-	-	-	3	3	-	-	-	-	-
4	-	-	-	-	-	-	-	3	2	-	-	-	-	-
5	-	-	-	-	-	-	-	3	3	-	-	-	-	-
CO (W.A)	-	-	-	-	-	-	-	2.4	2.6	-	-	-	-	-

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26GEI101 - ENGINEERING GRAPHICS	L	T	P	C
	3	0	2	4

Course Objectives	• To develop the ability to construct conic sections and perform freehand sketching of simple engineering objects for effective visualization. • To enable students to apply principles of orthographic projection to represent lines and plane surfaces in engineering drawings. • To build competency in visualizing and projecting simple solids using standard orthographic projection methods. • To analyze and represent sectioned solids using appropriate cutting planes and obtain true shapes of sections. • To develop skills in creating surface developments of simple and sectioned solids.

Course Outcomes: On completion of the course, the students will be able to		**Cognitive Level**
CO1	Construct conic sections and perform freehand sketching of simple engineering objects for effective visualization.	**C**
CO2	Apply principles of orthographic projection to represent lines and plane surfaces in engineering drawings.	**Ap**
CO3	Visualize and project simple solids using standard orthographic projection methods.	**C**
CO4	Analyze sectioned solids using appropriate cutting planes and determine the true shape of sections.	**An**
CO5	Develop surface developments of simple and sectioned solids for engineering applications.	**C**

UNIT I - CONICS AND FREEHAND SKETCHING	**9+3**

Introduction to 2D/3D software and its Tool usage - Basic Geometrical constructions, Curves used in engineering practices: Conics - Construction of ellipse, parabola and hyperbola by eccentricity method - Visualization concepts and Free Hand sketching: Visualization principles - Representation of Three Dimensional objects - Layout of views- Freehand sketching of multiple views from pictorial views of objects.

Conversion of simple solids into product prototype using 3D printer.

Practicing three dimensional modeling of simple objects using CAD Software.

UNIT II PROJECTION OF LINES AND PLANE SURFACE	**9+3**

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

Practicing projection of lines and planes using CAD Software.

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UNIT III PROJECTION OF SOLIDS	9+3
Projection of simple solids like prisms, pyramids, cylinder, cone and truncated solids when the axis is inclined to one of the principal planes and parallel to the other by rotating object method. Practicing projection of solids using CAD Software.	
UNIT IV PROJECTION OF SECTIONED SOLIDS	**9+3**
Sectioning of above solids in simple vertical position when the cutting plane is inclined to the one of the principal planes and perpendicular to the other - obtaining true shape of section. Practicing projection of sectioned solids using CAD Software.	
UNIT V PROJECTION OF DEVELOPMENT OF SURFACES	**9+3**
Development of lateral surfaces of simple and sectioned solids - Prisms, pyramids cylinders and cones. Practicing projection of development of solids using CAD Software.	
TOTAL PERIODS	**60**

TEXT BOOKS:

1. K.Venugopal and V.Prabhu Raja, "Engineering Graphics", New Age International (P) Limited, 2022.
2. N.S Parthasarathy and Vela Murali, "Engineering Drawing", Oxford University Press, 2015.

REFERENCES:

1. N.D.Bhatt and V.M.Panchal, "Engineering Drawing", Charotar Publishing House, 53rd Edition, 2014.
2. K.R.Gopalakrishna., "Computer Aided Engineering Drawing" (Vol I and II combined) Subhas Stores, Bangalore, 2017.
3. K. V.Natarajan, "A text book of Engineering Graphics", Dhanalakshmi Publishers, Chennai, 2018.
4. Luzzader, Warren.J., and Duff, John M, "Fundamentals of Engineering Drawing with an introduction to Interactive Computer Graphics for Design and Production", Eastern Economy Edition, PrenticeHall of India Pvt Ltd, New Delhi, 2005.
5. M.B.Shah and B.C.Rana, "Engineering Drawing", Pearson, 2nd Edition, 2009.

E-RESOURCES:

1. Open source Software

2. Engineering Drawing and Computer Graphics, Prof. Rajaram Lakkaraju (IIT Kharagpur) – https://onlinecourses.nptel.ac.in/noc22_me105 / preview Page 41 of 56

3. MIT Design Handbook: Engineering Drawing and Sketching – https://ocw.mit.edu/courses/2-007-design-and-manufacturing-i-spring- 2009 /pages / related -resources / drawing_and_sketching/

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Mapping of COs with POs / PSOs														
COs	POs											PSOs		
	1	2	3	4	5	6	7	8	9	10	11	1	2	3
1	3	-	3	-	3	-	-	-	-	-	-	-	-	-
2	3	-	3	-	3	-	-	-	-	-	-	-	-	-
3	3	-	3	-	3	-	-	-	-	-	-	-	-	-
4	3	-	3	-	3	-	-	-	-	-	-	-	-	-
5	3	-	3	-	3	-	-	-	-	-	-	-	-	-
CO (W.A)	3.0	-	3.0	-	3.0	-	-	-	-	-	-	-	-	-

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26CSL101 - PROGRAMMING IN C LABORATORY	L	T	P	C
	0	0	4	2

Course Objective	• To develop problem-solving skills by applying C programming concepts such as data types, control structures, arrays, functions, pointers, and user-defined data types. • To build practical applications using modular programming, dynamic memory allocation, and file handling techniques through hands-on experiments and mini projects.

Course Outcomes: The Student will be able to		**Cognitive Level**
CO1	Apply basic C programming constructs to solve arithmetic and logical problems.	**Ap**
CO2	Develop C programs using control structures and arrays to address simple computational tasks.	**Ap**
CO3	Implement modular programming solutions using user-defined functions for improved code reusability and structure.	**Ap**
CO4	Analyze and apply pointers, dynamic memory, and user-defined data types for efficient programming.	**An**
CO5	Develop file-based and mini real-time applications using C programming concepts.	**An**

LIST OF EXPERIMENTS:

1. Demonstrate the use of various data types and analyze their memory requirements and behavior.
2. Construct programs using input and output statements for data acquisition and display.
3. Apply arithmetic, relational, logical, assignment, and bitwise operators to evaluate expressions.
4. Develop programs using sequential, decision-making, and iterative control structures.
5. Implement one-dimensional and two-dimensional arrays to perform data processing operations.
6. Apply string manipulation techniques using both library functions and user-defined functions.
7. Implement user-defined and recursive functions to solve computational problems.
8. Design programs using structures, unions, arrays of structures, pointers, and dynamic memory allocation techniques.
9. Develop programs using file handling operations to create, read, write, update, and manage data in text and binary files.
10. Develop application programs by integrating programming concepts to solve real-world problems using modular design and file handling.

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HARDWARE REQUIRED: • Processor: Intel Core i3 / AMD Ryzen 3 or above • RAM: Minimum 8 GB • Storage: Minimum 256 GB HDD/SSD
SOFTWARE REQUIRED: • Operating System: Ubuntu / Windows 10 / Windows 11 • Programming Language: C (ANSI C / GCC Compiler) • IDE/Development Environment: Code Blocks / Visual Studio Code / Dev-C++ / Turbo C++

TOTAL PERIODS	**60**

Mapping of COs with POs / PSOs

COs	POs											PSOs		
	1	2	3	4	5	6	7	8	9	10	11	1	2	3
1	3	2	-	-	2	-	-	-	-	-	1	3	1	1
2	3	2	2	-	3	-	-	-	-	-	1	3	1	1
3	2	2	3	-	3	-	-	1	1	1	1	3	1	1
4	3	3	2	2	3	-	-	1	-	1	2	2	2	2
5	3	3	2	2	3	1	-	1	1	1	2	2	3	3
CO (W.A)	**2.8**	**2.4**	**2.3**	**2.0**	**2.8**	**1.0**	**-**	**1.0**	**1.0**	**1.0**	**1.4**	**2.6**	**1.6**	**1.6**

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26GEL101 - BASIC ENGINEERING LABORATORY	L	T	P	C
	0	0	4	2

Course Objectives	• To provide practical knowledge in civil, mechanical, electrical and electronics engineering through hands-on training in basic engineering workshop practices. • To develop fundamental skills in plumbing, wood work, welding, machining and sheet metal operations using standard tools and equipment. • To enable students to understand and perform basic electrical wiring, electronic assembly, soldering and testing procedures safely and effectively. • To familiarize students with the operation, assembly and maintenance of common engineering systems, household appliances and electronic devices. • To enhance problem-solving ability, technical competency, teamwork and safety awareness through practical engineering applications and laboratory exercises.

Course Outcomes: On completion of the course, the students will be able to		**Cognitive Level**
CO1	Perform basic plumbing operations and prepare simple plumbing line sketches using standard pipe fittings and household components.	**Ap**
CO2	Demonstrate fundamental skills in welding, machining and sheet metal work for preparing basic engineering joints and components.	**Ap**
CO3	Construct and test basic electrical wiring circuits, lighting systems and domestic wiring arrangements following safety practices.	**Ap**
CO4	Assemble, solder and test simple electronic circuits and identify the components and structure of common electronic devices.	**Ap**
CO5	Apply workshop safety practices, proper tool handling techniques and teamwork skills in executing basic engineering laboratory tasks.	**Ap**

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GROUP A	30
PART I **CIVIL ENGINEERING PRACTICES** **PLUMBING WORK:** a) Connecting various basic pipe fittings like valves, taps, coupling, unions, reducers, elbows and other components which are commonly used in household. b) Preparing plumbing line sketches. c) Laying pipe connection to the suction side of a pump d) Laying pipe connection to the delivery side of a pump. e) Connecting pipes of different materials: Metal, plastic and flexible pipes used in household appliances. **WOOD WORK:** a) Sawing, b) Planing and c) Making joints like T-joint, Lap joint and Dovetail joint. d) Wood Work Study: i) Studying joints in door panels and wooden furniture ii) Studying common industrial trusses using models. **PART II** **MECHANICAL ENGINEERING PRACTICES** **WELDING WORK:** a) Welding of Butt joints, Lap joints, Corner joints and Tee joints using arc welding. b) Study of gas welding. **BASIC MACHINING WORK:** a) Simple Turning. b) Simple Drilling. **SHEET METAL WORK:** a) Making of a square tray	

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GROUP B	30

PART I **ELECTRICAL ENGINEERING PRACTICES**

a) Introduction to switches, fuses, indicators and lamps - Basic switch board wiring with lamp, fan and three pin socket

b) Staircase wiring

c) Fluorescent Lamp wiring with introduction to CFL and LED types.

d) Study of Energy Meter wiring and assembly

e) Study of Iron Box wiring and assembly

f) Emergency lamp wiring setup

g) Three phase house wiring setup

PART II **ELECTRONICS ENGINEERING PRACTICES**

SOLDERING WORK:

a) Soldering simple electronic circuits and checking continuity.

ELECTRONIC ASSEMBLY AND TESTING WORK:

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

ELECTRONIC EQUIPMENT STUDY:

a) Study the elements of a smart phone.

b) Assembly and disassembly of a computer/ laptop

TOTAL PERIODS	60

Mapping of COs with POs / PSOs

COs	POs											PSOs		
	1	2	3	4	5	6	7	8	9	10	11	1	2	3
1	3	-	-	-	3	-	-	-	-	-	-	-	-	-
2	3	-	-	-	3	-	-	-	-	-	-	-	-	-
3	3	-	-	-	3	-	-	-	-	-	-	-	-	-
4	3	-	-	-	3	-	-	-	-	-	-	-	-	-
5	3	-	-	-	3	-	-	-	-	-	-	-	-	-
CO (W.A)	3.0	-	-	-	3.0	-	-	-	-	-	-	-	-	-

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26SDC101 - CAREER SKILLS DEVELOPMENT - I	L	T	P	C
	1	0	0	1

Course Objective	• To acquire sharpened analytical skill and to improve thinking capability of the students, and improve the basic skills in communication and to develop the conversation and Team management skills.

Course Outcomes: The student will be able to		**Cognitive Level**
CO1	Apply basic number concepts to solve arithmetic problems quickly and accurately. Use simple logical reasoning to solve series, codes, and basic puzzle-type questions in time-bound situations.	**AP**
CO2	Understand basic grammar and sentence structure to explain how words and phrases are used to form meaningful sentences and differentiate between similar words and their usage in simple contexts.	**U**
CO3	Create engaging extempore speeches, JAM sessions, stories, and team-building strategies while demonstrating innovative leadership skills.	**C**

UNIT I – QUANTITATIVE APTITUDE AND REASONING	**5**
Divisibility - HCF & LCM - Simplification - Number System (Unit Digit) - Averages - Percentage I - Number Series & Letter Series - Coding & Decoding - Logical Puzzles (basic arrangements)	
UNIT II -VERBAL ABILITY	**5**
Grammar (basic sentence structure) – Parts of Speech – Articles – Prepositions – Idioms and Phrasal Verbs (basic) – Verbal Analogy – Vocabulary basics – Synonyms & Antonyms – Homophones, Homographs, Homonyms	
UNIT III – SOFT SKILLS	**5**
Speaking: Introducing Oneself and Others - Sentence Connection & Connectors- Leadership Skills - Extempore Speech - JAM - Add It Up - Developing story from its context - Team Building.	
TOTAL PERIODS	**15**

REFERENCE BOOK:

1. Quantitative Aptitude for Competitive Examinations – by R.S. Aggarwal, 2022.
2. A Modern Approach to Logical Reasoning – by S. Chand & Company Limited , 2022.

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Mapping of COs with POs / PSOs														
COs	**POs**											**PSOs**		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**1**	**2**	**3**
1	3	3	1	2	2	1	-	-	1	1	1	1	1	1
2	1	2	1	1	1	-	-	-	-	2	1	-	1	-
3	1	1	1	1	1	-	-	1	3	3	2	-	1	2
CO (W.A)	**1.6**	**2.0**	**1.0**	**1.3**	**1.3**	**1.0**	-	**1.0**	**2.0**	**2.0**	**1.3**	**1.0**	**1.0**	**1.5**

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SEMESTER II

26MAT203 - TRANSFORMS AND COMPLEX FUNCTIONS	L	T	P	C
	3	1	0	4

Course Objective	• Understand the concepts of Fourier series, Transforms and Boundary Conditions, which will enable them to model and analyze the physical phenomena. • Explain the concepts of analytic functions in complex domain to predict the nature of different engineering systems.

Course Outcomes: The Student will be able to		**Cognitive Level**
CO1	Analyze the periodicity of a function and formulate the same as a combination of sine and cosine using Fourier series.	**An**
CO2	Demonstrate a function in frequency domain whenever the function is defined in time domain using Fourier transforms.	**Ap**
CO3	Solve difference equations using Z-Transform.	**An**
CO4	Apply the concepts of analytic function to estimate the integral in complex plane.	**Ap**
CO5	Apply the concepts of residue theorem to evaluate integrals.	**Ap**

UNIT I - FOURIER SERIES	**9+3**
Introduction - Dirichlet's Conditions - General Fourier Series -Periodic Functions -Odd and Even Functions - Parseval's Identity-Root Mean Square Value- Harmonic Analysis.	
UNIT II - FOURIER TRANSFORM	**9+3**
Fourier Integral Theorem- Fourier Transform and Inverse Fourier Transform- Properties - Transforms of Simple Functions - Convolution Theorem - Parseval's Identity- Sine and Cosine Transforms	
UNIT III- Z- TRANSFORM	**9+3**
Z-transform, the relationship of the Z-transforms to the Laplace transform, some useful properties, inverse Z-transforms - Solution of difference equations.	
UNIT IV –ANALYTIC FUNCTIONS	**9+3**
Necessary and Sufficient conditions-Harmonic and orthogonal properties of analytic functions –Harmonic conjugate –Construction of analytic functions – Conformal mapping: w= z+c, cz, 1/z and bilinear transformation.	
UNIT V - COMPLEX INTEGRATION	**9+3**
Cauchy's Fundamental Theorem - Cauchy's Integral Formula - Taylor's and Laurent's series- Classification of Singularities - Cauchy's Residue Theorem. Application of residue theorem for evaluation of real integrals - Evaluation of contour integration over unit circle and semi-circle excluding poles on boundaries.	
TOTAL PERIODS	**60**

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TEXT BOOK:

1. Grewal.B.S, Higher Engineering Mathematics, Khanna Publications, Delhi, 44th Edition, 2021.

REFERENCES:

1. Erwin Kreyszig, Advanced Engineering Mathematics, Wiley India, 10th Edition, 2017.
2. Jain.R.K. and Iyengar.S.R.K., Advanced Engineering Mathematics, Narosa Publishing House Private Limited, 5th Edition, 2016.
3. Churchill, R. V., & Brown, J. W., Complex Variables and Applications, McGraw-Hill Education (India) Pvt. Ltd., 9th Edition, 2013.
4. Spiegel, M. R., Lipschutz, S., Schiller, J., & Spellman, D., Schaum's Outline of Complex Variables, McGraw-Hill Education, 2nd Edition, 2009.

Mapping Cos with POs/PSOs

COs	POs											PSOs		
	1	2	3	4	5	6	7	8	9	10	11	1	2	3
1	3	2	2	3	-	-	-	-	-	-	-	3	-	-
2	3	2	2	3	-	-	-	-	-	-	-	3	2	2
3	3	3	2	2	-	-	-	-	-	-	-	3	3	2
4	3	2	2	2	-	-	-	-	-	-	-	3	2	-
5	3	3	3	2	-	-	-	-	-	-	-	3	2	2
CO (W.A)	**3.0**	**2.4**	**2.2**	**2.4**	-	-	-	-	-	-	-	**3.0**	**2.2**	**2.0**

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26PHT202 - MATERIALS SCIENCE		L	T	P	C
		3	0	0	3
Course Objective:	To impart knowledge on physics concepts and explore the potential applications in the field of electrical and electronics engineering.				

Course Outcomes: The Student will be able to		**Cognitive Level**
CO1	Analyze the electrical properties of materials based on classical and quantum free electron theories.	**An**
CO2	Describe the fundamental properties of semiconducting materials.	**U**
CO3	Analyze the basics of dielectric materials and their applications.	**An**
CO4	Analyze the behavior, properties of magnetic materials and their applications in magnetic data storage.	**An**
CO5	Apply the quantum mechanical phenomena to explain the behavior of nanomaterials and their applications in nano devices.	**Ap**

UNIT I – ELECTRICAL PROPERTIES OF MATERIALS	**9**
Classical free electron theory – Expression for electrical conductivity and thermal conductivity – Wiedemann – Franz law – Quantum free electron theory: Fermi Dirac statistics – Density of energy states - Electrons in a periodic potential – Energy bands in solids – Tight binding approximation – Electron effective mass – concept of hole.	
UNIT II – SEMICONDUCTING MATERIALS	**9**
Intrinsic Semiconductors – Energy band diagram- direct and indirect band gap semiconductors- Band gap determination – Carrier concentration in intrinsic semiconductors – extrinsic semiconductors – Carrier concentration in N- type & P- type semiconductors – Variation of carrier concentration with temperature – Variation of Fermi level with temperature and impurity concentration - Hall effect – Ohmic contacts-Schottky diode.	
UNIT III – DIELECTRIC MATERIALS	**9**
Matter polarization and relative permittivity: definition – dipole moment and polarization vector P - Polarization mechanisms: electronic, ionic, orientational, space charge and total polarization – frequency dependence – local field and Clausius – Mossotti equation – dielectric constant and dielectric loss – dielectric strength – dielectric breakdown mechanisms – applications – capacitors and transformers.	
UNIT IV – MAGNETIC MATERIALS	**9**
Magnetism in materials – magnetic field and induction, magnetization – magnetic permeability and susceptibility – classification of magnetic materials – Ferromagnetism: origin and exchange interaction – saturation magnetization and curie temperature – Domain theory – hysteresis – hard and soft magnetic materials. Magnetic principle in computer data storage - magnetic hard disc (GMR sensor).	

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UNIT V – NANO DEVICES	9
Density of states for solids – Significance between Fermi energy and volume of the material – Quantum confinement – Quantum structures – Density of states for quantum wells, wires and dots. Band gap of nano materials – Tunneling – Single electron phenomena – Single electron Transistor, Resonant tunneling diode, Carbon nano tubes : Properties and applications.	
TOTAL PERIODS	**45**

TEXT BOOK:

1. S.O. Kasap. Principles of Electronic Materials and Devices, McGraw Hill Education (Indian Edition), 2020.
2. G.W.Hanson. Fundamentals of Nanoelectronics. Pearson Education (Indian Edition), 2009.

REFERENCES:

1. Charles Kittel, Introduction to Solid State Physics, Wiley India Edition, 2019.
2. Laszlo Solymar, Walsh, Donald, Syms and Richard R.A., Electrical Properties of Materials, Oxford Univ. Press (Indian Edition) 2015.

Mapping of COs with POs / PSOs

COs	POs											PSOs		
	1	2	3	4	5	6	7	8	9	10	11	1	2	3
1	3	2	-	-	-	-	-	1	-	-	1	-	-	-
2	3	2	-	-	-	-	-	1	-	-	1	-	-	-
3	3	2	-	-	-	-	-	1	-	-	1	-	-	-
4	3	2	-	-	-	-	-	1	-	-	1	-	-	-
5	3	2	-	-	1	-	-	1	-	-	1	-	-	-
CO (W.A)	**3.0**	**2.0**	-	-	**1.0**	-	-	**1.0**	-	-	**1.0**	-	-	-

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26CST201 - OBJECT ORIENTED PROGRAMMING		L	T	P	C
		3	0	0	3
Course Objective	• To gain knowledge on introduction to Object Oriented Programming concepts and Java Programming language. • To know the principles of Packages, Inheritance, Exception handling, File handling, I/O streams and develop a advanced java concepts application.				

Course Outcomes: The Student will be able to		**Cognitive Level**
CO1	Apply the concepts of classes and objects to solve simple problems.	**Ap**
CO2	Develop programs using appropriate syntax and control structures.	**Ap**
CO3	Examine the application with inheritance, interfaces and packages.	**Ap**
CO4	Evaluate the exception handling and file handling mechanisms to develop Java programs.	**An**
CO5	Analyze basic database-driven applications using JDBC and ability to integrate Java programs with databases.	**An**

UNIT I - OBJECT-ORIENTED CONCEPTS	**9**
Fundamentals of OOP- Classes and objects- Constructors and Destructors-Access modifiers- Static keyword and its uses- Garbage collection overview.	
UNIT II - JAVA PROGRAMMING	**9**
Overview of programming paradigms- Features of Java - Java environment setup (JDK, JRE, JVM)- Structure of a Java program- Data types, variables, constants- Operators and expressions- Control statements - Arrays and strings	
UNIT III - INHERITANCE AND INTERFACES	**9**
Inheritance - Types of inheritance in Java- Method overriding-Method overloading- super keyword- Abstract classes and methods- Interfaces and multiple inheritance using interfaces- Packages: creation and usage- Access protection in packages	
UNIT IV - EXCEPTION HANDLING AND MULTITHREADING	**9**
Exception handling concepts- Types of exceptions- Try, catch, finally, throw, throws- User-defined exceptions- Multithreading concepts- Thread lifecycle- Creating threads- Synchronization and inter-thread communication	
UNIT V - I/O AND FILE HANDLING	**9**
Input/Output streams- Byte & character streams- File handling in Java- Collections Frameworks- Wrapper classes- String handling- Introduction to GUI – AWT- Swing basics - JDBC.	
TOTAL PERIODS	**45**

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TEXT BOOK:

1. Herbert Schildt -Java: "The Complete Reference", McGraw Hill Education, 12th Edition, 2021.
2. E.Balagurusamy- "Programming with Java", McGraw Hill Education, 6th Edition, 2021.

REFERENCES:

1. CayS. Horstmann, —"Core Java Fundamentals" Volume1, Pearson, 11th Edition, 2020
2. Hortsmann & Cornell, —"CORE JAVA 2 Advanced Features" – Volume 2, Oracle Press, 12th Edition, 2022.
3. Ramesh Vasappanavara et al. – Object Oriented Programming Through Java, Pearson. 12th Edition 2022.

Mapping of COs with POs / PSOs

COs	POs											PSOs		
	1	2	3	4	5	6	7	8	9	10	11	1	2	3
1	3	2	2	1	1	-	-	-	1	2	1	1	2	1
2	3	3	2	1	2	-	-	-	1	1	1	2	3	2
3	3	3	3	1	2	-	-	-	1	2	1	2	3	2
4	3	2	2	2	2	-	-	-	1	2	1	3	3	2
5	3	3	3	2	3	-	-	-	1	2	2	3	3	3
CO (W.A)	3.0	2.6	2.4	1.4	2.0	-	-	-	1.0	1.8	1.2	2.2	2.8	2.0

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26CHT101 – CHEMISTRY FOR ENGINEERS	L	T	P	C
	3	0	0	3

Course Objective	• To emphasize the engineering students to realize the importance of water technology, nanomaterials, corrosion control, electrochemistry and energy storage devices.

Course Outcomes: The Student will be able to		**Cognitive Level**
CO1	Apply the suitable water treatment technologies for domestic and industrial applications	**Ap**
CO2	Illustrate the principle, synthesis and applications of nanomaterials.	**U**
CO3	Understand electrochemical concepts and apply them in solving related problems.	**Ap**
CO4	Apply the knowledge of corrosion to solve the industrial problems.	**Ap**
CO5	Investigate on renewable energy sources and storage devices.	**Ap**

UNIT I – WATER TECHNOLOGY	**9**
Introduction-Hardness-types-Estimation of hardness by EDTA method. Water quality parameter – BOD and COD. Domestic water treatment – disinfection methods (chlorination, ozonation and UV treatment)-disadvantage of using hardwater in industry-Boiler troubles (scale, sludge and boiler corrosion) – Internal conditioning (carbonate and calgon) – External conditioning – demineralization process – desalination – reverse osmosis method.	
UNIT II – NANO MATERIALS	**9**
Nanomaterials -Types of nanomaterials (nanoparticle, nanocluster, nanorod, nanowire and nanotube)-Properties of nanomaterials- synthesis (sol-gel, chemical vapour deposition and electro spinning method) and applications of nanomaterials in medicine, agriculture, energy and electronics.	
UNIT III - ELECTROCHEMISTRY	**9**
Electrochemical cell - redox reaction, electrode potential- origin of electrode potential- measurement Nernst equation (derivation and problems) and applications -Conductivity of electrolytes, Factors-Electrochemical series and its significance.	
UNIT IV – CORROSION AND ITS CONTROL	**9**
Corrosion – pilling bedworth rule- mechanism of dry and wet corrosion-forms of corrosion– galvanic corrosion and differential aeration corrosion- factors influencing corrosion - corrosion control - sacrificial anode and impressed cathodic current methods - corrosion inhibitors - protective coatings - electroplating.	
UNIT V – ENERGY SOURCES AND STORAGE DEVICES	**9**
Nuclear fission - controlled nuclear fission - nuclear fusion - differences between nuclear fission and fusion - nuclear chain reactions - nuclear energy - light water nuclear power plant - breeder reactor. Batteries- Types of batteries – primary battery (dry cell) secondary battery (lead acid battery, lithium-ion-battery) -E-vehicle-working and principles- Fuel cells -H_2-O_2 fuel cell. Supercapacitors.	
TOTAL PERIODS	**45**

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TEXT BOOK:

1. P. C. Jain and Monica Jain, "Engineering Chemistry", 17th Edition, Dhanpat Rai Publishing Company (P) Ltd, New Delhi, 2018.
2. O.V. Roussak and H.D. Gesser, Applied Chemistry-A Text Book for Engineers and Technologists, Springer Science Business Media, New York, 2nd Edition, 2013.

REFERENCES:

1. Palanisamy P.N., Manikandan P., Geetha A., Manjula Rani K., Kowshalya V.N., " Chemistry for Engineering" Pearson Education, New Delhi ,Revised Edition 2024.
2. S.S. Dara, "A Text book of Engineering Chemistry", S. Chand Publishing, 12th Edition,2018.

Mapping of COs with POs / PSOs

COs	POs											PSOs		
	1	2	3	4	5	6	7	8	9	10	11	1	2	3
1	3	2	-	-	2	-	-	-	-	-	1	-	-	-
2	2	1	-	-	-	-	-	-	-	-	-	-	-	-
3	-	-	2	1	-	1	-	-	-	-	-	-	-	-
4	3	1	2	1	-	2	-	-	-	-	-	-	-	-
5	3	2	3	1	-	2	-	-	-	-	-	-	-	-
CO (W.A)	**2.8**	**1.5**	**2.3**	**1.0**	**2.0**	**1.6**	-	-	-	-	**1.0**	-	-	-

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26TAT201 - TAMILS AND TECHNOLOGY	L	T	P	C
	1	0	0	1

Course Objective:	The objective of this lesson is to explain the technological advancements of the Sangam period - including sculpture and temple architecture - as well as the technological skills of the Tamils as reflected in Sangam literature, and the concept of Scientific Tamil.

Course Outcomes		Cognitive Level
CO1	To recall the knowledge and understanding of the weaving and pottery industries of ancient Tamil people.	R
CO2	To recognize and appreciate the architectural and sculptural aesthetics of the Sangam age Tamils.	R
CO3	To learn about domestic industries of the Tamils as seen in epics, focusing on production techniques and historical evidence.	U
CO4	To enhance awareness of the eco-friendly lifestyle of Tamil people through their agricultural practices and food-related traditions.	U
CO5	To explain the development of the Tamil language in the modern era and understand the various language development initiatives undertaken for its growth.	U

UNIT I - WEAVING ANO CERAMIC TECHNOLOGY	3
Weaving industry during Sangam age – Ceramic technology – Black and Red Ware potteries (BRW) – Graffiti on Potteries.	
UNIT II - DESIGN AND CONSTRUCTION TECHNOLOGY	**3**
Designing and Structural construction House & Designs in household materials during Sangam Age – Building materials and Hero stones of Sangam age – Details of Stage Constructions in Silappathikaram – Sculptures and Temples of Mamallapuram – Great Temple of Cholas and other worship places – Temples of Nayaka Period – Type study (Madurai Meenakshi Temple) – Thirumalai Nayakar Mhal – Chetti Nadu Houses, Indo – Saracenic architecture at Madras during British Period.	
UNIT III - MANUFACTURING TECHNOLOGY	**3**
Art of Ship Building – Metallurgical Studies – Iron Industry – Iron Smelting, Steel – Copper and Gold – Coins as Source of History – Minting of Coins – Beads Making Industries Stone Beads - Glass Beads - Terracotta Beads - Shell Beads, Bone Beads – Archeological evidences – Gem stone types described in Silappathikaram.	
UNIT IV - AGRICULTURE ANO IRRIGATION TECHNOLOGY	**3**
Dam, Lake , Ponds, Sluice , Significance of Kumizhi Thoompu of Chola Period , Animal Husbandry – Wells designed for cattle use – Agriculture and Agro Processing –Knowledge of Sea – Fisheries – Pearl and Conche Diving – Ancient Knowledge of the Ocean – Knowledge Specific Society.	
UNIT V - SCIENTIFIC TAMIL & TAMIL COMPUTING	**3**
Development of Scientific Tamil – Tamil Computing – Digitalization of Tamil Books – Development of Tamil Software – Tamil Virtual Academy – Tamil Digital Library – Online Tamil Dictionaries – Sorkuvai Project	
TOTAL PERIODS	**15**

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TEXT -CUM- REFERENCE BOOKS

1. **தமிழக வரலாறு - மக்களும் பண்பாடும்** - கே.கே.பிள்ளை (வெளியீடு தமிழ்நாடு பாடநூல் மற்றும் கல்வியியல் பணிகள் கழகம்)
2. **கணினித்தமிழ்** - முனைவர் இல.சுந்தரம் (விகடன் பிரசுரம்)
3. **கீழடி** - வைகை நதிக்கரையில் சங்க கால நகர நாகரிகம் (தொல்லியல் துறை வெளியீடு)
4. **பொருநை** - ஆற்றங்கரை நாகரிகம் (தொல்லியல் துறை வெளியீடு)
5. **Social Life of Tamils** – Dr. K.K. Pillay (A joint publication of TNTB & ESC and RMRL – In print)
6. **Social Life of the Tamils** – The Classical Period – Dr. S. Singaravelu (Published by: International Institute of Tamil Studies)
7. **Historical Heritage of the Tamils** – Dr. S.V. Subramanian, Dr. K.D. Thirunavukkarasu (Published by: International Institute of Tamil Studies)
8. **The Contributions of the Tamils to Indian Culture** – Dr. M. Vannanthi (Published by: International Institute of Tamil Studies)
9. **Keeladi – Sangam City Civilization on the Banks of River Vaigai** (Jointly published by: Department of Archaeology & Tamil Nadu Textbook and Educational Services Corporation, Tamil Nadu)
10. **Studies in the History of India with Special Reference to Tamil Nadu** – Dr. K.K. Pillay (Published by: The Author)
11. **Porunai Civilization** (Jointly published by: Department of Archaeology & Tamil Nadu Textbook and Educational Services Corporation, Tamil Nadu)
12. **Journey of Civilization: Indus to Vaigai** – R. Balakrishnan (Published by: RMRL)

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26TAT201 - தமிழரும் தொழில்நுட்பமும்	L	T	P	C
	1	0	0	1

Course Objective:	சங்க காலத் தொழில்நுட்பங்கள் - சிற்பங்கள், கோவில்கள் - சங்க இலக்கியத்தில் தமிழர்களின் தொழில்நுட்பம் - அறிவியல் தமிழ் ஆகியவற்றினை எடுத்துரைப்பது இப்பாடத்தின் நோக்கம் ஆகும்.

Course Outcomes		Cognitive Level
CO1	பண்டைய காலத் தமிழ் மக்களின் நெசவுத்தொழில் மற்றும் பானைத் தொழில் பற்றிய அறிவு மற்றும் விளக்கும் திறனை நினைவு கூர்தல்.	R
CO2	சங்க காலத் தமிழர்களின் கட்டிடக்கலை, சிற்பங்கள் வடிவமைப்பின் நயங்களை அறிவுறுத்துதல்.	R
CO3	தமிழர்களின் உள்நாட்டுத் தொழில்கள், காப்பியங்களில் காணப்படும் உற்பத்தித் தொழில் மற்றும் வரலாற்றுச் சான்றுகளைப் பற்றி அறிதல்.	U
CO4	இயற்கையோடு இணைந்த தமிழ் மக்களின் வாழ்வு, உழவுத் தொழில் மற்றும் உணவு சார்ந்த செயல்பாடுகளின் அறிவினை மேம்படுத்துதல்.	U
CO5	இன்றைய நவீன காலத்தில் தமிழ் மொழியின் வளர்ச்சி மற்றும் மொழி வளர்ச்சித்திட்டங்கள் பற்றி எடுத்துரைத்தல்.	U

அலகு I - நெசவு மற்றும் பானைத் தொழில்நுட்பம்	3
சங்ககாலத்தில் நெசவுத்தொழில் - பானைத் தொழில்நுட்பம் - கருப்பு சிவப்பு பாண்டங்கள் - பண்டங்களில் கீறல் குறியீடுகள்.	
அலகு II - வடிவமைப்பு மற்றும் கட்டிடத் தொழில்நுட்பம்	**3**
சங்ககாலத்தில் வடிவமைப்பு மற்றும் கட்டுமானங்கள், சங்ககாலத்தில் வீட்டு பொருள்களில் வடிவமைப்பு - சங்ககாலத்தில் கட்டுமான பொருட்களும் நடுகல்லும் - சிலப்பதிகாரத்தில் மேடை அமைப்பு பற்றிய விவரங்கள் - மாமல்லபுரச் சிற்பங்களும், கோவில்களும் - சோழர் காலத்துப் பெருங்கோயில்கள் மற்றும் பிற வழிபாட்டுத் தலங்கள் - நாயக்கர் காலக் கோயில்கள் - மாதிரி கட்டமைப்புகள் பற்றி அறிதல், மதுரை மீனாட்சி அம்மன் ஆலயம் மற்றும் திருமலை நாயக்கர் மஹால் - செட்டிநாட்டு வீடுகள் - பிரிட்டிஷ் காலத்தில் சென்னையில் இந்தோ சரோசெனிக் கட்டிடக்கலை.	
அலகு III - உற்பத்தித் தொழில்நுட்பம்	**3**
கப்பல் கட்டும் கலை - உலோகவியல் - இரும்புத் தொழிற்சாலை - இரும்பை உருக்குதல் - எ.கு – வரலாற்றுச் சான்றுகளாக செம்பு மற்றும் தங்க நாணயங்கள் - நாணயங்கள் அச்சடித்தல் - மணிகள் தயாரிக்கும் தொழிற்சாலைகள் - கல்மணிகள், கண்ணாடி மணிகள், சுடுமண் மணிகள், சங்கு மணிகள், எலும்புத்துண்டுகள் - தொல்லியல் சான்றுகள் - சிலப்பதிகாரத்தில் மணிகளின் வகைகள்.	
அலகு IV - வேளாண்மை மற்றும் நீர்ப்பாசனத் தொழில்நுட்பம்	**3**
அணை, ஏரி, குளங்கள், மதகு - சோழர்காலக் குமிழித்தூம்பின் முக்கியத்துவம் - கால்நடை பராமரிப்பு - கால்நடைகளுக்காக வடிவமைக்கப்பட்ட கிணறுகள் - வேளாண்மை மற்றும் வேளாண்மைச் சார்ந்த செயல்பாடுகள் - கடல்சார் அறிவு - மீன்வளம் - முத்து மற்றும் முத்துக் குளித்தல் - பெருங்கடல் குறித்த பண்டைய அறிவு - அறிவுசார் சமூகம்.	
அலகு V - அறிவியல் தமிழ் மற்றும் கணினித்தமிழ்	**3**
அறிவியல் தமிழின் வளர்ச்சி - கணினித்தமிழ் வளர்ச்சி - தமிழ் நூல்களை மின்பதிப்பு செய்தல் - தமிழ் மென்பொருட்கள் உருவாக்கம் - தமிழ் இணையக் கல்விக் கழகம் - தமிழ் மின் நூலகம் - இணையத்தில் தமிழ் அகராதிகள் - சொற்குவைத் திட்டம்.	
TOTAL PERIODS	**15**

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TEXT – CUM- REFERENCE BOOKS

1. **தமிழக வரலாறு - மக்களும் பண்பாடும்** - கே.கே.பிள்ளை (வெளியீடு தமிழ்நாடு பாடநூல் மற்றும் கல்வியியல் பணிகள் கழகம்)
2. **கணினித்தமிழ்** - முனைவர் இல.சுந்தரம் (விகடன் பிரசுரம்)
3. **கீழடி** - வைகை நதிக்கரையில் சங்க கால நகர நாகரிகம் (தொல்லியல் துறை வெளியீடு)
4. **பொருநை** - ஆற்றங்கரை நாகரிகம் (தொல்லியல் துறை வெளியீடு)
5. **Social Life of Tamils** – Dr. K.K. Pillay (A joint publication of TNTB & ESC and RMRL – In print)
6. **Social Life of the Tamils** – The Classical Period – Dr. S. Singaravelu (Published by: International Institute of Tamil Studies)
7. **Historical Heritage of the Tamils** – Dr. S.V. Subramanian, Dr. K.D. Thirunavukkarasu (Published by: International Institute of Tamil Studies)
8. **The Contributions of the Tamils to Indian Culture** – Dr. M. Vannanthi (Published by: International Institute of Tamil Studies)
9. **Keeladi – Sangam City Civilization on the Banks of River Vaigai** (Jointly published by: Department of Archaeology & Tamil Nadu Textbook and Educational Services Corporation, Tamil Nadu)
10. **Studies in the History of India with Special Reference to Tamil Nadu** – Dr. K.K. Pillay (Published by: The Author)
11. **Porunai Civilization** (Jointly published by: Department of Archaeology & Tamil Nadu Textbook and Educational Services Corporation, Tamil Nadu)
12. **Journey of Civilization: Indus to Vaigai** – R. Balakrishnan (Published by: RMRL)

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26ENI201 - PROFESSIONAL ENGLISH	L	T	P	C
	2	0	2	3

Course Objectives	• Develop learners' ability to communicate effectively in workplace and professional contexts through integrated listening, speaking, reading, and writing activities. • Strengthen professional vocabulary, grammar, verbal reasoning, and communication skills required for academic and workplace communication. • Develop analytical, presentation, and interpersonal communication skills through authentic professional tasks. • Foster higher-order skills such as critical thinking, adaptability, collaboration, empathy, and decision-making in professional environments. • Enable learners to communicate confidently, ethically, and professionally in face-to-face and digital communication contexts.

Course Outcomes: On completion of the course, the students will be able to:		**Cognitive Level**
CO1	Apply grammar, professional vocabulary, and verbal reasoning skills in workplace communication.	**Ap**
CO2	Analyze spoken and written professional communication to identify purpose, tone, evidence, implied meaning, and communication strategies.	**An**
CO3	Communicate effectively through discussions, workplace conversations, presentations, and professional interactions.	**Ap**
CO4	Analyze professional documents and workplace situations to derive appropriate conclusions and recommendations.	**An**
CO5	Present information and data effectively using appropriate language, visuals, and professional communication strategies.	**An**

UNIT I – PROFESSIONAL COMMUNICATIONAND WORKPLACE INTERACTION	**6+6**
Grammar: Advanced Tenses in Context, Modals in Professional Communication; **Vocabulary:** Phrasal Verbs, Business & Professional Vocabulary; **Listening:** Workplace Conversations, Telephone Etiquette; **Speaking:** Professional Networking, Elevator Pitch; **Reading:** Professional Emails and Workplace Messages; **Writing:** Follow-up and Networking Emails	
UNIT II – PROFESSIONAL DISCUSSIONS AND MEETING SKILLS	**6+6**
Grammar: Complex Sentences, Cohesive Devices; **Vocabulary:** Professional Expressions and Transition Expressions; **Listening:** Meetings and Professional Discussions; **Speaking:** Group Discussion, Consensus Building; **Reading:** Meeting Documents, Professional Articles; **Writing:** Meeting Agenda and Meeting Minutes.	
UNIT III – TECHNICAL PRESENTATIONS ANDWORKPLACE COMMUNICATION	**6+6**
Grammar: Reported Speech, Passive Voice in Professional Context; **Vocabulary:** Technical Vocabulary and Workplace Expressions; **Listening:** Professional Presentations and Technical Demonstrations; **Speaking:** Technical Presentation, Process Explanation; **Reading:** Case Studies, Technical Instructions; **Writing:** Process Documentation, Instruction Writing	

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UNIT IV – CRITICAL THINKING AND PROFESSIONAL WRITING	6+6
Grammar: Conditionals, Editing for Clarity; **Vocabulary:** Formal and Objective Language, Verbal Reasoning; **Listening:** Expert/Industry Talks and Panel Discussions; **Reading:** Critical Reading, Evaluating Arguments; **Speaking:** Problem-solving Discussion, Negotiation in Workplace; **Writing:** Executive Summary, Recommendation Report.	
UNIT V –DATA COMMUNICATION AND PROFESSIONAL GROWTH	**6+6**
Grammar: Editing for Conciseness; **Vocabulary:** Advanced Professional Vocabulary; **Listening:** Presentation Inputs; **Reading:** Graphs, Info graphics; **Speaking:** Data Presentation, Professional Reflection; **Writing:** Analytical Report, Resume Writing.	

LIST OF COMMUNICATION TASKS/EXPERIMENTS:

1. Professional Networking Conversation
2. Professional Introduction and Elevator Pitch
3. Follow-up Email after a Networking Event
4. Structured Group Discussion
5. Mock Professional Meeting (Agenda, Discussion & Minutes)
6. Podcast Listening and Discussion
7. Professional Process Presentation
8. Case Study Discussion
9. Instruction Delivery and Demonstration
10. Expert Talk: Critical Evaluation and Argument Mapping
11. Negotiation Role Play
12. Recommendation Presentation with Report
13. Data Interpretation, Analysis and Presentation
14. Professional Profile Writing
15. Communication Portfolio Presentation

HARDWARE / SOFTWARE REQUIRED FOR A BATCH OF 30 STUDENTS:

HARDWARE REQUIRED:

- Computer Systems with minimum Intel Core i5 Processor- 30 (1 per Student)
- RAM- Minimum 8 GB
- LAN / Internet Connectivity
- Headphones with Microphone – 30 (for listening & speaking activities)
- LCD Projector / Smart Board – 1
- Audio System / Speakers

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SOFTWARE REQUIRED:

- Operating System – Windows 10/11 or Linux (Ubuntu)
- Web Browser – Google Chrome / Mozilla Firefox
- Office Suite – MS Office / LibreOffice (Word, PowerPoint)
- AI-assisted language learning and feedback tools
- Language Lab Software – Any standard software (e.g., Orell, Wordsworth, Sanako) or web-based tools for listening and speaking practice

TOTAL PERIODS	**60**

TEXT BOOK:

1. Sudharshana N P and Savitha C, English for Technical Communication, 2nd Edition, Cambridge University Press, New Delhi, 2016.

REFERENCES:

1. Ashraf Rizvi. Effective Technical Communication, 2nd Edition, McGraw-Hill India, 2017.
2. S. P. Dhanavel. English and Communication Skills for Students of Science and Engineering, Orient Black Swan Publishers, Hyderabad, 2009.
3. Shiv Khera. You Can Win: A Step-by-Step Tool for Top Achievers. Bloomsbury Publishing, 2018.
4. Meenakshi Raman & Sangeeta Sharma, Technical Communication: Principles and Practice, Oxford University Press, Latest Edition.
5. Murphy, H. A., Hildebrandt, H. W., & Thomas, J. P. Effective Business Communication. McGraw-Hill.
6. Lesikar, R. V., Flatley, M. E., & Rentz, K. O. Business Communication: Connecting in a Digital World.
7. Bovee, C. L., & Thill, J. V. Business Communication Today. Pearson.

Mapping of COs with POs / PSOs

COs	POs											PSOs		
	1	2	3	4	5	6	7	8	9	10	11	1	2	3
1	-	-	-	-	-	-	-	1	3	-	-	-	-	-
2	-	-	-	-	-	-	-	1	3	-	-	-	-	-
3	-	-	-	-	-	-	-	3	3	-	-	-	-	-
4	-	-	-	-	-	-	-	1	3	-	-	-	-	-
5	-	-	-	-	-	-	-	2	3	-	-	-	-	-
CO (W.A)	-	-	-	-	-	-	-	**1.6**	**3.0**	-	-	-	-	-

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26EEI201 - ELECTRIC CIRCUIT ANALYSIS	L	T	P	C
	3	0	2	4

Course Objective:	To develop the ability to analyze, simulate, and experimentally validate electrical networks under DC, AC, transient, and three-phase operating conditions.

Course Outcomes: After completion of the course, the Student will be able to		**Cognitive Level**
CO1	Apply network analysis techniques to solve DC electrical circuits.	**Ap**
CO2	Analyze AC circuits and evaluate electrical power using phasor methods.	**An**
CO3	Apply network theorems and two-port parameters to analyze electrical networks.	**Ap**
CO4	Analyze transient responses and resonance characteristics of electrical circuits.	**An**
CO5	Analyze three-phase and magnetically coupled circuits using analytical and experimental methods.	**An**

UNIT I – DC NETWORK ANALYSIS	**9+3**
Circuit Elements and Sources– Ohm's Law – Source Transformation - Series Circuits: Kirchoff's Voltage Law – Voltage Divider Rule – Mesh Current Analysis with Independent and Dependent Sources – Parallel Circuits: Kirchoff's Current Law – Current Divider Rule – Node Voltage Analysis With Independent and Dependent Sources – Network Reduction Techniques– Star to Delta and Delta to Star Transformations.	
UNIT II – AC NETWORK ANALYSIS	**9+3**
Fundamental concepts of AC circuits: R, L and C elements –Phasor Representation – Complex Impedance and Admittance - AC Mesh Analysis - AC Nodal Analysis - RMS Value - Real Power - Reactive Power - Apparent Power - Complex Power - Power Factor	
UNIT III – NETWORK THEOREMS AND TWO-PORT NETWORKS	**9+3**
Superposition Theorem – Thevenin's Theorem – Norton's Theorem – Maximum Power Transfer Theorem – Reciprocity Theorem – Introduction to Two-Port Networks: Z Parameters - Y Parameters - ABCD Parameters - Simple Parameter Conversion	
UNIT IV – TRANSIENT AND RESONANCE	**9+3**
Transient concepts – Transient response of simple RL, RC, and RLC series and parallel circuits for DC and sinusoidal excitation – Resonance: Series Resonance – Parallel Resonance –frequency response – Quality factor and Bandwidth.	
UNIT V – THREE PHASE AND MANGNETICALLY COUPLED CIRCUITS	**9+3**
Analysis of Three Phase Four Wire System, Balanced and Unbalanced Loads – Analysis of Three Phase Three Wire System, Balanced and Unbalanced Loads – Power Measurement Using Two Wattmeter Method – Self and Mutual Inductance – Co-efficient of Coupling – Dot Convention Rule - Analysis of Coupled Circuits– Linear Transformer – Ideal Transformer.	
TOTAL PERIODS	**60**

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TEXT BOOK:

1. Charles K. Alexander and Matthew N.O. Sadiku, *Fundamentals of Electric Circuits*, 7th Edition, McGraw Hill, 2022.
2. William H. Hayt, Jack E. Kemmerly, Jamie D. Phillips and Steven M. Durbin, *Engineering Circuit Analysis*, 10th Edition, McGraw Hill, 2024.

REFERENCES:

1. A. Sudhakar, Shyammohan S. Palli and Amarendra Reddy Bhimavarapu, *Circuits and Networks: Analysis and Synthesis*, 6th Edition, McGraw Hill, 2025.
2. Abhijit Chakrabarti, *Circuit Theory: Analysis and Synthesis*, 7th Edition, Dhanpat Rai & Co., 2018.

Mapping of Cos with Pos / PSOs

COs	POs											PSOs		
	1	2	3	4	5	6	7	8	9	10	11	1	2	3
1	3	3	1	2	2	–	–	–	1	1	1	3	2	1
2	3	3	1	2	2	–	–	–	1	1	1	3	2	1
3	3	3	2	2	3	–	–	–	1	1	1	3	3	1
4	3	3	2	2	3	–	–	–	1	1	2	3	3	2
5	3	3	2	2	2	1	1	–	1	1	2	3	3	2
CO (W.A)	**3.0**	**3.0**	**1.6**	**2.0**	**2.4**	**1.0**	**1.0**	**-**	**1.0**	**1.0**	**1.4**	**3.0**	**2.6**	**2.3**

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Lab Experiments	
1	Experimental verification of mesh analysis for DC circuits
2	Simulation verification of Node voltage method.
3	Simulation Verification of Determining Real power, Reactive Power, and RMS values
4	Experimental Verification of Superposition Theorem.
5	Simulation Verification of Maximum Power Transfer Theorem.
6	Simulation Verification of transient response of RLC circuit with sinusoidal excitation.
7	Experimental verification of transient response of RL for DC input
8	Experimental verification of transient response of RC for DC input
9	Simulation of three phase balanced and unbalanced star, delta networks circuits.
10	Experimental verification of power measurement using two wattmeter method.

Course Title: 26EEI201- Electric Circuits Analysis		
S.No.	**Description of Equipment**	**Required numbers(for batch of 30 students)**
1	10Nos of PC loaded with Pspice/Multisim/Any Equivalent Open Source Software Package	Minimum 10 Users
2	Printer	1
3	Regulated Power Supply (0-30V)	9 Nos
4	Function Generator (MHz Range)	5 Nos
5	Oscilloscope (20MHz)	5 Nos
6	Digital Storage Oscilloscope (20MHz)	2 Nos
7	AC/DC–Voltmeter required rating	10 Nos
8	AC/DC-Ammeter required rating	10 Nos
9	Multimeters	5 Nos
10	Decade Resistance Box, Decade Inductance Box, Decade Capacitance Box	6 Nos each.
11	Single Phase Wattmeter of suitable rating	5 Nos
12	Circuit Connection Boards	20 Nos
13	Connecting Wires	Necessary Quantity
14	Three phase star & delta connected load/Single phase load bank of suitable rating	3 Nos
15	Necessary Quantities of Resistors,Inductors,Capacitors of various capacities (Quarter Watt to 10 Watt)	As Required

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26CSL201 - OBJECT ORIENTED PROGRAMMING LABORATORY	L	T	P	C
	0	0	4	2

Course Objective	• To build software development skills using java programming for real-world applications. • To apply the concepts of classes, packages, interfaces, inheritance, exception handling and file processing and develop applications in JDBC connectivity.

Course Outcomes : The Student will be able to		**Cognitive Level**
CO1	Develop a program using object-oriented programming principles.	**Ap**
CO2	Apply fundamental programming concepts of Java to develop simple programs	**Ap**
CO3	Develop modular Java programs using interfaces, packages, and exception handling.	**Ap**
CO4	Evaluate the multithreading and file handling concepts.	**An**
CO5	Implement the collections framework and Database Connectivity (JDBC).	**An**

List of Experiments:

1. Implement of Class and Object Creation.
2. Develop a Java Applications Using Overloaded Constructors.
3. Develop a Control Flow Statements in Java.
4. Performing Arithmetic and Search Operations on Arrays.
5. Exploring Inheritance Concepts Through Single Inheritance
6. Develop a Applications Using Java Interfaces.
7. Implement the Exception Handling using try-catch-finally.
8. Implement of Multithreading Using Thread and Runnable Mechanisms.
9. Reading and Writing Data Using Java File Handling.
10. Building a Scalable Applications Using Java Collections Framework.

HARDWARE / SOFTWARE REQUIRED FOR A BATCH OF 30 STUDENTS:

HARDWARE REQUIRED:

- Computer System with minimum Intel Core i5 Processor
- RAM: Minimum 4 GB
- LAN / Internet Connectivity

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SOFTWARE REQUIRED:	
• Operating System: Windows / Linux / macOS • Programming Language: Java (JDK 8 or above) • IDE/Editor: Eclipse IDE / IntelliJ IDEA / NetBeans / Visual Studio Code	
TOTAL PERIODS	**60**

Mapping of COs with POs / PSOs														
COs	**POs**											**PSOs**		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**1**	**2**	**3**
1	2	1	2	1	1	-	-	-	1	2	2	2	2	3
2	2	2	1	1	1	-	-	-	2	3	2	3	3	2
3	2	1	1	1	1	-	-	-	1	2	1	3	3	2
4	2	2	2	1	1	-	-	-	3	1	1	2	1	2
5	1	2	1	2	1	-	-	-	1	1	1	3	1	2
CO (W.A)	**1.8**	**1.6**	**1.4**	**1.2**	**1**	-	-	-	**1.6**	**1.8**	**1.4**	**2.6**	**2.0**	**2.2**

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26PCL101 - PHYSICS AND CHEMISTRY LABORATORY	L	T	P	C
	0	0	4	2

PHYSICS LABORATORY

Course Objective	• To familiarize different experiments to enhance basic understanding of physics concepts applied in properties of matter, applied optics and quantum mechanics.

Course Outcomes: The Student will be able to		**Cognitive Level**
CO1	Evaluate elastic and mechanical properties of materials by determining Young's modulus using bending method.	**Ap**
CO2	Measure thickness of a thin material by forming interference fringes.	**Ap**
CO3	Apply diffraction principles to determine the wavelength of laser light experimentally.	**Ap**
CO4	Determine Planck's constant using photo electric effect.	**Ap**
CO5	Analyze different vibrational modes in stretched strings using Melde's string experiment	**An**

LIST OF EXPERIMENTS:

1. Non-uniform bending - Determination of Young's modulus.
2. Laser - Determination of the wavelength of the laser using grating.
3. Fiber optics - Determination of Numerical Aperture and Acceptance angle.
4. Air wedge - Determination of thickness of a thin sheet/wire.
5. Determination of band gap of a semiconductor
6. Photoelectric effect - Determination of Planck's constant.
7. Melde's string experiment - Determination of transverse and longitudinal mode of vibrations in Stretched strings.

LIST OF EQUIPMENTS AND APPARATUS REQUIRED FOR A BATCH OF 30 STUDENTS:

1. Young's Modulus apparatus (screw gauge, vernier caliper, knife edge, wooden 1m scale) for non uniform bending - 5 Nos.
2. Laser grating apparatus - 5Nos.
3. Fiber optical kit (Numerical aperture & acceptance angle determination)
4. Air wedge set up (Mercury vapour lamp, thin glass plate, 45-degree inclined stand with glass plates) - 5Nos
5. Band gap kit with accessories – 5 Nos.
6. Photoelectric effect kit – 5Nos.
7. Melde's string apparatus with accessories – 5 Nos

Common Apparatus : Travelling microscope – 10Nos, Reading lens – 5Nos

TOTAL PERIODS	**30**

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Mapping of COs with POs / PSOs														
COs	POs											PSOs		
	1	2	3	4	5	6	7	8	9	10	11	1	2	3
1	3	2	-	1	-	-	-	1	-	-	2	-	-	-
2	3	2	-	1	-	-	-	1	-	-	2	-	-	-
3	3	1	-	1	-	-	-	1	-	-	2	-	-	-
4	3	1	-	1	-	-	-	1	-	-	2	-	-	-
5	3	1	-	1	-	-	-	1	-	-	2	-	-	-
CO (W.A)	3.0	1.4	-	1.0	-	-	-	1.0	-	-	2.0	-	-	-

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CHEMISTRY LABORATORY		
Course Objective	• To develop experimental skills in water quality analysis, electroanalytical techniques, metal analysis, and nanoparticle synthesis.	
Course Outcomes: The Student will be able to		**Cognitive Level**
CO1	Analyze the quality of water samples such as hardness, acidity, chloride and dissolved oxygen.	**Ap**
CO2	Evaluate the suitability of water for drinking, irrigation, and aquatic life based on experimental results.	**Ap**
CO3	Analyze the acidic and basic nature of industrial effluents using conductometric and pH metric methods.	**An**
CO4	Apply electrochemical techniques like potentiometry to estimate metal ion concentration in alloys.	**Ap**
CO5	Learn simple methods of synthesis of nanoparticles.	**U**

LIST OF EXPERIMENTS:

1. Determine hardness of water samples collected from different areas and analysis suitability of water for drinking and irrigation purposes.
2. Evaluate the dissolved oxygen (DO) levels in water samples collected from different areas and the suitability of water for the growth of aquatic life
3. Evaluate the chloride levels in water samples collected from different areas and the suitability of water for drinking and irrigation purposes.
4. Analysis of acidic nature of effluent water from industries using the conductometric titration method.
5. Determination of basic nature of effluent water from industries using the pH metry.
6. Investigate the amount of Iron (Fe^{2+}) in a mild steel alloy sample using a Potentiometery.
7. Synthesis and characterization of ZnO nonmaterial and applications in pollution abatement.

LIST OF EQUIPMENTS AND APPARATUS REQUIRED FOR A BATCH OF 30 STUDENTS:

1. Iodine Flask - 30 No's
2. pH Meter - 5 No's
3. Conductivity Meter - 5 No's
4. Potentiometer - 5 No's
5. Magnetic Stirrer - 5 No's
6. Hot air oven - 1 No
7. Weighing balance-1 No

Common Apparatus : Burette, Pipette, Conical Flask and wash bottle (each 30 Nos)

TOTAL PERIODS	**30**

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REFERENCES:

1. Jeffery G.H., Bassett J., Mendham J.and Denny vogel"s R.C, "Text book of quantitative analysis chemical analysis", ELBS 5th Edn. Longman, Singapore publishers, Singapore, 1996.
2. Kolthoff I.M., Sandell E.B. et al. "Quantitative chemical analysis", Mcmillan, Madras 1980.

Mapping of COs with POs / PSOs

COs	POs											PSOs		
	1	2	3	4	5	6	7	8	9	10	11	1	2	3
1	3	2	-	2	3		-	-	-	-	-	-	-	-
2	3	2	-	2	-	2	-	-	-	-	-	-	-	-
3	3	2	-	2	3	2	-	-	-	-	-	-	-	-
4	3	2	-	2	3		-	-	-	-	-	-	-	-
5	2	1	-	2	2	1	-	-	-	-	-	-	-	-
CO (W.A)	**2.8**	**1.8**	-	**2.0**	**2.8**	**1.6**	-	-	-	-	-	-	-	-

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26SDC201 - CAREER SKILLS DEVELOPMENT - II	L	T	P	C
	1	0	0	1

Course Objective:	This course will Sharpen problem solving skills and to improve thinking capability of the students. To overcome the fear in group communication and to improve the social and Interpersonal skills of the students.

Course Outcomes The Student will be able to		**Cognitive Level**
CO1	Apply intermediate arithmetic concepts to solve profit, interest, sharing, and time-based problems efficiently.Use reasoning skills to interpret directions, positions, time-based cycles, and simple visual patterns under time limits.	**AP**
CO2	Understand sentence patterns and basic reading passages to explain errors, main ideas, and sequences of events, and to restate meaning from short texts or picture prompts in own word	**U**
CO3	Create personalized SWOT analyses, persuasive debates, technical talks, biography presentations, and emotional intelligence frameworks.	**C**

UNIT I – QUANTITATIVE APTITUDE AND REASONING	**5**
Profit and loss I – Simple Interest and Compound Interest - Problems on Partnership - Ages - Time and Work - Pipes & Cistern - Chain Rule - Clock & Calendar - Direction Sense Test - Ranking Test - Non-Verbal Reasoning (basic visual patterns)	
UNIT II - VERBAL ABILITY	**5**
Error spotting – Sentence correction – Sentence completion – One word substitution – Reading Comprehension (basic passages) – Paraphrasing short sentences – Vocabulary (advanced words) – Developing Stories with Picture (simple)	
UNIT III – SOFT SKILLS	**5**
SWOT Analysis - Communication skills (Debate,Tech Talk, Biography) - Reading skills and its Techniques (Newspaper Case Study, Short story, Blogs) - Emotional Intelligence.	
TOTAL PERIODS	**15**

REFERENCE BOOK:

- Quantitative Aptitude for Competitive Examinations – by R.S. Aggarwal,2022.
- A Modern Approach to Logical Reasoning– by S. Chand & Company Limited , 2022.

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Mapping of COs with POs / PSOs														
COs	**POs**											**PSOs**		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**1**	**2**	**3**
1	3	3	2	2	1	-	-	-	-	-	1	1	1	-
2	1	2	1	1	1	-	-	-	-	-	1	1	1	-
3	1	2	2	1	2	1	-	2	3	3	2	1	2	2
CO (W.A)	**1.6**	**2.0**	**1.0**	**1.3**	**1.3**	**1.0**	**-**	**1.0**	**2.0**	**2.0**	**1.3**	**1.0**	**1.3**	**2.0**

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