NANDHA COLLEGE OF TECHNOLOGY

(An Autonomous Institution Affiliated to Anna University Chennai)

Erode-52

www.nandhatech.org

REGULATIONS – 2026

CURRICULUM AND SYLLABUS

B.E - ELECTRONICS AND COMMUNICATION ENGINEERING

VISION

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

MISSION

1. To provide value based Communication Technology education and produce innovative, competent and high quality Electronics & Communication professionals for the growing demand of Society and Industry.
2. To facilitate the students for the constant up gradation of Technical expertise and perform research activities to solve the real world problems.

PROGRAM EDUCATIONAL OBJECTIVES (PEOs):

PEO1: To provide the students with a strong foundation in the required sciences in order to pursue studies in Electronics and Communication Engineering.

PEO2: To gain adequate knowledge to become good professional in electronic and communication engineering associated industries, higher education and research.

PEO3: To develop attitude in lifelong learning, applying and adapting new ideas and technologies as their field evolves.

PEO4: To prepare students to critically analyze existing literature in an area of specialization and ethically develop innovative and research oriented methodologies to solve the problems identified.

PEO5: To inculcate in the students a professional and ethical attitude and an ability to visualize the engineering issues in a broader social context.

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, modeling, and data analysis to reach valid conclusions.

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5. **Engineering Tools**: Apply modern tools for modeling 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.

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: To design and develop efficient electronic and modern communication systems for real-time applications.

PSO2: To identify, formulate, and solve complex problems in the field of electronics and communication engineering using modern tools and techniques.

PSO3: To keep pace with emerging technologies and demonstrate research aptitude, team work and ethical practices.

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CURRICULUM AND SYLLABUS

B.E – ELECTRONICS AND COMMUNICATION ENGINEERING

SEMESTER–I

S No.	Course Code	Course Title	Category	Periods Per week				Contact Periods
				L	T	P	C	
Theory Courses								
1	26MAT101	Matrices 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 Tamil / தமிழர்மரபு	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	2	0	0	1	2
			TOTAL	**19**	**1**	**12**	**25**	**32**

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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	26MAT202	Linear Algebra & Complex Analysis	BSC	3	1	0	4	4
2	26PHT201	Semiconductor & Quantum Physics	BSC	3	0	0	3	3
3	26CST201	Object Oriented Programming	ESC	3	0	0	3	3
4	26ECT201	Basic Electronics and Electrical Engineering	PCC	3	0	0	3	3
5	26CHT101	Chemistry for Engineers	BSC	3	0	0	3	3
6	26TAT201	Tamils and Technology/ தமிழரும் தொழில் நுட்பமும்	HSMC	1	0	0	1	1
Integrated Course								
7	26ENI201	Professional English	HSMC	2	0	2	3	4
Practical Course								
8	26PCL101	Physics and Chemistry laboratory	BSC	0	0	4	2	4
9	26CSL201	Object oriented Programming Laboratory	ESC	0	0	4	2	4
Employability Enhancement Course								
10	26SDC201	Career Skills Development - II	EEC	2	0	0	1	2
			TOTAL	**20**	**1**	**10**	**25**	**31**

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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	26MAT302	Probability and Random Process	BSC	3	1	0	4	4
2	26CST301	Data Structures	ESC	3	0	0	3	3
3	26ECT302	Circuit Analysis	PCC	3	0	0	3	3
4	26ECT303	Signals and Systems	PCC	3	0	0	3	3
Integrated Course								
5	26ECI301	Digital System Design	PCC	3	0	2	4	5
6	26ECI302	Electron Devices and Circuits	PCC	3	0	2	4	5
Practical Courses								
7	26CSL301	Data structures Lab	ESC	0	0	4	2	4
Employability Enhancement Course								
8	26SDC301	Career Skills Development - III	EEC	2	0	0	1	2
			TOTAL	**20**	**1**	**8**	**24**	**29**

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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	26ECT401	Analog Communication	PCC	3	0	0	3	3
2	26ECT402	Linear integrated circuits	PCC	3	0	0	3	3
3	26ECT403	Electromagnetic Fields	PCC	3	0	0	3	3
4	26ECT404	Control Systems	PCC	3	0	0	3	3
Integrated Course								
5	26ECI401	Digital Signal Processing	PCC	3	0	2	4	5
6	26ECI402	Microprocessor & Microcontroller	PCC	3	0	2	4	5
Practical Course								
7	26ECL401	Linear integrated circuits Laboratory	PCC	0	0	4	2	4
8	26ECL402	Analog Communication Laboratory	PCC	0	0	4	2	4
Employability Enhancement Course								
9	26SDC401	Career Skills Development - IV	EEC	2	0	0	1	**2**
			TOTAL	**20**	**0**	**12**	**25**	**32**

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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	26ECT501	VLSI & Chip Design	PCC	3	0	0	3	3
2	26ECT502	Network Security	PCC	3	0	0	3	3
3	26ECT503	Transmission Lines and Waveguides	PCC	3	0	0	3	3
4		Professional Elective-I	PEC	3	0	0	3	3
Integrated Courses								
5	26ECI501	Embedded Systems & IoT	PCC	3	0	2	4	5
6	26ECI502	Digital Communication	PCC	3	0	2	4	5
Practical Courses								
7	26ECL501	VLSI Design Laboratory	PCC	0	0	4	2	4
Mandatory Course								
8	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 Communication	HSMC	3	0	0	3	3
2	26ECT601	Wireless Communication	PCC	3	0	0	3	3
3		Professional Elective-II	PEC	3	0	0	3	3
4		Professional Elective-III	PEC	3	0	0	3	3
5		Open Elective-I	OEC	3	0	0	3	3
Practical Courses								
6	26ECP601	Mini Project	EEC	0	0	4	2	4
Mandatory Course								
7	26MDC601	Professional Development Activity	MAN	2	0	0	0	2
			TOTAL	**17**	**0**	**4**	**17**	**21**

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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	26ECT701	RF and Microwave Engineering	PCC	3	0	0	3	3
2	26HST701	Universal Human Values	HSMC	3	0	0	3	3
3		Professional Elective IV	PEC	3	0	0	3	3
4		Open Elective II	OEC	3	0	0	3	3
5		Open Elective III	OEC	3	0	0	3	3
Practical Course								
6	26ECP701	Project Phase I / Industry Project	EEC	0	0	6	3	6
			TOTAL	**15**	**0**	**6**	**18**	**21**

SEMESTER–VIII

S No.	Course Code	Course Title	Category	Periods Per week				Contact Periods
				L	T	P	C	
Practical Course								
1	26ECP801	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	16	**14**
2	Basic Science Courses -BSC	23	**23**
3	Engineering Science Courses - ESC	29	**23**
4	Program Core Courses (Branch specific) -PCC	59	**66**
5	Professional Elective Courses (Branch specific)-PEC	12	**12**
6	Open Elective Courses (Cross Discipline Subjects)-OEC	9	**9**
7	Project work, Seminar and Internship in Industry or elsewhere-EEC	15	**19**
8	Audit Courses [Environmental Sciences, Indian Constitution]	0	**0**
Total		**163**	**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	-	3	14	24	19	3	3	-	**66**
5	PEC	-	-	-	-	3	6	3	-	**12**
6	OEC	-	-	-	-	-	3	6	-	**9**
7	EEC	1	1	1	1	-	2	3	10	**19**
8	Audit Courses	-	-	-	-	-	-	-	-	**0**
Total		**25**	**25**	**24**	**25**	**22**	**17**	**18**	**10**	**166**

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PROFESSIONAL ELECTIVE COURSES: VERTICALS

VERTICAL - I	VERTICAL - II	VERTICAL - III	VERTICAL - IV
SIGNAL AND IMAGE PROCESSING	**WIRELESS COMMUNICATION TECHNOLOGIES**	**SENSOR TECHNOLOGIES AND IOT**	**EMBEDDED AND VLSI**
Advanced Digital Signal Processing	Mobile Communication	Introduction to MEMS and NEMS	Introduction to Embedded System Design
Digital Image Processing	Satellite Communication	Sensors Actuators and Interface Electronics	PIC Microcontrollers
Foundations of Wavelets and Multirate Digital Signal Processing	Optical Communication	Introduction to Nano Electronics	Advanced Microcontrollers
Soft Computing and Optimization Techniques	Information Theory and Coding	Wireless Sensor Network Design	Parallel and Distributed Processing
Deep Learning	Radar Communication	IOT With Single Board Computers	PCB Design
Computer Vision	Digital Communication receivers	Industrial IOT And Industry 4.0	Fundamentals of Semiconductor Chip Testing
Medical Image Processing	Software Defined Radio	Fiber Optic Sensor	VLSI Physical Design
VLSI Signal Processing	4G / 5G Communication Networks	Optoelectronics	Advanced CMOS Micro Fabrication

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PROFESSIONAL ELECTIVE COURSES								
VERTICAL I – SIGNAL AND IMAGE PROCESSING								
S. No.	Course Code	Course Title	Category	Hours/Week				Credits
				L	T	P	Total Hours	
Theory								
1	26ECE101	Advanced Digital Signal Processing	PEC	3	0	0	3	3
2	26ECE102	Digital Image Processing	PEC	3	0	0	3	3
3	26ECE103	Foundations of Wavelets and Multirate Digital Signal Processing	PEC	3	0	0	3	3
4	26ECE104	Soft Computing and Optimization Techniques	PEC	3	0	0	3	3
5	26ECE105	Deep Learning	PEC	3	0	0	3	3
6	26ECE106	Computer Vision	PEC	3	0	0	3	3
7	26ECE107	Medical Image Processing	PEC	3	0	0	3	3
8	26ECE107	VLSI Signal Processing	PEC	3	0	0	3	3

VERTICAL II – WIRELESS COMMUNICATION TECHNOLOGIES								
S. No.	Course Code	Course Title	Category	Hours/Week				Credits
				L	T	P	Total Hours	
Theory								
1	26ECE201	Mobile Communication	PEC	3	0	0	3	3
2	26ECE202	Satellite Communication	PEC	3	0	0	3	3
3	26ECE203	Optical Communication	PEC	3	0	0	3	3
4	26ECE204	Information Theory and Coding	PEC	3	0	0	3	3
5	26ECE205	Radar Communication	PEC	3	0	0	3	3
6	26ECE206	Digital Communication receivers	PEC	3	0	0	3	3
7	26ECE207	Software Defined Radio	PEC	3	0	0	3	3
8	26ECE208	4G / 5G Communication Networks	PEC	3	0	0	3	3

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VERTICAL III – SENSOR TECHNOLOGIES AND IOT								
S. No.	Course Code	Course Title	Category	Hours/Week				Credits
				L	T	P	Total Hours	
Theory								
1	26ECE301	Introduction to MEMS and NEMS	PEC	3	0	0	3	3
2	26ECE302	Sensors Actuators and Interface Electronics	PEC	3	0	0	3	3
3	26ECE303	Introduction to Nano Electronics	PEC	3	0	0	3	3
4	26ECE304	Wireless Sensor Network Design	PEC	3	0	0	3	3
5	26ECE305	IOT With Single Board Computers	PEC	3	0	0	3	3
6	26ECE306	Industrial IOT And Industry 4.0	PEC	3	0	0	3	3
7	26ECE307	Fiber Optic Sensor	PEC	3	0	0	3	3
8	26ECE308	Optoelectronics	PEC	3	0	0	3	3

VERTICAL IV – EMBEDDED AND VLSI								
S. No.	Course Code	Course Title	Category	Hours/Week				Credits
				L	T	P	Total Hours	
Theory								
1	26ECE401	Introduction to Embedded System Design	PEC	3	0	0	3	3
2	26ECE402	PIC Microcontrollers	PEC	3	0	0	3	3
3	26ECE403	Advanced Microcontrollers	PEC	3	0	0	3	3
4	26ECE404	Parallel and Distributed Processing	PEC	3	0	0	3	3
5	26ECE405	PCB Design	PEC	3	0	0	3	3
6	26ECE406	Fundamentals of Semiconductor Chip Testing	PEC	3	0	0	3	3
7	26ECE407	VLSI Physical Design	PEC	3	0	0	3	3
8	26ECE408	Advanced CMOS Micro Fabrication	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.	26EEO003	Renewable Energy Technologies	OEC	3	0	0	3	3
5.	26EEO004	Introduction to PLC Programming	PEC	3	0	0	3	3
6.	26ITO004	UI/UX Design	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	26EEO005	Sensors and Actuators	PEC	3	0	0	3	3
2	26EEO006	Energy Conservation and Management	OEC	3	0	0	3	3
3	26MEO007	Industrial Safety	OEC	3	0	0	3	3
4	26MEO008	Environmental and Social Impact Assessment	OEC	3	0	0	3	3
5	26CSO009	Information Security	OEC	3	0	0	3	3
6	26CSO010	Cloud Essentials	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 & 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	26EEO015	Fire Safety Engineering	OEC	3	0	0	3	3
5	26ADO016	Cloud Computing	OEC	3	0	0	3	3
6	26EEO016	Basics of Biomedical Instrumentation	OEC	3	0	0	3	3

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SEMESTER I

26MAT101– MATRICES AND DIFFERENTIAL CALCULUS	L	T	P	C
	3	1	0	4

Course Objective	• To develop the use of Matrix Algebra techniques and to familiarize the students with differential Calculus and Multiple Integrals. • To develop the ability to analyze and solve engineering problems in continuous and discrete time domains using appropriate transform techniques.

Course Outcomes: The student will be able to		**Cognitive Level**
CO1	Apply eigenvalues, eigenvectors, diagonalization, and quadratic forms to analyze matrices and engineering applications.	**Ap**
CO2	Solve higher-order linear differential equations and apply them to physical systems like mass-spring and electrical circuits.	**Ap**
CO3	Analyze functions of several variables using partial derivatives, Jacobians, and optimization techniques including Lagrange multipliers.	**An**
CO4	Evaluate multiple integrals to compute area and volume and solve related engineering problems.	**E**
CO5	Apply Laplace transforms and inverse techniques to solve differential equations and time-domain problems.	**Ap**

UNIT I -MATRICES	**9+3**
Characteristic equation – Eigen values and Eigen vectors of a real matrix – Properties of Eigen values and Eigen vectors – Diagonalization of a matrix by orthogonal transformation – Quadratic forms – Reduction of quadratic form to canonical form by orthogonal transformation and its nature.	
UNIT II – ORDINARY DIFFERENTIAL EQUATIONS	**9+3**
Linear differential equations of second and higher order with constant coefficients – Euler and Cauchy equations - Legendre Equations - Method of variation of parameters.	
UNIT III - 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 IV – MULTIPLE INTEGRALS	**9+3**
Double integration in Cartesian Co-ordinates-Change of order of integration-Area as double integral - Triple Integration in Cartesian and Spherical Polar Co-ordinates-Volume as triple integrals.	
UNIT V – LAPLACE TRANSFORMS	**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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TEXT BOOKS:

1. Kreyszig, G.E., "Advanced Engineering Mathematics", John Wiley & Sons Ltd., 10th Edition,2018.
2. Grewal, B.S., "Higher Engineering Mathematics", Khanna Publications, 44th edition, 2022.

REFERENCE BOOKS:

1. Zill, D. G., "Advanced Engineering Mathematics", Jones & Bartlett India Ltd., 7th Edition 2022.
2. Wylie, C. R., & Barrett, L. C., "Advanced engineering mathematics", Tata McGraw-Hill, 7th Edition, 2019.
3. Ramana, B. V., "Higher Engineering Mathematics", Tata McGraw-Hill Education Pvt. Ltd., New Delhi, 1st Edition, 2007.
4. Jain, R. K., & Iyengar, S. R. K., "Advanced Engineering Mathematics", Narosa Publishing House, New Delhi, 5th Edition, 2016.

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	3	-	-	-	-	-	-	3	-	-
2	3	3	3	3	2	-	-	-	-	-	-	3	-	-
3	2	3	2	3	2	-	-	-	-	-	-	3	2	-
4	3	2	1	2	1	-	-	-	-	-	-	-	2	-
5	3	3	2	2	3	-	-	-	-	-	-	3	3	2
CO (W.A)	**2.8**	**2.6**	**1.8**	**2.2**	**2.2**	**-**	**-**	**-**	**-**	**-**	**-**	**3.0**	**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

	POs											PSOs		
COs	**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

26MAT202 - LINEAR ALGEBRA AND COMPLEX ANALYSIS	L	T	P	C
	3	1	0	4

Course Objective:	• To introduce the basic concepts of matrices, vector spaces, eigenvalues, and eigenvectors. • To understand the fundamental concepts of analytic functions and study the methods of evaluating complex integrals.

Course Outcomes The student will be able to		Cognitive Level
CO1	Understand the fundamental concepts vector spaces, Basis and dimension	An
CO2	Apply linear algebra techniques to solve systems of linear equations and related mathematical problems.	Ap
CO3	Apply inner product space in Gram Schmidt orthogonalization process	Ap
CO4	Decompose the matrix for computational convenience	Ap
CO5	Evaluate complex integration over contour.	Ap

UNIT I - VECTOR SPACES	**9+3**
Analyze concepts of vector spaces Vector spaces – Subspaces – Linear combinations – linear span - Linear independence and linear dependence – Basis and dimensions.	
UNIT II - LINEAR TRANSFORMATIONS	**9+3**
Measure the similarity between different data sets using Inner product spaces- Linear transformation - Null spaces and ranges – Rank Nullity theorem (statement only) – Matrix representation of a linear transformation	
UNIT III -INNER PRODUCT SPACE	**9+3**
Inner product space - Norms - Orthonormal Vectors - Gram Schmidt orthogonalization process	
UNIT IV – MATRIX DECOMPOSITION	**9+3**
Decompose the matrix for computational convenience Generalized eigenvector - QR decomposition-generalized inverse - Singular value decomposition and applications – Least square approximations.	
UNIT V – COMPLEX INTEGRATION	**9+3**
Evaluate complex integration over contour- Cauchy 's integral theorem and Cauchy 's integral formula – Singular points – Residues – Residue theorem – Application of residue theorem to evaluate real integrals – Unit circle and semi-circular contour excluding poles on boundaries.	
TOTAL PERIODS	**60**

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TEXT BOOK:

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

REFERENCES:

1. Strang, G., & Thomson, R. Linear Algebra and its applications, Brooks/Cole. 4th Edition 2007.
2. Anton, H., &Rorres, C., Elementary Linear Algebra: Applications Version, Wiley India Pvt. Ltd., New Delhi, 11th Edition, 2014.
3. Churchill, R. V., & Brown, J. W., Complex Variables and Applications, McGraw-Hill Education, 9th Edition, 2013.
4. Kreyszig, E., Advanced Engineering Mathematics, John Wiley & Sons Ltd., 10th Edition, 2018.

COs	POs											PSOs		
	1	2	3	4	5	6	7	8	9	10	11	1	2	3
1	3	2	3	2	3	-	-	-	-	-	-	3	-	-
2	3	3	2	3	2	-	-	-	-	-	-	3	2	-
3	3	2	2	2	2	-	-	-	-	-	-	3	-	-
4	3	3	2	2	2	-	-	-	-	-	-	3	3	2
5	3	2	2	3	2	-	-	-	-	-	-	3	2	2
CO (W.A)	**3.0**	**2.4**	**2.2**	**2.2**	**2.2**	-	-	-	-	-	-	**3.0**	**2.3**	**2.0**

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26PHT201 - SEMICONDUCTOR AND QUANTUM PHYSICS	L	T	P	C
	3	0	0	3

Course Objective	• To provide a comprehensive understanding of physics concepts in computer science and engineering applications.

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 behavior, properties of magnetic materials and their applications in magnetic data storage.	An
CO4	Apply the quantum mechanical phenomena to explain the behavior of nanomaterials and their applications in nano devices.	Ap
CO5	Analyze the basic concepts of quantum computing and their role in information processing.	An

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**
Elemental and compound semiconductors – Intrinsic semiconductor – carrier concentration derivation – variation of Fermi level with temperature – electrical conductivity – band gap determination – extrinsic semiconductors – carrier concentration in N type and P type semiconductors – variation of Fermi level with temperature and impurity concentration – Hall effect – determination of Hall coefficient – Applications.	
UNIT III – 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. Applications: Magnetic principle in computer data storage - magnetic hard disc (GMR sensor).	
UNIT IV – NANO DEVICES	**9**
Introduction – electron density in bulk material – size dependence of Fermi energy – quantum confinement – quantum structures: quantum wells, wires and dots – band gap of nano materials. Tunneling – Coulomb blockade – single electron transistor - resonant tunneling diode – Carbon nano tubes: Properties and applications.	
UNIT V – QUANTUM COMPUTING	**9**
Quantum system for information processing – quantum states – classical bits – quantum bits or qubits – Bloch sphere, CNOT gate – single and multiple qubits – quantum gates (Pauli–X, Y and Z Gates, Hadamard Gate, Phase gate, T gate, CNOT Gate) – advantages of quantum computing over classical computing	
TOTAL PERIODS	**45**

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TEXT BOOK:

1. S.O.Pillai, Solid state Physics, 10th Edition, NEW AGE Internationa; Publishers, 2022
2. Parag K, Lala, Quantum Computing: A Beginner's Introduction, McGraw-Hill Education (Indian edition), 2020.

REFERENCES:

1. Principles of Electronic Materials and Devices, S.O.Kasap, McGraw Hill Education, 2017.
2. Physics for Computer Science Students, N.Garcia, A.Damask and S.Schwaz, Springer Verlag, 2012.
3. Fundamentals of Nanoelectronics, G.W.Hanson, Pearson education, 2009.

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	-	-	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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26ECT101- BASIC ELECTRONICS AND ELECTRICAL ENGINEERING	L	T	P	C
	2	1	0	3

Course Objective:	**CO1:** Understand passive components, semiconductor fundamentals, and analyze PN junction and Zener diode characteristics. **CO2:** Learn construction, operation, and applications of DC, AC, and special electrical machines including BLDC motors. **CO3:** Understand measurement principles, instruments, and techniques for electrical parameters and data acquisition. **CO4:** Understand power system structure, protection devices, earthing methods, and safety practices. **CO5:** Understand working principles and applications of various sensors and transducers in real-time systems.

Course Outcomes: The Student will be able to		**Cognitive Level**
CO1	Understand and explain the fundamentals of electronic components, semiconductor materials and basic electronic devices.	**U**
CO2	Apply the concepts of analog and digital electronics to analyze simple electronic circuits and systems.	**Ap**
CO3	Analyze the operating principles and applications of electrical machines and measurement instruments.	**An**
CO4	Analyze power system components, protection devices, earthing techniques and electrical safety practices.	**An**
CO5	Apply the working principles of sensors and transducers in engineering and real-time applications.	**Ap**

UNIT I – Basic Electronics	**9**
Passive and active components – Resistors, Capacitors, Inductors: Types, features and specifications – Energy band diagram of conductors, semiconductors and insulators – Intrinsic and extrinsic semiconductors – PN junction diode – Zener diode and applications.	
UNIT II – Analog and Digital Electronics	**9**
Semiconductor devices – Bipolar Junction Transistor (BJT): Construction, operation and characteristics – Field Effect Transistor (FET): Basics and applications – Operational Amplifier (Op-Amp): Characteristics and applications – Number systems and logic gates – Boolean algebra – Combinational circuits: Half Adder, Full Adder, Multiplexer and Decoder.	
UNIT III – Electrical Machines and Measurements	**9**
Principle of operation and applications of DC Motor, Single Phase Transformer and Three Phase Induction Motor – Functional elements of measuring instruments – Moving Coil and Moving Iron instruments – Energy Meter – Instrument Transformers (CT and PT) – Digital Storage Oscilloscope (DSO): Block diagram and applications.	
UNIT IV – Basics of Power Systems	**9**
Power system structure – Generation, Transmission and Distribution – Various voltage levels – Earthing: Methods of earthing – Protective devices: Switch Fuse Unit (SFU), Miniature Circuit Breaker (MCB), Moulded Case Circuit Breaker (MCCB), Earth Leakage Circuit Breaker (ELCB) – Electrical safety precautions and First Aid.	

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UNIT V – Sensors and Transducers	9
Solenoids, Electro-pneumatic systems, Proximity sensors, Limit switches, Piezoelectric sensors, Hall-effect sensors, Photo sensors, Strain gauge, LVDT, Piezoelectric crystals, Differential pressure transducers, Optical and Digital transducers, Smart sensors, Thermal imagers.	
TOTAL PERIODS	**45**

TEXT BOOKS:

- D.P. Kothari and I.J. Nagrath, *Basic Electrical and Electronics Engineering*, 2nd Edition, McGraw Hill Education, 2020.
- D. Patranabis, *Sensors and Transducers*, 2nd Edition, PHI Learning Pvt. Ltd., 2013.

REFERANCE BOOKS:

- A.K. Sawhney, *A Course in Electrical and Electronic Measurements and Instrumentation*, 19th Edition, Dhanpat Rai Publications, 2022.
- C.S. Rangan, G.R. Sarma and V.S.V. Mani, *Instrumentation Devices and Systems*, 2nd Edition, McGraw Hill Education (India), 2009

E- RESOURCES:

1. https://ocw.mit.edu/courses/electrical-engineering-and-computer-science
2. https://www.khanacademy.org/science/electrical-engineering

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	-	-	-	-	-	-	3	-	-
2	3	3	2	1	2	-	-	-	-	-	-	3	2	1
3	3	3	2	2	2	-	-	-	-	-	-	3	2	1
4	3	3	2	2	2	1	2	-	-	-	-	3	1	1
5	3	2	3	2	3	-	-	-	-	-	-	2	3	3
CO (W.A)	3.0	2.2	1.2	1.8	2.0	1.0	2.0	-	-	-	-	2.8	1.6	1.5

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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.கா – 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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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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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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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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