GOVERNMENT OF INDIA
MINISTRY OF
PARLIAMENTARY AFFAIRS

PREAMBLE TO THE CONSTITUTION

PREAMBLE

WE, THE PEOPLE OF INDIA.

having solemnly resolved to constitute India into a SOVEREIGN SOCIALIST SECULAR DEMOCRATIC **REPUBLIC** and to secure to all its citizens:

JUSTICE, social, economic and political;

LIBERTY of thought, expression, belief, faith and worship:

EQUALITY of status and of opportunity;

and to promote among them all

FRATERNITY assuring the dignity of the individual and the unity and integrity of the Nation;

IN OUR CONSTITUENT ASSEMBLY this 26th day of November, 1949, do HEREBY ADOPT, ENACT AND GIVE TO OURSELVES THIS CONSTITUTION.

I have read the Preamble

23-01-2026

Signature

SRI SIDDHARTHA ACADEMY OF HIGHER EDUCATION

("Deemed to be University u/s 3 of the UGC Act, 1956")
Accredited 'A+' Grade by NAAC(2nd Cycle)
Agalakote, B.H.Road, Tumkur – 572 107.KARNATAKA, INDIA.

No. SSAHE/ACA-S&C/120/UG (BE)/2026 **Date: 23/09/2026**

NOTIFICATION

Sub:- Ordinance pertaining to Curriculum of Undergraduate Programme in Bachelor Engineering (1st year Electronics and Communication Engineering)

Ref: Proceedings of the 32nd Academic Council meeting held on 28/07/2026 vide agenda no. SSAHE/AC/XXXII-52/2026 .

In exercise of the powers vested under section 6 of 6.05 of MoA / Rules of SSAHE, the Revised Ordinance pertaining to Curriculum of Undergraduate Programme in Bachelor of Engineering disciplines (1st year Electronics and Communication Engineering) is notified herewith as per Annexure.

By Order,

REGISTRAR

REGISTRAR
Sri Siddhartha Academy of Higher Education
Agalakote, B.H. Road, Tumkur - 572 107.

To,

Dean / Principal, Sri Siddhartha Institute of Technology,

Copy to:

1) **Office of the Chancellor, SSAHE, for kind information,**
2) **PA to Vice-Chancellor / PA to Registrar / Controller of Examinations / Finance Officer, SSAHE**
3) **All Officers of the Academy Examination Branch / Academic Section / Guard File / Office copy.**

Syllabus for the Academic Year 2026-27

Vision

Mould quality technocrats in the field of Electronics and Communication with human values to cater the societal needs.

Mission

- To impart high-quality academic environment.
- To provide training in new tools and technologies.
- To facilitate continuous learning and research environment.
- To inculcate professionalism with ethical values, with little impact on environment.

Program Educational Objectives

PEO-1: Proficient to apply the knowledge gained in mathematics, science and engineering to the field of electronics and communication engineering for the synthesis and analysis of systems.
PEO-2: Competent to pursue higher studies and research, with effective communication.
PEO-3: Aware of new technologies in the domain field, apply the same for the societal requirement minimizing the impact on environment and ethical practices in their domain.

Knowledge and Attitude Profile (Washington Knowledge)

WK1: A systematic, theory-based understanding of the natural sciences applicable to the discipline and awareness of relevant social sciences.
WK2: Conceptually-based mathematics, numerical analysis, data analysis, statistics and formal aspects of computer and information science to support detailed analysis and modelling applicable to the discipline.
WK3: A systematic, theory-based formulation of engineering fundamentals required in the engineering discipline.
WK4: Engineering specialist knowledge that provides theoretical frameworks and bodies of knowledge for the accepted practice areas in the engineering discipline; much is at the forefront of the discipline.
WK5: Knowledge, including efficient resource use, environmental impacts, whole-life cost, reuse of resources, net zero carbon, and similar concepts, that supports engineering design and operations in a practice area.
WK6: Knowledge of engineering practice (technology) in the practice areas in the engineering discipline.
WK7: Knowledge of the role of engineering in society and identified issues in engineering practice in the discipline, such as the professional responsibility of

an engineer to public safety and sustainable development.

WK8: Engagement with selected knowledge in the current research literature of the discipline, awareness of the power of critical thinking and creative approaches to evaluate emerging issues.

WK9: Ethics, inclusive behavior and conduct. Knowledge of professional ethics, responsibilities, and norms of engineering practice. Awareness of the need for diversity by reason of ethnicity, gender, age, physical ability etc., with mutual understanding and respect, and of inclusive attitudes.

Program Outcomes

Engineering Graduates will be able to:

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

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

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

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

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

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

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

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

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

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

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

Program Specific Outcomes (PSOs)

PSO1: The ability to identify, analyse and design systems related to modern engineering hardware and software tools, in Electronics and Communication Engineering in the areas of electronics, communication, image processing, VLSI, signal processing and embedded systems for solving day to day problems.

PSO2: Impart the awareness about the impact of professional engineering solutions in societal and environmental context, professional ethics and be able to communicate effectively.

Syllabus for the Academic Year 2026-27

I Semester B.E. (Physics Cycle) Academic year 2026-27

Sl. No.	Course Category	Course Code	Course Title	Teach. Dept.	Credits	Teaching Hrs. / Semester					Evaluation Marks			SEE Hrs.
						L	T	P	S	Total	CIE	SEE	Total	
1	ASC	26ECMA101	Calculus and Differential Equations	MA	4	42	28	-	50	120	50	50	100	3
2	ASC (IC)	26ECPHI102	Quantum Physics and Electronic Sensors	PH	4	42	-	28	50	120	50	50	100	3
3	ESC	26ECME103	Introduction to Mechanical Engineering	ME	2	28	-	-	32	60	50	50	100	3
4	ESC	26ECCE104	Introduction to Civil Engineering	CV	2	28	-	-	32	60	50	50	100	3
5	PSC	26ECPS105	Basic Electronics Engineering	EC	3	42	-	-	48	90	50	50	100	3
6	PLC (IC)	26ECCSI106	C - Programming	CS	4	42	-	28	50	120	50	50	100	3
7	PSCL	26ECPSL107	Basic Electronics Lab.	EC	1	-	-	28	02	30	50	50	100	3
8	HSC (MNCC)	26HSES108	Environmental Studies	Any	PP	14	-	-	16	30	100	-	100	-
				Total	**20**	**238**	**28**	**84**	**280**	**630**	**450**	**350**	**800**	**-**

LEGEND: L: Lecture Hours, T: Tutorial Hours, P: Practical / Drawing Hours, S: Student Academic Activity Hours, CIE: Continuous Internal Evaluation, SEE: Semester End Examination, PP: Permitted to Proceed.

Credit Distribution: ASC: Applied Science Course (4), ASC (IC): Integrated Applied Science Course (4), ESC: Engg. Science Course (4), PSC: Program Specific Course (3), PLC (IC): Integrated Programming Language Course (4), PSCL: Program Specific Core Laboratory (1), HSC: Humanity and Social Science Course, MNCC: Mandatory Non-Credit Course.

CIE Pattern: IA: Internal Assessment, ABL: Activity Based Learning, PLA: Periodic Lab. Assessment.
Integrated Course - Theory IA (30 Marks), PLA (10 Marks), ABL (5), Lab. CIE (5 Marks)] [**Eligibility for SEE**: Min. 40% in each evaluation category - Theory IA, PLA, ABL & Lab. CIE].
Non-integrated Course: Theory IA (40 Marks), ABL (10 Marks) [**Eligibility for SEE**: Min. 40% in each evaluation category - Theory IA & ABL].
Laboratory Course: PLA (30 Marks), Lab. CIE (20 Marks) [**Eligibility for SEE**: Min. 40% in each evaluation category – PLA & Lab. CIE]

Syllabus for the Academic Year 2026-27

II Semester B.E. (Chemistry Cycle) Academic year 2026-27

Sl. No.	Course Category	Course Code	Course Title	Teach. Dept.	Credits	Teaching Hrs. / Semester					Evaluation Marks			SEE Hrs.
						L	T	P	S	Total	CIE	SEE	Total	
1	ASC	26ECMA201	Laplace Transforms and Numerical Methods	MA	4	42	28	-	50	120	50	50	100	3
2	ASC (IC)	26ECCHI202	Applied Chemistry	CH	4	42	-	28	50	120	50	50	100	3
3	ESC	26ECEE203	Introduction to Electrical Engineering	EE	2	28	-	-	32	60	50	50	100	3
4	ESC	26ECED204	Computer-Aided Engg. Drawing	ME	2	14	-	28	18	60	50	50	100	3
5	ETC	26ECAI205	Foundations of Artificial Intelligence	Any	2	28	-	-	32	60	50	50	100	3
6	PLC (IC)	26ECCSI206	Python Programming	CS	4	42	-	28	50	120	50	50	100	3
7	PBL	26ECPBL207	Innovation and Design Thinking (Project Based Learning)	EC	1	-	-	28	02	30	50	50	100	3
8	HSC	26HSET208	English for Technical Communication	HS	1	-	-	28	02	30	100	-	100	-
9	HSC(MNCC)	26HSCI209	Constitution of India and Ethics	Any	PP	14	-	-	16	30	100	-	100	-
				Total	**20**	**210**	**28**	**140**	**252**	**630**	**550**	**350**	**900**	**-**

LEGEND: L: Lecture Hours, T: Tutorial Hours, P: Practical / Drawing Hours, S: Student Academic Activity Hours, CIE: Continuous Internal Evaluation, SEE: Semester End Examination, PP: Permitted to Proceed.

Credit Distribution: ASC: Applied Science Course (4), ASC (IC): Integrated Applied Science Course (4), ESC: Engg. Science Course (4), ETC: Emerging Technology course (2), PLC (IC): Integrated Programming Language Course (4), PBL: Project Based Learning (1), HSC: Humanity and Social Science Course (1), MNCC: Mandatory Non-Credit Course.

CIE Pattern: IA: Internal Assessment, ABL: Activity Based Learning, PLA: Periodic Lab. Assessment.
Integrated Course - Theory IA (30 Marks), PLA (10 Marks), ABL (5), Lab. CIE (5 Marks)] [**Eligibility for SEE**: Min. 40% in each evaluation category - Theory IA, PLA, ABL & Lab. CIE].
Non-integrated Course: Theory IA (40 Marks), ABL (10 Marks) [**Eligibility for SEE**: Min. 40% in each evaluation category - Theory IA & ABL]. **Laboratory Course:** PLA (30 Marks), Lab. CIE (20 Marks) [**Eligibility for SEE**: Min. 40% in each evaluation category – PLA & Lab. CIE]

Syllabus for the Academic Year 2026-27

Department: Mathematics			**Semester:**	**I**
Subject: Calculus and Differential Equations				
Subject Code:	**26ECMA101**	**L – T – P - C:**	**42-28-0-50(In Hrs)**	
			Credits:	**4**

Sl. No.	**Course Objectives**
1	**Understand** the fundamental concepts of ordinary differential equations, differential calculus, linear algebra, partial differentiation, and multiple integrals.
2	**Learn** the mathematical techniques and methods used for solving engineering and scientific problems involving differential equations, matrices, and multivariable calculus.
3	**Acquire** knowledge of analytical approaches for studying engineering problems using concepts of calculus, linear algebra, and differential equations.
4	**Study** the MATLAB tool for solving, visualizing, and interpreting mathematical models arising in real-world engineering applications

Module	**Description**	**Hrs**
I	**Elementary Linear Algebra**: Rank of matrices-Rank of a matrix by Echelon form, consistency of system of linear equations-homogeneous and non-homogeneous equations, Gauss elimination, and Gauss Seidel methods. Eigen values and Eigenvectors-properties, largest Eigen value and corresponding Eigen vector by Rayleigh's power method. Using modern tool to solve linear algebra problems. (Text 1: 2.7, 2.10, 2.13, 28.6, 28.7, 28.9, Text 3: MATLAB)	**8**
II	**Differential Calculus:** Basics of polar coordinates, polar curves, angle between the radius vector and the tangent curvature, radius of curvature-Cartesian, polar & parametric forms (without proof), center and circle of curvature (formulae only) and problems. Taylor's and Maclaurin's series for a function of a single variable (statements only) and problems. Solving and visualizing differential calculus using modern tools. (Text 1:4.7 to 4.12, 32.3, 4.4, Text 3: MATLAB)	**9**
III	**Partial Differentiation:** Partial derivatives definition and notations, higher order partial derivatives-problems, total differentials, total derivatives, composite functions and chain rule problems. Extreme values for a function of two variables, Jacobians-properties and problems. Method of Lagrange multipliers. Implementation using MATLAB. (Text 1: 5.1, 5.2, 5.4 to 5.7, 5.11, 5.12, Text 3: MATLAB)	**8**
IV	**Ordinary Differential Equations (ODE) of first order and first degree and nonlinear ODE:**	**9**

	Exact and reducible to exact differential equations- Integrating factors on $\frac{1}{N}\left(\frac{\partial M}{\partial y}-\frac{\partial N}{\partial x}\right)$ and $\frac{1}{M}\left(\frac{\partial M}{\partial y}-\frac{\partial N}{\partial x}\right)$ only. Linear and Bernoulli's differential equations. Orthogonal trajectories, L-R and C-R circuits. **Non-linear differential equations:** Introduction to general and singular solutions, Solvable for p only, Clairaut's equations, reducible to Clairaut's equations. Implementation using MATLAB. (Text 1: 11.10 to 11.12, 12.3, 11.13 to 11.14, Text 3: MATLAB)	
V	**Multiple Integrals:** Double integrals–Introduction and method of evaluation-problems. Change of order of integration and change of variables to polar coordinates-problems. Applications–area (Polar curve) volume and center of gravity. Triple integrals-introduction and method of evaluation and problems. Applications-volume of a solid and center of gravity. Implementation using MATLAB. (Text 1: 7.1 to 7.7, 7.10, Text 3: MATLAB)	**8**

Text Books:

Sl. No.	Text Book title	Author	Volume and Year of Edition
1	Higher Engineering Mathematics,	B. S. Grewal	43th Edition, 2015, Khanna Publishers, ISBN: 978-81-7409-195-5.
2	Advanced Engineering Mathematics	E. Kreyszig,	10th Edition (Reprint), 2016, John Wiley & Sons, ISBN: 978-04-70458-36-5.
3	MATLAB Programming for Engineers	Stephen J Chapman	7th Edition, Cengage, 2024. ISBN-9798214001531.

Reference Books:

Sl. No.	Text Book title	Author	Volume and Year of Edition
1	Advanced Engineering Mathematics	C. Ray Wylie, Louis C. Barrett, McGraw-Hill Book Co	6th Edition. 2017, ISBN:9780070722064
2	A Text Book of Engineering Mathematics	N.P.Bali and Manish Goyal	10th Edition Lakshmi Publishers, 2022, ISBN: 9788131808320.
3	Higher Engineering Mathematics	B.V.Ramana, Tata McGraw-Hill	11th Edition, Tata McGraw-Hill, 2017,ISBN:9780070634190

E-Resources Links:

1. https://nptel.ac.in/courses/111105121
2. https://nptel.ac.in/courses/111105035
3. https://nptel.ac.in/courses/111106100
4. https://nptel.ac.in/courses/111106101

Course Outcomes:

Course outcome	Descriptions
CO1	**Understand** the basic concepts of ordinary differential equations, calculus, linear algebra, and partial differentiation. (L1)
CO2	**Apply** the fundamental knowledge of linear algebra, differential calculus, partial differentiation, multiple integrals to engineering problems. (L2)
CO3	**Analyze** the complex engineering problems using appropriate mathematical techniques from linear algebra, calculus, differentiation, partial differentiation, and multiple integrals. (L2)
CO4	**Use** modern tool to solve/ visualize engineering problems. (L3)
CO5	**Enhance** the comprehensive understanding of linear algebra, differential calculus, differential equations, partial differentiation, multiple integrals gained to demonstrate the problems arising in real world situations. (L3)

Course Articulation Matrix:

PO/PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	3	2									
CO2	3	1	1								
CO3	3	2	1								1
CO4					1						1
CO5		2	1								1

Course Assessment and Evaluation:

Continuous Internal Evaluation (CIE): 50 Marks

Sl. No.	Components		Duration (min)	Marks Conducted for	Marks reduced to	40% Min Marks in each component to write SEE
1	Theory-Internal Assessment	IA-1	90	50	20	16
		IA-2	90	50	20	
2	Activity Based Learning	ABL1	-	25	5	4
		ABL2	-	25	5	
Total CIE				150	50	20

IA-1 Syllabus: 2 ½ Module, IA-2 Syllabus: 2 ½ Module

Activity Based Learning (ABL): Online course with certification, Hobby project, Simulations, Industrial Visits, Community-Based Learning, Case-study, Problem-Based Learning, Peer Teaching, web page design, student publications, Hackathons, Quiz (Leetcode, GitHub, Hackaranks and company specific quiz), Student Development program(1 week/online or offline), Students complete hands-on assignments and lab work (using tools like MATLAB) to satisfy practical/skill development hours. Activities include implementation of the mathematical problems …Etc..

Semester End Examination (SEE) : Max 100 Marks, Duration: 3 Hrs

The question paper shall contain 10 full questions (20 marks each)**,** with **2** questions from each of the 5 Modules**,** ensuring 100% syllabus coverage**.** Students shall answer any 5 full questions with 1:1 choice. Each question may have a maximum of 4 sub-divisions.

Minimum passing Marks : 40% of Max Marks

Department: Physics	**Semester:**	**I**

Subject: Quantum Physics and Electronic Sensors				
Subject Code:	**26ECPHI102**	**L – T – P - S:**	**42-0-28-50 (In Hrs)**	
			Credits	**4**

Sl. No.	**Course Objectives**
1	**Understand** the principles of quantum mechanics and its applications.
2	**Analyze** the electrical and electronic properties of materials.
3	**Apply** the concepts of photonics and optical fibers.
4	**Describe** the concepts of nanotechnology and superconductivity.
5	**Explore** the principles and operation of sensor and transducers.

Module	**Description**	**Hrs**
I	**Quantum Physics:** Introduction; Wave-particle dualism; matter waves and its characteristics; de-Broglie hypothesis; Phase velocity and Group velocity; Heisenberg Uncertainty Principle and its applications; Wave function and its properties; Probability density and normalization; Schrödinger Time Independent Wave Equation; Particle in one-dimensional infinite potential well; Numerical problems. (Text 3: 4.1 – 4.3, 4.4 – 4.6, 4.7, 4.8, 5.1 – 5.3, 5.4 – 5.6, 5.7, 5.8; Text 1: 1.1 – 1.3, 1.4 – 1.6, 1.7 – 1.9, 1.10 – 1.12)	**9**
II	**Electrical Conductivity of Metals:** Review of free electron theory of metals; Quantum free electron theory of metals-Assumptions; Drift velocity; Relaxation time; Collision time; Electrical conductivity (derivation); Fermi Energy; Fermi Velocity and Fermi Temperature; Numerical problems. **Energy Band Theory of Solids**: Conductors, Semiconductors and Insulators based on bandgap; Intrinsic and Extrinsic Semiconductors; Carrier concentration; Fermi level in intrinsic and extrinsic semiconductors; Hall Effect and applications; Direct and Indirect Band Gap Semiconductors; Numerical problems. (Text 1: 2.1 – 2.1.4, 2.2 – 2.2.5, 2.3 – 2.3.4, 2.4 – 2.4.3, 2.5 – 2.5.2, 3.1 – 3.1.4, 3.2 – 3.2.5, 3.3 – 3.3.3, 3.4 – 3.4.2; Text 2: 8.1 – 8.1.3, 8.2 – 8.2.4, 8.3 – 8.3.2, 9.1 – 9.1.4, 9.2 – 9.2.3)	**9**
III	**Photonics:** Introduction; Three types of interaction with matter; Expression for energy density in terms of Einstein Coefficients; Semiconductor Laser – Principle, Construction, Working and Applications; Holography- principle and its applications; Numerical	**8**

	problems. **Optical Fibers** – Principle; Structure of Optical Fiber; Expression for Numerical Aperture; Modes of Propagation; Classification of Fibers; Fiber Losses and Mechanisms - Radiation Loss; Optical Fiber Communication System; Advantages and Disadvantages of Optical Fiber Communication System; Numerical problems. (Text 1: 4.1 – 4.1.3, 4.2 – 4.2.4, 4.3 – 4.3.5, 4.4 – 4.4.3, 4.5 – 4.5.4, 4.6 – 4.6.2, 5.1 – 5.1.4, 5.2 – 5.2.3, 5.3 – 5.3.2, 5.4 – 5.4.3; Text 2: 12.1 – 12.1.4, 12.2 – 12.2.3, 12.3 – 12.3.2, 13.1 – 13.1.3, 13.2 – 13.2.4)	
IV	**Nanotechnology:** Introduction to Nano Science and Nanotechnology; Classification of Nanomaterials (0D, 1D, 2D and 3D), Nanocomposite materials; Smart materials; MEMS; Carbon nanotubes its applications; Types of Nano-scale Systems. **Superconductivity:** Introduction; Temperature dependence of resistivity in superconducting metals; Effect of magnetic field (Meissner effect); Type-I & Type-II superconductors; Temperature dependence of critical field; BCS theory and High temperature superconductors; Applications of superconductors; Numerical problems. (Text 2: 14.1 – 14.1.4, 14.2 – 14.2.3, 14.3 – 14.3.5, 14.4 – 14.4.3, 14.5 – 14.5.2, 15.1– 15.1.4, 15.2 – 15.2.3, 15.3 – 15.3.2, 15.4 – 15.4.3; Text 1: 3.1 – 3.1.4, 3.2 – 3.2.3, 3.3 – 3.3.4, 3.4 – 3.4.2, 3.5 – 3.5.3)	**8**
V	**Sensors and Transducers:** Introduction; Characteristics of Sensors; Principle, Construction and Working of LDR, RTD and Thermistors; Piezoelectric Sensors; Sensor applications in IoT; Wireless Communication; Biomedical Electronics and Embedded Systems. (Text 1: 5.1 – 5.1.3, 5.2 – 5.2.4, 5.3 – 5.3.3, 5.4 – 5.4.2, 5.5 – 5.5.3, 5.6 – 5.6.2, 5.7 –5.7.4, 5.8 – 5.8.3, 5.9 – 5.9.2, 5.10 – 5.10.3; Text 2: 16.1 – 16.1.4, 16.2 – 16.2.3, 16.3– 16.3.2, 17.1 – 17.1.3, 17.2 – 17.2.4)	**8**

LAB CONTENT:

Sl. No.	Experiment Description
1	Determination of Frequency of AC source by using Sonometer.
2	Determination of Band gap of semiconductor.
3	Determination of Fermi energy of copper wire.
4	Determination of Wavelength of Semiconductor Laser.
5	Determination of Planck’s constant using LED’s of known wavelengths.
6	Verification of Stefan’s law.
7	I-F characteristics of LCR Series resonance circuit.
8	I-F characteristics of LCR parallel resonance circuit.
9	Measurement of Numerical Aperture and Acceptance Angle of Optical Fiber.
10	Determination of Attenuation Coefficient of Optical Fiber.

Text Books:

Sl. No.	Text Book title	Author	Volume and Year of Edition
1	Engineering Physics	Satyendra Sharma and Jyotsna Sharma	Pearson Education, 2018.
2	Engineering Physics	S. L. Kakani and Shubhra Kakani	CBS Publishers, 2020.
3	Concepts of Modern Physics	Arthur Beiser	McGraw Hill Education, 6th Edition.

Reference Books:

Sl. No.	Text Book title	Author	Volume and Year of Edition
1	Solid State Physics	S. O. Pillai	New Age International.
2	Introduction to Quantum Mechanics	Griffiths D. J.	Pearson.
3	Optical Electronics	Ajoy Ghatak and K. Thyagarajan	Oxford University Press
4	Nanotechnology: Principles and Practices	Sulabha Kulkarni,	Springer.

E-Resource Links:

1. https://www.youtube.com/watch?v=R3YIlcCZWxQ&list=PLQzUXa8lZVq8Zciw0MsOdPJ1t-bpPKV6_
2. https://www.youtube.com/watch?v=y21fPylMk6E
3. https://www.youtube.com/watch?v=4jqQrC00PrY
4. https://www.youtube.com/watch?v=WgzynezPiyc
5. https://www.youtube.com/watch?v=-VYhfR8Fv2I
6. https://www.youtube.com/watch?v=SHoGV-sezNI&list=PLwdnzlV3ogoU1IvWa-_5u9iGVimN2uT3h
7. https://www.youtube.com/watch?v=0EWCqCIsFOA&list=PLyqSpQzTE6M8682dGkNTN8936vSY4CbqZ
8. https://www.youtube.com/watch?v=zxYeJW9v6OU&list=PLwymdQ84KI-w5DwDzqO_4hWsB2Jc4_eBy

Course Outcomes:

Course outcome	Descriptions
CO1	**Understand** the principles of quantum mechanics.
CO2	**Analyze** the electrical properties of metals and semiconductors.
CO3	**Apply** the concepts of LASERs and optical fibers.
CO4	**Evaluate** the properties of nanomaterials and superconductors.
CO5	**Demonstrate** the principles and operation of Sensors and Transducers.

Course Articulation Matrix:

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

Course Assessment and Evaluation:

Continuous Internal Evaluation (CIE): 50 Marks						
Sl. No.	**Components**		**Duration (min)**	**Marks Conducted for**	**Marks reduced to**	**40% Min Marks in each component to write SEE**
1	Theory-Internal Assessment	IA-1	90	50	15	12
		IA-2	90	50	15	
2	Periodic Lab Assessment		-	30	10	4
3	Lab CIE		-	20	10	4
	Total CIE			**150**	**50**	**20**

IA-1 Syllabus: 2 ½ Module , IA-2 Syllabus: 2 ½ Module
Rubrics for Periodic Lab Assessment: Attendance (5M), Lab record (10 M), Conduction of Experiments(10M) and Viva(5M)-**Total 30M**
Lab CIE: Write-up(5M), Conduction/Execution/Demonstration(10M) and Viva(5M)-**Total**

20M **One Open Ended Experiment/ Project:** Experimental / project Design (4 marks), Execution/demonstration (3 marks) and Analysis/Viva (3 marks)- **Total 10M**
Semester End Examination(SEE) : **Max 100 Marks, Duration: 3 Hrs** The question paper shall contain **10 full questions (20 marks each),** with **2 questions from each of the 5 Modules**, ensuring **100% syllabus coverage**. Students shall answer **any 5 full questions** with **1:1 choice.** Each question may have a **maximum of 4 sub-divisions.** **Minimum passing Marks : 40% of Max Marks**

Department: Mechanical Engineering			**Semester:**	**I**
Subject: Introduction to Mechanical Engineering				
Subject Code:	**26ECME103**	**L – T – P - S:**	**28-0-0-32(In Hrs)**	
			Credits:	**2**

Sl. No.	Course Objectives
1	**Acquiring** a basic understanding about scope of mechanical engineering, Identify different sources of energy and their conversion process.
2	**Acquire** a basic knowledge of various manufacturing techniques, Refrigeration & Power Transmission systems.
3	**Understand** the basics and working principle of IC engines, EV's, Hybrid electric vehicles.
4	**Acquiring** a basic insight into future mobility such as Mechatronics, robotics, CNC and Additive Manufacturing.

Module	Description	Hrs
I	**Introduction:** Role of Mechanical Engineering in Industries and Society-Emerging Trends and Technologies in different sectors such as Energy, Manufacturing, Automotive, Aerospace, and Marine sectors. **Energy Sources:** Introduction and applications of Energy sources like Fossil fuels, nuclear fuels, Hydel, Solar, wind, and biofuels. **Energy conversion:** Introduction and basic working principles of Pelton Turbine and Centrifugal pump. (Text 2: Ch- 1, 1.1, 1.2, 8.8, 7.1, 7.2, 7.3, 15.5, 17.7, 18.3, 19.4, 19.8, 19.9.)	**6**
II	**Fundamentals of Refrigeration** Definitions, refrigerating effect, Ton of Refrigeration (TR), and Coefficient of Performance (COP). **Refrigerants:** Desirable thermodynamic and physical properties, nomenclature, and common examples (e.g., Freon, Ammonia). **Vapor Compression Refrigeration (VCR):** Working principles, essential components (compressor, condenser, evaporator, expansion device), and cycle representation. **Vapor Absorption Refrigeration (VAR):** Principles, operation, and comparison of absorption systems vs. compression systems (e.g., Aqua-Ammonia and Lithium Bromide systems). (Text 2:Ch:14.1,14.2,14,3,14.4,14.5)	**6**
III	**Engines:** Introduction, petrol engine, diesel engines, Working of four Stroke engines, applications. **Insight into Future Mobility:** Electric and Hybrid Vehicles, Components of Electric and Hybrid Vehicles. Advantages and disadvantages of EVs and Hybrid vehicles. **Power Transmission systems**: Classification of gears, simple &	**6**

	compound gear trains, concepts of automatic and CVT transmission. (Text 2:Ch: 10.1,10.2,10,3) (RB2:Ch:15.3,15.4)	
IV	**INTRODUCTION TO MECHATRONICS AND ROBOTICS** **Introduction to Mechatronics :** Systems of mechatronics, advantages and disadvantages, measurement systems and control systems, open loop control systems and close loop control systems (with simple block diagrams), applications. **Introduction to Robotics**: classification of robots, parts of robots, applications. (Text 2:Ch- 26.19 TO 26.24.) (RB4:Ch1.1-1.10,10.1-10.5)	**5**
V	**Manufacturing** overview, classification of manufacturing processes, process selection criterion. **Principles** of Welding (**arc welding process**), soldering, brazing. **Introduction** to machine tools – lathe and drilling machine. **Lathe operations**: Turning, facing, knurling, **Drilling machine operations:** Drilling, reaming, tapping. **Introduction to CNC**, components, advantages and applications. Basic principles of 3Dprinting(**stereolithography process**). (Text 2: 23.4, 23.5, 25.7, 25.8, 25.11, 25.12, 26.14., RB2: 6.1,6.2, RB4: 9.2, A 8.7)	**5**

Text Books:

Sl. No.	Text Book title	Author	Volume and Year of Edition
1	Basic Mechanical Engineering	Pravin Kumar	Second edition (2018), Pearson Education;
2	Basic Mechanical Engineering	M.P. Poonia& S.C. Sharma	First Edition (2018), Khanna Book Publishing Company

Reference Books:

Sl. No.	Text Book title	Author	Volume and Year of Edition
1	Basics of Mechanical Engineering	Vinkel Kumar Arora, Gurjeet Singh, KrishanVerma & LalitBatra	First Edition (2023), New India Publishing Agency
2	Basic Mechanical Engineering	Basant Agrawal	First Edition (2008), Wiley India
3	Fundamentals of Mechanical Engineering and Mechatronics	AvinashMalladi, N. Ashok, S. Balu Mahandiran&Sambhrant Srivastava	First Edition (2021), Quill Tech Publications

4.	A Textbook of Mechatronics	R K RAJPUT	S.CHAND & COMPANY PVT.LTD

Course Outcomes:

Course outcome	Descriptions
CO1	**Recognize** the significance of mechanical engineering principles to solve the problems of social relevance & Energy sources and conversion.
CO2	**Explain** fundamentals of Mechatronics and Robotics their industrial applications.
CO3	**Understand** the working of I.C. engines, power transmission elements and future mobility vehicles.
CO4	**Demonstrate** basic operations of machine tools and analyze CNC system applications.
CO5	**Describe** the working principles and applications of various manufacturing processes &Refrigeration system.

E Resourses Links:

1. https://www.youtube.com/watch?v=Fvo2lCtgO-w
2. https://www.youtube.com/watch?v=MwYNViHUkrA
3. https://onlinecourses.nptel.ac.in/e-learning/preview/noc21_ch11
4. https://www.youtube.com/watch?v=elUIbOnJc7c
5. https://onlinecourses.nptel.ac.in/e-learning/preview/noc23_me31
6. https://nptel.ac.in/courses/107106088
7. https://www.youtube.com/watch?v=q6BYr5-fq5U
8. https://www.youtube.com/watch?v=AAJyUk4wHfI
9. https://www.youtube.com/watch?v=UrST-2yu8zQ
10. https://nptel.ac.in/translation
11. https://www.youtube.com/watch?v=kb0RowB8Myo
12. https://onlinecourses.nptel.ac.in/e-learning/preview/noc21_me115

Course Articulation Matrix:

PO/PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	1				2				2	1		1
CO2	2	2			2	2	1			2	2	1	
CO3	3	2			1	2				2	2		1
CO4	3	2	2		3				2	2	2	3	
CO5	2	2		1	3	2	2	1	2	3	3	3	3

Course Assessment and Evaluation:

Continuous Internal Evaluation (CIE): 50 Marks

Sl. No.	Components		Duration (min)	Marks Conducted for	Marks reduced to	40% Min Marks in each component to write SEE
1	Theory-Internal Assessment	IA-1	90	50	20	16
		IA-2	90	50	20	
2	Activity Based Learning	ABL1	-	25	5	4
		ABL2	-	25	5	
Total CIE				150	50	20

IA-1 Syllabus: 2 ½ Module , IA-2 Syllabus: 2 ½ Module

Activity Based Learning(ABL): Online course with certification, Hobby project, Simulations, Industrial Visits, Community-Based Learning, Case-study, Problem-Based Learning, Peer Teaching, web page design, student publications, Hackathons, Quiz(Leetcode, GitHub, Hackaranks and company specific quiz), Student Development program(1 week/online or offline), ……Etc

Semester End Examination(SEE) : Max 100 Marks, Duration: 3 Hrs

The question paper shall contain**10 full questions (20 marks each),** with **2 questions from each of the 5 Modules,** ensuring**100% syllabus coverage.** Students shall answer **any 5 full questions** with **1:1 choice**. Each question may have a **maximum of 4 sub-divisions**. **Minimum passing Marks : 40% of Max Marks**

Syllabus for the Academic Year 2026-27

Department: Civil Engineering			**Semester:**	**I**
Subject: Introduction to Civil Engineering				
Subject Code:	**26ECCE104**	**L – T – P - S:**	**28-0-0-32(In Hrs)**	
			Credits:	**2**

Sl. No.	Course Objectives
1	**Understand** the scope of various fields of Civil Engineering and the role of Civil Engineer in economic development of a country
2	**Understand** the basic concepts of smart buildings and automation systems.
3	**Understand** the principles of surveying, GPS, GIS and satellite-based technologies.
4	**Understan**d the laws governing mechanics, and apply them to analyse the concurrent forces
5	**Analyse** the equilibrium of a coplanar concurrent force system

Module	Description	Hrs
I	**Introduction to Civil Engineering:** Scope of major fields of civil Engineering- Surveying, Geotechnical Engineering, Structural Engineering, Hydraulics & Water Resources, Transportation Engineering, Environmental Engineering. Role of Civil Engineer in infrastructural development, Role of infrastructure in the economic development of a country. (Text 1: 1.1,1.2,1.3, 1.4,1.5)	5
II	**Smart Buildings and Automation:** Basic parts of buildings – foundation, walls, columns, beams and roofs. Introduction to smart buildings. Automatic lighting systems, temperature control systems, fire alarm systems, and home automation basics. *(*Text 4: 7 – 7.1, 7.2, 7.3; Text 3: Chapter 2, Chapter 4)	6
III	**Surveying, Gps and Satellite Systems:** Introduction to surveying and land measurement. Introduction to GPS and its applications. Smartphone navigation systems. Basics of remote sensing and satellite imaging. Introduction to GIS. Drone applications in mapping and planning. Revenue surveying and calculation of revenue areas by graphical methods (acres, gunters and cents). (Text 2: 1.1,1.2,1.11,1.12 Text 5: 1 – 1.1, 1.2, 1.3*)*	6
IV	**Force and force system:** Basic idealizations -Particle, Continuum and Rigid body. Force-Definition and characteristics, classification of force systems, composition and resolution of forces. Principle of transmissibility. Simple Numerical problems on the above. Moment of a force, couple and their characteristics, Varignon's theorem of moments, and numerical problems.(Text 1: 4.4, 4.6, 4.7, 4.9, 4.12, 4.13, 6.4, 6.5)	5

V	**Equilibrium of coplanar concurrent forces:** Definition of Equilibrant, Equilibrium, Free Body Diagram, Conditions of Equilibrium. Lami's theorem and its problems. (Text 1: 7.1,7.2,7.3,7.4,7.6,7.8)	6

Text Books:

Sl. No.	Text Book title	Author	Volume and Year of Edition
1	Elements of Civil Engineering and Mechanics	B K Kolhapure	8th Edition, Jan 2014
2	Surveying - 1	S K Duggal	4th Edition 2013
3	Sensors and Transducers	D. Patranabis	Tata McGraw-Hill Education, Second Edition, 2013**.**
4	Basic Civil Engineering	S.S. Bhavikatti	New Age International Publishers, 3rd Edition, 2022**.**
5	Remote Sensing and GIS	Basudeb Bhatta	Oxford University Press, 3rd Edition, 2020.

Reference Books:

Sl. No.	Text Book title	Author	Volume and Year of Edition
1	Smart Cities and Urban Development	Vinod Kumar Jain	CRC Press, 2019 Edition
2	Internet of Things: Architecture and Design Principles	Raj Kamal	McGraw-Hill Education,1st Edition, 2017

Course Outcomes:

Course outcome	Descriptions
CO1	**Explain** the scope of various fields of Civil Engineering and the role of Civil Engineer in economic development of a country (L2)
CO2	**Describe** smart buildings, building components and automation systems. (L2)
CO3	**Interpret** surveying, GPS, GIS and satellite technologies used in infrastructure applications. (L2)
CO4	**Explain** laws governing mechanics, and apply them to analyse the concurrent forces. (L2)
CO5	Able to **Analyse** the equilibrium of a coplanar concurrent force system . (L1)

Course Articulation Matrix:

PO/PSO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	2												
CO2	2	1		2									
CO3	2	1		1	1								
CO4	2												
CO5	2												

Course Assessment and Evaluation:

Continuous Internal Evaluation (CIE): 50 Marks

Sl. No.	Components		Duration (min)	Marks Conducted for	Marks reduced to	40% Min Marks in each component to write SEE
1	Theory-Internal Assessment	IA-1	90	50	20	16
		IA-2	90	50	20	
2	Activity Based Learning	ABL1	-	25	5	4
		ABL2	-	25	5	
Total CIE				150	50	20

IA-1 Syllabus: 2 ½ Module , IA-2 Syllabus: 2 ½ Module

Activity Based Learning(ABL): Online course with certification, Hobby project, Simulations, Industrial Visits, Community-Based Learning, Case-study, Problem-Based Learning, Peer Teaching, web page design, student publications, Hackathons, Quiz (Leetcode, GitHub, Hackaranks and company specific quiz), Student Development program(1 week/online or offline), ……Etc

Semester End Examination(SEE) : Max 100 Marks, Duration: 3 Hrs

The question paper shall contain **10 full questions (20 marks each),** with **2 questions from each of the 5 Modules,** ensuring **100% syllabus coverage.** Students shall answer **any 5 full questions** with **1:1 choice**. Each question may have a **maximum of 4 sub-divisions**.

Minimum passing Marks : 40% of Max Marks

Department: Electronics and Communication Engineering			**Semester:**	**1**
Subject: Basic Electronics Engineering				
Subject Code:	**26ECPS105**	**L – T – P – S:**	**42-0-0-48 (In Hrs)**	
			Credits:	**3**

Sl. No.	**Course Objectives**
1	**Study** the basic characteristics and operation of electronic devices & digital electronics.
2	**Acquire** the knowledge of transistor configuration and biasing techniques.
3	**Understand** different analog modulation techniques.
4	**Learn** the characteristics of operational amplifier and signal processing applications.

Module	**Description**	**Hrs**
I	**Semiconductor diode and its applications:** Review of PN–junction, diode equation, VI characteristics, effect of temperature, diode approximation, Half wave rectifier, Full wave rectifier, Capacitor filter (qualitative analysis). Zener diode: Working, VI characteristics, Zener regulator, clipping and clamping circuits. (Text 1: 1.1, 1.2, 1.6,1.8,1.9, 1.15, 2.7. 2.8, 2.9, 2.10)	**9**
II	**Transistors and its applications:** Bipolar junction transistor, CB and CE configuration and characteristics, Fixed bias and voltage divider bias, DC load line and operating point, Single stage RC coupled amplifier and its frequency response. **Field effect transistor**: Classification, Enhancement MOSFETs (N-channel): Construction, working and drain characteristics**. (**Text 1:3.1, 3.2,3.3, 3.4, 3.5, 3.6, 4.1, 4.2, 4.3, 4.5,5.1, 5.2, 5.8.)	**9**
III	**Operational amplifiers and applications:** Block Diagram of Op-Amp, Characteristics of an Ideal Op-Amp: Gain, Bandwidth, Input & Output Impedances, CMRR, PSRR, Slew Rate, Input Offset Voltage. Pin configuration and Typical Parameters of Op-Amp µA-741. Differential Amplifier, Op-Amp Applications: Inverting Amplifier, Non-Inverting, Amplifier, Voltage Follower, Summer, Integrator, Differentiator. (Text 1: 13.1, 13.2, 13.3, 13.4, 13.5.)	**9**
IV	**Introduction to communication systems:** Block diagram of a general communication system, Need for modulation, types of modulation: AM, FM,	**7**

	PM. AM Modulator and Envelope detector, Difference between AM and FM. (Text 2: 2.1,2.2,2.6,2.7.)	
V	**Digital electronics:** Introduction to number systems, De-Morgan's theorem, Boolean laws, Logic gates, Half adder & Full adder (Using Basic gates), Generation of switching equation from truth table, Canonical forms (2 & 3 variables), K-map. (Text 3: 2.1, 2.2, 2.4, 2.5, 2.6, 3.1, 3.2, 3.3 ,3.4, 3.5, 3.6, 3.7, 3.8, 3.9, 4.4, 4.5)	**8**

Text Books:

Sl. No.	Text Book title	Author	Volume and Year of Edition
1	Electronic Devices and Circuit Theory	Robert L Boylestad, Louis Nashelsky	Pearson Publication- 2005 ISBN: 81-203-2064-6
2	Communication systems	Simon Haykin	John Wiley & Sons-2007 ISBN:81-265-0904-X
3	Digital Principles and Design	Donald D. Givone	Tata McGraw- Hill-2002 ISBN: 0070529006-X

Reference Books:

Sl. No.	Text Book title	Author	Volume and Year of Edition
1	Basic Electronics	D P Kothari, I J Nagrath	McGraw Hill Education-2014
2	Op-Amp and Linear Integrated Circuits	Ramakant A. Gayakwad	Prentice Hall India-2011
3	Electronics Devices and Circuits	David A. Bell	Prentice Hall India-2008

Course outcome	Descriptions
CO1	**Outline** the characteristics of basic electronic devices- Diode, Transistor, JFET, MOSFET. (L2)
CO2	**Illustrate** configurations of a transistor, the biasing techniques and its applications. (L2)
CO3	**Design** OP-AMP application circuits. (L3)
CO4	**Interpret** the fundamental concepts of communication system. (L2)
CO5	**Solve** digital logic design problems using Boolean laws, logic gates, adders, k-maps and canonical forms. (L3)

Course Outcomes:

E-Resources Links:

1. https://youtu.be/ziJG9QEmBoQ?si=1hY1H4Io9uJMwaeA
2. https://youtu.be/F-ZITvATRmA?si=NOntxZbtCWzJbSlP
3. https://youtu.be/uJpM3PKXcLY?si=FInz2dIdv79x6nlP
4. https://youtu.be/5pJXBASisgo?si=XKmzTaTDxXtQC5h9
5. https://youtu.be/R2S9yzjPTAQ?si=o_Sm1e0VeQ0w3Psk
6. https://youtu.be/lzUZSkrVBZM?si=PcKT9IY-EFITTM2e
7. https://youtu.be/4yu83jP614o?si=SloBNF4PyowYXPA1
8. https://youtu.be/v9dit1C7YsA?si=nK1OZZtzFNAu75ro
9. https://youtu.be/u5j32gDYmhQ?si=Bxhnp6VCTyEnqb8S
10. https://youtu.be/5zH8mD9d7bg?si=PbxpDbu7oSigmvza
11. https://youtu.be/qhjj6WG7Rgc?si=Xfapxgix1WhA_geq
12. https://youtu.be/jo5_A8_jxlY?si=8SLb5QojwN_y15oW

Course Articulation Matrix:

PO/PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	2	2											
CO2	2	2											
CO3	2	2	1										
CO4	2	1	2										
CO5	2	2	1										

Course Assessment and Evaluation:

Continuous Internal Evaluation (CIE): 50 Marks						
Sl. No.	Components		Duration (min)	Marks Conducted for	Marks reduced to	40% Min Marks in each component to write SEE
1	Theory-	IA-1	90	50	20	16

	Internal Assessment	IA-2	90	50	20	
2	Activity Based Learning	ABL1	-	25	5	4
		ABL2	-	25	5	
Total CIE				150	50	20

IA-1 Syllabus: 2 ½ Module , IA-2 Syllabus: 2 ½ Module

Activity Based Learning (ABL): Online course with certification, Hobby project, Simulations, Industrial Visits, Community-Based Learning, Case-study, Problem-Based Learning, Peer Teaching, web page design, student publications, Hackathons, Quiz (Leetcode, GitHub, Hackaranks and company specific quiz), Student Development program(1 week/online or offline), ……Etc

Semester End Examination (SEE) : Max 100 Marks, Duration: 3 Hrs

The question paper shall contain 10 full questions (20 marks each)**,** with **2** questions from each of the 5 Modules**,** ensuring 100% syllabus coverage**.** Students shall answer any 5 full questions with 1:1 choice. Each question may have a maximum of 4 sub-divisions.

Minimum passing Marks : 40% of Max Marks

Department: Computer Science Engineering			**Semester:**	**I**
Subject: C - Programming				
Subject Code:	**26ECCSI106**	**L-T-P-S**	**42-0-28-50**	**(In Hrs)**
			Credits:	**4**

Sl. No.	Course Objectives
1	To **impart** adequate knowledge on the need of programming languages and problem solving techniques.
2	To **develop** programming skills using the fundamentals and basics of C Language.
3	To **understand** the effective usage of data types, operators, decision making and looping statements.
4	To **enable** effective usage of arrays, strings, functions, pointers, structures and unions.

Module	Description	Hrs
I	Overview of Problem solving techniques (pseudocodes, algorithms and flowcharts). **Text 2:** 1.1, 1.2 **Overview of C**: Basic structure of C program, C-Tokens, Keywords and Identifiers, Constants, Variables, Data Types, Declaration of Variables, Defining Symbolic Constants. **Operators and Expressions**: Arithmetic Operators, Relational Operators, Logical Operators, Assignment Operators, Increment and Decrement Operators, Conditional Operators, Bitwise Operators, Special Operators, Arithmetic Expressions, Evaluation of Expressions, Precedence of Arithmetic Operators. Type Conversion in Expressions, Operator Precedence and Associativity. **Managing Input and Output Operations**: formatted and unformatted Input and Output statements, Example programs. **Text 1:** 1.8, 2.3-2.8, 2.11, 3.2-3.15, 4.2- 4.5	**9**
II	**Decision Making and Branching**: Decision Making with Simple if Statement, if...else Statement, Nesting of if…else statements, else…if Ladder, switch Statement, goto statement. Example programs. **Decision Making and Looping**: The While statement, The do statement and for statement, unconditional branching: break, goto, continue, return, Example programs. **Text 1:** 5.1-5.7, 5.9, 6.2-6.5	**9**
III	**Arrays**: One dimensional arrays- declaration and initialization of one dimensional arrays, Two dimensional arrays - declaration and initialization of two dimensional arrays, Example programs. **Strings**: Declaringand Initializing String Variables, Reading and Writing	**8**

	strings, String-Handling Functions, Example programs. **Text 1:** 7.1-7.6, 8.2, 8.3,8.8	
IV	**Pointers**: Declaring Pointer Variables, Initialization of pointer Variables, Accessing a variable through its pointer. **Functions**: Need for User-Defined Functions, Elements of User Defined Functions, Category of Functions, Recursion. Example programs. **Text 1:** 11.4-11.6, 9.2,9.4,9.9,9.16	**8**
V	**Structures**: Defining a Structure, Declaring Structure Variables, Accessing Structure Members, Structure Initialization, Example programs. **Unions**: Defining union, declaring union variable, union initialization, Example programs. **Text 1:** 10.2-10.5, 10.12	**8**

LAB CONTENT:

Sl. No.	Experiment Description
1	Develop a C program to find and output all the roots of a given quadratic equation for non-zero coefficients. In case of errors, your program should display suitable error messages.
2	Develop a C program to perform the operations like addition, subtraction, multiplication and division only on integers. Use switch statement.
3	Develop a C program to reverse a given integer number and check whether it is PALINDROME or not. Output the given number with suitable message.
4	Develop a C program to generate and display the first 'N' FIBONACCI numbers.
5	Develop a C program to display and count the number of PRIME numbers in the range N1 and N2.
6	Develop a C program to read N integer numbers (in ASCENDING order) into an array. Conduct a BINARY search for a given KEY number and display success or failure in the form of a suitable messages.
7	Develop a C program to sort N integer number in ASCENDING/DESCENDING using BUBBLE sort. Display both input array and sorted array with suitable headings.
8	Develop a C program to read two matrices A(M*N) and B(P*Q) and perform ADDITION or SUBTRACTION of A and B. Find the TRACE of the resultant matrix.
9	Develop a C program to read two strings and CONCATENATE them (without using library functions). Output the given strings along with the concatenated string.
10	Develop a C program to demonstrate the concept of CALL BY VALUE and CALL BY REFERENCE.

Text Books:

Sl. No.	Text Book title	Author	Volume and Year of Edition

1	Programming in ANSI C	E. Balagurusamy	9th Edition, Tata McGraw-Hill Publication, 2024. ISBN-10: 9355326726 ISBN-13: 978-9355326720
2	Programming Techniques through C: A Beginners Companion	M.G. Venkateshmurthy	Pearson Education; 1st edition (1 January 2002); ISBN-10 : 9788131705087 ISBN-13 : 978-8131705087

Reference Books:

Sl. No.	Text Book title	Author	Volume and Year of Edition
1	Schaum's outlines, Programming with C	Byron Gottfried	3rd Edition, Tata McGraw-Hill Publication, 2017. ISBN-10: 0070145903 ISBN-13: 978-0070145900
2	C : How to Program	Paul Deffel and Harvey Deitel	8th Edition, Pearson, 2015. ISBN- 10: 9780133976892 ISBN-13: 978-0133976892
3	Let us C	Yashwant Kanetkar	15th Edition, BPB Publication, 2016. ISBN-10: 8183331637 ISBN-13: 978-8183331630

E - Resourse Links:

1. https://infyspringboard.onwingspan.com/web/en/login
2. https://leetcode.com/
3. https://www.geeksforgeeks.org/c/c-programming-language/
4. https://www.programiz.com/c-programming

Course Outcomes:

Course outcome	Descriptions
CO1	**Describe** the basic elements of C Programming.
CO2	**Solve** mathematical problems using operators and expressions.
CO3	**Apply** programming constructs of C language to solve problems.
CO4	**Implement** solutions to problems using derived data types.
CO5	**Explore** modular programming and user-defined data types.

Course Articulation Matrix:

PO/PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3												
CO2	1	2	2										
CO3		2	2										
CO4		2	2	1									
CO5		1	2										

Course Assessment and Evaluation:

Continuous Internal Evaluation (CIE): 50 Marks						
Sl. No	**Components**		**Duration (min)**	**Marks Conducted for**	**Marks reduced to**	**40% Min Marks in each component to write SEE**
1	Theory- Internal Assessment	IA-1	90	50	15	12
		IA-2	90	50	15	
2	Periodic Lab Assessment		-	30	10	4
3	Lab CIE		-	20	10	4
	Total CIE			**150**	**50**	**20**

IA-1 Syllabus: 2 ½ Module , IA-2 Syllabus: 2 ½ Module
Rubrics for Periodic Lab Assessment: Attendance (5M), Lab record (10 M), Conduction of Experiments(10M) and Viva(5M)-**Total 30M**
Lab CIE: Write-up(5M), Conduction/Execution/Demonstration(10M) and Viva(5M)-**Total 20M**
One Open Ended Experiment/ Project: Experimental / project Design (4 marks), Execution/demonstration (3 marks) and Analysis/Viva (3 marks)- **Total 10M**

Semester End Examination(SEE) : Max 100 Marks, Duration: 3 Hrs
The question paper shall contain 10 full questions (20 marks each), with 2 questions from each of the 5 Modules, ensuring 100% syllabus coverage. Students shall answer any 5 full questions with 1:1 choice. Each question may have a maximum of 4 sub-divisions.
Minimum passing Marks : 40% of Max Marks

Department: Electronics and Communication Engineering			**Semester:**	**1**
Subject: Basic Electronics Lab				
Subject Code:	**26ECPSL107**	**L – T – P – S:**	**0-0-28-2 (In Hrs)**	
			Credits:	**1**

Sl. No.	**Course Objectives**
1	**Understand** the characteristics and applications of semiconductor devices.
2	**Study** the various applications of Operational Amplifier.
3	**Learn** the truth table of digital ICs and design combinational circuits.

LAB CONTENT:

Sl. No.	**Experiment Description- Basic Hardware Experiments**
1	Conduct an experiment to study the load regulation and line regulation characteristics of a Zener diode voltage regulator.
2	Conduct an experiment to test clipping and clamping circuits to obtain desired Transfer Characteristics.
3	Conduct an experiment to determine the efficiency and ripple factor of Half Wave Rectifier and Full wave rectifier.
4	Conduct an experiment to analyze the input and output characteristics of NPN transistor in CE Configuration.
5	Conduct an experiment to investigate the gain of Inverting and Non-inverting amplifier using Op-amp
6	Conduct an experiment to study the Transfer Characteristics of a MOSFET.
7	Conduct an experiment to verify the function of digital logic gates (AND, NOT, OR, NAND and NOR).
8	Conduct an experiment to verify the truth table of Half adder and Full adder using basic gates.
Sl. No.	**Experiment Description- Open Ended Experiments**
1.	Amplitude Modulation using Discrete Components for given Specifications.

2.	Voltage follower, Integrator and Differentiator circuits using Op-amp.

Text Books:

Sl. No.	Text Book title	Author	Volume and Year of Edition
1	Electronic Devices and Circuits	David A Bell	5th Edition, Oxford University Press, 30th Impression, 2025.
2	Electronic Devices and Circuit Theory	Robert L. Boylestad, Louis Nashelsky,	11th Edition, PHI, 2016.

Reference Books:

Sl. No.	Text Book title	Author	Volume and Year of Edition
1	Op-amps and Linear Integrated Circuits	Ramakanth A Gayakwad	4th Edition, Pearson Education, 2015.
2	Basic electronics	D.P Kothari and I J Nagrath,	2nd Edition, McGraw Hill Education Pvt ltd, 2018.

Course Outcomes:

Course outcome	Descriptions
CO1	**Apply** the basic principles of diodes, transistors and MOSFETs to construct and test basic analog circuits. (L2)
CO2	**Interpret** amplitude modulation to explore fundamental analog communication techniques. (L2)
CO3	**Design** various applications of Operational Amplifier. (L3)
CO4	**Analyze** the functionality of logic gates and combinational circuits. (L3)

Course Articulation Matrix:

PO/PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	2	2											

CO2	3	1											
CO3	2	2											
CO4	3	1											

Course Assessment and Evaluation:

Continuous Internal Evaluation (CIE): 50 Marks			
Sl. No.	**Components**	**Marks Conducted for**	**40% Min Marks in each component to write SEE**
1	Periodic Lab Assessment	30	12
2	Lab CIE	20	8
	Total CIE	50	20
Rubrics for Periodic Lab Assessment: Attendance (5M), Lab record(10M), Conduction of Experiments(10M) and Viva((5M)-**Total 30M.** **Lab CIE**: Write-up(5M), Conduction/Execution/Demonstration(10M) and Viva(5M**)-Total 20M.**			
Semester End Examination (SEE) : Max 50 Marks, Duration: 3 Hrs. **Rubrics for Lab Examination:** Write-up(8M), Conduction/Execution/Demonstration(35M) and Viva(7M)-**Total 50M.** **Minimum passing Marks : 40% of Max Marks.**			

Department: Civil Engineering			**Semester:**	**I**
Subject: Environmental Studies				
Subject Code:	**26HSES108**	**L – T – P - S:**	**14-0-0-16 (In Hrs)**	
			Credits:	**PP**

Sl. No.	Course Objectives
1	Explain the fundamental concepts of environmental science, sustainability, ecosystems, natural resources, and biodiversity to develop environmental awareness.
2	Analyze the sources, impacts, and control measures of environmental pollution and waste management practices.
3	Apply environmental laws, ethics, and sustainable engineering practices to address environmental challenges responsibly.
4	Develop disaster management plans by integrating preparedness, mitigation, response, and recovery measures while evaluating global environmental issues.

Module	Description	Hrs
I	**Introduction**: Environment - Components of Environment, Atmosphere (Structure & Composition), Hydrological cycle. Ecosystem: Types & Function of Ecosystem, Effects of human activities on environment by Agriculture, Industry and urbanization, Environmental Impact Assessment (**EIA**), Sustainable Development goals **(SDG's)** **Text 1: Ch-1,2,5,6, Text 2: Ch-1,2,12** **Reference book 2:** Chapters on Ecosystems and Sustainable Development	**3**
II	**Natural Resources**- types of natural resources, Water resources – Surface and subsurface water, Quality aspects, Drinking water quality standards, Forest, Mineral Resources, Legal frameworks in conservation of natural resources, **EPA-1986,** Importance of natural resources, Natural Resource Management (Concept and case-studies) **Text 1: Ch-3, Text 2: Ch-3,10** **Reference book 1:** Chapters on Water Resources and Conservation	**3**
III	**Environmental Pollution** (Causes, effect and control) – Air pollution, Surface Water Pollution, Ground water pollution, Noise pollution, Soil Pollution, Environmental Acts & Regulations to control Pollution, **NGT**-Legal Framework, Role of CPCB & SPCB and NGOs, Environmental Toxicology	**3**

	Text 1: Ch- 4, Text 2: Ch-4,5,6,7,10 **Reference book 1:** Chapters on Air and Water Pollution Control	
IV	**Global Environmental Issues:** Global Warming, Acid rain & Ozone layer depletion (Causes, effect and control), Climate change, Carbon trading, Net zero emission **Energy:** Types, alternative sources of Energy, Municipal solid waste management: Storage, handling, Collection and disposal, 4'Rs, solid waste management rules 2026 **Text 1: Ch-5, Text 2: Ch-8,9,11** **Reference book 3:** Chapters on Climate Change, Energy and Waste Management	**3**
V	**Waste Management & Disposal:** E-Waste, Biomedical Waste, Hazardous waste (Management & Disposal), Plastic waste, National Environmental policy, **Disaster management Plan:** Types of disasters and its impacts, awareness and preparedness, Disaster Risk Management In India, NDMA, NDRF, SDRF. Develop plans to mitigate disasters **Text 1: Ch-5, Text 2: Ch-11,13** **Reference book 3:** Chapters on Waste Management and Disaster Management	**2**

Text Books:

Sl. No.	Text Book title	Author	Volume and Year of Edition
1	Environmental Studies for Undergraduate Courses	Erach Bharucha	Universities Press, 3rd Edition, 2023.
2	Environmental Science and Engineering	P. Anandan and R. Kumaravelan	Scitech Publications, 2026 Edition.

Reference Books:

Sl. No.	Text Book title	Author	Volume and Year of Edition
1	Environmental Engineering, Vol. I	S. K. Garg	Revised Edition, 2022, Khanna Publishers
2	Environmental Studies	R Rajagopalan	From Crisis to Cure", 4th Edition, 2022, Oxford University Press
3	Environmental Studies	Benny Joseph	3rd Edition, 2023, McGraw Hill Education

Course Outcomes:

Course	Descriptions

outcome	
CO1	**Explain** the fundamental concepts of environmental science, ecosystems, natural resources, biodiversity, and their significance in sustainable development.
CO2	**Analyze** the causes, impacts, and control measures of environmental pollution, climate change, and waste management practices..
CO3	**Evaluate** environmental issues related to water resources, energy resources, and environmental conservation using scientific and engineering principles.
CO4	**Apply** environmental laws, sustainability principles, and ethical responsibilities to develop environmentally responsible engineering solutions and promote sustainable lifestyles.
CO5	**Develop** disaster management plans incorporating disaster preparedness, mitigation, response, and recovery measures to minimize the impacts of natural and human-induced disasters.

Course Articulation Matrix:

PO/PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	1					1							
CO2						2	2				1		
CO3		2				1							
CO4			1			2					1		
CO5						1							

Course Assessment and Evaluation:

Sl. No.	Components		Duration (min)	Marks Conducted for	Min. Marks to pass the Course
1	Theory-Internal Assessment	IA-1	90	50	40
		IA-2	90	50	
	Total CIE			**100**	**40**

Department: Mathematics			**Semester:**	**II**
Subject: Laplace Transforms and Numerical Methods				
Subject Code:	**26ECMA201**	**L – T – P - C:**	**42-28-0-50 (In Hrs)**	
			Credits:	**4**

Sl. No.	Course Objectives
1	**Understand** the fundamental concepts of numerical methods for solving algebraic, transcendental, and differential equations.
2	**Learn** the principles of Laplace transforms and inverse Laplace transforms for representing and solving engineering problems.
3	**Acquire** knowledge of higher-order ordinary differential equations and vector calculus concepts used in mathematical modelling.
4	**Study** MATLAB-based techniques for solving and visualizing problems related to numerical methods, differential equations, Laplace transforms, and vector calculus.

Module	Description	Hrs
I	**Numerical Methods:** Algebraic and transcendental equations–Roots of equations, intermediate value property, Regula-Falsi and Newton-Raphson methods. Methods of solving first-order ordinary differential equations-Taylor's series method, 4th order Runge-Kutta method and Adams-Bashforth predictor–corrector method-problems. Implementation using MATLAB. (Text 1: 28.2, 32.3, 32.7, Text 3: MATLAB)	**8**
II	**Laplace Transform:** Existence and uniqueness of Laplace transform, transform of elementary functions, region of convergence. Properties-linearity, scaling, t-shift property, s-domain shift, differentiation in the s domain, division by t, differentiation and integration in the time domain. Laplace Transform of special functions-periodic functions (square wave, saw-tooth wave, triangular wave, full & half wave rectifier), Heaviside unit step function, unit impulse function-problems. Implementation using MATLAB. (Text 1: 21.3 to 21.5, 21.17, Text 3: MATLAB)	**9**
III	**Inverse Laplace Transform:** Definition, properties, evaluation using different methods. Convolution theorem (without proof), problems. Application to solve linear ordinary differential equations. Implementation using MATLAB (Text 1: 21.12 to 21.15, Text 3: MATLAB)	**8**

IV	**Ordinary Differential Equations of Higher Order:** Higher-order linear differential equations with constant coefficients, homogeneous and non-homogeneous equations- $e^{ax}, sinax, cosax, x^m$. Method of variation of parameters, Cauchy's and Legendre's homogeneous differential equations. Applications: solving governing differential equations of Mass Spring-problems. Implementation using MATLAB. (Text 1: 13.1 to 13.9, 14.4, Text 3: MATLAB)	**8**
V	**Vector Differentiation:** Vector-valued functions–2D and 3D scalar and vector fields. Gradient of a scalar field–Normal vector to the surface, directional derivative, scalar potential. Divergence and curl of a vector field, Laplacian of scalar field, Solenoidal and irrotational fields and physical interpretations. Expressions for gradient, divergence, curl and Laplacian in cylindrical, spherical-polar coordinates-problems. **Vector Integration:** Line integral, work done by a force, surface and volume integrals. Green's theorem, Stoke's theorem and Gauss divergence theorem (statements only)-problems, solenoidal fields and irrotational fields. Implementation using MATLAB. sss(Text 1: 8.4 to 8.8, 8.20, 8.21, 8.12 to 8.16, Text 3: MATLAB)	**9**

Text Books:

Sl. No.	Text Book title	Author	Volume and Year of Edition
1	Higher Engineering Mathematics	B.S. Grewal	43th Edition, 2015, Khanna Publishers,ISBN: 978-81-7409-195-5.
2	Advanced Engineering Mathematics	E. Kreyszig, John Wiley & Sons	10th Edition JonWiley &Sons, 2018. ISBN: 9781119446842
3	MATLAB Programming for Engineers	Stephen J Chapman	7th Edition, Cengage, 2024. ISBN: 9798214001531

Reference Books:

Sl. No.	Text Book title	Author	Volume and Year of Edition
1	Advanced Engineering Mathematics	C. Ray Wylie, Louis C. Barrett, McGraw-Hill Book Co	6th Edition. 2017, ISBN:9780070722064
2	A Text Book of Engineering Mathematics	N.P.Bali and Manish Goyal	10th Edition Lakshmi Publishers, 2022, ISBN: 9788131808320.
3	Higher Engineering Mathematics	B.V.Ramana, Tata McGraw-Hill	11th Edition,Tata McGraw-Hill, 2017, ISBN:9780070634190

Web Links and Video Lectures (e-Resources):

1. https://nptel.ac.in/courses/111106101
2. https://nptel.ac.in/courses/111105134
3. https://nptel.ac.in/courses/111105121
4. https://nptel.ac.in/courses/111106100

Course Outcomes:

Course outcome	Descriptions
CO1	**Understand** the basic concepts of numerical methods, Laplace transforms, ordinary differentiation and vector calculus. (L1)
CO2	**Apply** fundamental knowledge of numerical methods, Laplace transforms, ordinary differentiation of higher order and vector calculus to solve engineering problems. (L2)
CO3	**Analyze** the complex engineering problems using appropriate mathematical technics form numerical methods, Laplace transforms, vector calculus, and ordinary differentiation of higher order. (L3)
CO4	**Use** modern tools to solve/visualize engineering problems. (L3)
CO5	**Enhance** the comprehensive understanding of numerical methods, ordinary differentiation of higher order, Laplace transforms, vector calculus. (L3)

Course Articulation Matrix:

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	3	2									
CO2	3	1	1								
CO3	3	2	1								1
CO4					2						1
CO5		2	1								1

Course Assessment and Evaluation:

Continuous Internal Evaluation (CIE): 50 Marks					
Sl. No.	**Components**	**Duration (min)**	**Marks Conducted for**	**Marks reduced to**	**40% Min Marks in each component to write SEE**

1	Theory-Internal Assessment	IA-1	90	50	20	16
		IA-2	90	50	20	
2	Activity Based Learning	ABL1	-	25	5	4
		ABL2	-	25	5	
Total CIE				150	50	20

IA-1 Syllabus: 2 ½ Module , IA-2 Syllabus: 2 ½ Module

Activity Based Learning (ABL): Online course with certification, Hobby project, Simulations, Industrial Visits, Community-Based Learning, Case-study, Problem-Based Learning, Peer Teaching, web page design, student publications, Hackathons, Quiz (Leetcode, GitHub, Hackaranks and company specific quiz), Student Development program(1 week/online or offline), Students complete hands-on assignments and lab work (using tools like MATLAB) to satisfy practical/skill development hours. Activities include implementation of the mathematical problems ……Etc

Semester End Examination (SEE) : Max 100 Marks, Duration: 3 Hrs

The question paper shall contain 10 full questions (20 marks each)**,** with **2** questions from each of the 5 Modules**,** ensuring 100% syllabus coverage**.** Students shall answer any 5 full questions with 1:1 choice. Each question may have a maximum of 4 sub-divisions.

Minimum passing Marks : 40% of Max Marks

Department: Chemistry			**Semester:**	**II**
Subject: Applied Chemistry				
Subject Code:	**26ECCHI202**	**L – T – P - S:**	**42-0-28-50 (In Hrs)**	
			Credits:	**4**

Sl. No.	**Course Objectives**
1	To **develop** a clear understanding of the fundamental principles of electrochemistry and their importance in engineering and environmental systems.
2	To **introduce** modern chemical materials and technologies such as semiconductors, thin films, energy storage devices and relating them to practical applications.
3	To **build** knowledge of analytical techniques and sensor systems used for chemical measurement, monitoring, and problem-solving in laboratories and industry.
4	To **understand** the role of smart and flexible materials in advanced digital devices and to explore water technology and its treatment processes, highlighting their significance in promoting human health and environmental sustainability.

Module	**Description**	**Hrs**
I	**Basics of Electrochemistry and Electrode Systems.** **Introduction to electrochemistry & Cell Potential:** Definition of conductance, molar conductance, specific conductance, resistance, cell constant, effect of various factors on conductivity, conductors (metallic & non-metallic), type & non-conductors, Construction of Daniel cell & cell notation, Definition of cell potential, single electrode potential, standard electrode potential, Free Energy and EMF, reversible and irreversible cells. **Nernst's Equation & Electrode Systems**: Derivation of Nernst equation for single electrode potential and Nernst equation for a cell. Concentration cell – definition and derivation of equation for concentration cell. Numerical problems on E, E^0, Types of electrodes. Reference electrode - Calomel electrode – construction, working and applications. Ion selective electrode - Glass electrode - construction working and applications.	9

II	**Semiconductor, TFT & advanced display systems:** **General properties of Metals**: Conductivity, luster, malleability and ductility, Band theory: Prediction of conducting properties of conductors, Insulators and semiconductors using band theory. Extrinsic and intrinsic semiconductors, Doping in Semiconductors, application of semiconductors in daily life. **Thin film technology:** Definition, Thin Film Growth Techniques and Processes: Sputtering, Evaporation (Thermal, electron beam), Pulse Laser Deposition (PLD), Chemical Vapor Deposition (CVD) [Ga & Si]. Properties & applications. **Advanced Display Systems:** Organic light emitting Diodes (OLED's) - Introduction, properties and applications, Quantum Dot Light Emitting Diodes (QDLED's) - Introduction, properties and applications.	9
III	**Energy storage and conversion devices:** **Battery technology:** Definition, principle component of battery, Types of Battery, Characteristics of Battery, Li-ion batteries ($LiCoO_2$ and $LiFePO_4$), Sodium ion battery, construction, materials, mechanism & applications. **Fuel cells:** Construction, mechanism & applications-direct Methanol - Oxygen fuel cells, H_2O_2 fuel cells, Solid oxide fuel cells (SOFC). **Solar cells:** Definition, Amorphous Si and quantum dot-sensitized solar cells -materials, fabrication, mechanism, applications.	8
IV	**Analytical techniques & Sensors:** **Introduction to Analytical techniques:** Advantages of instrumental techniques, Colorimetry – laws of colorimetry, derivations of Beer-Lambert's law. Principle, instrumentation and applications of Colorimetry, Potentiometry, Conductometry. & Flame photometry. **Sensors:** Introduction, types (electrochemical, optoelectronic), chemistry of sensing mechanisms, Electrochemical Sensor: construction, working principle and applications. Optical Sensor: construction, working principle and applications. Gas Sensor: construction, working principle and applications.	8
V	**Smart Materials & water Technology** **Smart materials:** Chromic Materials (Thermo-, photo-, electrochromic), and electromechanical materials**:** Introduction, definition & Application. **Flexible electronics:** Phase change materials (PCMs), shape memory polymers (SMPs). Conducting polymers (Polyaniline and its composites) preparation, properties, applications in stretchable & printable circuits introduction. **Water Technology:** Definition of potable water, hard water (types of hardness and estimation of total hardness of water), definition of Chemical oxygen demand (COD) (numerical on COD with direct formula and estimation of COD of given waste water sample). Purification of water using Electrodialysis technique & Reverse Osmosis.	8

LAB CONTENT:

Sl. No.	Experiment Description
1	Determination of total hardness of a sample of water using disodium salt of EDTA
2	Determination of Calcium Oxide in the given sample of cement solution (Rapid EDTA method)
3	Determination of percentage of copper in Brass alloy using standard Sodium Thiosulphate solution
4	Determination of Iron in the given sample of Hematite ore solution (External Indicator method) using $K_2Cr_2O_7$ solution
5	Determination of Chemical Oxygen Demand of the given Industrial wastewater sample.
6	Determination of pKa value of the given soft drink using pH meter
7	Potentiometric estimation of Iron present in stainless steel solution using standard $K_2Cr_2O_7$ solution
8	Colorimetric estimation of copper in a conducting wire solution
9	Conductometric estimation of acid mixture against strong base.
10	Comparative study of viscosity of electrolyte solutions used in energy devices using Ostwald viscometer.
11	Investigation of optical properties of graphene derivatives via UV-Vis sprectroscopy.
12	Synthesis of inorganic quantum dots and determination of bandgap using UV-Vis sprectroscopy.

Text Books:

Sl. No.	Text Book title	Author	Volume and Year of Edition
1	Engineering Chemistry	Putti R. Vijayasarathy	New Edition, by Prentice Hall of India
2	Chemistry for Engineering Students	Dr. B.S. Jai Prakash Prof. R. Venugopal Dr. Shivakumaraiah Dr. Pushpa Iyengar	1st Edition, 2018

Reference Books:

Sl. No.	Text Book title	Author	Volume and Year of Edition
1	Engineering Chemistry: Concepts in Chemistry for Engineering	Satya Prakash & Manisha Agrawal	1st Edition, 2012
2	Engineering Chemistry –	Bhaskar Chaurasia, Rajiv Kumar	1st Edition, 2024

	2024	Chaurasia, Jitendra Chaurasia	
3	Principles of Physical Chemistry	Puri, Sharma, Pathania	49th Edition, 2024
4	Principles of Instrumental Analysis	Douglas A. Skoog/F. James Holler/Stanley R. Crouch	7th Edition, 2018
5	Vogel's Text Book of Quantitative Inorganic Analysis.	J.Basset, R.C.Denny, G.H.Jaffery	4th Edition

Course Outcomes:

Course outcome	Descriptions
CO1	**Explain** the basic concepts of electrochemistry, conductance, electrode systems, and the Nernst equation, and understand their use in electrochemical analysis and energy systems.
CO2	**Analyze** the electronic structure and band-theory basis of metals, insulators, and semiconductors; explain doping, thin film growth methods, and the working principles and applications of OLEDs and QDLEDs in modern display technologies.
CO3	**Understand** the electrochemical basis of operation, construction and material aspects various energy storage and conversion devices, and **apply** instrumental techniques, sensor-based methods to analyze chemical systems and interpret results.
CO4	**Interpret** the principles and applications of smart and flexible materials in technological advancements and advanced digital devices, **apply** water treatment technologies to address water quality challenges and analyse their role in promoting human health and environmental sustainability.

Course Articulation Matrix:

PO/PSO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	2	2			1							
CO2	3				1	1							
CO3	3	2	1	1	2	2	1						
CO4	3	1	1	1	1	2	3	2			2		

Course Assessment and Evaluation:

Continuous Internal Evaluation (CIE): 50 Marks						
Sl. No.	**Components**		**Duration (min)**	**Marks Conducted for**	**Marks reduced to**	**40% Min Marks in each component to write SEE**
1	Theory-Internal Assessment	IA-1	90	50	15	12
		IA-2	90	50	15	
2	Periodic Lab Assessment		-	30	10	4
3	Lab CIE		-	20	10	4
	Total CIE			**150**	**50**	**20**

IA-1 Syllabus: 2 ½ Module , IA-2 Syllabus: 2 ½ Module
Rubrics for Periodic Lab Assessment: Attendance (5M), Lab record (10 M), Conduction of Experiments(10M) and Viva(5M)-**Total 30M**
Lab CIE: Write-up(5M), Conduction/Execution/Demonstration(10M) and Viva(5M)-**Total 20M**
One Open Ended Experiment/ Project: Experimental / project Design (4 marks), Execution/demonstration (3 marks) and Analysis/Viva (3 marks)- **Total 10M**

Semester End Examination(SEE) : **Max 100 Marks, Duration: 3 Hrs**
The question paper shall contain **10 full questions (20 marks each),** with **2 questions from each of the 5 Modules**, ensuring **100% syllabus coverage**. Students shall answer **any 5 full questions** with **1:1 choice.** Each question may have a **maximum of 4 sub-divisions.**
Minimum passing Marks : 40% of Max Marks

Department: Electrical and Electronics Engineering			**Semester:**	**II**
Subject: Introduction to Electrical Engineering				
Subject Code:	**26ECEE203**	**L – T – P - S:**	**28-0-0-32 (In Hrs)**	
			Credits:	**2**

Sl. No.	Course Objectives
1	**Understand** the basic Electrical concepts and energy sources.
2	**Illustrate** the generation of AC voltages and measurement of R L and C.
3	**Study** the principle of working of measuring instruments, AC and DC Machines.
4	**Impart** the knowledge of Electrical Installation and Safety.

Module	Description	Hrs
I	**AC Fundamentals:** Introduction, Definitions - Charge, Current, Voltage, Power and Energy. Generation of AC voltage, Emf equation , Definitions- peak, average, RMS, form factor, power and power factor as applied to Sinusoidal waveform. Phasor diagrams in AC circuits;R,L,C,series RL, RC and RLC circuits. (Text1: Chapter 11)	6
II	**Measuring Instruments**: Dynamometer type wattmeter, Digital Energy meter, Electronic Multimeter . **Extension of Instrument Ranges** ; Shunts , Multipliers. (Text 2: Chapter 10)	5
III	**Bridge Circuits and Energy sources:** Measurement of Resistance- Kelvin's Double Bridge, Measurement of Inductance- Maxwell's bridge, Measurement of Capacitance- Schering bridge. Energy sources; Thermal, Hydroelectric (schematic) (Text 2: Chapter16 and 24)	6
IV	**Electrical Machines :** DC Machines: Construction , principle of operation and EMF equation of DC generator. DC Motors: series and shunt type. **AC Machines:** Construction, Principle of operation - Alternator, three phase Induction motor, Stepper motor and BLDC motor. (Text 1: Chapters 26,29,34,37,39)	6
V	**Transformers and Electrical Safety:** Construction, principle of operation, transformation ratio, Emf equation. Safety measures, pipe & plate earthing Elementary discussion on fuse and miniature circuit	5

	breakers. (Text 1: Chapter 32, Text 3)	

Text Books:

Sl. No.	Text Book title	Author	Volume and Year of Edition
1	A Textbook of Electrical Technology Vol I,II,III	B.L.Theraja	S Chand and Company Ltd 2018
2	Electrical Measurements and Measuring Instruments	E W Golding and F C Widdies	Reem Publications 5th edition, 2011
3	Electrical Safety handbook	John Cadick PE, Mary Capelli and Dennis k Neitzel	McGraw Hill Education, 3rd Edition, 2010

Reference Books:

Sl. No.	Text Book title	Author	Volume and Year of Edition
1	Basic Electrical Engineering	D P Kothari, I J Nagrath	McGraw Hill Education, 4thEdition, 2012
2	Basic Electrical Engineering	V K Mehta and Rohit Mehta	S Chand and Company Ltd 2018

E Resourses Links:

1.nptel.ac.in/courses/108102185

Course Outcomes:

Course outcome	Descriptions
CO1	**Understand** the basic Electrical concepts and energy sources.
CO2	**Illustrate** the generation of AC voltages and measurement of R L and C.
CO3	**Study** the principle of working of measuring instruments, AC and DC Machines.
CO4	**Impart** the knowledge of Electrical Installation and Safety.

Course Articulation Matrix:

PO/PSO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	2	1											
CO2	1	2									1		
CO3	2	2											
CO4	1	2	1								1		

Course Assessment and Evaluation:

Continuous Internal Evaluation (CIE): 50 Marks						
Sl. No.	**Components**		**Duration (min)**	**Marks Conducted for**	**Marks reduced to**	**40% Min Marks in each component to write SEE**
1	Theory-Internal Assessment	IA-1	90	50	20	16
		IA-2	90	50	20	
2	Activity Based Learning	ABL1	-	25	5	4
		ABL2	-	25	5	
Total CIE				150	50	20

IA-1 Syllabus: 2 ½ Module , IA-2 Syllabus: 2 ½ Module

Activity Based Learning(ABL): Online course with certification, Hobby project, Simulations, Industrial Visits, Community-Based Learning, Case-study, Problem-Based Learning, Peer Teaching, web page design, student publications, Hackathons, Quiz (Leetcode, GitHub, Hackaranks and company specific quiz), Student Development program(1 week/online or offline), ……Etc

Semester End Examination(SEE) : Max 100 Marks, Duration: 3 Hrs

The question paper shall contain **10 full questions (20 marks each),** with **2 questions from each of the 5 Modules,** ensuring **100% syllabus coverage.** Students shall answer **any 5 full questions** with **1:1 choice**. Each question may have a **maximum of 4 sub-divisions**.

Minimum passing Marks : 40% of Max Marks

Syllabus for the Academic Year 2026-27

Department: Mechanical Engineering			**Semester:**	**II**
Subject: Computer-Aided Engineering Drawing				
Subject Code:	**26ECED204**	**L – T – P - S:**	**14-0-28-18 (In Hrs.)**	
			Credits:	**2**

Sl. No.	Course Objectives
1	**Understand** and **apply** the fundamentals of engineering drawing, BIS conventions, lettering, dimensioning, geometrical constructions, and computer-aided sketching using CAD software.
2	**Construct** and **interpret** orthographic projections of points, lines, planes, and solids using first-angle projection methods.
3	**Construct** isometric projections and **develop** lateral surfaces of simple engineering solids and their truncated or frustum forms.
4	**Apply** CAD tools to **create** engineering drawings such as machine part drawings, simple mechanisms, wiring and lighting diagrams, building drawings, and PCB layouts.

Module	Description	Hrs
I	**Introduction to Computer Aided Sketching:** Introduction to Drawing instruments and their uses, BIS Conventions, Lettering, Dimensioning, geometrical constructions and freehand practicing. Introduction to software, commands used for engineering drawing. **Orthographic Projections of Points, Lines and planes:** Introduction to Orthographic projections, Orthographic projections of points and Orthographic projections of lines. (Placed in First quadrant only). Introduction, Projections of plane surfaces triangle, square, rectangle, pentagon, hexagon and circle planes in different positions by change of position method only (First Angle Projection Only).	**3L+ 10P**
II	**Orthographic Projection of solids** Introduction to projection of Solids, Orthographic projection of right regular solids (Solids Resting on HP only), tetrahedron, hexahedron (cube), Prisms, Pyramids of square, pentagon and Hexagon, cylinders and cones in different positions (First angle Projection only).	**5L+ 10P**
III	**Isometric Projection** Isometric scale, Isometric projection of plane surfaces, Isometric projection of hexahedron (cube), right regular prisms, pyramids, cylinders, cones, spheres, Isometric projection of combination of two	**2L**

	simple solids.	
IV	**Development of Lateral Surfaces** Development of lateral surfaces of right regular prisms, cylinders, pyramids and cones resting with base on HP only. Development of lateral surfaces of their frustums and truncations.	**2L**
V	**Engineering Applications** Conversion of pictorial views of a simple machine part into orthographic projections. Sketching and Drawing Simple Mechanisms, Wiring and lighting diagrams using CAD software, basic Building Drawing, Electronic Drawing- PCB Drawings. Introduction to development of computer graphical packages.	**2L+ 8P**

Text Books:

Sl. No.	Text Book title	Author	Volume and Year of Edition
1	Engineering Graphics	K.R. Gopalakrishna	39th Edition, 2017, Subhash Publications, Bangalore
2	Engineering Drawing	N.D. Bhatt & V.M. Panchal	53rd Edition, 2019, Charotar Publishing House, Gujarat

Reference Books:

Sl. No.	Text Book title	Author	Volume and Year of Edition
1	Fundamentals of Engineering Drawing with an Introduction to Interactive Computer Graphics for Design and Production	Luzadder Warren J., Duff John M.	Eastern Economy, 2005, Prentice-Hall of India Pvt. Ltd., New Delhi.
2	Engineering Drawing and Graphics + Autocad	K. Venu Gopal & V. Prabu Raja	4th Edition, 2005, New Age International Publishers, New Delhi.
3	Computer Aided Engineering Drawing	Dr. M. H Annaiah, Dr. C. N Chandrappa & Dr. B. Sudheer Premkumar	5th Edition, 2015, New Age International Publishers, New Delhi
4	Computer Aided Engineering Drawing	S. Trymbaka Murthy	3rd Edition, 2006, I.K. International Publishing House Pvt. Ltd., New Delhi.
5	Electric Power Distribution	Amarjit Singh Pabla	6th Edition, 2011, McGraw Hill Education (India) Private Limited

6	Engineering Visualisation	S.N. Lal, & T Madhusudhan	1st Edition, 2022, Cengage Publication
7	Electrical Engineering Drawing	Bhattacharya S. K.,	2nd Edition, 2005, New Age International publishers
8	PCB Design Using AutoCAD	Chris Schroder	1st Edition, 1997, EDN Series for Design Engineers
9	Design of Steel Structures,	K. S. Sai Ram	3rd Edition, 2020, Pearson
10	Design of Foundation Systems: Principles and Practices	Nainan P. Kurian	3rd Edition, 2005, Narosa publications

E-Resources Links:

1. https://nptel.ac.in/courses/112/103/112103019/
2. https://onlinecourses.nptel.ac.in/e-learning/preview/noc21_me128

Course Outcomes:

Course outcome	Descriptions
CO1	**Apply** BIS conventions, lettering, dimensioning, geometrical constructions, and CAD commands to prepare basic engineering drawings.
CO2	**Construct** orthographic projections of points, lines, and plane surfaces in the first quadrant using first-angle projection principles.
CO3	**Develop** orthographic projections of right regular solids in different positions resting on HP using first-angle projection methods.
CO4	**Construct** isometric projections and **Develop** lateral surfaces of prisms, pyramids, cylinders, cones, and their frustums/truncations.
CO5	**Create** engineering application drawings using CAD tools, including machine part drawings, simple mechanisms, wiring and lighting diagrams, building drawings, and PCB layouts.

Course Articulation Matrix:

PO/PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	1	1		3					1			
CO2	3	2	2		2					1			
CO3	3	2	3		2					1			
CO4	3	2	3		2								
CO5	2	2	3	1	3				1	2			

Course Assessment and Evaluation:

1. A maximum of six questions must be set as per the following pattern

Q. No.	Question paper pattern	Marks Allotted
1	Both questions are from projection of planes only with choice	**15**
2	Both questions are from projection of Solids only with choice	**25**
3	Isometric projection or Development of Lateral Surfaces with choice	**10**
	Total	**50**

Evaluation for Continuous Internal Evaluation (CIE) (50 Marks)

1. 30 Marks for Class work (Sketching & Computer Aided Engineering drawing printouts in A4 size sheets).
2. At least one Test covering all the modules is to be conducted for 50 marks and evaluation to be based SEE pattern, and the same is to be scaled down to 20Marks.
3. A student must obtain a minimum of 40% marks in the Continuous Internal Evaluation (CIE) to become eligible to appear for the Semester End Examination (SEE).

Q. No.	Solutions and sketching in the sketch book	Computer display and print out	Total Marks
1	6	9	15
2	10	15	25
3	10	0	10
Total Marks	**26**	**24**	**50**

Evaluation for Semester End Examination (SEE) (50Marks)

1. Students must submit the computer printouts and the sketches drawn on the graph sheets at the end of the examination. Both Internal and External examiners must jointly evaluate the solutions (Sketches), Computer display and Printouts of each student for 50 Marks.
2. A student must obtain a minimum of 40% marks in the Semester End Examination (SEE) out of the maximum marks prescribed for the SEE.

Department: Artificial Intelligence & Machine Learning		**Semester:**	**II**
Subject: Foundations of Artificial Intelligence			
Subject Code:	**26ECAI205**	**L–T–P-S:**	**28-0-0-32**
		Credits:	**2**

Sl. No.	**Course Objectives**
1	**Introduce** basic concepts of Artificial Intelligence.
2	**Learn** the techniques in Artificial Intelligence.
3	**Understand** the Engineering applications and basics of Robotics.
4	**Realize** ethical approaches in Artificial Intelligence.

Module	**Description**	**Hrs**
I	**Introduction to Artificial Intelligence:** Definition of Artificial Intelligence, History of Artificial Intelligence, Types of Artificial Intelligence, Augmented Intelligence and Cognitive Computing, Machine Learning and Deep Learning. (Text 1: 1.1-1.5)	**5**
II	**Artificial Intelligence Technologies:** Techniques in AI, Machine Learning Model, Types of Machine Learning Algorithms, Regression Analysis in Machine Learning, Working of Regression Analysis, Model Evaluation Metrics, Types of Regression (Text 1: 2.1-2.3)	**6**
III	**Classification Techniques**: K-Nearest Algorithm, Decision Trees, Random Forests **Clustering Techniques**: K-Means Algorithm, Applications of Clustering in Real-World Scenarios, Evaluation Metrics for Clustering, Working of K-Means Algorithm, Pros and Cons of K-Means Algorithm, Density-Based Spatial Clustering of Applications with Noise (Dbscan) (Text 1: 2.4-2.5)	**6**
IV	**AI to all:** AI and Society, AI and Privacy, AI in Healthcare, AI in Finance, AI in Marketing, AI and Automation, AI-Powered Communication, AI in Customer Service, Future Trends in AI, AI for Personal Growth. (Text 2: 10-21) **Robotics - An Application of AI:** Drones Using AI, Future of AI, No Code AI, Low Code AI (Text 1: 1.7, 1.8, 1.9, 1.10)	**5**
V	**Ethical Decision-Making:** Introduction, Ethical Theories, Values, Ethics in Practice, Implementing Ethical Reasoning**.** **Taking Responsibility:** Introduction, Responsible Research and Innovation, The ART of AI: Accountability, Responsibility, Transparency, Design for Values. (Text 3: 3, 4, 5-5.1,5.2, 5.3)	**6**

Text Books:

Sl. No.	Title	Author	Volume and Year of Edition
1	Artificial Intelligence: Beyond Classical AI,	Reema Thareja	Pearson Education, 2023 ISBN-10 : 9356069328
2	AI for Everyone	Kai L Thornton	eBookIt.com, 2025 ISBN-13 : 978-1456664169
3	Responsible Artificial Intelligence	Virginia Dignum	Springer-Nature New York Inc , 2019 ISBN-10: 3030303705

Reference Books:

Sl. No.	Title	Author	Volume and Year of Edition
1	Artificial Intelligence Structure and Strategies for Complex Problem Solving	George F Lugar	Pearson Education, 2011, 5th Edition, ISBN-10 : 8131723275
2	Artificial Intelligence A Modern Approach	Stuart Russell & Peter Norvig	Pearson Education, 2010 3rd Edition, ISBN-10 : 9789332543515
3	Artificial Intelligence	Saroj Kaushik	Cengage learning, 2014 1st Edition ISBN-10 : 8131510999

E-Resources Links:

1. https://nptel.ac.in/courses/112103280
2. https://www.youtube.com/playlist?list=PLwdnzlV3ogoXaceHrrFVZCJKbm_laSHcH
3. https://nptel.ac.in/courses/106106472
4. https://www.youtube.com/watch?v=mmrlkO4vpts

Course Outcomes:

Course outcome	Descriptions
CO1	**Outline** the types of Artificial Intelligence.(L2)
CO2	**Identify** the different Regression models. (L3)
CO3	**Analyze** the classification techniques in Artificial Intelligence.(L4)
CO4	**Extend** the applications of Artificial Intelligence. (L2)
CO5	**Relate** ethical decision making.(L2)

Course Articulation Matrix:

PO/PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	2											
CO2	2	2	2	1									
CO3	2	2	2	1									
CO4	2	2	2	1									
CO5	2	1	1	1									

Course Assessment and Evaluation:

Continuous Internal Evaluation (CIE): 50 Marks

Sl. No.	Components		Duration (min)	Marks Conducted for	Marks reduced to	40% Min Marks in each component to write SEE
1	Theory-Internal Assessment	IA-1	90	50	20	16
		IA-2	90	50	20	
2	Activity Based Learning	ABL1	-	25	5	4
		ABL2	-	25	5	
Total CIE				150	50	20

IA-1 Syllabus: 2 ½ Module , IA-2 Syllabus: 2 ½ Module

Activity Based Learning(ABL): Online course with certification, Hobby project, Simulations, Industrial Visits, Community-Based Learning, Case-study, Problem-Based Learning, Peer Teaching, web page design, student publications, Hackathons, Quiz (Leetcode, GitHub, Hackaranks and company specific quiz), Student Development program(1 week/online or offline), ……Etc

Semester End Examination(SEE) : Max 100 Marks, Duration: 3 Hrs

The question paper shall contain **10 full questions (20 marks each),** with **2 questions from each of the 5 Modules,** ensuring **100% syllabus coverage.** Students shall answer **any 5 full questions** with **1:1 choice**. Each question may have a **maximum of 4 sub-divisions**.

Minimum passing Marks : 40% of Max Marks

Department: Computer Science and Engineering			**Semester:**	**II**
Subject: Python Programming				
Subject Code:	**26ECCSI206**	**L – T – P - S:**	**42–0–28–50 (In hrs)**	
			Credits:	**4**

Sl. No.	Course Objectives
1	**Recognize** fundamental Python syntax, data types, operators, and control flow structures.
2	**Implement** user-defined and built-in functions, including recursion and anonymous functions.
3	**Differentiate** between various compound data types such as strings, lists, tuples, and dictionaries.
4	**Construct** Python programs that handle file operations and manage exceptions effectively.

Module	Description	Hrs
I	**Introduction:** Python Overview, Getting Started with Python, Comments, Python Identifiers, Reserved Keywords, Variables, Standard Data Types, Operators, Statement and Expression, String Operations, Boolean Expressions, Control Statements, Iteration – while Statement, Input from Keyboard. (Text 1: 3.1 to 3.15)	**9**
II	**Functions:** Introduction, Built-in Functions, Composition of Functions, User Defined Functions, Parameters and Arguments, Function Calls, the return Statement, Python Recursive Function, The Anonymous Functions, Writing Python Scripts. **Strings:** Compound data type, len, slicing, strings are immutable, traversal, escape characters, formatting operator, formatting functions. (Text 1: 4.1 to 4.10 and 5.1)	**9**
III	**Lists:** Basic operations, traversal, deletion, built in list operators, built in list Methods **Tuples:** Creating tuples, accessing values in tuples, tuple assignment, return values, basic tuple operations, built in tuple functions. (Text 1: 5.2**,** 6.1)	**8**
IV	**Dictionaries:** Creation, accessing values, updating, deletion, properties of keys, basic operations, built in methods **Files:** Text Files, opening and closing file, file object attributes, writing and reading a file, renaming file, deleting a file, file related methods. (Text	**8**

	1: 6.2 .7.1)	
V	**Directories**: Basic commands **Exceptions:**Built in exceptions, handling exceptions, exceptions with arguments, user defined exceptions. (Text 1: 7.2, 7.3 to 7.5)	**8**

LAB CONTENT:

Unit	Experiment Description
1a	Write a Python program to convert the given number of seconds to Hours, Minutes and Seconds and display the result.
1b	Write a Python program to compute and display the maturity amount for the deposit made in $A = P\left(1 + \frac{r}{n}\right)^{nt}$ Where, • P = principal amount (initial investment) • r = annual nominal interest rate (as a decimal) • n = number of times the interest is compounded per year • t = number of years
2a	Write a Python program to simulate a simple calculator. The program should accept two numerical inputs and an operator (+, -, * /) from the user. Based on the operator, perform the corresponding arithmetic operation and display the result. Ensure that the program handles division by zero.
2b	Write a Python script that prints prime numbers less than n.
3a	Write a python program to find factorial of a number using Recursion.
3b	Write a Python function analyze text(text) that: • Calculates total characters **(excluding spaces)** • Counts total **words** • Counts **vowels** and **consonants**
4a	Write a Python program to generate the nth Fibonacci number using an iterative (non-recursive) approach.
4b	Write a Python function string stats(text) that: • Counts the total number of characters (excluding spaces) • Finds the number of **uppercase**, **lowercase**, **digits**, and **special characters** Return a clean report

5a	Write a program to accept a list of student marks. Perform the following operations: find the highest, lowest, average marks, and sort the list in ascending order.
5b	Accept a list of student records (name, roll, branch) and convert each into a tuple. Store all tuples in a list and display them neatly using a loop.
6a	Define a function that takes two tuples representing coordinates (x1, y1) and (x2, y2), and calculates the Euclidean distance between them.
6b	Read N numbers from the console and create a list. Develop a program to print the mean, variance, and standard deviation with suitable messages.
7a	Write a program that inputs a text file. The program should print all of the unique words in the file in alphabetical order.
7b	Write a Python program that accepts the names and marks of 3 subjects, stores them in a dictionary, and displays the subjects, marks, total, and average.
8a	Write a Python program that reads a text file and counts the frequency of each word using a dictionary. Display the result sorted by the word.
8b	Accept names and grades for 3 students. Store in a dictionary and display the students' names with their grades, highest grade, and lowest grade.
9a	Write a Python program to read a file and display its contents. If the file is not found, handle the exception and display a proper message.
9b	Create a dictionary of 3 cities and their populations. Ask the user to enter a city name and print the population. Handle the case when the city is not in the dictionary.
10a	Write a Python program that takes two numbers as input and divides them. Handle exceptions such as division by zero and invalid input.
10b	Write a program that raises a custom exception if the entered age is less than 18.

Text Books:

Sl. No.	Text Book title	Author	Volume and Year of Edition
1	Introduction to computing and problem solving using python	E Balagurusamy	FIRST Edition ,2016

Reference Books:

Sl. No.	Text Book title	Author	Volume and Year of Edition
1	Automate The boring stuff with Python: Practical Programming for total beginners	Al Sweigar T	3rd Edition August 2024

2	Think Python: How toThinkLike a Computer Scientist	Allen B. Downey	Third Edition, June 2024

E-Resources Links:

1. Introduction to Python - TOC | Infosys Springboard
2. Python Tutor code visualizer: Visualize code in Python, JavaScript, C, C++, and Java
3. Python Tutorial - GeeksforGeeks
4. Learn Python By Example

Course Outcomes:

Course outcome	Descriptions
CO1	**Explain** basic concepts of Python programming.
CO2	**Develop** Python programs using built-in and user-defined functions.
CO3	**Analyze** and apply appropriate data structures for solving problems.
CO4	I**mplement** basic file and directory operations in Python.
CO5	**Design and implement** error handling in Python.

Course Articulation Matrix:

PO/PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	2												
CO2	1	1	2										
CO3		3	2										
CO4		2	2										
CO5		2	3										

Course Assessment and Evaluation:

Continuous Internal Evaluation (CIE): 50 Marks

Sl. No.	Components		Duration (min)	Marks Conducted for	Marks reduced to	40% Min Marks in each component to write SEE
1	Theory-Internal Assessment	IA-1	90	50	15	12
		IA-2	90	50	15	
2	Periodic Lab Assessment		-	30	10	4
3	Lab CIE		-	20	10	4
	Total CIE			**150**	**50**	**20**

IA-1 Syllabus: 2 ½ Module , IA-2 Syllabus: 2 ½ Module
Rubrics for Periodic Lab Assessment: Attendance (5M), Lab record (10 M), Conduction of Experiments(10M) and Viva(5M)-**Total 30M**
Lab CIE: Write-up(5M), Conduction/Execution/Demonstration(10M) and Viva(5M)-**Total 20M**
One Open Ended Experiment/ Project: Experimental / project Design (4 marks), Execution/demonstration (3 marks) and Analysis/Viva (3 marks)- **Total 10M**

Semester End Examination(SEE) : **Max 100 Marks,** Duration: 3 Hrs

The question paper shall contain 10 full questions (20 marks each)**,** with 2 questions from each of the 5 Modules, ensuring 100% syllabus coverage. Students shall answer any 5 full questions with 1:1 choice**.** Each question may have a maximum of 4 sub-divisions**.**

Minimum passing Marks : 40% of Max Marks

Syllabus for the Academic Year 2026-27

Department: Electronics and Communication Engineering			**Semester:**	**2**
Subject: Innovation and Design Thinking Lab (Project Based Learning)				
Subject Code:	**26ECPBL207**	**L – T – P – S:**	**0-0-28-2 (In Hrs)**	
			Credits:	**1**

Sl. No.	Course Objectives
1	**Learn** the principles and process of Design Thinking.
2	**Explore** creativity, empathy, innovation, and problem-solving skills.
3	**Identify** real-world psssroblems through ideation, prototyping, testing, and iterative solution development.
4	**Cultivate** interdisciplinary teamwork, communication, and entrepreneurial thinking.

Module	Description	Hrs
I	**Introduction to design thinking:** Meaning and importance of Design Thinking, Traditional problem-solving vs Design Thinking, Human-centered innovation, Stanford d.school Design Thinking Process, Applications of Design Thinking in Engineering, Business, Healthcare and Society, Creativity and Innovation Mindset	6
II	**Empathize – understanding users:** Importance of empathy in innovation, User observation techniques, Interviews and questionnaire preparation, Empathy mapping, User persona creation, Customer journey mapping	4
III	**Define and ideate:** Problem identification, Framing problem statements, Point of View (POV) statements, Brainstorming techniques, SCAMPER method, Mind mapping, Affinity diagrams	6
IV	**Prototyping:** Importance of prototyping, Types of prototypes, Rapid prototyping methods, Paper prototyping, Storyboarding, Digital mockups, Prototype refinement	6
V	**Testing, implementation and presentation:** User testing methods, Collecting and analyzing feedback, Iterative improvement**,** Pitching innovative ideas, Sustainability and ethics in design, Entrepreneurship and innovation ecosystem	6

Text Books:

Sl. No.	Text Book title	Author	Volume and Year of Edition

1	Change by Design	Tim Brown	Harper Business, 2012 (ISBN: 978-0062337382)
2	Design Thinking: Understanding How Designers Think and Work	Nigel Cross	Bloomsbury Publishing, 2011 (ISBN: 1847888461)

Reference Books:

Sl. No.	Text Book title	Author	Volume and Year of Edition
1	Design Thinking for Strategic Innovation: What They Can't Teach You at Business or Design School	Idris Mootee	John Wiley & Sons 2013
2	Solving Problems with Design Thinking - Ten Stories of What Works	Jeanne Liedtka , Andrew King, Kevin Bennett	Columbia Business School Publishing, 2013 (ISBN: 0231163568)

Course Outcomes:

Course outcome	Descriptions
CO1	**Describe** the concepts and stages of Design Thinking.
CO2	**Apply** empathy-based approaches to identify user needs and problems.
CO3	**Derive** innovative ideas using structured ideation techniques.
CO4	**Develop** low-fidelity prototypes, evaluation of solutions through testing and presentation of innovative solutions.

Course Articulation Matrix:

PO/PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	2	2											
CO2	1	2	2										
CO3		1	2	2		1	1						
CO4			2	3	1			2	3	2	2		

Course Assessment and Evaluation:

This course consists of experimental and project-based learning.

- Part A: 5 weeks of experimental learning with 5 experiments. Students shall conduct the experiments individually.
  CIE for Part A shall be conducted in the 7th week.
- Part B: 5 weeks of project-based learning. A team of maximum 4 students shall carry out a project. The project shall be completed by the 13th week, CIE for Part B may be conducted in the 14th week.

Continuous Internal Evaluation (CIE): 50 Marks

Sl. No.	Components	Marks Conducted for	Marks Reduced to	40% Min Marks in each component to write SEE
CIE for PART A (Experimental Learning)				
1	Periodic Lab Assessment	30	15	6
2	Lab CIE	20	10	4
	Total CIE for Part A	50	25	10
Rubrics for Periodic Lab Assessment: Attendance (5M), Lab record (10 M), Conduction of Experiments(10) and Viva(5M)-**Total 30M** **Lab CIE**: Write-up(5M), Conduction/Execution/Demonstration(10M) and Viva(5M**)- Total 20M**				
CIE for PART B (Project based Learning)				
1	Lab CIE Part B	50	25	10
	Total CIE(Part A and PartB)	**100**	**50**	**20**
Rubric for Lab CIE Part B: Write-up (10M), Presentation(10M) Demonstration(20M) Viva(10M)- **Total 50 Marks**				
Semester End Examination (SEE) : 50 Marks, Duration: 3 Hrs **PART A (25 Marks):** **Rubrics for Part A:** Write-up(5M), Conduction/Execution/Demonstration(15M) and Viva(5M)-**Total 25M.** **PART B (25 Marks):** **Rubrics for Part B:** Write-up(5M), Presentation/Demonstration(15M) and Viva(5M)-**Total 25M.** **Minimum passing Marks: 40% in Part A and Part B each**				

Department: Humanity Sciences	**Semester:**	**I**

Subject : English for Technical Communication				
Subject Code:	**26HSET208**	**L – T – P - S:**	**0-0-28-2 (In Hrs)**	
			Credits:	**1**

Sl. No.	**Course Objectives**
1	Cultivate a professional corporate register and master cross-cultural workplace communication dynamics.
2	Master the syntax, mechanics, and structural precision required for technical engineering documentation.
3	Expand professional vocabulary, master contextual nuances, and eliminate common linguistic ambiguities.
4	Develop essential digital literacy, corporate drafting skills, and strategies for early career networking.

Module	**Description**	**Hrs**
I	**Dynamics of Professional Communication:** Communication architecture in corporate environments (Vertical, Horizontal, Diagonal). The 7 Principles of Effective Communication. Overcoming socio-cultural and psychological barriers. Active listening mechanics and Non-verbal professional etiquette.	**6**
II	**Technical Syntax and Remedial Grammar:** Shift from casual to technical register. Precision in writing: Active and Passive voice in engineering reports, Subject-Verb concord, and modifier placement. Mechanics of advanced punctuation, styling, and textual cohesion.	**6**
III	**Lexical Mechanics and Professional Nuance:** Building industry-relevant technical vocabulary. Homophones, contextual usage, and eliminating redundant phrasing/jargon. Collocations, idiomatic precision, and managing tone (formal vs. collaborative) in engineering environments.	**6**
IV	**Contemporary Corporate Drafting and Branding:** Designing high-impact modern Resumes and Professional Bio-data. Fundamentals of Digital Professional Branding (LinkedIn optimization). Executive correspondence: Crafting persuasive emails, cover letters, and structured paragraph building (Topic sentence, logical elaboration, transition tokens).	**5**
V	**Analytical Reading and Executive Summarization:** Advanced reading methodologies (Skimming for intent, Scanning for data, Critical analysis). Comprehension of technical white papers, case studies, and engineering literature. Extracting key insights and drafting concise abstract summaries.	**5**

Text Books:

Sl. No.	Text Book title	Author	Volume and Year of Edition
1	Technical Communication: Principles and Practice	Meenakshi Raman & Sangeeta Sharma	Oxford University Press, 4th Edition, 2023
2	Professional Communication	Aruna Koneru	McGraw Hill Education, 3rd Edition, 2023
3	Business Communication Today	Courtland L. Bovee & John V. Thill	Pearson, 15th Edition, 2024

Reference Books:

Sl. No.	Text Book title	Author	Volume and Year of Edition
1	Effective Technical Communication	M. Ashraf Rizvi	McGraw Hill Education (2nd Edition, 2017)
2	Advanced Grammar in Use	Martin Hewings	Cambridge University Press (3rd Edition, 2015)

Course Outcomes:

Course outcome	Descriptions
CO1	**Demonstrate** effective professional communication skills by applying verbal, non-verbal, listening, and interpersonal communication techniques in corporate and multicultural workplace environments.
CO2	**Apply** advanced grammar, technical writing conventions, and structured documentation skills to prepare accurate and professional engineering reports and correspondence.
CO3	**Employ** appropriate technical vocabulary, contextual language usage, and professional tone while communicating in academic and industrial settings.
CO4	**Design** industry-standard resumes, LinkedIn profiles, cover letters, and professional emails to enhance employability and career readiness.
CO5	**Analyze** technical documents and engineering literature using advanced reading strategies and prepare concise summaries, abstracts, and critical interpretations.

Course Articulation Matrix:

PO/PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3					2				3	2		
CO2	2					2				3	2		
CO3	1					2				3	2		
CO4	1					2				3	2		
CO5	2					1				3	1		

Course Assessment and Evaluation:

Sl. No.	Components		Duration (min)	Marks Conducted for	Min. Marks to pass the Course
1	Theory- Internal Assessment	IA-1	90	50	40
		IA-2	90	50	
	Total CIE			100	40

Department: Humanity Sciences			**Semester:**	**II**
Subject: Constitution of India and Ethics				
Subject Code:	**26HSCI209**	**L – T – P - S:**	**14-0-0-16 (In Hrs)**	
			Credits:	**PP**

Sl. No	**Course Objectives**
1	To be **familiar** with salient features and preamble of the constitution of India, fundamental duties and rights
2	To **understan**d the relevance of directive principles under part-4 and the responsibilities of individuals towards society.
3	To **understand** the powers and functions of the Legislature bodies.
4	To provide the information of FDs, Electoral Process, emergencies and amending procedures

Module	**Description**	**Hrs**
I	Introduction, Meaning and definitions. Salient features, Sources, Constituent Assembly, Drafting Committee. Preamble to the constitution of India.	**2**
II	Fundamental rights under part III, scope, Limitations and important cases, Judicial and Excecutive	**2**
III	Relevance of directive principles of state policy, fundamental duties and its significance, different commissions of india, Finance Commission, five year plans, 73rd & 74th Constitutional Amendment	**3**
IV	Union Executives- President, Vice President, Prime minister, Speaker, Parliament, Supreme Court of India. State Executives – Governor, Chief Minister, (Upper and lower house) State legislature and High Court.	**3**
V	Constitutional Special Provisions for Scheduled Castes and Tribes, Women, Children and backward classes. Electoral process. Ethics : Introduction Scope of Ethics , History of Ethics, Methods of Ethics Different Approaches to the Study of Ethics, Division of Ethics	**4**

Text Books:

Sl. No.	**Textbook title**	**Author**	**Volume and Year of Edition**
1	Introduction to the Constitution of India (student edition)	Durga Das Basu	EEE, 19th/20th Edn.,2001
2	An Introduction to Constitution of India	MV Pylee	Volume-1 ,Vikas Publishing, 2002

Reference Books:

Sl. No.	Textbook title	Author	Volume and Year of Edition
1	An Introduction to Constitution of India	Brij kishore Sharma	Prentice-Hall of India, Volume-1, 2002
2	Constitution of India and Professional Ethics	V. Rajaram	Second Edition, New Age International Publication. 2011
3	https://egyankosh.ac.in/bitstream/123456789/81071/1/Block_1.pdf		

Course outcomes:

Course Outcome	Descriptions
CO1	Have general knowledge and legal literacy and thereby to take up competitive examinations.
CO2	Understand the fundamental rights, directive principles and fundamental duties.
CO3	Understand the importance of the three main organs of the constitution, Viz-legislature, executive and judiciary.
CO4	Remember the various Amendments and Provisions.
CO5	Know about various Union and state executives.

Course Articulation Matrix:

PO/PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1						2	1	3	3	2			
CO2		2			2				3	2	1		
CO3	1		1					3	2	2		1	
CO4				1				3	3	2			
CO5							1						

Syllabus for the Academic Year 2026-27

Course Assessment and Evaluation: Humanities and Social Science Courses

Sl. No.	Components		Duration(min)	Marks Conducted for	Min. Marks to pass the Course
1	Theory- Internal Assessment	IA-1	90	50	40
		IA-2	90	50	
	Total CIE			**100**	**40**