CHRIST COLLEGE OF ENGINEERING
IRINJALAKUDA (AUTONOMOUS)

B. Tech Syllabus– 2025

COMPUTER SCIENCE AND ENGINEERING
(DATA SCIENCE)

FIRST SEMESTER

COMPUTER SCIENCE AND ENGINEERING

(DATA SCIENCE)

SEMESTER – S1 CURRICULUM

FIRST SEMESTER: Computer Science and Engineering (Data Science)														
Sl. No:	Slot	Course Code	Course Type	Course Category	Course Title (Course Name)	Credit Structure				SS	Total Marks		Credits	Hrs./Week
						L	T	P	R		CIE	ESE		
THEORY														
1	A	G25MAT101	BS	GC	Mathematics for Information Science-1	3	0	0	0	4.5	40	60	3	3
2	B	G25PYE102	BS	GC	Chemistry for Information and Electrical Science	3	0	2	0	5.5	40	60	4	5
3	C	G25EGE104	ES	GC	Engineering Graphics and Computer Aided Drawing	2	0	2	0	4	40	60	3	4
4	D	G25EET105	ES	GC	Introduction To Electrical and Electronics Engineering	4	0	0	0	5.5	40	60	4	4
5	E	A25ATE106	ES	GC	Algorithmic Thinking with Python	3	0	2	0	5.5	40	60	4	5
PRACTICALS														
6	L	G25EEP107	ES	GC	Basic Electrical and Electronics Engineering Workshop	0	0	2	0	1	50	50*	1	2
7	I	A25LSE109	HM	CC	Life Skills and Professional Communication	2	0	1	0	3.5	100	0	1	3
Total										**28.5**			**20**	**26**

SEMESTER S1

MATHEMATICS FOR INFORMATION SCIENCE – I

(Group A)

Course Code	G25MAT101	**CIE Marks**	40
Teaching Hours/Week (L:T:P:R)	3:0:0:0	**ESE Marks**	60
Credits	3	**Exam Hours**	2 Hrs. and 30 Mins.
Prerequisites (if any)	Basic knowledge in single variable calculus	**Course Type**	Theory

Course Objective:

1. To provide students with essential skills in analysing functions of several variables, identifying extrema, and optimising processes to prepare them to address diverse engineering applications and challenges.

SYLLABUS

Module No.	Description	Contact Hours
1	Limits of Function Values, Continuity at a point, Continuous Functions, Rates of Change: Derivative at a Point, Derivative as a Function, Second- and Higher-Order Derivatives, Instantaneous Rates of Change, Chain Rule, Implicit Differentiation, Tangents and Normal Lines, Linearization, Concavity: The Second Derivative Test for Concavity.	9
2	Functions of Several Variables: Domains and Ranges, Level curves of two variables, Limits for functions of two variables, Continuity for functions of two variables, Partial derivatives of a functions of more than two variables, Partial derivatives and continuity, Second- Order partial derivatives, The mixed derivative theorem, The Chain Rule: Functions of two variables	9
3	The Chain Rule: Functions of three Variables, Directional Derivatives in the Plane, Interpretation of the Directional Derivative, Gradient, Properties of the Directional Derivative, Local Extreme Values for Functions of Two Variables: Relative extrema, first derivative theorem for local extreme values, Critical	9

	point, saddle point, Second Derivative Test for Local Extreme Values, Absolute Maxima and Minima on Closed Bounded Regions.	
4	Constrained Maxima and Minima, The Method of Lagrange Multipliers with one constraint, The Method of Lagrange Multipliers with two constraints, Method of Steepest Descent (only two variables), LPP- Formation, Solution of LPP using graphic method.	9

Course Assessment Method (CIE: 40 Marks, ESE: 60 Marks)

Continuous Internal Evaluation Marks (CIE):

Assignment (Activity based)	Internal Examination-I (Written)	Internal Examination-II (Written)	Internal Examination-III (Written)	Total
15*	30	30	30	
	A total of 90 marks will be scaled to 25.			**40**

*One or more assignments should be given, and the total marks should be consolidated and converted to 15 as per revised evaluation guidelines.

End Semester Examination Marks (ESE)

In Part A, all questions need to be answered and in Part B, each student can choose any one full question out of two questions.

Part A	Part B	Total
• 2 questions from each module. • Total of 8 questions, each carrying 3 marks **(8 x 3 = 24 Marks)**	• Each question carries 9 marks. • Two questions will be given from each module, out of which 1 question should be answered. • Each question can have a maximum of 3 sub divisions. **(4 x 9 = 36 Marks)**	**60**

Course Outcomes (COs)

At the end of the course students should be able to:

CO No.	Description	Blooms Knowledge Level (KL)
CO1	Apply various concepts in calculus to linearize functions and to examine concavity of functions.	K2
CO2	Analyze multivariable functions to evaluate limits, test continuity, and examine the applications of partial derivatives	K3
CO3	Apply the concepts of gradients and classify extreme values of functions of several variables.	K2
CO4	Analyze optimization problems using constrained maxima–minima, linear programming, and the method of steepest descent	K3
CO5	Able to apply theoretical concepts and computational techniques to analyze, design, and develop solutions for complex engineering problems, and to effectively interpret and visualize results.	K3

Note: K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyse, K5 – Evaluate, and K6 – Create

CO-PO Mapping Table:

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

1: Slight (Low),2: Moderate (Medium),3: Substantial (High), : No Correlation

Text Books

Sl. No.	Title of the Book	Name of the Author(s)	Name of the Publisher	Edition and Year
1	Thomas' Calculus	Maurice D. Weir, Joel Hass, Christopher Heil, Przemyslaw Bogacki	Pearson	15th Edition, 2023

2	Advanced Engineering Mathematics	Erwin Kreyszig	John Wiley & Sons	10th Edition, 2016

Reference Books

Sl. No.	Title of the Book	Name of the Author(s)	Name of the Publisher	Edition and Year
1	Calculus	Howard Anton, Irl Bivens, Stephens Davis	Wiley	10th Edition, 2012
2	Optimisation: Algorithms and Applications	Rajesh Kumar Arora	CRC Press	1st Edition, 2015
3	Multivariable Calculus	Ron Larson, Bruce Edwards	Brooks/Cole, Cengage Learning	10th Edition, 2014
4	Calculus & its applications	Goldstein, Schneider, Lay, Asmar	Pearson	14th Edition, 2018
5	Bird's Higher Engineering Mathematics	John Bird	Taylor & Francis	9th Edition, 2021
6	Higher Engineering Mathematics	B. V. Ramana	McGraw-Hill Education	39th Edition, 2023

Video Links (NPTEL, SWAYAM, etc.)

Module No.	Link
1	https://nptel.ac.in/courses/111106146
2	https://nptel.ac.in/courses/111107108
3	https://nptel.ac.in/courses/111107108
4	https://nptel.ac.in/courses/111107108

SEMESTER S2

CHEMISTRY FOR INFORMATION SCIENCE AND ELECTRICAL SCIENCE

Course Code	**G25CYE203**	**CIE Marks**	40
Teaching Hours/Week (L: T:P: R)	3:0:2:0	**ESE Marks**	60
Credits	4	**Exam Hours**	2 Hrs. 30 Min.
Prerequisites (if any)	None	**Course Type**	Lab Embedded Theory

Course Objectives:

1. To equip students with a comprehensive understanding of chemistry concepts that are relevant to engineering applications.
2. To familiarize students with applied topics such as spectroscopy, electrochemistry, and instrumental methods.
3. To raise awareness among students about environmental issues, including climate change, pollution, and waste management, and their impact on the quality of life.

SYLLABUS

Module No.	Syllabus Description	Contact Hours
1	**Electrochemistry and Corrosion Science (9 Hours)** **Electrochemical Cell**- Electrode potential- Nernst equation for single electrode and cell (Numerical problems)- Reference electrodes – SHE & Calomel electrode –Construction and Working - Electrochemical series - Applications – Glass Electrode & pH Measurement-Conductivity-Measurement using Digital conductivity meter. Li-ion battery & H_2-O_2 fuel cell (acid electrolyte only) construction and working. **Corrosion** –Electrochemical corrosion mechanism (acidic & alkaline medium) - Galvanic series - Corrosion control methods - Cathodic Protection - Sacrificial anodic protection and impressed current cathodic protection –Electroplating of copper - Electroless plating of copper.	9

2	**Materials for Electronic Applications (9 Hrs)** **Nanomaterials** - Classification based on Dimension & Materials-Synthesis – Sol gel & Chemical Reduction - Applications of nanomaterials Carbon Nanotubes, Fullerenes, Graphene & Carbon Quantum Dots – structure, properties & application. **Polymers** - Fire Retardant Polymers- Halogenated & Non-halogenated polymers (Examples only)- Conducting Polymers-Classification-Polyaniline & Polypyrrole-synthesis, properties and applications. **Organic electronic materials and devices**- construction, working and applications of Organic Light Emitting Diode (OLED) & Dye-Sensitized Solar Cells (DSSC) Materials used in Quantum computing Technology**,** Super capacitors, Spintronics	9
3	**Molecular Spectroscopy and Analytical Techniques (9 Hours)** **Spectroscopy**-Types of spectra- Molecular energy levels - Beer Lambert's law – Numerical problems - Electronic Spectroscopy – Principle, Types of electronic transitions –Role of conjugation in absorption maxima- Instrumentation-Applications – Vibrational spectroscopy – Principle- Number of vibrational modes - Vibrational modes of CO_2 and H_2O – Applications **Thermal Analysis**: Dielectric Thermal Analysis (DETA) of Polymers- Working and Application. **Electron Microscopic Techniques:** SEM - Principle, instrumentation and Applications.	9
4	**Environmental Chemistry (9Hrs)** **Water characteristics** - Hardness - Types of hardness- Temporary and Permanent - Disadvantages of hard water -Degree of hardness (Numericals) Water softening methods-Ion exchange process-Principle, procedure and advantages. Reverse osmosis – principle, process and advantages. – Water disinfection methods – chlorination-Break point chlorination, ozone and UV irradiation. Dissolved oxygen (DO), BOD and COD- Definition & Significance. **Waste Management**: Sewage water treatment- Primary, Secondary and Tertiary - Flow diagram -Trickling filter and UASB process. E Waste, Methods of disposal – recycle, recovery and reuse. Chemistry of climate change- Greenhouse Gases- Ozone Depletion-Sustainable Development-an introduction to Sustainable Development Goals.	9

Course Assessment Method (CIE: 40 Marks, ESE: 60 Marks)

Continuous Internal Evaluation Marks (CIE):

Continuous Assessment	Internal Examination-I (Written)	Internal Examination-II (Written)	Internal Examination-III (Written)	Lab Examination	Total
10	30	30	30	10	**40**
	A total of 90 marks will be scaled to 20.				

End Semester Examination Marks (ESE)

In Part A, all questions need to be answered and in Part B, each student can choose any one full question out of two questions.

Part A	Part B	Total
• 2 questions from each module. • Total of 8 questions, each carrying 3 marks **(8 x 3 = 24 Marks)**	• Each question carries 9 marks. • Two questions will be given from each module, out of which 1 question should be answered. • Each question can have a maximum of 3 sub divisions. **(4 x 9 = 36 Marks)**	**60**

Course Outcomes (COs)

At the end of the course students should be able to:

CO No.	CO Statement	Module Mapping	Blooms Level
CO1	Apply the basic concepts of Electrochemistry and corrosion to examine their possible applications in various engineering fields for creating clean energy.	2	K3
CO2	Illustrate the use of analytical techniques for the synthesis and characterisation of different engineering materials for sustainable consumption and production.	3	K2
CO3	Interpret the use of various engineering materials for the production of affordable and clean energy in different industries.	1	K4

CO4	Analyse water treatment techniques and waste management methods to ensure the availability of water, a good climate and to maintain a sustainable life below water and on land.	4	K4
CO5	Apply basic knowledge of principles and theories in Chemistry to conduct experiments.	Lab Practical-based	K3
CO6	Apply basic chemistry principles in material design and innovation to synthesis new materials through hands-on experiments and perform software-based studies to construct simple models or interpret experimental results.	Out of syllabus	K3

Note: K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyse, K5 – Evaluate, and K6 – Create

CO-PO Mapping Table:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	2	2	2			3					
CO2	2	2	2			3					
CO3	2	2				3					
CO4	2	2	2			3					
CO5	2	2	2	2		2		3	3	3	3
CO6					2	3	3	3	3	3	3

1: Slight (Low),2: Moderate (Medium),3: Substantial (High), : No Correlation

Text Books				
Sl. No	**Title of the Book**	**Name of the Author/s**	**Name of the Publisher**	**Edition and Year**
1	Engineering Chemistry	B. L. Tembe, Kamaluddin, M. S. Krishnan	NPTEL Web-book	2018
2	Physical Chemistry	P. W. Atkins	Oxford University Press	International Edition-2018
3	Instrumental Methods of Analysis	H. H. Willard, L. L. Merritt	CBS Publishers	7th Edition-2005
4	Engineering Chemistry	Jain & Jain	Dhanpath Rai Publishing Company	17th Edition - 2015

Reference Books				
Sl. No	**Title of the Book**	**Name of the Author/s**	**Name of the Publisher**	**Edition and Year**
1	Fundamentals of Molecular Spectroscopy	C. N. Banwell	McGraw-Hill	4th edn., 1995
2	Principles of Physical Chemistry	B. R. Puri, L. R. Sharma, M. S. Pathania	Vishal Publishing Co	47th Edition, 2017
3	Introduction to Spectroscopy	Donald L. Pavia	Cengage Learning India Pvt. Ltd	2015
4	Polymer Chemistry: An Introduction	Raymond B. Seymour, Charles E. Carraher	Marcel Dekker Inc	4th Revised Edition, 1996
5	The Chemistry of Nanomaterials: Synthesis, Properties and Applications	Prof. Dr. C. N. R. Rao, Prof. Dr. h.c. mult. Achim Müller, Prof. Dr. A. K. Cheetham	Wiley-VCH Verlag GmbH & Co. KGaA	2014
6	Organic Electronics Materials and Devices	Shuichiro Ogawa	Springer Tokyo	2024
7	Principles and Applications of Thermal Analysis	Gabbot, P	Oxford: Blackwell Publishing	2008

Video Links (NPTEL, SWAYAM…)	
Module No.	**Link ID**
1	https://archive.nptel.ac.in/courses/104/106/104106137/ https://archive.nptel.ac.in/courses/113/105/113105102/ https://archive.nptel.ac.in/courses/113/104/113104082/ https://www.youtube.com/watch?v=BeSxFLvk1h0
2	https://archive.nptel.ac.in/courses/113/104/113104102/ https://archive.nptel.ac.in/courses/104/105/104105124/ https://archive.nptl.ac.in/courses/105/104/105104157/

Continuous Assessment (10 Marks)

Continuous assessment evaluations are conducted based on laboratory associated with the theory.

Mark distribution

1. **Preparation and Pre-Lab Work (2 Marks)**
   - Pre-Lab Assignments: Assessment of pre-lab assignments or quizzes that test understanding of the upcoming experiment.
   - Understanding of Theory: Evaluation based on students' preparation and understanding of the theoretical background related to the experiments.
2. **Conduct of Experiments (2 Marks)**
   - Procedure and Execution: Adherence to correct procedures, accurate execution of experiments, and following safety protocols.
   - Skill Proficiency: Proficiency in handling equipment, accuracy in observations, and troubleshooting skills during the experiments.
   - Teamwork: Collaboration and participation in group experiments.
3. **Lab Reports and Record Keeping (3 Marks)**
   - Quality of Reports: Clarity, completeness and accuracy of lab reports. Proper documentation of experiments, data analysis and conclusions.
   - Timely Submission: Adhering to deadlines for submitting lab reports/rough record and maintaining a well-organized fair record.
4. **Viva Voce (3 Marks)**
   - Oral Examination: Ability to explain the experiment, results and underlying principles during a viva voce session.

Final Marks Averaging: *The final marks for preparation, conduct of experiments, viva, and record are the average of all the specified experiments in the syllabus.*

Evaluation Pattern for Lab Examination (10 Marks)

1. **Procedure/Principle/Conduct of Experiments (4 Marks)**
   - Procedure Understanding and Description: Clarity in explaining the procedure and understanding each step involved.
   - Preliminary Work and Planning: Thoroughness in planning and organizing materials/equipment.
   - Setup and Execution: Proper setup and accurate execution of the experiment or

programming task.

2. **Result (4 Marks)**
   - Accuracy of Results: Precision and correctness of the obtained results.
3. **Viva Voce (2 Marks)**
   - Proficiency in answering questions related to theoretical and practical aspects of the subject.

List of Experiments

Any 10 Experiments Mandatory

Nos.	Experiment
1	Estimation of iron in iron ore
2	Estimation of copper in brass
3	Determination of cell constant and conductance of solutions
4	Calibration of pH meter and determination of pH of a solution
5	Synthesis of polymers (a)Urea-formaldehyde resin (b) Phenol-formaldehyde resin
6	Determination of wavelength of absorption maximum and colorimetric estimation of Fe^{3+} in solution
7	Determination of molar absorptivity of a compound (KMnO4 or any water-soluble food colorant)
8	Analysis of IR spectra
9	Identification of drugs using TLC
10	Estimation of total hardness of water-EDTA method
11	Estimation of dissolved oxygen by Winkler's method
12	Determination of calorific value using Bomb calorimeter
13	Determination of saponification value of a given vegetable oil
14	Determination of acid value of a given vegetable oil
15	Verification of Nernst equation for electrochemical cell.

SEMESTER S1

ENGINEERING GRAPHICS AND COMPUTER AIDED DRAWING

Course Code	G25EGE104	**CIE Marks**	40
Teaching Hours/Week (L:T:P:R)	2:0:2:0	**ESE Marks**	60
Credits	3	**Exam Hours**	2 Hrs. and 30 Mins.
Prerequisites (if any)	None	**Course Type**	Theory + Lab

Course Objective:

1. To learn the principles and techniques of dimensioning and preparing engineering drawings.
2. To develop the ability to accurately interpret and understand engineering drawings.
3. To learn the features of CAD software

SYLLABUS

Module No.	Description	Contact Hours
1	Introduction: Relevance of technical drawing in engineering field. Types of lines, Dimensioning, BIS code of practice for technical drawing. (No questions for the end semester examination) Projection of points in different quadrants, Projection of straight lines inclined to one plane and inclined to both planes. Trace of a line. Inclination of lines with reference planes. True length and true inclinations of line inclined to both the reference planes.	9
2	Projection of Simple solids such as Triangular, Rectangle, Square, Pentagonal and Hexagonal Prisms, Pyramids, Cone and Cylinder only. Projection of solids in simple position including profile view. Projection of solids with axis inclined to one of the reference planes and with axis inclined to both reference planes.	9
3	Sections of Solids: Sections of Prisms, Pyramids, Cone and Cylinder only, with axis in vertical position and cut by different section planes. True shape of the sections. (Exclude true shape given problems) Development of Surfaces: Development of surfaces of the solids and solids cut by different section planes. (Exclude problems with through holes)	9

4	Isometric Projection: Isometric scale- Isometric View and Projections of Prisms, Pyramids, Cone, Cylinder, Sphere, Hemisphere and their combinations. Computer Aided Drawing (CAD): Introduction, Role of CAD in design and development of new products, Advantages of CAD. Creating two dimensional drawing with dimensions using suitable software. (CAD, only internal evaluation)	9

Course Assessment Method
(CIE: 40 Marks, ESE: 60 Marks)

Continuous Internal Evaluation Marks (CIE):

Continuos Assessment	Internal Examination-I (Written)	Internal Examination-II (Written)	Internal Examination-III (Written)	Total
20	30	30	30	**40**
	A total of 90 marks will be scaled to 20			

End Semester Examination Marks (ESE)

	Total
2 Questions from one module Total 8 Questions, each question carries 15 marks **(15 x 4 = 60 Marks)**	**60**

Course Outcomes (Cos)

At the end of the course students should be able to:

CO No.	Description	Blooms Knowledge Level (KL)
CO1	Apply Engineering drawing principles and projection methods, to accurately represent points and lines in different quadrants.	3
CO2	Visualize and model projections of simple solids for resource-efficient manufacturing and sustainable product design	4
CO3	Prepare sectional views and surface developments to optimize material usage, reduce waste, and support eco-friendly production systems	3

CO4	Interpret principles of isometric projections to convey 3d information and Execute 2D sketching and 3D modelling using CAD tools.	3

Note: K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyse, K5 – Evaluate, and K6 – Create.

CO-PO Mapping Table:

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

1: Slight (Low),2: Moderate (Medium),3: Substantial (High), : No Correlation

Text Books

Sl. No.	Title of the Book	Name of the Author(s)	Name of the Publisher	Edition and Year
1	Engineering Graphics	Varghese P. I.	V.I.P. Publishers	2018 Edition
2	Engineering Graphics	Benjamin J.	Pentex Publishers	2016 Edition
3	Engineering Graphics	John K. C.	Prentice Hall India	2017 Edition
4	Engineering Drawing	Bhatt N. D.	Charotar Publishing House Pvt. Ltd.	60th Edition. 2019
5	Engineering Graphics	Anilkumar K. N.	Adhyuth Narayan Publishers	2022 Edition

Reference Books

Sl. No.	Title of the Book	Name of the Author(s)	Name of the Publisher	Edition and Year
1	Engineering Graphics with AutoCAD	Kulkarni D. M., Rastogi A. P., and Sarkar A. K.	Prentice Hall India	2020 Edition
2	Engineering Drawing & Graphics	Venugopal K.	New Age International	5th Edition, 2011
3	Engineering Drawing	Parthasarathy N. S., and Murali V.	Oxford University Press	2015 Edition

Video Links (NPTEL, SWAYAM, etc.)

Module No.	Link
1	https://archive.nptel.ac.in/courses/112/102/112102304/
2	https://archive.nptel.ac.in/courses/112/102/112102304/
3	https://archive.nptel.ac.in/courses/112/102/112102304/
4	https://archive.nptel.ac.in/courses/112/102/112102304/

SEMESTER S1

INTRODUCTION TO ELECTRICAL AND ELECTRONICS ENGINEERING

(Common to Group A & B)

Course Code	G25EET105	**CIE Marks**	40
Teaching Hours/Week (L:T:P:R)	4:0:0:0	**ESE Marks**	60
Credits	4	**Exam Hours**	2 Hrs. and 30 Mins.
Prerequisites (if any)	None	**Course Type**	Group Core-Theory

Course Objective:

1. To provide an understanding of the fundamental principles of electrical engineering
2. To introduce the working principles of fundamental electronic devices and circuits
3. To provide an overview of the basic concepts in different types of communication

SYLLABUS

Module No.	Description	Contact Hours
1	**Elementary concepts of DC electric circuits:** Current and Voltage Division Rule - Relative potential Capacitors & Inductors: V-I relations and Energy stored. Ohms Law and Kirchhoff's laws – numerical problems. Star-delta conversion (resistive networks only - derivation not required) - numerical problems. Node voltage methods-matrix representation-solution of network equations by matrix methods - numerical problems. **Elementary Concepts of Magnetic circuits:** Magnetic Circuits: Basic Terminology: MMF, field strength, flux density, reluctance - Comparison between electric and magnetic circuits - Series and parallel magnetic circuits with composite materials (numerical problems not needed) **Analysis of DC Electric circuits:** Mesh current method – matrix representation - Solution of network equations.	11
2	**Electromagnetic Induction:** Faraday's laws, Lenz's law- statically induced and dynamically induced emf – Self-inductance and mutual inductance, coefficient of coupling (numerical problems not needed) **Alternating Current fundamentals:** Generation of alternating voltages - Representation of sinusoidal waveforms: frequency, period, average value, RMS value and form factor - numerical problems AC Circuits: Phasor representation of sinusoidal quantities, Trigonometric, Rectangular, Polar and complex forms. **Analysis of simple AC circuits:** Purely resistive, inductive & capacitive circuits; Inductive and capacitive reactance, concept of impedance - numerical	11

	problems. RL, RC and RLC series circuits- power factor, active, reactive and apparent power. Simple numerical problems. Three phase AC systems: Generation of three phase voltages, advantages of three phase systems, star and delta connections (balanced only), relation between line and phase voltages, line and phase currents- numerical problems	
3	**Introduction to Electronic devices:** Passive and active components in electronics Working of PN junction diode, V-I characteristics of PN Junction diode Zener diode and avalanche breakdown. Basics of Zener voltage regulator, Block diagram of DC power supply, circuit and working of half wave, full wave and bridge rectifiers, ripple factor (with and without capacitor filters) Construction, working and V-I Characteristics of BJT, Input output characteristics of CE configuration, Comparison of CE, CB and CC configurations Concept of biasing and load line Transistor as a switch, Transistor as an amplifier (Circuit Diagram and working) RC coupled amplifier - Circuit diagram and frequency response Introduction to FET, Construction and working of N-channel and PChannel MOSFETs	13
4	**Modern Electronics and its applications:** General block diagram of a Communication system, Block diagram of Fiber optic Communication system Concept of AM and FM (No derivation required), Block diagram of AM and FM super-heterodyne receiver Basic concepts of Wired and Wireless communication, Block diagram of GSM Comparison of 3G, 4G, 5G and 6G communication technologies Block diagrams of Electronic instrumentation system, Digital Multimeter, Function generator Introduction to CRO and Lissajous patterns Applications of modern electronics – IoT based smart homes, healthcare and agriculture (Case study only)	9

Course Assessment Method (CIE: 40 Marks, ESE: 60 Marks)

Continuous Internal Evaluation Marks (CIE):

Assignment (Activity based)	Internal Examination-I (Written)	Internal Examination-II (Written)	Internal Examination-III (Written)	Total
15	30	30	30	
	Average of best two then convert to 25			**40**

End Semester Examination Marks (ESE)

In Part A, all questions need to be answered and in Part B, each student can choose any one full question out of two questions.

Part A	Part B	Total
• 2 questions from each module. • Total of 8 questions, each carrying 3 marks **(8 x 3 = 24 Marks)**	• Each question carries 9 marks. • Two questions will be given from each module, out of which 1 question should be answered. • Each question can have a maximum of 3 sub divisions. **(4 x 9 = 36 Marks)**	**60**

Course Outcomes (Cos)

At the end of the course students should be able to:

CO No.	Description	Blooms Knowledge Level (KL)
CO1	Apply fundamental concepts and circuit laws to solve simple DC/AC electric circuits	K3
CO2	Design basic electronic circuits with the knowledge of passive and active electronic components	K3
CO3	Apply fundamental concepts of magnetic circuits to classify series and parallel magnetic circuits and design the values of self and mutual inductance of coils	K3
CO4	Distinguish the principles of various Communication systems & electronic instruments	K2
CO5	Analyse AC circuits with resistive, inductive and capacitive loads and solve three phase Star and Delta connected circuits	K4
CO6	Apply knowledge of modern electronics to study case studies related to IoT applications in smart homes, healthcare and agriculture	K3

Note: K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyse, K5 – Evaluate, and K6 - Create

CO-PO Mapping Table

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	3	3		2		2					2
CO2		2		2		2					2
CO3	3	3		2		2					2
CO4	2	2	2	2		2					2
CO5	3	3		2		2					2
CO6	2	3	2	2		2					3

Text Books

Sl. No.	Title of the Book	Name of the Author(s)	Name of the Publisher	Edition and Year
1	Basic Electrical Engineering Tata	D P Kothari and I J Nagrath	McGraw Hill	4th Edition, 2019
2	Schaum's Outline of Basic Electrical Engineering	J. J. Cathey and Syed A Nasar	Tata McGraw Hill	3rd Edition, 2010
3	Basic Electronics: Principles and Applications	Chinmoy Saha, Arindham Halder and Debarati Ganguly	Cambridge University Press	1st Edition, 2018
4	Basic Electrical and Electronics Engineering	D. P. Kothari and I. J. Nagrath	McGraw Hill	2nd Edition, 2020
5	The Internet of Things: How Smart TVs, Smart Cars, Smart Homes, and Smart Cities Are Changing the World	Michael Miller	QUE	1st Edition, 2015
6	Basic Electronics and Linear Circuits	N N Bhargava D C Kulshreshtha and S. C. Gupta	McGraw Hill	2nd Edition, 2017
7	Electronic Communication Systems	Kennedy and Davis	McGraw Hill	6th Edition, 2017

Reference Books

Sl. No.	Title of the Book	Name of the Author(s)	Name of the Publisher	Edition and Year
1	Basic Electrical Engineering	D C Kulshreshtha	Tata McGraw Hill	2nd Edition, 2019
2	Electrical Engineering Fundamentals	Del Toro V	Pearson Education	2nd Edition, 2019
3	Basic Electrical Engineering	T. K. Nagsarkar, M. S. Sukhija	Oxford Higher Education	3rd Edition, 2017
4	Electronics: A Systems Approach	Neil Storey	Pearson	6th Edition, 2017
5	Electronic Devices and Circuit Theory	Robert L. Boylestad and Louis Nashelsky	Pearson	11th Edition 2015
6	Principles of Electronic Communication Systems	Frenzel L. E.	McGraw Hill	4th Edition, 2016
7	Internet of Things: Architecture and Design Principles	Raj Kamal	McGraw Hill	1st Edition, 2017
8	Electronic Communication	Dennis Roddy and John Coolen	Pearson	4th Edition, 2008

SEMESTER S1

ALGORITHMIC THINKING WITH PYTHON

Course Code	A25ATE106	**CIE Marks**	40
Teaching Hours/Week (L:T:P:R)	3:0:2:0	**ESE Marks**	60
Credits	4	**Exam Hours**	2 Hrs. and 30 Mins.
Prerequisites (if any)	None	**Course Type**	Lab Embedded Theory

Course Objective:

1. To provide students with a thorough understanding of algorithmic thinking and its practical applications in solving real-world problems. To develop the ability to accurately interpret and understand engineering drawings.
2. To explore various algorithmic paradigms, including brute force, divide-and-conquer, dynamic programming, and heuristics, in addressing and solving complex problems.

SYLLABUS

Module No.	Description	Contact Hours
1	**Problem-Solving Strategies**: - Problem-solving strategies defined, Importance of understanding multiple problem-solving strategies, Trial and Error, Heuristics, Means-Ends Analysis, and Backtracking (Working backward). **The Problem-Solving Process:** - Computer as a model of computation, Understanding the problem, formulating a model, developing an algorithm, Writing the program, Testing the program, and evaluating the solution. **Essentials of Python Programming: -** Creating and using variables in Python, Numeric and String data types in Python, Using the math module, Using the Python Standard Library for handling basic I/O - print, input, Python operators and their precedence.	7
2	**Algorithm and Pseudocode Representation:** - Meaning and Definition of Pseudocode, Reasons for using pseudocode, The main constructs of pseudocode - Sequencing, selection (if-else structure, case structure) and repetition (for, while, repeat-until loops). Sample problems. **Flowcharts:** - Symbols used in creating a Flowchart - start and end, arithmetic calculations, input/output operation, decision (selection), module name (call), for loop (Hexagon), flow-lines, on-page connector, off-page connector.	9

3	**Selection and Iteration Using Python: -** if-else, elif, for loop, range, while loop. Sequence data types in Python - list, tuple, set, strings, dictionary, Creating and using Arrays in Python (using Numpy library). **Decomposition and Modularization*: -** Problem decomposition as a strategy for solving complex problems, Modularization, Motivation for modularization, Defining and using functions in Python, Functions with multiple return values **Recursion: -** Recursion Defined, Reasons for using Recursion, The Call Stack, Recursion and the Stack, Avoiding Circularity in Recursion, Sample problems.	10
4	**Computational Approaches to Problem-Solving:** Brute-force Approach, Divide-and-conquer Approach, Dynamic Programming Approach, Greedy Algorithm Approach, Randomized Approach.	10

Course Assessment Method
(CIE: 40 Marks, ESE: 60 Marks)

Continuous Internal Evaluation Marks (CIE):

Continuous Assessment	Internal Examination-I (Written)	Internal Examination-II (Written)	Internal Examination-III (Written)	Internal Lab Examination	Total
10	30	30	30	10	**40**
	A total of 90 marks will be scaled to 20.				

End Semester Examination Marks (ESE)

In Part A, all questions need to be answered and in Part B, each student can choose any one full question out of two questions.

Part A	Part B	Total
• 2 questions from each module. • Total of 8 questions, each carrying 3 marks **(8 x 3 = 24 Marks)**	• Each question carries 9 marks. • Two questions will be given from each module, out of which 1 question should be answered. • Each question can have a maximum of 3 sub divisions. **(4 x 9 = 36 Marks)**	**60**

Course Outcomes (Cos)

At the end of the course students should be able to:

CO No.	Description	Blooms Knowledge Level (KL)
CO1	Utilize computing as a model for solving real-world problems.	3
CO2	Articulate a problem before attempting to solve it and prepare a clear and accurate model to represent the problem.	3
CO3	Develop effective algorithms to solve formulated models and translate algorithms into executable programs.	3
CO4	Demonstrate problem-solving approaches, a systematic approach to solving computational problems, and essential Python programming skills.	3
CO5	Design and implement a mini-project using algorithmic and problem-solving strategies to address real-world sustainability challenges.	3

Note: K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyse, K5 – Evaluate, and K6 – Create

CO-PO Mapping Table:

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

Reference Books

Sl. No.	Title of the Book	Name of the Author(s)	Name of the Publisher	Edition and Year
1	Problem solving & programming concepts	Maureen Sprankle, Jim Hubbard	Pearson	9th Edition, 2011
2	How to Solve It: A New Aspect of Mathematical Method	George Pólya	Princeton University Press	2nd Edition, 2015
3	Creative Problem Solving: An Introduction	Donald Treffinger., Scott Isaksen, Brian Stead-Doval	Prufrock Press	4th Edition, 2005

4	Psychology (Sec. Problem Solving.)	Spielman, R. M., Dumper, K., Jenkins, W., Lacombe, A., Lovett, M., & Perlmutter, M	H5P Edition	1st Edition, 2021
5	Computational Thinking: A Primer for Programmers and Data Scientists	G Venkatesh Madhavan Mukund	Mylspot Education Services Pvt Ltd	1st Edition, 2020
6	Computer Arithmetic Algorithms	Koren, Israel	AK Peters/CRC Press	2nd Edition, 2001
7	Python for Everyone	Cay S. Horstmann, Rance D. Necaise	Wiley	3rd Edition, 2024
8	Introduction to Computation and Programming using Python	Guttag John V	PHI	2nd Edition, 2016

Video Links (NPTEL, SWAYAM, etc.)

Module No.	Link
1	https://opentextbc.ca/h5ppsychology/chapter/problem-solving/
2	https://onlinecourses.nptel.ac.in/noc21_cs32/preview

Continuous Assessment (10 Marks)

Accurate Execution of Programming Tasks

- Correctness and completeness of the program
- Efficient use of programming constructs
- Handling of errors.
- Proper testing and debugging

Evaluation Pattern for Lab Examination (10 Marks)

1. Algorithm (2 Marks)

Algorithm Development: Correctness and efficiency of the algorithm related to the question.

2. Programming (3 Marks)

Execution: Accurate execution of the programming task.

3. Result (3 Marks)

Accuracy of Results: Precision and correctness of the obtained results.

4. Viva Voce (2 Marks)

Proficiency in answering questions related to theoretical and practical aspects of the subject.

SEMESTER S1

BASIC ELECTRICAL AND ELECTRONICS ENGINEERING WORKSHOP

Course Code	G25EEP107	**CIE Marks**	50
Teaching Hours/Week (L:T:P:R)	0:0:2:0	**ESE Marks**	50
Credits	1	**Exam Hours**	2 Hrs. and 30 Mins.
Prerequisites (if any)	None	**Course Type**	Practical

Course Objective:

1. To create awareness and familiarity with electrical wiring and safety measures to be taken.
2. To Identify various electronic components and to operate various measuring instruments
3. Learn to setup simple electronic circuits on breadboard and PCB

SYLLABUS

Expt. No.	Experiments
Electrical Workshop (Minimum of 7 Experiments to be done)	
1	a) Demonstrate the precautionary steps adopted in case of Electrical shocks. b) Identify different types of cables, wires, switches, fuses, fuse carriers, MCB, ELCB and MCCB, familiarize the ratings.
2	Wiring of a simple light circuit for light/ fan point (PVC conduit wiring) and a 6A plug socket with individual control.
3	Wiring of light/fan circuit using two-way switches. (Staircase wiring)
4	Wiring of fluorescent lamp and a power plug (16 A) socket with a control switch.
5	Wiring of power distribution arrangement using single phase MCB distribution board with ELCB, main switch and Energy meter.
6	Familiarisation of step up and step-down transformers, (use low voltage transformers) Measurement and representation of voltage and waveform to scale in graph sheet with the help of CRO
7	Familiarisation of rheostats, measurement of potential across resistance elements and introducing the concept of relative potential using a DC circuit.

8	a) Identify battery specifications using different types of batteries. (Lead acid, Li Ion, NiCd etc.) b) Familiarize different types of earthing (Pipe, Plate Earthing, Mat Schemes) and ground enhancing materials (GEM).
ELECTRONICS WORKSHOP (Minimum of 7 Experiments to be done)	
1	Familiarization/Identification of electronic components with specification (Functionality, type, size, colour coding, package, symbol and cost of -Active, Passive, Electrical, Electronic, Electro-mechanical, Wires, Cables, Connectors, Fuses, Switches, Relays, Crystals, Displays, Fasteners, Heat sink etc.)
2	Drawing of electronic circuit diagrams using BIS/IEEE symbols and Interpret data sheets of discrete components and IC's
3	Familiarization/Application of testing instruments and commonly used tools. - Multimeter, Function generator, Power supply, CRO, DSO. Soldering iron, Desoldering pump, Pliers, Cutters, Wire strippers, Screw drivers, Tweezers, Crimping tool, Hot air soldering and de- soldering station
4	Testing of electronic components using multimeter - Resistor, Capacitor, Diode, Transistor and JFET.
5	Printed circuit boards (PCB) - Types, Single sided, Double sided, PTH, Processing methods. Design and fabrication of a single sided PCB for a simple circuit.
6	Inter-connection methods and soldering practice. Bread board, Wrapping, Crimping, Soldering - types - selection of materials and safety precautions. Soldering practice in connectors and general-purpose PCB, Crimping.
7	Assembling of electronic circuit/system on general purpose PCB, test and show the functioning (Any two)- Fixed voltage power supply with transformer • Rectifier diode • Capacitor filter • Zener/IC regulator Square wave generation using IC 555 timer in IC base.
8	Assembling of electronic circuits using SMT (Surface Mount Technology) stations.
9	Introduction to EDA tools (such as KiCad or XCircuit)

Course Assessment Method
(CIE: 40 Marks, ESE: 60 Marks)

Continuous Internal Evaluation Marks (CIE):

Preparation/Pre-Lab Work, experiments, Viva and Timely completion of Lab Reports / Record (Continuous Assessment)	**Total**
50	**50**

End Semester Examination Marks (ESE)

Procedure/ Preparatory work/Design/ Algorithm	Conduct of experiment/ Execution of work/ troubleshooting/ Programming	Result with valid inference/ Quality of Output	Viva voce	Record	Total
10	**20**	**5**	**10**	**5**	**50**

Submission of Record: Students shall be allowed for the end semester examination only upon submitting the duly certified Lab record.

Pass Criteria:

- A student must score a minimum of 50% overall, combining marks from both Continuous Internal Evaluation (CIE) and End Semester Examination (ESE).
- In addition, the student must secure at least 40% in the End Semester Examination (ESE).

The ESE evaluation carried out by a panel of faculty members. This panel must include at least one faculty member who was not involved in the Continuous Internal Evaluation (CIE) of the lab course.

Course Outcomes (Cos)

At the end of the course students should be able to:

CO No.	Description	Blooms Knowledge Level (KL)
CO1	Identify and familiarise various electrical components.	2
CO2	Identify and familiarise various electronic components.	2
CO3	Illustrate the connection diagram and identify the suitable accessories necessary for wiring simple electric circuits.	3
CO4	Apply the design procedure of simple electronic circuits on breadboard, PCB and Operate various measuring instruments to take measurements of circuit parameters.	3
CO5	Design and Interpret basic circuit diagrams and translate them into physical layouts for prototyping and testing	3,5

Note: K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyse, K5 – Evaluate, and K6 – Create

CO-PO Mapping Table:

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

1: Slight (Low),2: Moderate (Medium),3: Substantial (High), : No Correlation

Text Books

Sl. No.	Title of the Book	Name of the Author(s)	Name of the Publisher	Edition and Year
1	Electrical Design Estimating and Costing	K B Raina and S K Bhattacharya	New Age International Publishers	2nd Edition, 2024
2	Electrical Systems Design	M. K. Giridharan	I K International Publishing House Pvt. Ltd.	3rd Edition, 2022
3	Basic Electrical Engineering	D P Kothari and I J Nagrath	Tata McGraw Hill	4th Edition, 2019
4	Basic Electronics and Linear Circuits	N N Bhargava, D C Kulshreshtha and S C Gupta	McGraw Hill	2nd Edition, 2017

Continuous Assessment with Equal Weightage for Both Specialisations (10 Marks)

1. Preparation and Pre-Lab Work (10 Marks)

Algorithm Development: Correctness and efficiency of the algorithm related to the question.

2. Programming (3 Marks)

Execution: Accurate execution of the programming task.

3. Result (3 Marks)

Accuracy of Results: Precision and correctness of the obtained results.

4. Viva Voce (2 Marks)

Proficiency in answering questions related to theoretical and practical aspects of the subject.

Evaluation Pattern for End Semester Examination with equal weightage in both specializations (60 Marks)

1. **Procedure/Preliminary Work/Design/Algorithm (10 Marks)**
    - Procedure Understanding and Description: Clarity in explaining the procedure and understanding each step involved.
    - Preliminary Work and Planning: Thoroughness in planning and organizing materials/equipment.
    - Algorithm Development: Correctness and efficiency of the algorithm related to the experiment.
    - Creativity and logic in algorithm or experimental design.
2. **Conduct of Experiment/Execution of Work/Programming (25 Marks)**
    - Setup and Execution: Proper setup and accurate execution of the experiment or programming task.
3. **Result with Valid Inference/Quality of Output (10 Marks)**
    - Accuracy of Results: Precision and correctness of the obtained results.
    - Analysis and Interpretation: Validity of inferences drawn from the experiment or quality of program output.
4. **Viva Voce (10 Marks)**
    - Ability to explain the experiment, procedure results and answer related questions
    - Proficiency in answering questions related to theoretical and practical aspects of the subject.
5. **Record (5 Marks)**
    - Completeness, clarity, and accuracy of the lab record submitted

SEMESTER S1

LIFE SKILLS AND PROFESSIONAL COMMUNICATION

(Common to All Branches)

Course Code	A25LSE109	**CIE Marks**	100
Teaching Hours/Week (L:T:P:R)	2:0:1:0	**ESE Marks**	0
Credits	1	**Exam Hours**	-
Prerequisites (if any)	None	**Course Type**	Activity-based learning

Course Objective:

1. To foster self-awareness and personal growth, enhance communication and interpersonal connection skills, promote effective participation in groups and teams, develop critical thinking, problem-solving, and decision-making skills, and cultivate the ability to exercise emotional intelligence.
2. To equip students with the necessary skills to listen, read, write & speak, to comprehend and successfully convey any idea, technical or otherwise.
3. To equip students to build their profile in line with the professional requirements and standards.

Continuous Internal Evaluation Marks (CIE):

- Continuous internal evaluation is based on the individual and group activities as detailed in the activity table given below.
- The students should be grouped into groups of size 4 to 6 at the beginning of the semes ter. They should use online collaboration tools for group activities, report/presentation making and work management.
- Activities are to be distributed between 3 class hours (2L+1P) and 3.5 Self-study hours.
- Marks given against each activity should be awarded fully if the students successfully complete the activity.
- Students should maintain a portfolio file with all the reports and other textual materials generated from the activities. Students should also keep a journal related to the activities undertaken.
- Portfolio and journal are mandatory requirements for passing the course, in addition to the minimum marks required.
- The portfolio and journal should be carried forward and displayed during the 7th Semester Seminar course as a part of the experience sharing regarding the skills developed through the HMC courses and Mini project course.

- Self-reflection questionnaire shall be given at the beginning of the semester, in between and at the end of the semester based on the guidelines in the manual of the course.

Table 1: Activity List

Sl. No.	Activity	Class room (L) / Self Study (SS)	Week of completion	Group / Individual (G/I)	Marks	Skills	CO
1.1	Group formation and self-introduction among the group members	L	1	G	-	• Connecting with group members • Time management – Gantt Chart	CO1
1.2	Familiarizing the activities and preparation of the time plan for the activities	L	1	G	-		CO1
1.3	Preparation of Gantt chart based on the time plan	SS	1	G	2		CO1
2.1	Take an online personality development test, self-reflect and report	SS	1	I	2	• Self-Awareness writing	CO1
2.2	Role-storming exercise 1: Students assume 2 different roles given below and write about their ● Strengths, ● Areas for improvement, ● Concerns, ● Areas in which he/she hesitates to take advice, ● Goals/Expectations, from the point of view of the following assumed roles i) their parent/guardian/mentor ii) their friend/sibling/cousin	L	1	I	2	• Goal setting- Identification of skills and setting goal • Self-awareness • Discussion in groups • Group work- Compiling of ideas • Mind mapping	CO1
2.3	Role-storming exercise 2: Students assume the role of their teacher and write about the ● Skills required as a B.Tech graduate	SS	1	I	2		CO1

	● Attitudes, habits, approaches required and activities to be practised during their B.Tech years, in order to achieve the set goals						
2.4	Discuss the skills identified through role storming exercise by each one within their own group and improvise the list of skills	L	1	G	2		CO1
2.5	Prepare a mind map based on the role storming exercise and exhibit/present it in class	SS	2	G	2		CO1
3	Prepare a presentation on instances of empathy they have observed in their own life or in other's life	L	2 to 4	I	2	• Empathy	CO2
4.1	Each student connects and networks with a minimum of 3 professionals from industry/ public sector organizations/other agencies/NGOs /academia (at least 1 through LinkedIn)	SS	3	I	2	• Workplace awareness • Listening • Communication - interacting with people • Networking through various media including LinkedIn • Discussion in groups • Report preparation • Creativity	CO2
4.2	Interact with them to understand their workplace details including ● workplace skills required ● their work experience ● activities they have done to enhance their employability during their B.Tech years ● suggestions on the different activities to be done during B.Tech years Prepare a documentation of this	SS	3	I	4		CO2
4.3	Discuss the different workplace details & work readiness activities assimilated by each through the interactions within their group and compile the inputs collected by the individuals	SS	3	G	2		CO2

	Prepare the Minutes of the discussions					Goal setting - Preparation of action plan	
4.4	Report preparation based on the discussions	SS	4	G	3		CO4
4.5	Perform a role-play based on the workplace dynamics assimilated through interactions and group discussions	L	5	G	4		CO3
4.6	Identify their own goal and prepare an action plan for their undergraduate journey to achieve the goal	SS	5	I			CO1
5.1	Select a real-life problem that requires a technical solution and list the study materials needed	L	6	G	2		CO5
5.2	Listen to TED talks & video lectures from renowned Universities related to the problem and prepare a one-page summary (Each group member should select a different resource)	SS	6	1	2		CO4
5.3	Use any online tech forum to gather ideas for solving the problem chosen	SS	6	G	2		CO5
5.4	Arrive at a possible solution using six thinking hat exercise	L	7	G	3		CO5
5.5	Prepare a report based on the problem-solving experience	SS	7	G	2		CO5
6.1	Linkedin profile creation	SS	1	I	2	Profile-building	CO4
6.2	Resume preparation	SS	8	I	2		CO4
6.3	Self-introduction video	SS	8	I	3		CO3
7	Prepare a presentation on instances of demonstration of emotional intelligence	SS	9	I	2	Emotional intelligence	CO2
8	Prepare a short video presentation on diversity	SS	10	G	3	Diversity	CO2

	aspects observed in our society (3 to 5 minutes)						
9	Take online Interview skills development sessions like robotic interviews; self-reflect and report	SS	10	I	2	Interview skills	CO4
10	Take an online listening test, self-reflect and report	SS	11	1	2	Listening skills	CO3
11.1	Activities to improve English vocabulary of students	L	8	I/G	4	• English vocabulary • English language skills • Writing • Presentation • Group work • Self-reflection	CO4
11.2	Activities to help students identify errors in English language usage	L	9	I/G	2		CO4
11.3	Activity to help students identify commonly misspelled words, commonly mispronounced words and confusing words	L	10	I/G	2		CO4
11.4	Write a self-reflection report on the improvement in English language communication through this course	SS	12	I	2		CO4
11.5	Presentation by groups on the experience of using online collaboration tools in various group activities and time management experience as per the Gantt chart prepared	L	11 to 12	G	2		CO3
12.1	Each group prepares video content for podcasts on innovative technological interventions/research work tried out in Kerala context by academicians/professionals/Govt. agencies/research institutions/private agencies/NGOs/other agencies	SS	12	G	4	• Audio-visual presentations creations with the use of technology tools	CO5
12.2	Upload the video content to podcasting platforms or YouTube	SS	12	G	1		CO5

12.3	Add the link of the podcast in their LinkedIn profile	SS	12	G	1	• Effective use of social media plat forms • Profile building	CO5

Table 2: Lab hour activities: 25 Marks

Sl. No.	Activity	Marks	Skill	CO
1	Hands-on sessions on day-to-day engineering skills and a self-reflection report on the experience gained: 1. Drilling practice using electric hand drilling machines. 2. Cutting of MS rod and flat using electric hand cutters. 3. Filing, finishing and smoothening using electrically operated hand grinders. 4. MS rod cutting using Hack saw by holding the work in bench wise. 5. Study and handling different types of measuring instruments. 6. Welding of MS, SS work pieces. 7. Pipe bending practice (PVC and GI). 8. Water tap fitting. 9. Water taps rubber seal changing practice. 10. Union and valves connection practice in pipes. 11. Foot valve fitting practice.	24	Basic Practical engineering skills	5

	12. Water pump seal and bearing changing practice.			
2	Language Lab sessions	-	Language Skills	4

Course Assessment Method
(CIE: 40 Marks, ESE: 60 Marks)

Continuous Internal Evaluation Marks (CIE):

Activity	Lab hour activities	Total
75	**25**	**100**

Course Outcomes (COs)

At the end of the course students should be able to:

CO No.	Description	Blooms Knowledge Level (KL)
CO1	Apply self-awareness strategies to demonstrate confidence in one's abilities; implement goal-setting and planning techniques; and practice emotional intelligence, empathy, responsibility, and respect for diversity while working effectively in collaborative environments.	**K5**
CO2	Apply critical thinking, problem-solving, and decision-making techniques to address personal, academic, and professional situations effectively.	**K3**
CO3	Apply listening, reading, writing, and speaking skills to comprehend, interpret, and communicate ideas effectively using textual, audio, and visual modes.	**K4**
CO4	Apply audio-visual and digital tools to develop professional presentations and profiles aligned with industry standards, and actively engage in networking through social media platforms and professional forums.	**K6**
CO5	Apply basic engineering knowledge and problem analysis techniques to identify a real-life technical problem, formulate a solution approach, evaluate alternatives, and document results with consideration for feasibility and sustainability.	**K3**

Note: K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyse, K5 – Evaluate, and K6 – Create

CO-PO Mapping Table:

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

1: Slight (Low),2: Moderate (Medium),3: Substantial (High), : No Correlation

Text Books

Sl. No.	Title of the Book	Name of the Author(s)	Name of the Publisher	Edition and Year
1	Life Skills & Personality Development	Maithry Shinde et.al.	Cambridge University Press	First Edition, 2022
2	Emotional Intelligence: Why it can matter more than IQ	Daniel Goleman	Bloomsbury, Publishing PLC	25th Anniversary Edition December 2020
3	Think Faster, Talk Smarter: How to speak successfully when you are put on the spot	Matt Abrahams	Macmillan Business	September 2023
4	Deep Work: Rules for focused success in a distracted world	Cal Newport	PIATKUS	January 2016
5	Effective Technical Communication	Ashraf Rizvi	McGraw Hill Education	2nd Edition 2017
6	Interchange	Jack C. Richards, With Jonathan Hull, Susan Proctor	Cambridge publishers	5th Edition

Reference Books

Sl. No.	Title of the Book	Name of the Author(s)	Name of the Publisher	Edition and Year
1	Life Skills for Engineers	Remesh S., Vishnu R.G.	Ridhima Publications	First Edition, 2016
2	Soft Skills & Employability Skills	Sabina Pillai and Agna Fernandez	Cambridge University Press	First Edition, 2018
3	Effective Technical Communication	Ashraf Rizvi	McGraw Hill Education	2nd Edition 2017
4	English Grammar in Use	Raymond Murphy,	Cambridge University Press India PVT LTD	5th Edition 2023
5	Guide to writing as an Engineer	David F. Beer and David McMurrey	John Willey. New York	2004