REGULATION-2025

Curriculum @ Syllabus

First Year Academics

Adhiyamaan College of Engineering

(An Autonomous Institution)

JUNE 2025

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FIRST YEAR ACADEMICS

(As per Regulations 2025 – Curriculum and Syllabus)

1. Introduction

The First Year of the B.E./B.Tech. programme under *Regulations 2025* is designed to provide a **strong foundation in basic sciences, engineering principles, and essential professional skills**. It serves as a transitional phase from school education to professional engineering learning, ensuring students acquire the necessary knowledge, competencies, and attitudes required for higher-level courses.

2. Objectives

The First Year curriculum aims to:

- Build a solid grounding in Mathematics, Physics, Chemistry, and Engineering Fundamentals
- Develop analytical thinking and problem-solving skills
- Introduce students to basic engineering practices and tools
- Enhance communication skills and professional ethics
- Foster multidisciplinary awareness and environmental responsibility

3. Pedagogical Approach

The teaching-learning process emphasizes:

- Outcome-Based Education (OBE) framework
- Experiential learning through laboratory sessions and mini-projects
- Activity-based learning and real-life problem-solving
- Integration of digital tools and e-learning platforms
- Continuous engagement through tutorials, assignmentCus, and assessments

4. Assessment Methodology

Student performance is evaluated through a combination of:

- **Continuous Internal Assessment (CIA)**
  - Assignments
  - Quizzes
  - Model Examinations
  - Laboratory Performance
- **End Semester Examination (ESE)**

The assessment system ensures a **comprehensive evaluation of knowledge, skills, and application abilities**.

5. Skill Development and Value Addition

Special emphasis is given to:

- **Communication and Soft Skills Development**
- **Critical Thinking and Innovation**
- **Teamwork and Leadership Skills**
- **Ethical and Social Responsibility**

Students are encouraged to participate in **clubs, technical activities, and co-curricular initiatives** to enhance holistic development.

6. Outcome of First Year Programme

Upon successful completion of the First Year, students will be able to:

1. Apply fundamental concepts of science and engineering
2. Demonstrate basic programming and engineering skills
3. Exhibit effective communication abilities
4. Understand the importance of ethics, environment, and sustainability
5. Be prepared for core engineering subjects in subsequent years

7 Bridge and Support Mechanisms

To support diverse student backgrounds, the institution provides:

1. Bridge Courses in Mathematics, Physics, and Chemistry
2. Remedial Classes for slow learners
3. Advanced Learning Modules for fast learners
4. Mentoring and Counseling Support Systems

B.E. EEE:

S. No.	Course Code	Course Title	Category	L	T	P	C
-	125IP001	Induction Programme	-	-	-	-	-
Theory							
1	125ENI01	Professional English-I	HS	3	0	2	4
2	125MCT02	Calculus for Engineers with MATLAB	BS	3	1	0	4
3	125PHT03	Engineering Physics	BS	3	0	0	3
4	125CYT04	Engineering Chemistry	BS	3	0	0	3
5	125EGT05	Engineering Graphics	ES	3	0	0	3
6	125CMT06	Basic Civil and Mechanical Engineering	ES	3	0	0	3
7	125IKT07	Heritage of Tamils	AC	1	0	0	1*
8	125DTT08	Design Thinking	ES	2	0	0	1*
Laboratory							
9	125PCP09	Physics & Chemistry Laboratory	BS	0	0	2	1
10	125ACT01	Idea Lab Workshop	AC	2	0	2	0
Total Credits							**22**

SYLLABUS- SEMESTER I

125ENI01	PROFESSIONAL ENGLISH-I (COMMOM FOR ALL BRANCHES)	L	T	P	C
		3	0	2	4

The Course prepares first semester Engineering and Technology students to:

- Use grammar and vocabulary in real-time situations, integrating AI tools where appropriate.
- Strengthen their listening skills to comprehend academic, technical and industry-based communications.
- Speak confidently in both formal and informal contexts, including virtual platforms.
- Develop critical reading and interpretation skills using diverse contemporary and technical texts.
- Write effective and structured documents for academic and professional purposes.

UNIT I - Language Development

Theory

Vocabulary building - Parts of speech - Articles - Tenses - Voices - Types of sentences - Misspelled words - Modals.

English Laboratory

Vocabulary Test (GRE, TOEFL, TOEIC & CAT Exam words) – Idioms and phrasal verbs – Sentence improvement – Digital soft skills: adaptability, decision making – Introduction to AI tools like Grammarly/Quillbot/Spinbot/Sora (ethical usage).

UNIT II - Listening

Theory

Listening to technical discussions and expert interviews – Understanding purpose and perspectives – Listening to academic lectures and panel discussions – Listening comprehension

English Laboratory

Listening to TED/INK/AI Talks and answering MCQs – Product demo analysis – Technical storytelling – Video-based listening tasks – Case study presentations.

UNIT III - Speaking

Theory

Speaking on everyday academic and workplace scenarios – Self-introduction for career contexts – Impromptu speaking and debate on social/technical issues – Elevator pitch – Explaining a process/product.

English Laboratory

Mock interviews (onsite and virtual) – Story knitting – Brainstorming sessions – Group discussion with role rotation – Voice modulation exercises – Problem-solving talk – Peer feedback.

UNIT IV - Reading

Theory

Skimming and scanning – Reading technology blogs, ethical case studies, company reports and academic articles – Critical reading of social media content and online reviews - Understanding digital privacy and terms of service in online platforms - Interpreting infographics and charts – Summarising digital content.

English Laboratory

Comprehension through simulated aptitude tests – Digital reading passages – Extracting key information from websites and user manuals – Real-world news apps and online articles - Reading AI-generated texts and evaluating credibility.

UNIT V - Writing

Theory

Writing definitions, process descriptions, formal emails with clarity and etiquette – Blog-style reflections – Resume with profile statement – Minutes of meeting – Short formal reports.

English Laboratory

Resume building with digital tools – Email writing (professional tone, context awareness) – LinkedIn summary writing – Letter drafting – Paragraph framing – Peer editing using AI-based grammar tools.

TOTAL: 60 HOURS

Lab Requirements:

1. Laptop for students.
2. GD & Presentation ambiance.

COURSE OUTCOMES:

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

1. Use correct grammar and vocabulary effectively in academic, digital and workplace settings.
2. Listen and interpret academic and professional content effectively.
3. Speak fluently and confidently in both formal and informal contexts, including interviews and discussions.
4. Read and analyse contemporary and technical texts using comprehension strategies.
5. Write formal and semi-formal documents using appropriate format, tone and grammar.

CO–PO MAPPING

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11
CO1	-	-	-	-	-	-	-	-	3	-	2
CO2	-	-	-	-	-	-	-	-	-	-	-
CO3	-	-	-	-	-	-	-	2	3	-	2
CO4	-	2	-	-	-	-	-	-	3	-	2
CO5	-	-	-	-	-	-	-	-	-	-	2

TEXT BOOKS:

1. Board of Editors. Fluency in English: A Course book for Engineering and Technology. Orient Blackswan, Hyderabad: 2016.

2. Sudharshana N. P. & Saveetha C. English for Technical Communication. Cambridge University Press: New Delhi, 2016.
3. Additional resources: curated podcasts, AI-enhanced writing tools and company profiles for real-time analysis.

REFERENCES:

1. Raman, Meenakshi and Sharma, Sangeetha. Technical Communication Principles and Practice. Oxford University Press, 2014.
2. Grussendorf, Marion. English for Presentations. Oxford University Press, 2007.
3. Sharon Weiner Green & Ira K. Wolf. Barron's GRE. Glagotia Publications, 18th Ed., 2011.
4. Mohamed Elias R. Gupta's IELTS/TOEFL Essays. Ramesh Publishing House, 6th Ed., 2016.

Online tools: Grammarly, QuillBot (educational use), TED Talks archive, LinkedIn Learning

125MCT02	CALCULUS FOR ENGINEERS WITH MATLAB	L	T	P	C
		3	1	0	4

(Common to B.E. AE, CE, BM, EE & ME Degree Programmes & B. Tech. BT & CHEM)

Course Objectives

- To understand the concepts of curvatures (Cartesian and Polar coordinates), evolutes and envelopes.
- To learn the derivatives of multivariable functions and applications.
- To solve differential equations of certain types, including systems of differential equations that they might encounter in engineering subjects.
- To understand double and triple integration concepts.
- To study vector calculus comprising of surface and volume integrals along with the classical theorems involving them.

Pre-requisite: Fundamentals of Differential and Integral Calculus.

UNIT I DIFFERENTIAL CALCULUS 9+3

Pedal equations - Curvature and Radius of curvature - Cartesian, Parametric, Polar Co-ordinate forms – Circle of curvature – Evolute – Envelope – Evolute as the envelope of normal.

UNIT II PARTIAL DIFFERENTIATION 9+3

Partial derivatives – Euler's theorem for homogenous functions – Total derivatives – Jacobians – Taylor's expansion– Applications to find Extremities: Maxima and Minima – Method of Lagrangian multipliers.

UNIT III ORDINARY DIFFERENTIAL EQUATIONS 9+3

Second order linear differential equations with constant coefficients – Method of variation of parameters – Cauchy's and Legendre's linear equations – Simultaneous first order linear equations with constant coefficients-Applications to Engineering problems-Electric Circuits, Simple Harmonic Motions and Bending of beams.

UNIT IV MULTIPLE INTEGRALS 9+3

Double integration – Cartesian and polar co-ordinates – Change of order of integration – Change of variables between Cartesian and polar coordinates –Triple integration in Cartesian co-ordinates – Area as double integral – Volume as triple integral.

UNIT-V VECTOR CALCULUS 9+3

Gradient, Divergence and Curl – Directional derivative – Irrotational and Solenoidal, vector fields – Vector integration – Green's theorem in a plane, Gauss divergence theorem and Stokes' theorem (Statement and applications only) – Simple applications involving cubes and rectangular parallelopipeds.

PEDAGOGY-: LIST OF EXERCISES using MATLAB/SCILAB

1. 2D plots for Cartesian and polar curves.
2. Finding Evolutes and Envelopes.
3. Computing Stationary points of functions of two variables.

4. Finding partial derivatives and Jacobian of functions of several variables.
5. Applications to Maxima and Minima of two variables.
6. Solution of first-order ordinary differential equation and plotting the solution curves.
7. Solution of Second Order Ordinary Differential Equation and Plotting the Solution Curve.
8. Finding Area as doble integrals.
9. Finding Volume as triple integrals.
10. Finding gradient, divergent, curl and their geometrical interpretation.

TOTAL: 45+15= 60 PERIODS

Course Outcomes

After completing this course, the student will be able to

1. Apply the differential calculus tools to path of a curve or family of curves.
2. Compute extremities of a function using multivariable derivatives.
3. Determine the solutions of ordinary differential equations by various methods which have an application in their core subjects.
4. Determine the area and volume in 2-dimension and 3-dimension respectively using multiple integrals.
5. Expertise the concept of vector calculus and apply in core subjects.

TEXT BOOKS

1. Erwin Kreyszig, "Advanced Engineering Mathematics", Wiley India, 10th edition,2017.
2. Grewal. B.S, "Higher Engineering Mathematics", 44th Edition, Khanna Publications, 2018.

REFERENCES

1. T.Veerarajan, "Engineering Mathematics for Semester I and II" ,Tata McGraw-Hill Publishing company, 2019.
2. Kandasamy.P, Thilagavathy,K., &Gunavathi.K., "Engineering Mathematics for first year "., S.Chand &Company Ltd., New Delhi,2018.
3. Ramana B.V., "Higher Engineering Mathematics", Tata McGraw Hill Co. Ltd., New Delhi, 11thReprint, 2010.
4. Jain R.K. and Iyengar S.R.K., "Advanced Engineering Mathematics", Narosa Publications, New Delhi, 3rd Edition, 2007.
5. James Stewart, "Calculus: Early Transcendentals", Cengage Learning, 9th Edition.

CO–PO MAPPING

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11
CO1	3	2	2	2	2						2
CO2	3	3	2	2	2						2
CO3	3	3	3	2	1						2
CO4	3	3	3	2	1						2
CO5	3	3	3	2	1						2

125PHT03	ENGINEERING PHYSICS (Common to all Branches)	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

- To explain atomic and nuclear models and compare the principles of fission and fusion with reactor applications.
- To illustrate the dual nature of matter and radiation and their applications in electron microscopy and instrumentation.
- To apply Ohm's law and principles of electrolysis for analyzing electric circuits and electrolysis processes.
- To explain the principles of laser operation and demonstrate their applications in engineering fields.
- To analyze the factors affecting acoustics of buildings and apply noise control techniques in real-life applications.

UNIT – I ATOMIC PHYSCIS AND NUCLEAR PHYSICS 9

Atomic structure – Atomic Spectra – Interaction with light – Interaction with particles – Application of nuclear structure – Composition of nuclei (protons and neutrons) – Nuclear forces – Nuclear models – Liquid drop model – Shell model – Nuclear masses and binding energy – Nuclear fission and fusion – Nuclear reactor – PWR and BWR.

UNIT – II QUANTUM THEORY AND APPLICATIONS 9

Quantization – Compton effect – Theory and Experiment – Dual nature of radiation – de-Broglie wave length – Dual nature of matter – Heisenberg uncertainty principle – Physical signification of wave function – Schrödinger wave equation – Time dependent and time independent types – Particle in a box – Scanning electron microscopy (SEM) – Transmission electron microscopy (TEM).

UNIT – III ELECTRIC CURRENT AND ELECTROLYSIS 9

Introduction – Electric charges – Properties – Electric current – Electric potential – Potential difference – current in conductors and electrolytes – Electric circuits and Ohm's law – Experimental verification of ohm's law (Voltmeter and Ammeter method) – Potentiometer method – Joule's law – Joule's experiment – Electrolysis – Electrolysis of water – Electrolysis of copper sulphate

UNIT – IV LASERS 9

Laser Characteristics – Stimulated absorption –spontaneous emission – stimulated emission – Einstein coefficients – Principle of laser action – Population inversion – pumping methods – two energy level systems – four energy levels systems –Types of lasers– Nd-YAG – He-Ne laser – CO2 – Applications of lasers.

UNIT – V ACOUSTICS 9

Acoustics of buildings – Absorption coefficient measurement – Intensity – Loudness – Reverberation time – Sabine's formula – Problems – Factors affecting acoustics of buildings – Mathematics and computational tools in acoustics- wave equation – Greens function -Finite element method (FEM) –

Boundary element method (BEM) – Applications - Room acoustics – Noise control, Aero acoustics, Bio acoustics, Ultrasound imaging, Metamaterials.

Reference books:

1. Fundamentals of Physics, Halliday, Resnick and Walker, Wiley Publishers, 8th edition, 2010.
2. Concepts of Modern Physics, Arthur Beiser, Sixth Edition, 2003.
3. Modern Physics by R Murugesan, 18th Edition, 2016.
4. Acoustics and Noise Control by Dr B J Smith, 2nd Edition, 1996.
5. Lasers- Fundamentals and Applications, A. Ghatak and K. Thyagarajan, 2019

COURSE OUTCOMES:

After successful completion of this course, the students will be able:

1. To explain various atomic and nuclear models and compare the principles of nuclear fission and fusion and implementing them in different types of nuclear reactors.
2. To illustrate the dual nature of matter and radiation, and analyze their applications in modern electron microscopy techniques and engineering instrumentation.
3. To apply Ohm's law and the principles of electrolysis for analyzing and solving problems related to electric circuits and electrolysis processes in engineering systems.
4. To explain the fundamental principles of laser operation and demonstrate their applications in various engineering domains such as manufacturing, communication, and medical diagnostics.
5. To analyze the acoustic properties of buildings and apply suitable noise control techniques for effective design and practical implementation in engineering applications

CO-PO MAPPING:

CO / PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	1	–	–	1	1	1	1	1	–	1
CO2	3	2	1	–	–	1	1	1	1	1	–	1
CO3	3	2	1	–	–	1	1	1	1	1	–	1
CO4	3	2	1	–	–	1	1	1	1	1	–	1
CO5	3	2	1	–	–	1	1	1	1	1	–	1

125CYT04	Engineering Chemistry	L	T	P	C
		3	0	0	3

(Common for B.E. CSE & Allied Branches, EC, EE, BM)

Course Objectives:

The course will enable the students to

1. Introduce fundamental concepts in quantum chemistry to explain atomic and molecular structure and their influence on material properties.
2. Provide foundational knowledge of photochemistry and spectroscopy for chemical analysis and sensing.
3. Explain the principles and applications of various sensor technologies in environmental and industrial monitoring.
4. Enable understanding of corrosion mechanisms, electrochemical systems, and analytical techniques like potentiometry and conductometry.
5. Explore the chemistry of polymers, green fuels, and their applications in sustainable and emerging technologies.

Unit I – Atomic and Molecular Structure (Quantum Approach) 9

Time-independent Schrödinger equation – particle in a 1D box – applications. Hydrogen atom – wave functions, radial distribution, and spatial orbital shapes. LCAO method – Molecular orbitals of diatomic molecules, bond order, magnetism – π-orbitals in ethene, butadiene and benzene. Band theory of solids, doping effects on conductors, semiconductors, and insulators.

Self-learning: Real-world applications in quantum dots, nanowires, and solar cells. Impact of doping (n-type & p-type) in electronic devices.

Unit II – Photochemistry and Spectroscopy 9

Fundamentals of photochemistry – laws of photochemistry, quantum yield, Jablonski diagram, fluorescence and phosphorescence. Introduction to UV-Visible, IR spectroscopy and AAS – principles, instrumentation, and applications in chemical analysis.

Self-learning: Applications of UV-Visible Spectroscopy in Real-Time Monitoring, Fluorescence and Phosphorescence in Modern Devices.

Unit-III: Sensors 9

Introduction to sensors, transducers, and actuators – definitions and classifications. Working principles and applications of electrochemical, thermometric (flame photometer), conductometric and optical (colorimetric) sensors. Electrochemical detection of dissolved oxygen (DO), SOx and NOx. Disposable sensors and biomolecule detection (ascorbic acid, pesticides – glyphosate).

Self-learning: Types of electrochemical sensor, Gas sensor - O2 sensor, Biosensor - Glucose sensors

Unit-IV: Corrosion and Electrode System 9

Introduction-types of Corrosion-Galvanic Series-factors influencing the rate of corrosion-Corrosion Penetration Rate-prevention of corrosion-electroplating and electro less plating -ions selective electrode-reference electrode and Concentration cells-Conductometry and Potentiometry (Application).

Self-learning: Nanotechnology in Corrosion Protection, Smart Coatings and Self-Healing Materials.

Unit V: Polymer and Green Fuels **9**

Introduction-Molecular weight - Number average, weight average and numerical problems. Conducting polymers – Synthesis and conducting mechanism of polyacetylene and commercial Applications-Preparation, properties, and commercial applications of Kevlar. **Green Fuels:** Introduction - types of fuels-construction and working of solar photovoltaic cell. *Green hydrogen:* Introduction - Generation of hydrogen by electrolysis of water.

Self-learning: Regenerative fuel cells

Course Outcomes

By the end of the course, the student will be able to:

1. Apply quantum chemical models to analyze atomic and molecular structure and relate them to material properties.
2. Interpret fundamental photochemical processes and utilize spectroscopic methods for molecular identification.
3. Explain the operating principles and applications of chemical sensors used in industrial and environmental contexts.
4. Analyze corrosion mechanisms and electrochemical techniques to suggest suitable prevention methods.
5. Describe the synthesis, structure, and applications of polymers and green fuels in sustainable technologies.

Textbooks:

1. **Jain and Jain**, *Engineering Chemistry*, 16th Edition, Dhanpat Rai Publishing Company, 2020.
2. **P.C. Jain and Monika Jain**, *A Textbook of Engineering Chemistry*, Dhanpat Rai Publishing Company, 2021.
3. **B.K. Sharma**, *Engineering Chemistry*, Krishna Prakashan Media, 2020. – Good coverage of spectroscopy, sensors, and green energy topics.
4. **S. S. Dara and S.S. Umare**, *Engineering Chemistry*, S. Chand Publishing, 2021.
5. **K. Krishna Reddy**, *Engineering Chemistry*, McGraw-Hill Education, 2020.

Reference Books:

1. **Donald A. McQuarrie**, *Quantum Chemistry*, University Science Books, 2nd Edition, 2008.
2. **Atkins and Paula**, *Physical Chemistry*, Oxford University Press, 11th Edition, 2019.
3. **John R. Ferraro**, *Introductory Group Theory and its Application to Molecular Structure*, Wiley, 1995.
4. **C. N. Banwell and E.M. McCash**, *Fundamentals of Molecular Spectroscopy*, McGraw-Hill Education, 4th Edition, 1994.
5. **A.K. De**, *Environmental Chemistry*, New Age International, 2020.

COs POs Mapping

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12
CO1	3	3	3	-	-	-	2	-	-	-	-	-
CO2	3	3	3	-	-	-	2	-	-	-	-	-
CO3	3	3	3	2	-	-	-	-	-	-	-	-
CO4	3	3	3	-	-	-	2	-	-	-	-	-
CO5	3	3	3	2	-	-	-	-	-	-	-	-
AVE	3	3	3	-	-	-	2	-	-	-	-	-

125CMT06	BASIC CIVIL AND MECHANICAL ENGINEERING (COMMON FOR ECE,BME,EEE)	L	T	P	C
		3	0	0	3

OBJECTIVES:

1. To gain the knowledge in surveying and construction materials.
2. To understand the building structures.
3. The student should familiar with foundry, welding and forging processes.
4. To know the working of IC engines and Boilers.
5. To gain the knowledge about sources of energy and refrigeration.

A – CIVIL ENGINEERING

UNIT I SURVEYING AND CIVIL ENGINEERING MATERIALS 09

Surveying: Objects, types, classification, principles, measurements of distances, angles, leveling, determination of areas, illustrative examples.

Civil Engineering Materials: Bricks, stones, sand, cement, concrete, steel sections.

UNIT II BUILDING COMPONENTS AND STRUCTURES 10

Foundations: Types, Bearing capacity, Requirement of good foundations.

Superstructure: Brick masonry, stone masonry, beams, columns, lintels, roofing, flooring, plastering, Mechanics, Internal and external forces, Stress, Strain, Elasticity, Types of Bridges and Dams, Basics of Interior Design and Landscaping.

B – MECHANICAL ENGINEERING

UNIT III FOUNDRY WELDING AND FORGING 10

Foundry: Introduction - Patterns –materials. Types of pattern and pattern allowances. Molding sand, types and properties, Molding procedure. Welding: Definition and Classification, Gas welding, Oxy Acetylene welding, Types of flames, advantages and disadvantages of gas welding. Resistance welding - Classification, Spot welding and Seam welding. Soldering, Definition and Classification. Brazing – Definition and Classification. Forging: Types of Forging, Differences between Hot working and Cold working processes.

UNIT IV I C ENGINES & BOILERS 08

Internal combustion engines, Working principle of Petrol and Diesel Engines, Four stroke and Two stroke cycles, Comparison of four stroke and two stroke engines, Boilers: Introduction of boilers, classification, Lancashire boiler, Babcock and Wilcox boiler, list of boiler mountings and accessories and applications (no sketches).

COURSE OUTCOMES:

The students will have an ability to

1. Explain the usage of construction material and proper selection of construction materials.
2. Design building structures.
3. Gain knowledge on manufacturing processes like foundry, welding and forging.
4. Demonstrate working principles of petrol and diesel engine and the components used in power plants.
5. Explain the components of Refrigeration and Air conditioning cycle.

TEXT BOOKS:

1. Ranganath G, “Basic Engineering Civil & Mechanical”, S.S. Publishers, 2023.

2. Shanmugam G and Palanichamy M S, “Basic Civil and Mechanical Engineering”, Tata McGraw Hill Publishing Co., New Delhi, 3rd Edition, 2018.

REFERENCE BOOKS:

1. Shanmugasundaram. S and Mylsamy. K, “Basics of Civil and Mechanical Engineering”, Cenage Learning India Pvt. Ltd, New Delhi, 2012.
3. Ramamrutham. S, “Basic Civil Engineering”, Dhanpat Rai Publishing Co. (P) Ltd, 3rd Edition reprint, 2013.
4. Gopalakrishna K R, “Elements of Mechanical Engineering”, Subhas Publications, Bangalore, 2015.
5. Khanna O.P, Foundry Technology, Dhanpat Rai Publishing Co. (P) Ltd, 2011.
6. Venugopal.K and Prabhu Raja.V, “Basic Mechanical Engineering”, Anuradha Publishers, Kumbakonam, 2016.
7. Shantha Kumar S R J, “Basic Mechanical Engineering”, Hi-Tech Publications, Mayiladuthurai, 2001.

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12
CO1	3	3	3									
CO2	3	3	3							1		
CO3	3	3	3	1				1			1	
CO4	3	3	3									
CO5	3	3	3									
AVE	3	3	3	1	-	-	-	1	-	1	1	-

125IKT07	HERITAGE OF TAMILS (COMMOM FOR ALL BRANCHES)	L	T	P	C
		1	0	0	1

UNIT I - LANGUAGE AND LITERATURE

Language Families in India - Dravidian Languages – Tamil as a Classical Language – Classical Literature in Tamil – Secular Nature of Sangam Literature – Distributive Justice in Sangam Literature - Management Principles in Thirukural - Tamil Epics and Impact of Buddhism & Jainism in Tamil Land - Bakthi Literature Azhwars and Nayanmars - Forms of minor Poetry – Development of Modern literature in Tamil -Contribution of Bharathiyar and Bharathidhasan.

UNIT II - HERITAGE - ROCK ART PAINTINGS TO MODERN ART – SCULPTURE

Hero stone to modern sculpture - Bronze icons - Tribes and their handicrafts - Art of temple car making - - Massive Terracotta sculptures, Village deities, Thiruvalluvar Statue at Kanyakumari, Making of musical instruments - Mridhangam, Parai, Veenai, Yazh and Nadhaswaram - Role of Temples in Social and Economic Life of Tamils.

UNIT III - FOLK AND MARTIAL ARTS

Therukoothu, Karagattam, Villu Pattu, Kaniyan Koothu, Oyillattam, Leatherpuppetry, Silambattam, Valari, Tiger dance - Sports and Games of Tamils.

UNIT IV - THINAI CONCEPT OF TAMILS

Flora and Fauna of Tamils & Aham and Puram Concept from Tholkappiyam and Sangam Literature - Aram Concept of Tamils - Education and Literacy during Sangam Age - Ancient Cities and Ports of Sangam Age - Export and Import during Sangam Age - Overseas Conquest of Cholas.

UNIT V - CONTRIBUTION OF TAMILS TO INDIAN NATIONAL MOVEMENT AND INDIAN CULTURE

Contribution of Tamils to Indian Freedom Struggle - The Cultural Influence of Tamils over the other parts of India – Self-Respect Movement - Role of Siddha Medicine in Indigenous Systems of Medicine – Inscriptions & Manuscripts – Print History of Tamil Books.

TEXT-CUM-REFERENCE BOOKS

1. **தமிழக வரலாறு – மக்களும் பண்பாடும்** – மக. மகேஷ் பிள்ளை (தமிழ்நாடு பாடநூல் மற்றும் கல்வியியல் பணிகள் கழகம் வெளியீடு)
2. **கணினி தமிழ்** – முனைவர் இள. சுந்தரம் (விகடன் பிரசுரம்)
3. **கீழடி – வைமக நதிக்கரையில் செங்கோல் நகர நாகரிகம்** (தொல்லியல் துறை வெளியீடு)
4. **பொருநை – ஆற்றங்கரை நாகரிகம்** (தொல்லியல் துறை வெளியீடு)
5. Social Life of Tamils (Dr.K.K.Pillay) A joint publication of TNTB & ESC and RMRL – (in print)

225PCP08	PHYSICS & CHEMISTRY LABORATORY	L	T	P	C
		0	0	2	1

PHYSICS LAB

Objectives:

1. To analyze the mechanical properties such as Young's modulus and rigidity modulus for various materials.
2. To measure the physical parameters like thickness, particle size via wavelength of light using optical instruments.
3. To determine the frequency of a vibrating source using Melde's string method and acquire knowledge of fluid by measuring the velocity of sound and compressibility of liquid using high frequency sound waves.
4. To understand the relationship between energy gap influences the electrical conductivity of semiconducting material with respect to temperature**.**

List of Experiments

1. Determination of Young's modulus of the material by Uniform bending method.
2. Determination of thickness of a thin wire by Air wedge method.
3. Determination of wavelength of sound and compressibility of liquid-Ultrasonic interferometer.
4. Determination of Young's modulus of the material by non-uniform bending method.
5. Determination of Rigidity Modulus of a wire by Torsional pendulum method.
6. Determination of wavelength of mercury spectrum using Spectrometer - grating.
7. Determination of wavelength of sodium light by Newton's ring method.
8. Determination the frequency of an electrically maintained tuning fork by Melde's string method.
9. (a) Determination of laser parameters-Wavelength. (b) Particle size determination using Diode laser.
10. Determination of energy gap of a given semiconductor by Four Probe Method.

Minimum 7 experiments must be performed.

B. Chemistry Laboratory

Objectives:
Students will be conversant with the estimation of various compounds using volumetric and Instrumental analysis.

LIST OF EXPERIMENTS

1. Estimation of Total hardness by EDTA
2. Estimation of alkalinity of Water sample
3. Estimation of chloride in water sample
4. Determination of DO in Water (Winkler's Method)
5. Conduct metric titration (Simple acid base)
1. PH titration (acid & base)
2. Potentiometric Titration (Fe^{2+} / $KMnO_4$ or $K_2Cr_2O_7$)
3. Determination of Molecular Weight of Polymer by Viscometry Method

A minimum of Seven experiments shall be offered.

Course Outcomes (COs)

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

1. **CO1:** Perform experiments to determine mechanical properties (Young's modulus, rigidity modulus) and analyze material behavior using standard laboratory methods.
2. **CO2:** Measure physical parameters such as wavelength, thickness, particle size, and frequency using optical and ultrasonic techniques with appropriate instruments.
3. **CO3:** Determine electrical and semiconductor properties such as energy gap using experimental techniques like the Four Probe Method and interpret temperature dependence of conductivity.
4. **CO4:** Analyze water quality parameters (hardness, alkalinity, chloride, dissolved oxygen) and estimate chemical compounds using volumetric and instrumental methods.
5. **CO5:** Apply experimental skills, interpret data, evaluate errors, and present results effectively with proper scientific documentation and laboratory safety practices.

CO-PO Mapping:

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

CURRICULUM FOR SEMESTER-II

EEE:

S. No.	Course Code	Course Title	Category	L	T	P	C
1	225ENT01	Professional English-II	HS	3	0	0	3
2	225PST02	Probability and Statistics	BS	3	1	0	4
3	225SCT03	Physics of Semiconductor	BS	3	0	0	3
4	225EST04	Environmental Science & Sustainability	BS	2	0	0	2
5	225PPI05	Python Programming	ES	3	0	2	4
6	225CAI06	Electric Circuit Analysis	ES	3	0	2	4
7	225EPP08	Workshop	ES	2	0	2	1
8	225IKT07	Tamils and Technology	AC	1	0	0	1*
Total Credits							**22**

SEMESTER II SYLLABUS

225ENT01	PROFESSIONAL ENGLISH - II	L	T	P	C
		3	0	0	3

(COMMON TO ALL BRANCHES)

OBJECTIVES:

The Course prepares second semester Engineering and Technology students to:

- Confidently use grammar and domain-specific vocabulary in real-world and professional situations, leveraging AI tools for language support.
- Enhance listening skills to interpret complex academic lectures, industry talks, and multimedia content.
- Communicate fluently and persuasively in varied contexts, including webinars, interviews, and collaborative virtual environments.
- Critically read and analyse diverse, advanced-level texts, including research articles and technical documentation.
- Produce coherent, well-structured academic and professional documents such as reports, proposals, and presentations.

UNIT I: Language Development

Infinitive and gerund- Information and emphasis - Cause and effect -Purpose and function - Phrasal verbs –British and American English–Conditionals – Question Tag- Research Terminology

UNIT II: Listening

Conversation – Listening to stories –Verbatim –Podcast – Stakeholder communication – A scene from a documentary – Global English accents – Public service announcements - Research Interviews

UNIT III: Speaking

Role play – Reporting – Describing a person/place/thing – Exchanging personal information – Greeting – Leave taking – Introducing friends – Handling disagreement – Persuasive speaking - Presenting research findings

UNIT IV: Reading

Newspaper reports – Newspaper articles – Case studies – Critical reviews - Literature review – Business proposals – Global job descriptions – Short story: The Last Leaf

UNIT V: Writing

Note-making – Note-taking – Instructions– Précis writing and summarizing – Title Making–Diary Writing – Statement of Purpose–Writing an Effective Abstract - IMRaD Format

TOTAL: 45 HOURS

COURSE OUTCOMES:

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

- **CO1:** Effectively apply advanced grammar and technical vocabulary in academic and professional contexts, with the aid of AI tools when appropriate.
- **CO2:**Analyze and interpret complex academic and industry-based audio content with a high level of comprehension.
- **CO3:** Communicate confidently and fluently in formal and informal contexts, including collaborative virtual platforms.
- **CO4:** Critically read and evaluate a range of contemporary and technical texts for deeper understanding and interpretation.
- **CO5:** Produce well-organized, purposeful academic and professional documents such as reports, proposals, and reflective writing.

CO–PO MAPPING

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

'1'= Low; '2' = Medium; '3' = High; '-' = Not Related

TEXT BOOKS:

- Adams, D. J. (2022). Clarity, organization, precision, economy: A technical writing guide for engineers (4th ed.). University of New Haven Press.
- Celentano, T. (2021). *The big book of English gerunds & infinitives, prepositions, and phrasal verbs for ESL learners*. Smashwords.
- Celentano, T. (2021). *The big book of English grammar for ESL learners*. Smashwords.
- Finkelstein, L. Jr., Aune, J. E., & Potter, L. A. (2022). Technical writing for engineers & scientists (4th ed.). McGraw-Hill Education.
- Qiu, Q., & Zeng, Y. (2021). Research and technical writing for science and engineering. Routledge.

REFERENCES:

- English Current. (2021). *Activities for teaching gerunds & infinitives (ESL)*. https://www.englishcurrent.com/grammar/teaching-gerunds-infinitives-activities/
- Godwin-Jones, R. (2022). *Emerging technologies for language learning: AI, wearables, and adaptive platforms*. *Language Learning & Technology*, 26(1), 45–62.
- Grammarly Inc. (n.d.). *Grammarly: AI writing assistant*. https://www.grammarly.com

- Hyland, K., & Jiang, F. (2021). *Academic written English: Research transitions in a digital era*. Routledge.
- QuillBot. (n.d.). *QuillBot: Paraphrasing and grammar AI tool*. https://www.quillbot.com

2252SCT03	PHYSICS OF SEMICONDUCTORS	L	T	P	C
		2	0	0	3

(COMMON TO BME, ECE & EEE)

COURSE OBJECTIVES:

1. To make **PHYSICS** the students to understand the basics of crystallography and its importance in studying materials properties.
2. To understand the conducting properties of materials including Classical and Quantum theories.
3. To instill knowledge on physics of semiconductors.
4. To inculcate an idea of significance of advanced engineering material like nano materials with its applications.
5. To insist the basic knowledge about Capacitors and ESPs.

UNIT I: PHYSICS OF SOLIDS (6)

Definitions: Crystal Structure – parameters - Bravais lattices – Calculations of no. of atoms per unit cell – atomic radius – Coordination number – packing factor of SC, BCC, FCC and HCP Structures - Miller indices - d-spacing in Cubic structure.

UNIT II: CONDUCTING MATERIALS (6)

Classical free electron theory - Expression for electrical and thermal conductivity – Wiedmann - Franz law– drawbacks - Quantum free electron theory - Fermi-Dirac statistics - Density of energy states.

UNIT III: ELECTRONIC MATERIALS (6)

Semiconductors – Properties - Energy band diagram – Types of semiconductors - direct and indirect band gap, Elemental and Compound semiconductors - carrier concentration in intrinsic semiconductors – Hall Effect and Devices.

UNIT IV: ADVANCED ENGINEERING MATERIALS (6)

Nano materials: Introduction – different forms – Synthesis - ball milling - Plasma arcing method - Electro deposition- Chemical vapour deposition – application of nano phase materials.

UNIT V: ELECTROSTATICS (6)

Capacitor – Sharing of energy between two capacitors – Capacity of a spherical and cylindrical capacitors – Capacitors in series and parallel. Applications of Electrostatics- Electrostatic precipitator (ESP)- types of ESP- advantages- Industrial applications.

TOTAL HOURS: 30

COURSE OUTCOMES:

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

1. Know basics of crystal physics and its importance for various material properties.
2. Gain knowledge on the conducting properties of materials and their applications.
3. Understand about physics of semiconducting materials.
4. Gain knowledge about nano materials and its applications.
5. Get basic knowledge about Capacitors and its applications.

TEXT BOOKS:

1. R. N. Jayaprakash, Physics for information science, Sahana publication, 2022
2. S.O. Kasap. Principles of Electronic Materials and Devices, McGraw Hill Education (Indian Edition), 2020.
3. Jasprit Singh, "Semiconductor Devices: Basic Principles", Wiley (Indian Edition), 2007.
4. S.O. Kasap. Principles of Electronic Materials and Devices, McGraw-Hill Education (Indian Edition), 2020.
5. Parag K. Lala, Quantum Computing: A Beginner's Introduction, McGraw-Hill Education (Indian Edition), 2020.

REFERENCES:

1. Charles Kittel, Introduction to Solid State Physics, Wiley India Edition, 2019.
2. Y.B.Band and Y.Avishai, Quantum Mechanics with Applications to Nanotechnology and
3. Information Science, Academic Press, 2013.
4. V.V.Mitin, V.A. Kochelap and M.A.Stroscio, Introduction to Nanoelectronics, Cambridge Univ.Press, 2008.
5. G.W. Hanson, Fundamentals of Nanoelectronics, Pearson Education (Indian Edition) 2009.
6. B.Rogers, J.Adams and S.Pennathur, Nanotechnology: Understanding Small Systems, CRC Press, 2014.

CO-PO MAPPING:

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

225CAI06	ELECTRIC CIRCUIT ANALYSIS (ONLY FOR EEE)	L	T	P	C
		3	0	2	4

OBJECTIVES:

1. To explain the fundamental concepts and analytical methods of DC and AC circuits**.**
2. To develop the ability of applying network reduction techniques and circuit theorems for electrical network analysis.
3. To familiarize learners with resonance phenomena, frequency response, and coupling in tuned circuits
4. To impart knowledge of transient analysis of RL, RC, and RLC circuits using Laplace transforms.
5. To equip learners with skills to analyze three-phase circuits and evaluate power and power factor.

UNIT – I - BASIC CIRCUITS CONCEPTS AND ANALYSIS 09

Linear passive elements: R, L and C; V-I relationship of circuit elements - sinusoidal voltage and current-RMS value, Average value, form factor, power and power factor-Ohm's Law – Kirchoff's laws – Mesh current and nodal voltage methods of analysis for D.C Circuits.

UNIT – II MULTIDIMENSIONAL CIRCUIT ANALYSIS & NETWORK THEOREMS 09

Series and Parallel Circuits - Network reduction: Voltage and Current division techniques, Source transformation – Star delta conversion, Thevenin's and Norton's Theorems – Superposition Theorem – Maximum Power Transfer Theorem – Reciprocity Theorem.

UNIT – III RESONANCE AND TUNED CIRCUITS

Series and parallel resonance – Frequency response – Quality factor and Bandwidth – Self and mutual inductance – Coefficient of coupling – Singly tuned circuits- **Duality in Networks**.

UNIT – IV TRANSIENT RESPONSE FOR DC AND AC CIRCUITS 09

Introduction – Laplace transforms and inverse Laplace transforms - Transient response of RL, RC and RLC circuits using Laplace transform for Step input, Source free and Sinusoidal input.

UNIT – V ANALYSIS OF THREE PHASE CIRCUITS 09

Analysis of three phase 3-wire and 4-wire circuits with star and delta connected loads, balanced and unbalanced – phasor diagram of voltages and currents – power measurement in three phase circuits– power factor calculations

Course Outcomes:

CO1 - Explain the electrical parameters in DC and AC circuits.
CO2 – Apply network analysis techniques and theorems to solve electrical circuits
CO3 - Analyze resonance characteristics and coupling effects in tuned circuits
CO4 - Examine transient responses of RL, RC, and RLC circuits using Laplace transforms.
CO5 - Compute power and power factor in balanced and unbalanced three-phase circuits.

TEXT BOOKS

1. William H. Hayt Jr, Jack E. Kemmerly and Steven M. Durbin, "Engineering Circuits Analysis", Tata McGraw Hill publishers, 10th Edition, 2024.
2. Joseph A. Edminister, Mahmood, Nahri, "Electric Circuits" – Schaum Series and Systems", Schaum‟s Outlines, Tata McGrawHill-Indian, 7th Edition, 2017.
3. Sudhakar A and Shyam Mohan SP, "Circuits and Network Analysis and Synthesis", Tata McGraw Hill, 3rd Edition, 2019.
4. Charles K. Alexander, Mathew N.O. Sadiku, "Fundamentals of Electric Circuits", McGraw Hill, 7th Edition, 2022.

REFERENCE BOOKS

1. Chakrabati. A, "Circuits Theory (Analysis and synthesis)" , Dhanpat Rai & Sons, New Delhi, 7th Edition, 2020.
2. David Irwin J, Mark Nelms R with Amalendu Patnaik. "Basic Engineering Circuit Analysis", Wiley Publishers, 12th Edition, 2020.
3. Arumugam,M and Prem Kumar, K, Electric Circuit Theory, Khanna Publishers, 5th Edition, 2013.
4. Van Valkaenburg M.E and Rathore T.S, Network Analysis, Pearson India Publishers, 3rd Edition, 2019.

Electric Circuit Analysis Laboratory

List of Experiments

1. Verification of kirchoff's
2. Verification of OHMS LAW
3. Verification of Mesh analysis
4. Verification of nodal analysis
5. Verification of Thevinins theorem
6. Verification of superposition theorem
7. Verification of Maximum power transfer theorem
8. Transient response of RL, RC and RLC circuits for DC input using MATLAB/SIMULINK.
9. Frequency response of series and parallel resonance circuits using MATLAB/SIMULINK.

CO-PO MAPPING:

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

225EST04	ENVIRONMENTAL SCIENCES AND SUSTAINABILITY (COMMON FOR ALL BRANCHES)	L	T	P	C
		2	0	0	2

COURSE

OBJECTIVES:

The course aims to:

1. Introduce the basic concepts of environment, ecosystems and biodiversity with special emphasis on biodiversity of India and its conservation.
2. Impart knowledge on causes, effects and preventive measures of environmental pollution, waste management and environmental health.
3. Facilitate understanding of renewable and non-renewable energy resources, energy conservation and sustainable resource utilization.
4. Familiarize learners with sustainable development goals, climate change, carbon footprint and environmental management practices.
5. Inculcate sustainability-oriented thinking and promote green practices related to materials, energy cycles and sustainable urban development.

Unit I Environment and Biodiversity **6**

Definition, scope and importance of environment – need for public awareness. Ecosystem: structure and functions – energy flow – food chains and food webs – ecological pyramids – ecological succession. Biodiversity: definition and types – genetic, species and ecosystem diversity – values of biodiversity. India as a mega-diversity nation – biodiversity hotspots of India. Threats to biodiversity: habitat loss, invasive species, climate change, poaching of wildlife and man–wildlife conflict. Endangered and endemic species of India. Conservation of biodiversity: in-situ and ex-situ conservation – role of community participation and biodiversity legislation in India.

Unit II Environmental Pollution and Environmental Health **6**

Environmental pollution: causes, effects and preventive measures of water, air, soil and noise pollution – indoor air pollution. Waste management: solid waste, plastic waste, hazardous waste,biomedical waste and e-waste – principles of waste minimization and extended producer responsibility. Environmental health and safety: occupational health hazards – safety management systems – industrial accidents and case studies.
Environmental protection: environmental laws and acts – environmental compliance and monitoring.

Unit III Renewable Energy and Energy Management **6**

Energy resources and energy management – energy conservation and efficiency – Indian and global energy scenario. Renewable and alternative energy sources: solar, wind, biomass and small hydro power (overview). Emerging energy technologies: hydrogen energy – ocean energy (tidal, wave and OTEC) – geothermal energy: concept, origin and power plants. Energy storage systems and smart energy management (overview).

Unit IV – Sustainability and Environmental Management **6**

Development and sustainability – concept of sustainable development – economic, social and environmental dimensions of sustainability. From unsustainability to sustainability – Millennium Development Goals and Sustainable Development Goals – targets and indicators.
Climate change: causes, impacts, mitigation and adaptation – global, regional and local environmental

issues – case studies. Carbon footprint, carbon credit and carbon trading. Environmental management systems – industrial environmental management: case study.

UnitV –Sustainability Practices and Green Engineering 6

Zero waste concepts – 5R/7R principles – circular economy. Life cycle assessment – material life cycle – environmental impact assessment. Sustainable habitat: green buildings, green materials, energy-efficient systems. Sustainable transportation and energy cycles – carbon cycle, emission and sequestration. Green engineering and sustainable urbanization – socio-economic and technological transformations.

TOTAL: 30 PERIODS

OUTCOMES:

CO1: Explain the structure and functions of environment, ecosystems and biodiversity and their conservation.
CO2: Identify environmental pollution problems and propose preventive and control measures.
CO3: Apply concepts of renewable energy and resource conservation for sustainable development.
CO4: Analyze sustainability goals, climate change issues and environmental management practices.
CO5: Demonstrate sustainability practices related to green materials, energy cycles and sustainable urbanization.

TEXT BOOKS:

1. Erach Bharucha, Textbook of Environmental Studies for Undergraduate Courses, Orient Blackswan (Indian reference widely adopted in Indian universities).
2. Benny Joseph, Environmental Science and Engineering, Tata McGraw-Hill, New Delhi (Indian context, pollution and policy emphasis).
3. Anubha Kaushik & C.P. Kaushik, Perspectives in Environmental Studies, New Age International Publishers (India-centric examples).
4. Sanjay Kumar Batra et al., Environmental Science (Hindi/English), Taxmann Publications (Indian environmental issues and policies).
5. A Textbook of Environmental Studies by A. Dhinakaran & B. Sankaran (Indian authors).

REFERENCES:

1. R.K. Trivedi, 'Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standards', Vol. I and II, Enviro Media. 38. Edition 2010.
2. Cunningham, W.P. Cooper, T.H. Gorhani, 'Environmental Encyclopedia', Jaico Publ., House, Mumbai, 2001.
3. Dharmendra S. Sengar, 'Environmental law', Prentice hall of India PVT. LTD, New Delhi, 2007.
4. Rajagopalan, R, 'Environmental Studies-From Crisis to Cure', Oxford University Press, Third Edition, 2015.
5. Erach Bharucha "Textbook of Environmental Studies for Undergraduate Courses" Orient Blackswan Pvt. Ltd. 2013.

CO / PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	2	1	–	–	–	2	3	1	–	–	–

CO2	2	3	2	2	1	3	3	2	–	–	–
CO3	3	2	3	2	2	2	3	1	–	–	1
CO4	2	3	2	3	1	3	3	2	–	–	1
CO5	2	2	3	2	2	3	3	2	1	1	2

225EPP08	WORKSHOP	L	T	P	C
		0	0	2	1

(COMMON TO II SEMESTER FOR MECH, CIVIL, BIOTECH, CHEMICAL, BME, ECE, EEE)

OBJECTIVES:

1. To get the knowledge on welding techniques and sheet metal operation..
2. To know the principle involved in plumbing work and in carpentry work.
3. To know about wiring various electrical joints in common household electrical and wire work.
4. To know about the working procedure of electrical appliances.
5. To get the knowledge about basics of electronics and to know the characteristics of switching devices.

LIST OF EXPERIMENTS

1. **WELDING:**
   Study of Electric Arc welding equipment's.
   Preparation of welding joints:
   i) Butt joint ii) Lap joint iii) T - joint.

2. **SHEET METAL WORK:**
   Study of sheet metal tools and operations
   Preparation of sheet metal models: i) Rectangular Tray ii) Funnel

3. **PLUMBING WORKS:**
   Study of pipeline joints and house hold fittings.
   Preparation of plumbing models: Basic pipe connections with PVC and GI pipe fittings.

4. **CARPENTRY:**
   Study of wooden joints and tools used in roofs, doors, windows, furniture.
   Preparation of carpentry models:
   i) Lap joint ii) Dovetail joint iii) T-Joint

Part –B (Electrical and Electronics)

LIST OF EXPERIMENTS

1. Introduction to House Wiring.
2. Staircase Wiring.
3. Fluorescent lamp Wiring.
4. Measurement of single phase energy meter.
5. Measurement of Power, Power factor by using two- wattmeter Method.
6. Study of Electrical iron box and fan with regulator.
7. Characteristics of SCR and Diode
8. Introduction to color coding of resistor.

COURSE OUTCOMES:

The students will be able to

- Weld various joints in steel plates using arc welding work, make a tray out of metal sheet using sheet metal work.

- Draw pipe line plan, lay and connect various pipe fittings used in common household plumbing work, Sawing, Planning and make joints in wood materials used in common household wood work.
- Wire various electrical joints in common household electrical wire work.
- Know about the basic knowledge about electrical appliances.
- Know about the basic knowledge about electronics devices.

CO-PO MAPPING:

Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1		2	2	1			1	1		1	1
CO2	2		2	2	1				1		1	1
CO3	1		1	2	1				1		1	1
CO4	1		1	2	1				1		1	1
CO5	1		1	1	2				1		1	1

225IKT07	Tamils and Technologies	L	T	P	C
		1	0	0	1

UNIT I WEAVING AND CERAMIC TECHNOLOGY

Weaving Industry during Sangam Age – Ceramic technology – Black and Red Ware Potteries (BRW) – Graffiti on Potteries.

UNIT II DESIGN AND CONSTRUCTION TECHNOLOGY

Designing and Structural construction House & Designs in household materials during Sangam Age – Building materials and Hero stones of Sangam age – Details of Stage Constructions in Silappathikaram – Sculptures and Temples of Mamallapuram – Great Temples of Cholas and other worship places – Temples of Nayaka Period – Type study (Madurai Meenakshi Temple)- Thirumalai Nayakar Mahal – Chetti Nadu Houses, Indo – Saracenic architecture at Madras during British Period.

UNIT III MANUFACTURING TECHNOLOGY

Art of Ship Building – Metallurgical studies – Iron industry – Iron smelting, steel -Copper and goldCoins as source of history – Minting of Coins – Beads making-industries Stone beads -Glass beads – Terracotta beads -Shell beads/ bone beats – Archeological evidences – Gem stone types described in Silappathikaram.

UNIT IV AGRICULTURE AND IRRIGATION TECHNOLOGY

Dam, Tank, ponds, Sluice, Significance of Kumizhi Thoompu of Chola Period, Animal Husbandry – Wells designed for cattle use – Agriculture and Agro Processing – Knowledge of Sea – Fisheries – Pearl – Conche diving – Ancient Knowledge of Ocean – Knowledge Specific Society.

UNIT V SCIENTIFIC TAMIL & TAMIL COMPUTING

Development of Scientific Tamil – Tamil computing – Digitalization of Tamil Books – Development of Tamil Software – Tamil Virtual Academy – Tamil Digital Library – Online Tamil Dictionaries – Sorkuvai Project.

Reference:

1. Jayanthi Ravikrishnan, G. (2022). *Tamils and Technology.* Sri Krishna Tech Publishing.
2. Tamil Nadu State Department of Archaeology. (2020). *Keeladi Excavation Report.*
3. Tamil Virtual Academy. (n.d.). *Digital Tamil Initiatives.*
4. Sarveswaran, K. (2024). *Tamil Language Computing: The Present and the Future.*

Assessment Weightage

Regulations 2025:

1. Clause 12(a, b, c): Procedure for awarding marks for internal assessment:

Assessment I (100 Marks)		Assessment II (100 Marks)		Total Internal Assessment Marks
Individual Assignment / Case Study/ Seminar /Mini Project / any other experiential Learning	Written Test	Individual Assignment / Case Study/ Seminar /Mini Project / any other experiential Learning	Written Test	
40	**60**	**40**	**60**	**200***

Basic Science-Mathematics:

Component	CIA-1 (Marks)	CIA-2 (Marks)
Assignments (Minimum 4)	20	20
Solution to application-oriented problems using MATLAB	20	20
Internal Examinations	60	60
Total	100	100

Basic Science-Physics & Chemistry & Engineering Science

Component	CIA-1 (Marks)	CIA-2 (Marks)
Quiz	10	10
Assignments (Minimum 4)	20	20
Flipped Class	10	10
Internal Examinations	60	60
Total	100	100

Engineering Science: Engineering Graphics

Component	CIA-1 (Marks)	CIA-2 (Marks)
Project	10	10
Models	10	10
Assignments (Minimum 2)	20	20
Internal Examinations	60	60
Total	100	100

HS: English (Integrated)

Component	CIA-1 (Marks)	CIA-2 (Marks)
Assignments	10	10
Listening Task	10	10
Speaking Task	10	10
Reading Task	10	10
Writing Task	10	10
Internal Examinations	50	50
Total	100	100

Engineering Science Papers (Integrated)

Component	CIA-1 (Marks)	CIA-2 (Marks)
Quiz	10	10
Assignment	10	10
Practical	30	30
Internal Examinations	50	50
Total	100	100

Laboratory:

Internal Assessment (100 Marks)	
Evaluation of Laboratory Observation, Record	Test
75	**25**

STANDARD OPERATING PROCEDURE (SOP)
FOR FLIPPED CLASSROOM
(Applicable to Physics, Chemistry, and Engineering Science Courses)

SOP for Conducting Flipped Classroom (Weightage: 10 Marks) as a Component of Continuous Internal Assessment (CIA)

Objective

To promote active learning, peer interaction, and independent thinking by engaging students in pre-class preparation and in-class application activities, thus enhancing conceptual understanding and problem-solving abilities in foundational science and engineering courses.

Scope

This SOP applies to all First-Year B.E./B.Tech. students enrolled in Physics, Chemistry, and Engineering Science courses, as part of the Continuous Internal Assessment (CIA) framework, with a weightage of 10 marks.

Definition of Flipped Classroom

The Flipped Classroom is a learner-centered approach where students:

- Learn basic concepts before class through videos, notes, or readings shared by faculty.
- Engage in higher-order learning activities during class, such as discussions, problem-solving, experiments, or mini-presentations.
- This reverses the traditional model by shifting knowledge acquisition to pre-class and application to in-class time.

5. Frequency and Duration

- Each course shall conduct one Flipped Classroom activity per unit or a minimum of two per semester.
- Each session may last for a period.
- The schedule and preparatory material shall be shared one week in advance with students.

6. Procedure

A. Pre-Class Phase

- Faculty identifies a specific topic/unit concept for the flipped activity.
- Faculty provides learning resources (videos, PPTs, open educational materials, NPTEL links, or recorded lectures) through LMS, Google Classroom, or WhatsApp groups.

Students are instructed to:

- Study the shared content before class.
- Note down key points or queries for in-class discussion.

B. In-Class Phase

- Faculty conducts an interactive session to clarify concepts.
- Students are divided into small groups (3–5 members).

- Each group performs one or more of the following:
    - Present learned content (mini-seminar).
    - Solve numerical or analytical problems.
    - Demonstrate experiments or simulations.
    - Engage in peer-teaching or case discussion.

Faculty facilitates and evaluates based on participation, understanding, and presentation skills.

C. Post-Class Phase

Faculty summarizes key takeaways, addresses misconceptions, and shares feedback.

Students submit a brief reflection or summary report of the activity.

Evaluation Criteria (Total: 10 Marks)

Criterion	Description	Marks
Pre-Class Preparation	Understanding of shared material (quiz/notes review)	2
In-Class Participation	Engagement, teamwork, and interaction	3
Presentation / Problem Solving	Clarity, accuracy, and application of concepts	3
Reflection / Report Submission	Quality of summary or feedback	2
Total		10

Evaluation and Record Maintenance

Faculty maintains a Flipped Classroom Evaluation Register (or Excel/LMS record) with:

- Topic details
- Group members
- Evaluation sheet
- Marks obtained

The consolidated marks shall be entered in the internal mark register/ERP within 5 working days after the session.

Documentation and Audit

The following documents/evidence must be maintained in the Course File:

- Topic details and schedule.
- Shared learning materials (videos, notes, links).
- Attendance and evaluation sheets.
- Group presentations or activity photos/screenshots.
- Reflection reports of students (sample).
- Consolidated mark list.

Roles and Responsibilities

- **Course Faculty:** Plan topics, share pre-class materials, evaluate participation, and record marks.
- **Students:** Engage in self-learning, active participation, and group collaboration.
- **Head of Department:** Monitor implementation and verify documentation.
- **IQAC/Academic Audit:** Review records and evidence during audits.

Review and Revision

This SOP shall be reviewed annually based on feedback from faculty, students, and audit recommendations to ensure the effectiveness of flipped learning practices.

STANDARD OPERATING PROCEDURE (SOP) FOR QUIZ

(Applicable to Physics, Chemistry and Engineering Science Courses)

SOP for Conducting Quiz (Weightage: 10 Marks) as a Component of Continuous Internal Assessment (CIA)

Objective

To assess the students' comprehension, analytical ability, and conceptual clarity in core science subjects through short, structured quizzes that promote active learning and continuous engagement.

Scope

This SOP applies to all First-Year B.E./B.Tech. courses in Physics, Chemistry, and Engineering Science, forming part of the Continuous Internal Assessment (CIA) framework with a weightage of 10 marks out of 100 internal marks.

Frequency and Duration

- Each course shall conduct a minimum of two quizzes per semester.
- Each quiz shall have a duration of 1 period. (30 Minutes for Quiz and 20 Minutes for discussion)
- The schedule and syllabus coverage should be announced one week in advance to students.

Mode of Conduct

The quiz may be conducted in either offline (written) or online (LMS/Google Forms/ERP) mode, depending on departmental convenience.

Offline Mode

- Conducted in the classroom using printed or handwritten question papers.
- Answers to be written on the supplied answer sheets.

Online Mode

- Conducted using institutional LMS, Google Forms, or ERP-based quiz tools with time control and automatic grading.

Quiz Structure

Type of Question	Number of Questions	Marks per Question	Total Marks
Multiple Choice Questions*	10	1	10
Total			**10 Marks**

**Alternative formats such as Fill in the Blanks, Match the Following, or True/False may be used depending on subject relevance.*

Question Design Guidelines

- Questions must align with Course Outcomes (COs) and Unit Learning Objectives.
- At least 20% of questions should test higher-order thinking skills (Application/Analysis) based on Bloom's Taxonomy.
- Ensure balanced coverage of theory and problem-based concepts.

Evaluation and Marks Entry

- Each quiz carries a maximum of 10 marks.
- The evaluated scripts or online results must be verified and recorded in the Quiz Assessment Register (or Google Sheet/LMS).
- Marks should be uploaded to the internal assessment portal/ERP within 5 working days of the quiz.

Feedback and Remedial Action

- Faculty shall provide collective feedback discussing common mistakes and correct solutions during the next class.
- Students scoring below 40% shall be given additional support/remedial sessions and may be allowed to take an improvement quiz if necessary.

Documentation and Audit

The following documents shall be maintained in the **Course File**:

1. Quiz question paper and key.
2. Quiz attendance record.
3. Student responses and evaluation sheets (or online screenshots).
4. Consolidated mark sheet and summary of performance.
5. Sample evidence (photographs, LMS reports) for audit verification.

Responsibility

- **Course Faculty :** Design, conduct, evaluate, and record quiz marks.
- **Head of Department :** Verify question quality, schedule, and mark entry.
- **IQAC/Academic Audit :** Review documentation during audit cycles.

Review and Revision

This SOP shall be reviewed once every academic year based on feedback from faculty, students, and audit observations to ensure continuous improvement in assessment practices.

Adhiyamaan College of Engineering
(An Autonomous Institution)
AY 20XX-XX

Lesson Plan

Department:

Programme: Semester: Course Code & Title:

Date/Hour	Topics Covered	Pedagogical Approach*	COs	POs & PSOs

Course Coordinator **HoD** **Dean Academics**

Note:

Pedagogical Approaches:

- Chalk & Talk
- PPT
- NPTEL/ODL
- Group Learning and Teaching
- Individual Learning/Self study
- Game based learning
- Technology based learning
- Peer teaching
- Learning through problem solving
- Project based learning
- Flipped Class room