# K.L.N. COLLEGE OF ENGINEERING

## Pottapalayam-630612, Sivagangai District

**(An Autonomous Institution, Affiliated to Anna University, Chennai)**

**Estd: 1994**

## FIRST YEAR

## CURRICULAM AND SYLLABUS

### REGULATIONS 2024

### For under Graduate Program

# B.E. ELECTRICAL AND ELECTRONICS ENGINEERING

### CHOICE BASED CREDIT SYSTEM

**(For the students admitted from the Academic Year 2024 - 2025 onwards)**

**K.L.N. COLLEGE OF ENGINEERING, POTTAPALAYAM**

**(An Autonomous Institution, Affiliated to Anna University, Chennai)**


## VISION OF THE INSTITUTION

To become a Centre of Excellence in Technical Education and Research in producing Competent and Ethical professionals to the society

## MISSION OF THE INSTITUTION

To impart Value and Need based curriculum to the students with enriched skill development in the field of Engineering, Technology, Management and Entrepreneurship and to nurture their character with social concern and to pursue their career in the areas of Research and Industry**.**

## VISION OF THE DEPARTMENT

To become a high standard of excellence in Education, Training and Research in the field of Electrical & Electronics Engineering and allied applications.

## MISSION OF THE DEPARTMENT

1. To create graduates possess excellent knowledge in Electrical and Electronics Engineering fundamentals.
2. To provide employable graduates for industry and to do high quality research.
3. To Emphasis on Ethics, professional conduct for societal development

**K.L.N. COLLEGE OF ENGINEERING, POTTAPALAYAM**

**(An Autonomous Institution, Affiliated to Anna University, Chennai)**

## PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

**PEO 1** To excel in industrial or graduate work in Electrical and Electronics Engineering and allied fields.

**PEO 2** To practice their Professions conforming to Ethical Values and Environmentally friendly policies

**PEO 3** To work in international and multi-disciplinary Environments.

**PEO 4** To successfully adapt to evolving Technologies and stay current with their Professions.

## PROGRAM SPECIFIC OUTCOMES (PSOs)

**PSO 1** Apply the fundamentals of Mathematics, Science and Engineering knowledge to identify, formulate, design and investigate complex engineering problems of Electric Circuits, Analog and Digital Electronic Circuits, Electrical Machines and Power Systems.

**PSO 2** Apply appropriate techniques and modern Engineering hardware and software tools in Power Systems to engage in life- long learning and to successfully adapt in multi disciplinary environments



## PROGRAM OUTCOMES (POs):

**PO1: Engineering knowledge**

Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

**PO2: Problem analysis**

Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

**PO3: Design/development of solutions**

Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

**PO4: Conduct investigations of complex problems**

Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

**PO5: Modern tool usage**

Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

**PO6: The engineer and society**

Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

**PO7: Environment and sustainability**

Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

**PO8: Ethics**

Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

**PO9: Individual and team work**

Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

**PO10: Communication**

Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

**PO11: Project management and finance**

Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

**PO12: Life-long learning**

Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

**K.L.N. COLLEGE OF ENGINEERING, POTTAPALAYAM**
**(An Autonomous Institution, Affiliated to Anna University, Chennai)**

# REGULATIONS 2024

## For Under Graduate Program

## B.E. – ELECTRICAL AND ELECTRONICS ENGINEERING

## CHOICE BASED CREDIT SYSTEM

### CATEGORY OF COURSES

i. **Humanities and Social Sciences (HS) Courses** include Technical English, Environmental Science and Engineering, Engineering Ethics and human values, Communication Skills and Management courses.

ii. **Basic Sciences (BS**) **Courses** include Mathematics, Physics, and Chemistry.

iii. **Engineering Sciences (ES) Courses** include Engineering Practices, Engineering Graphics, Basics of Electrical / Electronics / Mechanical / Computer Engineering / Instrumentation etc.

iv. **Professional Core (PC) Courses** include the core courses relevant to the chosen programme of study.

v. **Professional Elective (PE) Courses** include the elective courses relevant to the chosen programme of study.

vi. **Open Elective (OE) Courses** include courses from other departments which a student can choose from the list specified in the curriculum of the students B.E. / B.Tech. Programmes.

vii. **Employability Enhancement Courses (EEC)** include Project Work and/or Internship, Seminar, Professional Practices, Case Study and Industrial/Practical Training.

viii. **Mandatory (MC) Courses** include Personality and Character development and the courses recommended by the regulatory bodies such as AICTE, UGC, etc

# K.L.N. COLLEGE OF ENGINEERING, POTTAPALAYAM

**(An Autonomous Institution, Affiliated to Anna University, Chennai)**

## REGULATIONS 2024
## CHOICE BASED CREDIT SYSTEM
## B.E. – ELECTRICAL AND ELECTRONICS ENGINEERING

### SEMESTER I

(Common to all B.E/B.Tech Programmes)

| S.No | COURSE CODE | COURSE TITLE | CATEGORY | CONTACT PERIODS | L | T | P | C |
|---|---|---|---|---|---|---|---|---|
| **THEORY** | | | | | | | | |
| 1. | 24HS101 | Professional English I | HS | 2 | 2 | 0 | 0 | 2 |
| 2. | 24BS101 | Engineering Mathematics | BS | 4 | 3 | 1 | 0 | 4 |
| 3. | 24BS102 | Engineering Physics | BS | 3 | 3 | 0 | 0 | 3 |
| 4. | 24BS103 | Engineering Chemistry | BS | 3 | 3 | 0 | 0 | 3 |
| 5. | 24GE101 | Problem solving and C Programming | ES | 3 | 3 | 0 | 0 | 3 |
| 6. | 24GE102 | Engineering Graphics | ES | 3 | 2 | 1 | 0 | 3 |
| 7. | 24HST01 | தமிழர்மரபு /Heritage of Tamils | HS | 1 | 1 | 0 | 0 | 1 |
| **PRACTICAL** | | | | | | | | |
| 8. | 24BS1L1 | Basic Science Laboratory | BS | 4 | 0 | 0 | 4 | 2 |
| 9. | 24GE1L1 | C Programming laboratory | ES | 4 | 0 | 0 | 4 | 2 |
| 10. | 24HS1L1 | English Laboratory | HS | 2 | 0 | 0 | 2 | 1 |
| **TOTAL** | | | | **29** | **17** | **2** | **10** | **24** |

### SEMESTER II

| S.No | COURSE CODE | COURSE TITLE | CATEGORY | CONTACT PERIODS | L | T | P | C |
|---|---|---|---|---|---|---|---|---|
| **THEORY** | | | | | | | | |
| 1. | 24HS201 | Professional English II | HS# | 4 | 2 | 0 | 2 | 3 |
| 2. | 24BS201 | Advanced Calculus **(Common to B.E. Mech.,EEE & ECE)** | BS | 4 | 3 | 1 | 0 | 4 |
| 3. | 24BS203 | Physics for Electronics and Devices | BS | 3 | 3 | 0 | 0 | 3 |
| 4. | 24HS202 | Environmental Sciences and Sustainability | HS# | 2 | 2 | 0 | 0 | 2 |
| 5. | 24GE201 | Python Programming | ES# | 3 | 3 | 0 | 0 | 3 |
| 6. | 24EE201 | Electric Circuit Theory | PC | 3 | 2 | 1 | 0 | 3 |
| 7. | 24HST02 | தமிழரும் தொழில்நுட்பமும் / Tamils and Technology | HS# | 1 | 1 | 0 | 0 | 1 |
| 8. | 24HS203 | Aptitude and Soft Skills – I | EEC# | 2 | 0 | 0 | 2 | 1* |
| **PRACTICAL** | | | | | | | | |
| 9. | 24EE2L1 | Electric Circuits Laboratory | PC | 4 | 0 | 0 | 4 | 2 |
| 10. | 24GE2L1 | Python Programming Laboratory | ES# | 3 | 0 | 0 | 3 | 1.5 |
| 11. | 24GE2L2 | Industrial practices Workshop | ES# | 3 | 0 | 0 | 3 | 1.5 |
| **TOTAL** | | | | **32** | **16** | **2** | **14** | **24** |

# Common to all B.E. / B.Tech programmes

*The grades earned by the students will be recorded in the mark sheet, however the same shall not be considered for the computation of CGPA

| 24HS101 | PROFESSIONAL ENGLISH – I | L | T | P | C |
|---|---|---|---|---|---|
| | | 2 | 0 | 0 | 2 |

**OBJECTIVES:**

- To improve the communicative competence of learners.
- To learn to apply basic grammatical structures in appropriate contexts.
- To acquire lexical competence, use them appropriately in sentences, and comprehend their meaning in a text.
- To help learners use language effectively in professional contexts.
- To develop learners' ability to read and write complex texts, summaries, articles, blogs, definitions, essays and user manuals.

**PRE-REQUISITE: NIL**

**UNIT-I Introduction to Effective Communication 6**

Exploring the Elements of Effective Communication through various Activities - Unveiling the Significance of Effective Communication in Academic, Research, and Professional Achievements -Dissecting the Seven Components Integral to Effective Communication - Analyzing the Characteristics of Effective Writing - Enhancing English Language and Communication Skills for Optimal Course Outcome

**Introduction to Fundamentals of Communication**

**Reading –** Reading Brochures (Technical Context) – Telephone Messages / Social Messages. **Writing –** Email to MNC's (Requesting for IV, Internship, and Requesting HR for College Function, Internal & External Business Communication) - Letter to the Principal (Requesting Bona-fide Certificate, Getting Original Certificate, etc.,) **Grammar –** Present Tense – Questions Types. **Vocabulary** – Technical Vocabulary.

**UNIT-II Narration and Summation 6**

**Reading** – Biographies. **Writing –** Guided Writing – Paragraph Writing – Travel & Technical Blogs – Report on Events. **Grammar** – Simple Past Tense – Concord. **Vocabulary** – Word Formation – Prefix, Suffix and Roots

**UNIT-III Description of a Process / Product 6**

**Reading** – Project Reviews – User Manuals. **Writing –** Definitions – Instructions – Process Description. **Grammar –** Modals. **Vocabulary** – Compound Nouns – Voices

**UNIT- IV Classification and Recommendations 6**

**Reading** – Newspaper Articles, Note Taking. **Writing –** Inference – Charts, Diagrams, Tables – Note Making – Recommendations. **Grammar –** Articles – Possessive & Relative Pronouns – Degrees of Comparison.

**UNIT-V Expression 6**

**Reading** – Opinion Blogs. **Writing –** Essay Writing – Descriptive Writing - Social Issues (Public Transportation, Drinking Water) - Narrative Writing (Cyber Crime, Experience of First Semester). **Grammar –** Future Tense – Punctuation – Cause & Effect – Discourse Markers.

**TOTAL: 30 PERIODS**

**TEXT BOOKS:**

1. English for Engineers & Technologists Orient Blackswan Private Ltd. Department of English, Anna University, (2020 edition)
2. English for Science & Technology Cambridge University Press, 2021. Authored by Dr. VeenaSelvam, Dr. SujathaPriyadarshini, Dr. Deepa Mary Francis, Dr. KN. Shoba, and Dr. Lourdes Joevani, Department of English, Anna University.

**REFERENCES:**


1. Technical Communication – Principles And Practices By Meenakshi Raman &Sangeeta Sharma, Oxford Univ. Press, 2016, New Delhi.
2. A Course Book on Technical English By Lakshminarayanan, Scitech Publications (India) Pvt. Ltd.
3. English for Technical Communication (With CD) By AyshaViswamohan, Mcgraw Hill Education, ISBN: 0070264244.
4. Effective Communication Skill, Kulbhusan Kumar, RS Salaria, Khanna Publishing House.
5. Learning to Communicate – Dr. V. Chellammal, Allied Publishing House, New Delhi, 2003.
6. A Course in Technical English by Mr. D. Praveen Sam, KN Shoba, Cambridge University Press, 2020, India.


**OUTCOMES:**

**AT THE END OF THE COURSE, LEARNERS WILL BE ABLE TO:**

| **COURSE NAME :PROFESSIONAL ENGLISH – I** | | **COURSE CODE : 24HS101** | | | |
|---|---|---|---|---|---|
| **CO** | **Course Outcomes** | **Unit** | **K –CO** | **POs** | **PSOs** |
| **C101.1** | Remember and use appropriate words in a professional context in precise and efficient way on technological contexts | I-V | AD | | - |
| **C101.2** | Form situational conversations and technical writing styles for interpersonal and effective communication | I-V | AD | | - |
| **C101.3** | Gain understanding of basic grammatical structures and use them in right context | I-V | AD | | - |
| **C101.4** | Read and infer the denotative and connotative meanings of technical texts | I-V | AD | | - |
| **C101.5** | Write definitions, descriptions, narrations and essays on various topics | I-V | AD | | - |

| 24BS101 | ENGINEERING MATHEMATICS | L | T | P | C |
|---|---|---|---|---|---|
| | | 3 | 1 | 0 | 4 |

**OBJECTIVES:**

- To relate various methods of Matrix Algebra to handle practical problems arising in the field of engineering.
- To achieve conceptual understanding and to retain the best traditions of Calculus.
- To provide the basic tools of Calculus of Single and Multivariable, mainly for the purpose of modeling the engineering problems mathematically and obtaining solutions.

**PRE-REQUISITE: NIL**

**UNIT - I MATRICES 12**

Introduction to Matrices-Eigenvalues and Eigenvectors of a real matrix – Characteristic equation – Properties of Eigenvalues and Eigenvectors – Cayley-Hamilton Theorem(without proof) – Diagonalization of matrices – Reduction of a Quadratic form to Canonical form by Orthogonal transformation – Nature of Quadratic forms.

**UNIT - II DIFFERENTIAL CALCULUS 12**

Representation of functions - Limit of a function - Continuity - Derivatives - Differentiation rules - Differentiation of Polynomials, Exponential, Trigonometric, Hyperbolic, Logarithmic and Implicit functions- Maxima and Minima of functions of single variable.

**UNIT - III FUNCTIONS OF SEVERAL VARIABLES 12**

Partial differentiation – Homogeneous functions and Euler's theorem(without proof) – Total derivative – Change of variables – Jacobians – Partial differentiation of implicit functions – Taylor's series for functions of two variables – Maxima and Minima of functions of two variables – Lagrange's method of undetermined multipliers.

**UNIT - IV INTEGRAL CALCULUS 12**

Definite and Indefinite integrals - Substitution rule - Techniques of integration - Integration by parts, Trigonometric integrals, Trigonometric substitutions, Integration of rational functions by partial fraction, Integration of irrational functions, Improper integrals.

**UNIT - V ORDINARY DIFFERENTIAL EQUATIONS 12**

Higher order linear differential equations with constant coefficients - Method of variation of parameters – Homogenous equation of Euler's and Legendre's type – System of simultaneous linear differential equations with constant coefficients.

**TOTAL: 60 PERIODS**

**TEXT BOOKS:**

1. Grewal B.S., "Higher Engineering Mathematics", Khanna Publishers, New Delhi, 44th Edition, 2017.
2. Veerarajan. T., "Engineering Mathematics I", The Tata McGraw Hill Publication-New Delhi, First Edition, 2018.

**REFERENCES:**

1. James Stewart, "Calculus, Early Transcendental", Cengage Learning, 7th Edition, New Delhi, 2015. [For units II & III].
2. Kreyszig Erwin, "Advanced Engineering Mathematics", John Wiley and Sons, 9th Edition, New Delhi, 2006.
3. Wiley, "Calculus- International Student version", 10th Edition, Wiley India Pvt. Ltd, New Delhi 2017.
4. Jain R.K. and Iyengar S.R.K., "Advanced Engineering Mathematics", Narosa Publications, New Delhi, 5th Edition, 2016.
5. Bali N., Goyal M. and Watkins C., "Advanced Engineering Mathematics II", Firewall Media (An imprint of Lakshmi Publications Pvt., Ltd.,), New Delhi, 9th Edition, 2014.

**OUTCOMES:**

**AT THE END OF THE COURSE, LEARNERS WILL BE ABLE TO:**

| **COURSE NAME : ENGINEERING MATHEMATICS** | | **COURSE CODE : 24BS101** | | | |
|---|---|---|---|---|---|
| **CO** | **Course Outcomes** | **Unit** | **K –CO** | **POs** | **PSOs** |
| **C102.1** | Determine the Eigen values, Eigen vectors to diagonalize a matrix and reduce quadratic form to canonical form. | I | K3 | | |
| **C102.2** | Apply the concepts of Concavity, Convexity to determine the critical points, point of Inflection, Maxima and Minima of Single variable functions. | II | K3 | | |
| **C102.3** | Compute the derivatives of functions of two variables and apply them to calculate the maxima and minima. | III | K3 | | |
| **C102.4** | Determine integrals using techniques of integration, such as substitution, partial fractions and integration by parts. | IV | K3 | | |
| **C102.5** | Apply the various techniques to solve higher order differential equations with constant and variable coefficients. | V | K3 | | |

| 24BS102 | ENGINEERING PHYSICS | L | T | P | C |
|---|---|---|---|---|---|
| | | 3 | 0 | 0 | 3 |

**OBJECTIVES:**

- To inculcate properties of matter and characteristics of electromagnetic waves.
- To introduce the basics of LASER, fiber optics and crystallography.
- To enhance the knowledge on importance and applications of quantum physics.

**PRE-REQUISITE: NIL**

**UNIT - I PROPERTIESOFMATTER 9**

Elasticity – Hooke's Law – Stress-Strain diagram and its uses – three modulus of elasticity (qualitative) – Poisson's ratio – Factors affecting elastic modulus and tensile strength – Twisting couple – Torsional pendulum: theory and experiment – Bending of beams – Bending moment –Cantilever: theory and experiment – Uniform and Non-uniform bending – theory and experiment – I-shaped girders

**UNIT - II ELECTROMAGNETIC WAVES 9**

The Maxwell's equations - Wave equation: plane electromagnetic waves in vacuum, conditions on the wave field - Properties of electromagnetic waves: speed, amplitude, phase, orientation and waves in matter - Polarization producing electromagnetic waves - Reflection and Transmission of electromagnetic waves from a non-conducting medium - Vacuum interface for normal incidence.

**UNIT - III LASER AND FIBER OPTICS 9**

LASER: theory of laser - Characteristics - Spontaneous and Stimulated emission - Einstein's coefficients - Population inversion - Nd-YAG laser, $CO_2$ laser – Basic applications of lasers in industry. Fiber optics: principle, Numerical aperture and Acceptance angle - Types of optical fibers (material, refractive index, mode) – Losses associated with optical fibers - Fiber optic sensors: Pressure and Displacement

**UNIT - IV QUANTUM PHYSICS 9**

Black body radiation – Planck's theory – Compton effect: theory and experimental verification – wave particle duality – Concept of wave function and its physical significance – Schrödinger's wave equation – time independent and time dependent equations – Particle in a one-dimensional box – Tunneling (qualitative) - Scanning tunneling microscope (STM).

**UNIT - V CRYSTALLOGRAPHY 9**

Crystalline and amorphous materials – Unit cell, Crystal systems, Bravais lattices, Lattice planes - Miller indices – Interplanar spacing in cubic lattice – Atomic radius, Coordination number and Packing factor for SC, BCC, FCC, HCP structures - Growth of single crystals: Solution and melt growth techniques.

**TOTAL: 45 PERIODS**

**TEXT BOOKS:**

1. R. K. Gaur and S. L. Gupta, “Engineering Physics”, DhanpatRai Publishers,2012.
2. B. K. Pandey and S. Chaturvedi, “Engineering Physics”, Cengage Learning India, 2018.

**REFERENCES:**

1. D. K. Bhattacharya and T. Poonam, “Engineering Physics”, Oxford University Press 2017.
2. R. Wolfson, “Essential University Physics”, Volume 1 & 2, Pearson Education (Indian Edition), 2009.
3. K.Thyagarajan and A.Ghatak, “Lasers: Fundamentals and Applications”, Laxmi Publications (Indian Edition), 2019.
4. D. Halliday, R. Resnick and J. Walker, “Principles of Physics”, Wiley (Indian Edition), 2015.
5. P. A. Tipler and G. Mosca W. H. Freeman, “Physics for Scientists and Engineers with Modern Physics”, 2007.

**OUTCOMES:**
**AT THE END OF THE COURSE, LEARNERS WILL BE ABLE TO:**

| **COURSE NAME : ENGINEERING PHYSICS** | | **COURSE CODE : 24BS102** | | | |
|---|---|---|---|---|---|
| **CO** | **Course Outcomes** | **Unit** | **K –CO** | **POs** | **PSOs** |
| **C103.1** | Demonstrate the properties of elasticity and measure the different moduli of elasticity | I | K3 | | - |
| **C103.2** | Discuss the characteristics of electromagnetic waves. | II | K2 | | - |
| **C103.3** | Examine the characteristics of laser and optical fiber. | III | K2 | | - |
| **C103.4** | Explain black body radiation, properties of matter waves and Schrodinger equation. | IV | K2 | | - |
| **C103.5** | Classify Bravais lattices, different types of crystal structures and crystal growth techniques | V | K3 | | - |

| 24BS103 | ENGINEERING CHEMISTRY | L | T | P | C |
|---|---|---|---|---|---|
| | | 3 | 0 | 0 | 3 |

**OBJECTIVES:**

- To inculcate sound understanding of water quality parameters and water treatment techniques.
- To familiarize the students with the operating principles, working processes and applications of energy conversion and storage devices.
- To introduce the basic concepts and applications of corrosion and alloys.
- To facilitate the understanding of different types of fuels, their preparation, properties and combustion characteristics.
- To impart knowledge on the basic principles and preparatory methods of nanomaterials.

**PRE-REQUISITE: NIL**

**UNIT - I WATER AND ITS TREATMENT 9**

Water: Sources and impurities, Water quality parameters: Estimation of hardness by EDTA method (Problems). Desalination of brackish water: Reverse Osmosis, Electro dialysis. Waste water treatment. Boiler troubles: Scale and sludge, Boiler corrosion, Caustic embrittlement, Priming & foaming. Treatment of boiler feed water: Internal treatment: phosphate, colloidal, sodium aluminate and calgon conditioning and External treatment: Ion-exchange demineralization and zeolite process.

**UNIT - II ENERGY SOURCES AND STORAGE DEVICES 9**

Stability of nucleus: mass defect (problems), binding energy; Nuclear energy: light water nuclear power plant, breeder reactor. Solar energy conversion: Principle, working and applications of solar cells; Recent developments in solar cell materials, Wind energy.

Batteries- Types of batteries, Primary battery - dry cell, Secondary battery - lead acid battery and lithium-ion-battery; Electric vehicles - working principles; Fuel cells: $H_2$-$O_2$ fuel cell, microbial fuel cell.

**UNIT - III CORROSION AND ALLOYS 9**

Corrosion-causes-factors-types-chemical, electrochemical corrosion (galvanic, differential aeration), corrosion control-material selection and design aspects-electrochemical protection-sacrificial anode method and impressed current cathodic method.

Alloys – introduction, definition, properties of alloys, significance of alloying; Functions and effects of alloying elements; Heat treatment of steel - annealing, hardening, tempering, carburizing, nitriding; Ferrous alloys- nichrome and stainless steel (18/8); Non-ferrous alloys – brass and bronze.

**UNIT - IV FUELS AND COMBUSTION 9**

Fuels: Introduction: Classification of fuels; Coal proximate analysis of coal and manufacture of metallurgical coke (Otto Hoffmann method). Petrol characteristics, knocking - octane number, diesel oil characteristics, cetane number; Power alcohol and biodiesel. Combustion of fuels: Introduction: Calorific value - higher and lower calorific values, Theoretical calculation of calorific value; Ignition temperature: spontaneous ignition temperature, Explosive range; Flue gas analysis - ORSAT Method.

**UNIT - V NANOCHEMISTRY 9**

Basics: Distinction between molecules, nanomaterials and bulk materials; Size-dependent properties: optical, electrical, mechanical and magnetic; Types of nanomaterials: Definition, properties and uses of – nanoparticle, nanowire and nanotube. Preparation of nanomaterials: sol-gel, solvothermal, laser ablation, chemical vapour deposition, electrochemical deposition and electro spinning. Applications of nanomaterials in medicine, agriculture, energy, electronics and catalysis.

**TOTAL: 45 PERIODS**

**TEXT BOOKS:**


1. P. C. Jain and Monica Jain, *"Engineering Chemistry",* 17th Edition, DhanpatRai Publishing Company (P) Ltd, New Delhi, 2018.
2. Sivasankar B., *"Engineering Chemistry"*, Tata McGraw-Hill Publishing Company Ltd, New Delhi, 2008.
3. S.S. Dara, *"A Text book of Engineering Chemistry",* S. Chand Publishing, 12th Edition, 2018


**REFERENCES:**


1. B. S. Murty, P. Shankar, Baldev Raj, B. B. Rath and James Murday, "Text book of nanoscience and nanotechnology", Universities Press-IIM Series in Metallurgy and Materials Science, 2018.
2. O.G. Palanna, "Engineering Chemistry" McGraw Hill Education (India) Private Limited, 2nd Edition, 2017.
3. Friedrich Emich, "Engineering Chemistry", Scientific International PVT, LTD, New Delhi, 2014.
4. ShikhaAgarwal, "Engineering Chemistry-Fundamentals and Applications", Cambridge University Press, Delhi, Second Edition, 2019.
5. O.V. Roussak and H.D. Gesser, Applied Chemistry-A Text Book for Engineers and Technologists, Springer Science Business Media, New York, 2nd Edition, 2013


**OUTCOMES:**

**AT THE END OF THE COURSE, LEARNERS WILL BE ABLE TO:**

| **COURSE NAME : ENGINEERING CHEMISTRY** | | **COURSE CODE : 24BS103** | | | |
|---|---|---|---|---|---|
| **CO** | **Course Outcomes** | **Unit** | **K –CO** | **POs** | **PSOs** |
| **C104.1** | Infer the quality of water from quality parameter data and propose suitable treatment methodologies to treat water. | I | K2 | | |
| **C104.2** | Describe the different forms of energy resources, apply them in suitable energy sectors and illustrate the working of various batteries. | II | K2 | | |
| **C104.3** | Explain the principles, various type of corrosion, corrosion control methods and alloys. | III | K2 | | |
| **C104.4** | Categorize various fuels for Engineering processes and describe about applications. | IV | K2 | | |
| **C104.5** | Identify basic concepts of nano science and nanotechnology in designing the synthesis of nanomaterials for engineering and technology applications. | V | K2 | | |

| 24GE101 | PROBLEM SOLVING AND C PROGRAMMING | L | T | P | C |
|---|---|---|---|---|---|
| | | 3 | 0 | 0 | 3 |

**OBJECTIVES:**

- To understand the basic C programming constructs
- To learn about usage of arrays and strings
- To understand the concepts of functions and pointes
- To understand structures and unions
- To expose to file handling operations in C

**PRE-REQUISITE: NIL**

**UNIT - I PROBLEM SOLVING USING C PROGRAMMING 9**

Introduction to computer system – Block Diagram of Computer, Types of Memory, I/O Devices, Application Programs and System Programs – Loader, linker, assembler, compiler, interpreter, Programming process – source code to executable code, Problem Solving Strategies – Problem analysis, Algorithms, Flow Charts, Pseudo Code, Overview of C : Features of C, structure of C program, data types, variables, Constants, Keywords, Operators–Precedence and Associativity, Expressions,statements, Control structures- Branching and Looping , Illustrative problems: odd or even number, Leap year, Biggest of three numbers, square root of a number, Sum of n numbers, Armstrong number, Palindrome, Fibonacci Series, Prime number

**UNIT - II ARRAYS AND STRINGS 9**

Arrays– Declaration and Initialization of one dimensional array , Example Programs– Insertion sort, Selection sort, Linear search, Binary search, Declaration and Initialization of two dimensional array, Example programs- Matrix Addition and Multiplication, Determinant and Transpose of a matrix

Strings- Declaring and Initializing String Variables, Reading Strings from Terminal, Writing Strings to Screen, String-handling Functions, Example Programs- with and without using built-in string functions

**UNIT - III FUNCTIONS AND POINTERS 9**

Introduction to functions – need of Function, Function prototype, function definition, function call, Return Values and their Types, Category of Functions, Built- in functions (string functions, math functions), Passing Arrays to Functions, Recursion, Scope, Visibility and Lifetime of variables, Example Program – Computation of Sine series, Scientific calculator using built-in functions. Pointers- Declaration and Initialization of pointer, Pointer operators, Pointer arithmetic, Pointer Increments and Scale Factor, Array of pointers, Example Program – Sorting of names, Parameter passing – Pass by value, Pass by reference, Example Program – Swapping of two numbers using pass by reference

**UNIT - IV STRUCTURES AND UNIONS 9**

Structure – Defining a structure, declaring structure variables, accessing structure members, structure initialization,Nested structures, Pointer and Structures, Array of structures, Example Program – using structures and pointers, typedef, Self referential structures, Union, Dynamic memory allocation, Illustrative programs – allocating block of memory, sum of n numbers using malloc, calloc.

**UNIT - V FILE PROCESSING 9**

Files – File operations, Types of file processing– Sequential access and Random access, Error Handling on Files - Example Program– Finding average of numbers stored in sequential access file, Random access file -Example Program– Transaction processing using random access files, Command line arguments.

**TOTAL: 45 PERIODS**

**TEXT BOOKS:**


1. Balagurusamy E, “Programming in ANSI C”, Eighth Edition, Tata Mcgraw-Hill,2019.
2. YashavantKanetkar, “Let Us C”, BPB Publications, 17th Edition,2020.
3. Kernighan, B.W and Ritchie, D.M, “The C Programming language”, Second Edition, Pearson Education,2015.


**REFERENCES:**


1. Paul Deitel and Harvey Deitel, “C How to Program”, Seventh edition, PearsonEducation India, 2015.
2. Juneja, B. L and Anita Seth, “Programming in C”, CENGAGE Learning India pvt. Ltd.,2011
3. PradipDey, ManasGhosh, “Computer Fundamentals and Programming in C”, Second Edition, Oxford University Press,2013.
4. Byron Gottfried, "Schaum’s outlines- Programming with C", McGraw-Hill Education, Fourth edition, 2018.
5. ReemaThareja, “Programming in C”, Oxford University Press, Second Edition,2016.


**OUTCOMES:**
**AT THE END OF THE COURSE, LEARNERS WILL BE ABLE TO:**

| COURSE NAME : PROBLEM SOLVING AND C PROGRAMMING | | COURSE CODE : 24GE101 | | | |
|---|---|---|---|---|---|
| **CO** | **Course Outcomes** | **Unit** | **K –CO** | **POs** | **PSOs** |
| **C105.1** | Explain the basic concepts of computer system and develop simple C programs. | I | K3 | | |
| **C105.2** | Apply one dimensional and two dimensional arrays for implementing matrix operations and string operations. | II | K3 | | |
| **C105.3** | Make use of function concept and develop programs to implement pointer arithmetic and arrays with pointers for solving simple mathematical problems. | III | K3 | | |
| **C105.4** | Illustrate simple programs for structures and unions. | IV | K3 | | |
| **C105.5** | Apply various file operations and develop programs to implement file access procedures. | V | K3 | | |

| 24GE102 | ENGINEERING GRAPHICS | L | T | P | C |
|---|---|---|---|---|---|
| | | 2 | 1 | 0 | 3 |

**OBJECTIVES:**

- To understand the importance of the drawing in engineering applications
- To develop graphic skills for communication of concepts, ideas and design of engineering products
- To expose them to existing national standards related to technical drawings.
- To improve their visualization skills so that they can apply this skill in developing new products.
- To improve their technical communication skill in the form of communicative drawings

**PRE-REQUISITE: NIL**

CONCEPTS AND CONVENTIONS (Not for Examination)

Importance of graphics in engineering applications – Use of drafting instruments – BIS conventions and specifications – Size, layout and folding of drawing sheets – Lettering and dimensioning

**UNIT-I PROJECTION OF POINTS AND LINES** **9**

Orthographic projection – Principles - Principal planes - Projection of points in all quadrants - Projection of straight lines (only First angle projections) inclined to both the principal planes - Determination of true lengths and true inclinations by rotating line method.

**UNIT-II PROJECTION OF PLANE SURFACES** **9**

Projection of planes (Polygonal and Circular surfaces) inclined to both the principal planes by rotating object method.

**UNIT-III PROJECTION OF SOLIDS** **9**

Projection of simple solids like prisms, pyramids, cylinder and cone when the axis is inclined to one of the principal planes by rotating object method.

**UNIT- IV PROJECTION OF SECTIONED SOLIDS AND DEVELOPMENT OF SURFACES** **9**

Sectioning of simple solids in vertical position when the cutting plane is inclined to one of the principal planes and perpendicular to the other – obtaining true shape of section - Development of lateral surfaces of simple and sectioned solids – Prisms, pyramids, cylinder and cone.

**UNIT-V ISOMETRIC PROJECTION** **9**

Principles of Isometric Projection – Isometric scale – Isometric projections of simple solids – Frustum and truncated Prisms and Pyramids.

Introduction to Perspective projections. (Not for Examination)

**DEMONSTRATION ON DRAFTING PACKAGES**(For Internal Evaluation Weightage only)

**TOTAL: 45 PERIODS**

**TEXT BOOKS:**

1. Natarajan K.V., “A text book of Engineering Graphics”, Dhaallnalakshmi Publishers, Chennai, 33rd Edition, 2020.
2. Venugopal K. and Prabhu Raja V., “Engineering Graphics”, New Age International (P) Limited, 17th Multicolor Edition, 2021.
3. N.D. Bhatt, “Engineering Drawing” Charotar Publishing House, 54th Edition, 2023.

**REFERENCES:**


1. Shah M.B., and Rana B.C., "Engineering Drawing", Pearson Education, 5th Edition, 2022
2. Gopalakrishna K.R., "Engineering Drawing" (Vol. I&II combined), Subhas Stores, Bangalore, 2019
3. Luzadder and Duff, Fundamentals of Engineering Drawing, 11th edition, Pearson Education, 2015
4. BasantAgarwal and Agarwal C.M., "Engineering Drawing", Tata McGraw Hill PublishingCompany Limited, New Delhi, 2019
5. M.S.Kumar, "Engineering Graphics", DD Publications, 2018
6. http://nptel.ac.in/courses/112103019/
7. https://archive.nptel.ac.in/courses/112/102/112102304/


**BUREAU OF INDIAN STANDARDS:**

1. IS 10711 – 2001: Technical products Documentation – Size and lay out of drawing sheets.
2. IS 9609 (Parts 0 & 1) – 2001: Technical products Documentation – Lettering.
3. IS 10714 (Part 20) – 2001: Technical drawings - General principles of presentation.
4. IS 11669 – 1986: General principles of dimensioning on technical drawings.
5. SP 46 (2003): Engineering Drawing Practice for Colleges.
6. IS 15021 (Parts 1 to 4) – 2001: Technical drawings – Projection Methods.

**SPECIAL POINTS APPLICABLE TO EXAMINATIONS ON ENGINEERING GRAPHICS:**

1. There will be five questions, each of either or type covering units of the syllabus.
2. All questions will carry equal marks of 20 each making a total of 100.
3. The answer paper shall consist of drawing sheets of A3 size only. The students will be permitted to use appropriate scale to fit solution within A3 size.
4. The examination will be conducted in appropriate sessions on the same day.

**OUTCOMES:**

**AT THE END OF THE COURSE, LEARNERS WILL BE ABLE TO:**

| **COURSE NAME :ENGINEERING GRAPHICS** | | **COURSE CODE : 24GE102** | | | |
|---|---|---|---|---|---|
| **CO** | **Course Outcomes** | **Unit** | **K –CO** | **POs** | **PSOs** |
| **C106.1** | Build the orthographic projections of points and lines. | I | K3 | | |
| **C106.2** | Sketch the projection of polygonal and circular planes. | II | K3 | | |
| **C106.3** | Project simple solids like prisms, pyramids, cylinder and cone. | III | K3 | | |
| **C106.4** | Construct the section and develop lateral surfaces of solids. | IV | K3 | | |
| **C106.5** | Apply the concept of isometric projection to sketch 3D views. | V | K3 | | |

| 24HST01 | HERITAGE OF TAMILS | L | T | P | C |
|---|---|---|---|---|---|
| | | 1 | 0 | 0 | 1 |

**PRE-REQUISITE: NIL**

**UNIT-I LANGUAGE AND LITERATURE: 3**

Language Families in India - Dravidian Languages – Tamil as a Classical Language – Classical Literature in Tamil – Secular Nature of Sangam Literature – Distributive Justice in Sangam Literature - Management Principles in 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 3**

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 3**

Therukoothu, Karagattam, VilluPattu, KaniyanKoothu, Oyillattam, Leather puppetry, Silambattam,Valari, Tiger dance - Sports and Games of Tamils.

**UNIT- IV THINAI CONCEPT OF TAMILS 3**

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 3**

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

**TOTAL: 15 PERIODS**

| 24HST01 | தமிழர் மரபு | L | T | P | C |
|---|---|---|---|---|---|
| | | 1 | 0 | 0 | 1 |

**அலகு -I மொழி மற்றும் இலக்கியம்** **3**

இந்திய மொழிக் குடும்பங்கள் - திராவிட மொழிகள் - தமிழ் ஒரு செம்மொழி - தமிழ் செவ்வி லக்கியங்கள் சங்க இலக்கியத்தின் சமயச் சார்பற்ற தன்மை - சங்க இலக்கியத்தில் பகிர்தல் அறம் - திருக்குறளில் மேலாண்மைக் கருத்துக்கள் - தமிழ்க் காப்பியங்கள், தமிழகத்தில் சமண பௌத்துவ சமயங்களின் தாக்கம் - பக்தி இலக்கியம், ஆழ்வார்கள் மற்றும் நாயன்மார்கள் - சிற்றிலக்கியங்கள் - தமிழில் நவீன இலக்கியத்தின் வளர்ச்சி - தமிழ் இலக்கிய வளர்ச்சியில் பாரதியார் மற்றும் பாரதிதாசன் ஆகியோரின் பங்களிப்பு

**அலகு –II மரபு - பறை ஓவியங்கள் முதல் நவீன ஓவியங்கள் வரை - சிற்பக்கலை** **3**

நடுகல் முதல் நவீன சிற்பங்கள் வரை - ஐம்பொன் சிலைகள் - பழங்குடியினர் மற்றும் அவர்கள் தயாரிக்கும் கைவினைப் பொருட்கள், பொம்மைகள் - தேர் செய்யும் கலை - சுடுமண் சிற்பங்கள் - நாட்டுப்புறத் தெய்வங்கள் - குமரி முனையில் திருவள்ளுவர் சிலை - இசைக்கருவிகள் - மிருதங்கம், பறை, வீணை, யாழ், நாதஸ்வரம் - தமிழர்களின் சமூக பொருளாதார வாழ்வில் கோவில்களின் பங்கு.

**அலகு –III நாட்டுப்புற கலைகள் மற்றும் வீர விளையாட்டுகள்** **3**

தெருக்கூத்து, கரகாட்டம், வில்லுப்பாட்டு, கனியான் கூத்து, ஒயிலாட்டம், தோல்பாவைக் கூத்து, சிலம்பாட்டம், வளரி, புலி யாட்டம், தமிழர்களின் விளையாட்டுகள்

**அலகு –IV தமிழர்களின் திணைக் கோட்பாடுகள்** **3**

தமிழகத்தின் தாவரங்களும், விலங்குகளும் - தொல்காப்பியம் மற்றும் சங்க இலக்கியத்தில் அகம் மற்றும் புறக் கோ ட்பாடுகள் - தமிழர்கள் போற்றிய அறக்கோட்பாடு - சங்க காலத்தில் தமிழகத்தில் எழுத்தறிவும், கல்வியும் - சங்க கால நகரங்களும் துறைமுகங்களும் - சங்க காலத்தில் ஏற்றுமதி மற்றும் இறக்குமதி - கடல் கடந்த நாடுகளில் சோழர்களின் வெற்றி.

**அலகு –V இந்திய தேசிய இயக்கம் மற்றும் இந்திய பண்பாட்டிற்க்குத் தமிழர்களின் பங்களிப்பு** 3

இந்திய விடுதலைப் போரில் தமிழர்களின் பங்கு - இந்தியாவின் பிற் ப்பகுதிகளில் தமிழ் பண்பாட்டின் தாக்கம் - சுயமரியாதை இயக்கம் - இந்திய மருத்துவத்தில், சித்த மருத்துவத்தின் பங்கு - கல்வெட்டுகள், கையெழுத்துப் படிகள் - தமிழ் புத்தகங்களின் அச்சு வரலாறு.

**TEXT & REFERENCE BOOKS:**


1. தமிழகவரலாறு - மக்களும்பண்பாடும் - கே. கே. பிள்ளை ( வெளியீடு: தமிழ்நாடுபாடநூல்மற்றும்கல்வியியல்பணிகள்கழகம்)
2. கணினித்தமிழ் - முனைவர்இல. சுந்தரம். ( விகடன்பிரசுரம்
3. .கீழடி-வைகைநதிக்கரையில்சங்ககாலநகரநாகரீ கம் ( தொல்லியல்துறைவெளியீடு)
4. பொருனந - ஆற்றங்கரைநாகரீ கம். ( தொல்லியல்துறைவெளியீடு
5. Social Life of Tamils (Dr.K.K.Pillay) A joint publication of TNTB & ESC and RMRL
6. Social Life of the Tamils - The Classical Period (Dr.S.Singaravelu) (Published by: International

Institute of Tamil Studies.

7. Historical Heritage of the Tamils (Dr.S.V.Subatamanian, Dr.K.D. Thirunavukkarasu) (Published by: International Institute of Tamil Studies).
8. The Contributions of the Tamils to Indian Culture (Dr.M.Valarmathi) (Published by: International
   Institute of Tamil Studies
9. Keeladi - 'Sangam City C ivilization on the banks of river Vaigai' (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation,
   TamilNadu
10. Studies in the History of India with Special Reference to Tamil Nadu (Dr.K.K.Pillay)
11. Porunai Civilization (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book And Educational Services Corporation, Tamil Nadu)
12. Journey of Civilization Indus to Vaigai (R.Balakrishnan) (Published by: RMRL)

| 24BS1L1 | BASIC SCIENCE LABORATORY | L | T | P | C |
|---|---|---|---|---|---|
| | | 0 | 0 | 4 | 2 |

## PHYSICS LABORATORY

**OBJECTIVES:**

- To inculcate the proper usage of various physics laboratory equipments and interpretation of experimental data.
- To stimulate problem solving skills related to physics principles.
- To make the student as an active participant in each part of all lab exercises.

**PRE-REQUISITE: NIL**

**LIST OF EXPERIMENTS: (ANY SIX)**

1. Torsion Pendulum – determination of moment of inertia of a disc and rigidity modulus of wire.
2. Uniform Bending – determination of Young's modulus of a given material.
3. Determination of band gap of a semiconductor.
4. Air wedge – determination of thickness of a thin wire / sheet.
5. Newton's ring – determination of radius of curvature of plano convex lens.
6. Ultrasonic interferometer – determination of velocity of sound and compressibility of liquid.
7. a. Optical fiber – determination of Numerical aperture and acceptance angle.
   b. Diode laser – determination of width of groove in compact disc.
8. Spectrometer grating – determination of wavelength of mercury spectrum.
9. Spectrometer hollow prism – determination of refractive index of a given liquid.

**TOTAL: 30 PERIODS**

**LIST OF APPARATUS AND EQUIPMENT FOR A BATCH OF 30 STUDENTS**

| S.No. | NAME OF THE EQUIPMENT | Quantity |
|---|---|---|
| 1 | Torsion pendulum set | 6 |
| 2 | Travelling microscope & accessories | 6 |
| 3 | Air wedge set up | 6 |
| 4 | Ultrasonic interferometer | 6 |
| 5 | Laser kit | 6 |
| 6 | Spectrometer &hollow prism | 6 |
| 7 | Spectrometer & grating | 6 |
| 8 | Semiconductor band gap kit | 6 |
| 9 | Newton's ring set up | 6 |

## CHEMISTRY LABORATORY

**OBJECTIVES:**

- To inculcate experimental skills to test basic understanding of water quality parameters through volumetric analysis.
- To have hands on experience in using instruments like pH meter, conductivity meter, potentiometer.
- To determine the amount of metal ions in alloys& molecular weight of polymer.
- To acquaint the students with the determination of molecular weight of polymer by viscometer

**PRE-REQUISITE: NIL**

**LIST OF EXPERIMENTS: (ANY SIX)**

1. Determination of types and amount of alkalinity in a water sample.
2. Determination of total, temporary & permanent hardness of water by EDTA method.
3. Determination of DO content of water sample by Winkler's method.
4. Estimation of copper content of the brass solution by EDTA.
5. Determination of strength of given hydrochloric acid using pH meter.
6. Determination of strength of acids in a mixture of acids using conductivity meter.
7. Conductometric titration of barium chloride against sodium sulphate. (precipitation titration)
8. Estimation of iron content of the given solution using potentiometer.
9. Determination of molecular weight of polyvinyl alcohol using Ostwald viscometer.
10. Estimation of Nickel in steel.

**TOTAL: 30 PERIODS**

**LIST OF APPARATUS AND EQUIPMENT FOR A BATCH OF 30 STUDENTS**

| S.No. | NAME OF THE EQUIPMENT | Quantity |
|---|---|---|
| 1 | Burette (50ml) | 30 |
| 2 | Pipette(20ml) | 30 |
| 3 | Beaker (100ml) | 30 |
| 4 | Conical Flask (250ml) | 30 |
| 5 | Conductivity meter | 10 |
| 6 | Potentiometer | 10 |
| 7 | pH meter | 10 |
| 8 | Viscometer | 14 |
| 9 | Electronic Balance | 1 |

**OUTCOMES:**
**AT THE END OF THE COURSE, LEARNERS WILL BE ABLE TO:**

| COURSE NAME :BASIC SCIENCE LABORATORY | | COURSE CODE : 24BS1L1 | | | |
|---|---|---|---|---|---|
| **CO** | **Course Outcomes** | **EXP** | **K –CO** | **POs** | **PSOs** |
| **PHYSICS LABORATORY** | | | | | |
| **C107.1** | Calculate rigidity modulus, Young's modulus of a given material and band gap of a semiconductor diode | 1,2, 3 | K3 | | - |
| **C107.2** | Predict the thickness of a given thin object, radius of curvature of Plano convex lens and velocity of ultrasound, compressibility of liquid | 4,5,6 | K3 | | - |
| **C107.3** | Determine the basic parameters of optical fiber, width of groove in CD, wavelength of the prominent spectral lines and refractive index of a given liquid | 7,8,9 | K3 | | - |
| **CHEMISTRY LABORATORY** | | | | | |
| **C107.4** | Estimate the chemical quality of a water sample by volumetric analysis. | 1,2, 3, 4 | K3 | | - |
| **C107.5** | Determine the molecular weight of polymer and amount of metal ions and impurities in solution through volumetric and electro analytical techniques. | 5,6,7,8,9,10 | K3 | | - |

| 24GE1L1 | C PROGRAMMING LABORATORY | L | T | P | C |
|---|---|---|---|---|---|
| | | 0 | 0 | 4 | 2 |

**OBJECTIVES:**

- To develop programs in C using basic constructs.
- To develop applications in C using strings, pointers, functions, structures.
- To develop applications in C using file processing.

**PRE-REQUISITE: NIL**

**LIST OF EXPERIMENTS:**

1. Programs using I/O statements, expressions and decision-making constructs.
2. Program for finding given year is leap year or not and finding given number is Armstrong number or not.
3. Design a calculator to perform the operations namely, addition, subtraction, multiplication, division and square of a number.
4. Given a set of numbers like <10, 36, 54, 89, 12, 27>, find sum of weights based on the following conditions.
   a. if it is a perfect cube.
   b. if it is a multiple of 4 and divisible by 6.
   c. if it is a prime number.
5. Sort the numbers based on the weight in the increasing order as shown below <10,its weight><36,its weight><89,its weight>
6. Matrix addition and subtraction
7. Matrix multiplication and transpose of a matrix
8. Program using string with and without using string functions: string copy and Reverse the String.
9. Convert the given decimal number into binary, octal and hexadecimal numbers using user defined functions.
10. From a given paragraph perform the following using built-in functions:
    a. Find the total number of words.
    b. Capitalize the first word of each sentence.
    c. Replace a given word with another word.
11. Program using recursion – factorial and Fibonacci series
12. Sort the list of numbers using pass by reference.
13. Generate salary slip of employees using structures and pointers.
14. Insert, update, delete and append telephone details of an individual or a company into a telephone directory using random access file.
15. Count the number of account holders whose balance is less than the minimum balance using sequential access file.
16. **Mini project (Any one project : Maximum 4 per Team)**
    - Railway reservation system
    - Library Management System
    - University Result Publication System
    - Hospital Management System
    - Student Automation System
    - Payroll System
    - Banking System
    - Inventory System

**PLATFORM NEEDED:** Turbo C++ Compiler **TOTAL: 60 PERIODS**

**LIST OF EQUIPMENT FOR A BATCH OF 30 STUDENTS:**

**Laboratory requirements for a batch of 30 students -** Systems with Linux Operating System with gnu compiler.

**OUTCOMES:**

**AT THE END OF THE COURSE, LEARNERS WILL BE ABLE TO:**

| **COURSE NAME : C PROGRAMMING LABORATORY** | | **COURSE CODE : 24GE1L1** | | | |
|---|---|---|---|---|---|
| **CO** | **Course Outcomes** | **EXP** | **K –CO** | **POs** | **PSOs** |
| **C108.1** | Develop simple programs using decision making and looping statements. | 1-5 | K3 | | |
| **C108.2** | Utilize array concepts to perform matrix addition, subtraction and multiplication. | 6-7 | K3 | | |
| **C108.3** | Develop programs using user defined functions, built-in functions and recursion and utilize string operations to show string copy and reverse | 8-12 | K3 | | |
| **C108.4** | Develop applications using sequential and random access files. | 14-15 | K3 | | |
| **C108.5** | Develop simple real time projects using the concepts of structures and union. | 13,16 | K3 | | |

| 24HS1L1 | ENGLISH LABORATORY | L | T | P | C |
|---|---|---|---|---|---|
| | | 0 | 0 | 2 | 1 |

**OBJECTIVES:**

- To improve the communicative competence of learners
- To help learners use language effectively in academic /work contexts
- To develop various listening strategies to comprehend various types of audio materials like lectures, discussions, videos etc.
- To build on students' English language skills by engaging them in listening, speaking and grammar learning activities which are relevant to authentic contexts.
- To use language efficiently in expressing their opinions via various media.

**PRE-REQUISITE: NIL**

**UNIT-I Introduction to Fundamentals of Communication 6**

Listening for General Information - Specific Details - Conversation: Introduction to Classmates - Audio / Video (Formal & Informal); Telephone Conversation; Listening to Voicemail & Messages; Listening and Filling a Form. Speaking - Making Telephone Calls - Self Introduction; Introducing a Friend; Politeness Strategies - Making Polite Requests, Making Polite Offers, Replying to Polite Requests and Offers - Understanding Basic Instructions (Filling Out a Bank Application for Example).

**UNIT-II Narration and Summation 6**

Listening - Listening to Podcasts, Anecdotes / Stories / Event Narration; Documentaries and Interviews with Celebrities. Speaking - Narrating Personal Experiences / Events - Talking about Current and Temporary Situations & Permanent and Regular Situations - Describing Experiences and Feelings Engaging in Small Talk - Describing Requirements and Abilities.

**UNIT-III Description of a Process / Product 6**

Listening - Listen to Product and Process Descriptions; a Classroom Lecture; and Advertisements about Products. Speaking – Picture Description & Video Description - Describing Locations in Workplaces - Giving Instruction to Use the Product - Explaining Uses and Purposes - Presenting a Product - Describing Shapes and Sizes and Weights - Talking about Quantities (Large & Small) - Talking about Precautions; Tips to Create YouTube Channel.

**UNIT- IV Classification and Recommendations 6**

Listening – Listening to TED Talks; Listening to Various Online Video Repository. Speaking – SMALL Talk; Discussing and Making Plans - Talking about Tasks - Talking about Progress - Talking about Positions and Directions of Movement - Talking about Travel Preparations - Talking about Transportation.

**UNIT-V Expression 6**

Listening – Listening to Debates / Discussions; Different View Points on an Issue; and Panel Discussions. Speaking – Making Predictions - Talking about a Given Topic - Giving Opinions Understanding a Website - Describing Processes.

**TOTAL: 30 PERIODS**

**REFERENCES:**


1. Learn English with Cambridge - https://www.youtube.com/channel/UC9-5oT15dxc81MI-pUui3Ww
2. https://www.oxfordonlineenglish.com/
3. Oxford Online English - https://www.youtube.com/channel/UCNbeSPp8RYKmHUliYBUDizg
4. British Council | Learn English - https://www.youtube.com/channel/UCOtnu-KKoAbN47IuYMeDPOg
5. https://tcesrenglish.blogspot.com/


**OUTCOMES:**
**AT THE END OF THE COURSE, LEARNERS WILL BE ABLE TO:**

| **COURSE NAME : ENGLISH LABORATORY** | | **COURSE CODE : 24HS1L1** | | | |
|---|---|---|---|---|---|
| **CO** | **Course Outcomes** | **Unit** | **K –CO** | **POs** | **PSOs** |
| **C109.1** | Listen to and comprehend general as well as complex academic information | I - V | AD | | - |
| **C109.2** | Listen to and understand different points of view in a discussion | I – V | AD | | - |
| **C109.3** | Speak fluently and accurately in formal and informal communicative contexts | I – V | AD | | - |
| **C109.4** | Describe products and processes and explain their uses and purposes clearly and accurately | I – V | AD | | - |
| **C109.5** | Express their opinions effectively in both formal and informal discussions | I - V | AD | | - |

| 24HS201 | PROFESSIONAL ENGLISH - II | L | T | P | C |
|---|---|---|---|---|---|
| | | 2 | 0 | 2 | 3 |

**OBJECTIVES:**

- To engage learners in meaningful language activities to improve their reading and writing skills.
- To learn various reading strategies and apply in comprehending documents in professional context.
- To help learners understand the purpose, audience, contexts of different types of writing.
- To develop analytical thinking skills for problem solving in communicative contexts.
- To demonstrate an understanding of job applications and interviews for internship and placements.

**PRE-REQUISITE: NIL**

**UNIT-I Making Comparisons** **12**

Reading - Reading New Product Features, Invitations – Technical Seminar, Conferences, Workshops, Inter-College Functions; Writing – Safety Instructions - Compare and Contrast Essay; Grammar – Preposition – Position, Movement, Direction - Prepositional Phrases – Connectives, Common Errors in Technical Writing.

**LAB COMPONENT**

**Speaking –** Self Introduction **-**Role Play Exercises Based on Workplace Contexts – Discussion on Goal Setting. **Listening –** about Important Events – Experts Talks

**UNIT-II Expressing Causal Relations in Speaking and Writing** **12**

Reading - Reading Longer Technical Texts – Technological Inventions – Flaws – Rectifications Writing - Cause and Effect Essays, and Letters to Companies - Product Enquiry – Service Information - Emails of Complaint - Writing Responses to Complaints. Grammar - Voice Transformations – Impersonal Passive Voice, Infinitive and Gerunds, Smileys & Abbreviations for Email Writing - Resume Preparation

**LAB COMPONENT**

**Speaking –** Technical Presentations (TED Talk) **-** Recent Media Updates – Travel Experiences – Devising Plans and Making Decisions. **Listening –** FAQ on Technological Contexts – Making Itineraries

**UNIT-III Problem Solving** **12**

Reading - Journal Abstracts, Case Studies, Excerpts from Literary Texts, News Reports etc. Writing – Letter to the Editor, Checklists, Problem Solution Essay / Argumentative Essay. Grammar – Present Perfect Tense, If conditional Sentences, Digital Vocabulary, Spell Check, Tips to Create Technical Blogs - Introduction to Word Processing Online Tools (Quillbot, Grammarly, etc.,)

**LAB COMPONENT**

**Speaking –** Group Discussions**-**Likes & Dislikes **–** Climate Conditions **–** Narrating Imaginary Situations. **Listening –** Talks on Purchase and TRADES – Merits and Demerits – Advantages & Disadvantages.

**UNIT- IV Reporting of Events and Research 12**

**Reading** – Newspaper Archives; **Writing** – Suggestions, Transcoding - Flow Charts, Pie / Bar Diagrams, Accident Report, Survey Report. Grammar – Reported Speech; **Vocabulary** (Social Media Platforms) – Coherence Markers - Use of Prepositions.

**LAB COMPONENT**

**Speaking –** Discussion on Environments –Socio Political Systems, Mandatory Systems.
**Listening –** Technical Instructions – Positions and Challenges of Higher Officials

**UNIT-V The Ability to Put Ideas or Information Cogently 12**

Reading – Technical Articles / Papers, Company Profiles, Statement of Purpose (SOP), an Excerpt of Interview with Professionals; Writing – Job / Internship Application – Cover Letter & Resume - Letter of Recommendation (To the Principal from NRI); Grammar – Numerical Adjectives - Relative Clauses – .PPT Preparation Tips

**LAB COMPONENT**

**Speaking –** Job Interview Practice **-** Describing Personal Outlook, Grooming, Safety Issues.
**Listening –** Instructions about Electrical Devices, Timely Remedial Measures, Precautionary Measures

**TOTAL: 60 PERIODS**

**TEXT BOOKS:**

1. English for Engineers & Technologists (2020 edition) Orient Blackswan Private Ltd. Department of English, Anna University.
2. English for Science & Technology Cambridge University Press 2021.
3. Authored by Dr. VeenaSelvam, Dr. SujathaPriyadarshini, Dr. Deepa Mary Francis, Dr. KN. Shoba, and Dr. Lourdes Joevani, Department of English, Anna University.

**REFERENCES:**


1. Raman. Meenakshi, Sharma. Sangeeta (2019). Professional English. Oxford university press. New Delhi.
2. Improve Your Writing ed. V.N. Arora and Laxmi Chandra, Oxford Univ. Press, 2001, NewDelhi.
3. Learning to Communicate – Dr. V. Chellammal. Allied Publishers, New Delhi, 2003
4. Business Correspondence and Report Writing by Prof. R.C. Sharma & Krishna Mohan, Tata McGraw Hill & Co. Ltd., 2001, New Delhi.
5. Developing Communication Skills by Krishna Mohan, MeeraBannerji- Macmillan India Ltd. 1990, Delhi.
6. A Course in Technical English by Mr. D. Praveen Sam, KN Shoba, Cambridge University Press, 2020, India.


**Lab Component References:**

**Free, Authentic Online Repositories for English Proficiency and General Aptitude Practice for Higher Studies and Placement.**

- https://www.examenglish.com
- https://www.aptitude-test.com/verbal-aptitude.html
- https://www.edudose.com
- https://www.freshersliv e.com/online-test/aptitude-test/questions-and-answers
- https://www.indiabix.com/

- https://www.oxfordonlineenglish.com/english-level-test
- https://learnenglish.britishcouncil.org/english-levels/online-english-level-test
- https://www.ted.com
- https://tcesrenglish.blogspot.com/

**OUTCOMES:**
**AT THE END OF THE COURSE, LEARNERS WILL BE ABLE TO:**

| **Course Name : PROFESSIONAL ENGLISH II** | | **Course Code : 24HS201** | | | |
|---|---|---|---|---|---|
| **CO** | **Course Outcomes** | **Unit** | **K –CO** | **POs** | **PSOs** |
| **C111.1** | Compare and contrast ideas in technical texts, identify and report cause and effects in events, industrial processes | I - V | AD | | |
| **C111.2** | Analyze problems, feasible solutions and communicate them in the written format. | I – V | AD | | |
| **C111.3** | Present their ideas, opinions, discuss, analyze concepts and problems by effective speaking in group discussions. | I – V | AD | | |
| **C111.4** | Draft effective emails, official letters and job applications, effective resumes in a planned and logical manner. | I – V | AD | | |
| **C111.5** | Write critical reports from inferred data and information with clarity and precision | I - V | AD | | |

| 24BS201 | ADVANCED CALCULUS | L | T | P | C |
|---|---|---|---|---|---|
| | | 3 | 1 | 0 | 4 |

**OBJECTIVES:**

- To make the student familiar with topics such as Multiple Integrals, Vector Calculus, Analytic Functions, Complex Integration and Laplace Transform.
- To learn the concept of basic Vector Calculus which can be widely used for Modeling the various laws of Physics.
- To understand the various methods of Complex Analysis and Laplace Transform can be used for efficiently solving the problems that occur in various branches of Engineering disciplines.

**PRE-REQUISITE: NIL**

**UNIT - I LAPLACE TRANSFORM 12**

Existence Conditions – Transforms of Elementary Functions – Transform of Unit Step Function and Unit Impulse Function – Basic Properties – Shifting Theorems -Transforms of Derivatives and Integrals – Initial and Final Value Theorems – Inverse Transforms – Convolution Theorem – Transform of Periodic Functions – Application to Solution of Linear Second Order Ordinary Differential Equations with Constant Coefficients.

**UNIT - II MULTIPLE INTEGRALS 12**

Double integrals – Change of order of integration – Double integrals in Polar coordinates – Area enclosed by plane curves – Triple integrals – Volume of Solids – Change of Variables in Double and Triple integrals.

**UNIT - III VECTOR CALCULUS 12**

Gradient and Directional Derivative – Divergence and Curl - Vector Identities – Irrotational and Solenoidal Vector fields – Line Integral over a Plane curve – Surface Integral - Area of a Curved Surface - Volume Integral – Green's, Gauss divergence and Stoke's theorems (without proof) – Verification and Application in evaluating Line, Surface and Volume Integrals.

**UNIT - IV ANALYTIC FUNCTIONS 12**

Analytic functions – Necessary and Sufficient Conditions for Analyticity in Cartesian and Polar Coordinates – Properties – Harmonic Conjugates – Construction of Analytic Function – Conformal Mapping – Mapping by Functions $w = z+c$, $cz$, $1/z$ , $z^2$ - Bilinear transformation.

**UNIT - V COMPLEX INTEGRATION 12**

Line integral – Cauchy's Integral Theorem (without proof) – Cauchy's Integral Formula – Taylor's and Laurent's Series – Singularities – Residues – Residue Theorem (without proof) – Application of Residue Theorem for Evaluation of Real Integrals – Use of Circular Contour.

**TOTAL: 60 PERIODS**

**TEXT BOOKS:**

1. Grewal B.S., "Higher Engineering Mathematics", Khanna Publishers, New Delhi, 44th Edition, 2017.
2. Veerarajan.T"Engineering Mathematics I", The Tata McGraw Hill Publication-New Delhi, First Edition 2018.

**REFERENCES:**


1. Kreyszig Erwin, "Advanced Engineering Mathematics", John Wiley and Sons, 9th Edition, NewDelhi, 2006.
2. James Stewart, "Calculus, Early Transcendental", Cengage Learning, 7th Edition, New Delhi, 2015.
3. Bali N., Goyal M. and Watkins C., "Advanced Engineering Mathematics II", Firewall Media (An imprint of Lakshmi Publications Pvt., Ltd.,), New Delhi, 9th Edition, 2014.
4. Jain R.K. and Iyengar S.R.K., "Advanced Engineering Mathematics II", Narosa Publications, New Delhi, 5th Edition, 2016.
5. Robert C.Wrede, Murray R.Spiegel, "Advanced Calculus"Schaum's outline series, McGraw Hill, New Delhi, Second Edition, 2002.


**OUTCOMES:**

**AT THE END OF THE COURSE, LEARNERS WILL BE ABLE TO:**

| **Course Name : ADVANCED CALCULUS** | | **Course Code : 24BS201** | | | |
|---|---|---|---|---|---|
| **CO** | **Course Outcomes** | **Unit** | **K –CO** | **POs** | **PSOs** |
| **C112.1** | Apply Laplace transform and inverse transform to solve the initial value problems. | I | K3 | | |
| **C112.2** | Solve the multiple integrals and apply the concept to find areas, volumes. | II | K3 | | |
| **C112.3** | Determine the line, surface and volume integrals using Green's, Gauss and Stokes theorems | III | K3 | | |
| **C112.4** | Determine Analytic functions, Bilinear Transformations and apply the concept of conformal mapping to find the images of given curves. | IV | K3 | | |
| **C112.5** | Determine the Contour Integrals using Cauchy's Integral and Residue theorems. | V | K3 | | |

| 24BS203 | PHYSICS FOR ELECTRONICS AND DEVICES | L | T | P | C |
|---|---|---|---|---|---|
| | | 3 | 0 | 0 | 3 |

**OBJECTIVES:**

- To introduce the essential physics of semiconductors, dielectric materials and electron transport properties
- To inculcate proficiency in Diodes and transistors
- To develop the knowledge on special semiconducting and optoelectronic devices.

**PRE-REQUISITE: NIL**

**UNIT - I ELECTRICAL PROPERTIES OF MATERIALS 9**

Classical free electron theory: Derivation of Electrical conductivity and Thermal conductivity – Wiedemann-Franz law – Success and failures – Quantum free electron theory: Fermi–Dirac statistics – Density of energy states. Band theory: electron in periodic potential – Energy bands in solids – Semiconductor, metals and insulators - Electron effective mass – Concept of hole.

**UNIT - II SEMICONDUCTOR PHYSICS 9**

Properties of semiconductors – Energy band diagram – Direct and indirect semiconductors – Intrinsic semiconductors – Carrier concentration (derivation) – Variation of Fermi level with temperature – Extrinsic semiconductors – Carrier concentration in n-type & p-type semiconductors (qualitative) – Variation of carrier concentration with temperature - Variation of Fermi level with temperature and carrier concentration - Hall effect and devices.

**UNIT - III DIELECTRIC MATERIALS 9**

Basic definitions – Polarization processes – Frequency and temperature dependence of polarization – Internal field – Clausius-Mosotti relation – Dielectric constant: experiment – Relation between dielectric constant and refractive index – Dielectric loss – Dielectric breakdown – High-K dielectric – applications: capacitor, transformer.

**UNIT - IV DIODE & TRANSISTORS 9**

P-N junction diodes: biasing, V-I characteristics – UJT: operation, characteristics and equivalent circuit – BJT open circuit - Biasing, operation of PNP and NPN transistor, V-I characteristics - Introduction to FET, J-FET (n & p channels) - MOSFET structures, I-V Characteristics, transconductance and substrate effects - Frequency limitations, non-ideal effects - MOSFET scaling, threshold voltage modification due to short and narrow channel effects, Drain induced barrier effects.

**UNIT - V SPECIAL SEMICONDUCTOR DEVICES 9**

SCR, IGBT, Schottky barrier diode, Zener diode - Varactor diode – Tunnel diode - Gallium arsenide devices, LDR, LASER diode, LED, LCD, phototransistor, Opto Coupler, Solar cell.

**TOTAL: 45 PERIODS**

**TEXT BOOKS:**


1. S.M.Sze, “Physics of Semiconductor Devices”, John Wiley & Sons, third Edition, 2007.
2. D.Neaman and D.Biswas, “Semiconductor Physics and Devices”, McGraw Hill Education, 2017.
3. D.K.Bhattacharya, PoonamTandon, “Engineering Physics”, Oxford University Press, 2016.
4. BEN G.Streetman, Sanjay Kumar Banerjee, “Solid State Electronic Devices”, PHI learning Private Limited, sixth edition, 2012.


**REFERENCES:**


1. S.O.Kasap, “Principles of Electronic Materials and Devices”, McGraw Hill Education (India) Private Limited, 2017.
2. B.K Pandey, S.Chaturvedi, “Engineering Physics”, Cengage Learning India Pvt.Ltd, 2012.
3. S.Salivahanam, N Suresh Kumar, “Electronic Devices and Circuits”, McGraw Hill Education (India) Private Limited, Fourth Edition, 2017.
4. Dr. K. S. Srinivasan, “Electronic Device and Circuits”, Anuradha Publications, 2023.


**OUTCOMES:**
**AT THE END OF THE COURSE, LEARNERS WILL BE ABLE TO:**

| **COURSE NAME :PHYSICS FOR ELECTRONICS AND DEVICES** | | **Course Code : 24BS203** | | | |
|---|---|---|---|---|---|
| **CO** | **Course Outcomes** | **Unit** | **K –CO** | **POs** | **PSOs** |
| **C113.1** | Differentiate classical, quantum electron theories and energy band theory. | I | K2 | | - |
| **C113.2** | Discuss the various types of semiconductors and Hall effect. | II | K2 | | - |
| **C113.3** | Explain dielectric properties of materials. | III | K2 | | - |
| **C113.4** | Compare the characteristics of the diode and transistors. | IV | K2 | | - |
| **C113.5** | Generalize the physics of special semiconductor devices. | V | K2 | | - |

| 24HS202 | ENVIRONMENTAL SCIENCES AND SUSTAINABILITY | L | T | P | C |
|---|---|---|---|---|---|
| | | 2 | 0 | 0 | 2 |

**OBJECTIVES:**

- To study the scope and significance of environment, understand the interrelationship between living organism and environment.
- To get a concept knowledge on various types of pollution and its effects.
- To gain knowledge on various renewable energy sources and its applications.
- To provide knowledge on solid waste disposal methods and natural disasters and its management.
- To development goals and protocol- sustainability and gain knowledge on carbon credit and carbon footprint.

**PRE-REQUISITE: NIL**

**UNIT – I ENVIRONMENT AND BIODIVERSITY 6**

Definition, scope and importance of environment – need for public awareness. Eco-system and Energy flow– ecological succession. Types of biodiversity: genetic, species and ecosystem diversity– values of biodiversity, India as a mega-diversity nation – hot-spots of biodiversity – threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts – endangered and endemic species of India – conservation of biodiversity: In-situ and ex-situ.

**UNIT - II ENVIRONMENTAL POLLUTION 6**

Causes, Effects and Preventive measures of Water, Soil, Air and Noise Pollutions. Climate change, Global warming, Acid rain, Ozone layer depletion. Case studies on Occupational Health and Safety Management system (OHASMS). Environmental protection.

**UNIT - III RENEWABLE SOURCES OF ENERGY 6**

Energy management and conservation, New Energy Sources: Need of new sources. Different types new energy sources. Solar, Wind, Tidal, Geothermal, $H_2$ energy & Ocean energy. Applications of Hydrogen energy, Ocean energy resources.

**UNIT - IV SOLID WASTE AND DISASTER MANAGEMENT 6**

Solid waste management - Introduction,types,e-waste, effects on human beings and disposal management. Disaster management - Introduction, causes, effects and management of flood, cyclone, earthquake, landslide disasters, case studies – roles and responsibilities of Government and community.

**UNIT - V SUSTAINABILITY AND MANAGEMENT 6**

Development, GDP, sustainability – concept, needs and challenges- economic, social and aspects of sustainability –from unsustainability to sustainability – millennium development goals, and protocols – Sustainable Development Goals-targets, indicators and intervention areas. Climate change – Global Regional and local environmental issues and possible solutions – case studies. Concept of Carbon Credit, Carbon Footprint. Environmental management in industry – A case study.

**TOTAL: 30 PERIODS**

**TEXT BOOKS:**


1. AnubhaKaushik and C. P. Kaushik's "Perspectives in Environmental Studies", 6th Edition,New Age International Publishers ,2018.
2. Benny Joseph, 'Environmental Science and Engineering', Tata McGraw-Hill, New Delhi, 2016.


**REFERENCES:**


1. Dr.A.Ravikrishnan, 'Environmental Science & Engineering', Sri Krishna Hitech Publishing Company Pvt.Ltd. Revised Edition 2023-2024.

2. Dr.V.Veeraiyanand Dr.L.DevarajSteohen, 'Environmental Science & Engineering', VRB Publishers Pvt.Ltd. Reised& Updated Edition 2018-19.


**OUTCOMES:**

**AT THE END OF THE COURSE, LEARNERS WILL BE ABLE TO:**

| **Course Name : ENVIRONMENTAL SCIENCES AND SUSTAINABILITY** | | **Course Code : 24HS202** | | | |
|---|---|---|---|---|---|
| **CO** | **Course Outcomes** | **Unit** | **K –CO** | **POs** | **PSOs** |
| **C114.1** | Describe the environment, ecosystem and their significances and explain the threats to biodiversity. | I | K2 | | |
| **C114.2** | Describe the sources, effects, and control methods of environmental pollution. | II | K2 | | |
| **C114.3** | Explain the knowledge on various renewable sources and its applications. | III | K2 | | |
| **C114.4** | Describe the disposal techniques of solid waste and record the consequences of natural disasters. | IV | K2 | | |
| **C114.5** | Outline the different goals of sustainable development and apply them for suitable technology and societal development. | V | K2 | | |

| 24GE201 | PYTHON PROGRAMMING | L | T | P | C |
|---|---|---|---|---|---|
| | | 3 | 0 | 0 | 3 |

**OBJECTIVES:**

- To understand Python basics and programs with conditional and looping constructs.
- To understand Python functions and strings.
- To understand various operations using Python data structures– lists, tuples, sets and dictionaries.
- To understand exception handling and modules, packages in Python
- To understand usage of data base in python

**PRE-REQUISITE: NIL**

**UNIT - I PYTHON BASICS AND PROGRAM FLOW 9**

**Introduction to python** - Features of python, python syntax compared to other programming languages, python installation, python interpreter and interactive mode, values and types – int, float, boolean, string and list, variables, expressions, statements, comments, operators and precedence of operators,control flow statements – conditionals – conditional (if), alternative (if-else), chained conditional (if-elif-else), iteration – state, while, for, break, continue, pass ,illustrative programs – exchange the values with and without using temporary variables, circulate the values of n variables, distance between two points.

**UNIT - II FUNCTIONS, STRINGS 9**

Functions – function definition and use, flow of execution, parameters and arguments, function composition, Fruitful functions – return values, parameters, local and global scope, recursion , Illustrative programs- Decimal binary conversion, Tower of Hanoi , Strings – string slices, immutability, string functions and methods, string module, Illustrative programs – square root, GCD, exponentiation, Factorial of a number, linear search, binary search.

**UNIT - III LISTS, TUPLES, SETS AND DICTIONARIES 9**

**Lists** – list operations, list slices, list loop, mutability, aliasing, cloning lists, list parameters, Lists as arrays, list methods, List comprehension, **Tuples** –Tuple operations (create, access, modify, delate, append, membership test, concatenation and repeat), tuple assignment, tuple as return value, Iterating a tuple, Built-in functions with tuple, **Sets** – Creating, Modifying a set, Removing elements from a set, Set operations- Set Union, Set intersection, Set difference, Set membership test, Iterating through a set, Built-in functions and methods with set, **Dictionaries** – creation, accessing elements, operations and methods, Illustrative programs – selection sort, insertion sort, Matrix addition and subtraction, sum an array of numbers.

**UNIT - IV FILES HANDLING, MODULES, PACKAGES 9**

Files and exception – text files, reading and writing files, format operator, command line arguments, errors and exceptions, handling exceptions, modules, packages – Math and Rand, Illustrative programs – word count, copy file, merge two files

**UNIT - V DATA BASES INPYTHON 9**

**Python SQL database:** Installation, DB connection, create table, Data Manipulation operations (Insert, read, update, delete, commit and rollback), **Additional topics:** Lambda

function, filter, map, reduce, decorators, Frozenset – creation, accessing elements, operations,collections (Counters, OrderedDict, DefaultDict ,ChainMap ,NamedTuple,DeQue,UserDict,UserList,UserString)

**TOTAL: 45 PERIODS**

**TEXT BOOKS:**


1. E. Balagurusamy, “Problem solving and Python Programming”, First edition, McGraw Hill Education (India) Private Limited, 2017.
2. Allen B. Downey, “Think Python: How to Think Like a Computer Scientist”, 2nd edition, Updated for Python 3, Shroff/O‘Reilly Publishers, 2016 (http://greenteapress.com/wp/think-python/)


**REFERENCES:**


1. YashavantKanetkar, AdityaKanetkar, “Let Us Python”, 2nd Edition, BPB Publications, 2020.
2. John V Guttag, “Introduction to Computation and Programming Using Python: With Application to Understanding Data”, 2nd Edition, PHI Publisher,2017.
3. Robert Sedgewick, Kevin Wayne, Robert Dondero, “Introduction to Programming in Python: An Inter-disciplinary Approach”, Pearson India Education Services Pvt. Ltd., 2016.
4. Timothy A. Budd, “Exploring Python”, Mc-Graw Hill Education (India) Private Ltd.,2015.
5. Paul Gries, Jennifer Campbell and Jason Montojo, “Practical Programming: An Introduction to Computer Science using Python 3.6”, 3rd edition, Shroff/O’ Reilly Publishers,2018.
6. Dr.A.Kannan,Dr.L.SaiRamesh, “ProblemSolvingandPythonProgramming”,Updated Edition, United Global Publishers Pvt. Ltd., April 2018.


**OUTCOMES:**
**AT THE END OF THE COURSE, LEARNERS WILL BE ABLE TO:**

| **COURSE NAME : PYTHON PROGRAMMING** | | **Course Code : 24GE201** | | | |
|---|---|---|---|---|---|
| **CO** | **Course Outcomes** | **Unit** | **K –CO** | **POs** | **PSOs** |
| **C115.1** | Explain the basic concepts of python programming like python installation, data types, expression and control statements. | I | K2 | | |
| **C115.2** | Apply Python functions, recursive functions and string functions to solve simple problems and perform linear and binary search. | II | K3 | | |
| **C115.3** | Illustrate the various operations of lists, tuples, sets, dictionaries and arrays and develop programs to solve various sorting and matrix operations. | III | K3 | | |
| **C115.4** | Explain file handling operations, exception handling, modules and packages and develop programs for word count, file copy, merge operations and exception handling. | IV | K3 | | |
| **C115.5** | Apply python SQL database and additional functions like Lambda function and Frozenset to solve real world applications. | V | K3 | | |

| 24EE201 | ELECTRIC CIRCUIT THEORY | L | T | P | C |
|---|---|---|---|---|---|
| | | 2 | 1 | 0 | 3 |

**OBJECTIVES:**

- To impart knowledge on solving A.C and D.C Circuits using various laws and theorems.
- To familiarize the concepts of resonance circuits and coupled circuits.
- To educate on obtaining the transient response of circuits.
- To introduce Phasor diagrams and analysis of three phase circuits.

**PRE-REQUISITE: NIL**

**UNIT - I BASIC CIRCUITS ANALYSIS 9**

Ohm's Law – Kirchhoff's law – D.C and A.C circuits, Resistors in series and parallel circuits- Voltage and current division rule – Mesh current and node voltage analysis in DC and AC circuits - average and R.M.S value, Phasor diagram, Power and Power Factor.

**UNIT - II NETWORK REDUCTION AND THEOREMS FOR DC AND AC CIRCUITS 9**

Network reduction: source transformation – star- delta and delta-star transformation, Thevenin's theorem – Norton's Theorem – Superposition Theorem – Reciprocity Theorem – Maximum power transfer theorem.

**UNIT - III RESONANCE AND COUPLED CIRCUITS 9**

Series and parallel resonance – frequency response – Quality factor and Bandwidth - Self and mutual inductance –Coefficient of coupling – Tuned circuits – Single tuned circuits.

**UNIT - IV TRANSIENT RESPONSE ANALYSIS 9**

Transient response of series RL, RC and RLC Circuits for DC input and A.C. sinusoidal input.

**UNIT - V THREE PHASE CIRCUITS 9**

Three phase balanced / unbalanced voltage sources - Analysis of three phase 3-wire and 4-wire circuits - three phase balanced star and delta connected load - three phase unbalanced star and delta connected load – phasor diagram of voltage, current and power measurement in three phase circuits.

**TOTAL: 45 PERIODS**

**TEXT BOOKS:**

1. Sudhakar A and Shyam Mohan SP, "Circuits and Network Analysis and Synthesis", McGraw Hill, 2015.
2. William H. HaytJr, Jack E. Kemmerly and Steven M. Durbin, "Engineering Circuits Analysis", McGraw Hill publishers, edition, New Delhi, 2013.
3. Charles K. Alexander, Mathew N.O. Sadiku, "Fundamentals of Electric Circuits", Second Edition, McGraw Hill, 2013.

**REFERENCES:**


1. Chakrabarti A, “Circuits Theory (Analysis and synthesis), Dhanpath Rai & Sons, New Delhi, 2017.
2. Jegatheesan, R., “Analysis of Electric Circuits” McGraw Hill, 2015.
3. Joseph A. Edminister, MahmoodNahri, “Electric circuits”, Schaum’s series, McGraw-Hill, New Delhi, 2010.
4. Mahadevan, K., Chitra, C., “Electric Circuits Analysis,” Prentice-Hall of India Pvt Ltd., New Delhi, 2015.


**OUTCOMES:**
**AT THE END OF THE COURSE, LEARNERS WILL BE ABLE TO:**

| **Course Name : ELECTRIC CIRCUIT THEORY** | | **Course Code : 24EE201** | | | |
|---|---|---|---|---|---|
| **CO** | **Course Outcomes** | **Unit** | **K –CO** | **POs** | **PSOs** |
| **C116.1** | Solve the DC and AC circuits by using nodal analysis and mesh analysis | I | K3 | | |
| **C116.2** | Solve the DC and AC circuits by using network theorems. | II | K3 | | |
| **C116.3** | Calculate frequency response, Quality factor and Bandwidth of Series and Parallel resonance and tuned circuits. | III | K3 | | |
| **C116.4** | Solve the transient response of series RL, RC and RLC Circuits for DC and AC input. | IV | K3 | | |
| **C116.5** | Determine the voltage, current and power measurement in three phase circuits | V | K3 | | |

| 24HST02 | TAMILS AND TECHNOLOGY | L | T | P | C |
|---|---|---|---|---|---|
| | | 1 | 0 | 0 | 1 |

**UNIT-I WEAVING AND CERAMIC TECHNOLOGY 3**

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

**UNIT-II DESIGN AND CONSTRUCTION TECHNOLOGY 3**

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

**UNIT-III MANUFACTURING TECHNOLOGY 3**

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

**UNIT- IV AGRICULTURE AND IRRIGATION TECHNOLOGY 3**

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

**UNIT-V SCIENTIFIC TAMIL & TAMIL COMPUTING 3**

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

**TOTAL: 15 PERIODS**

**TEXT & REFERENCE BOOKS:**

1.தமிழகவரலாறு - மக்களும்பண்பாடும் - கே. கே. பிள்ளை ( வெளியீடு: தமிழ்நாடுபாடநூல்மற்றும்கல்வியியல்பணிகள்கழகம்)

2.கணினித்தமிழ் - முனைவர்இல. சுந்தரம். ( விகடன்பிரசுரம்)

3.கீழடி - வைகைநதிக்கரையில்சங்ககாலநகரநாகரீகம் ( தொல்லியல்துறைவெளியீடு)

4.பொருநை - ஆற்றங்கரைநாகரீகம். ( தொல்லியல்துறைவெளியீடு)

5. Social Life of Tamils (Dr.K.K.Pillay) A joint publication of TNTB & ESC and RMRL – (in print)

6. Social Life of the Tamils - The Classical Period (Dr.S.Singaravelu) (Published by: InternationalInstitute of Tamil Studies

7 .Historical Heritage of the Tamils (Dr.S.V.Subatamanian, Dr.K.D. Thirunavukkarasu) (Publishedby: International Institute of Tamil Studies).

8. The Contributions of the Tamils to Indian Culture (Dr.M.Valarmathi) (Published by: InternationalInstitute of Tamil Studies.)

9. Keeladi - ‘Sangam City C ivilization on the banks of river Vaigai’ (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, TamilNadu)

10. Studies in the History of India with Special Reference to Tamil Nadu (Dr.K.K.Pillay) (Publishedby: The Author

11. Porunai Civilization (Jointly Published by: Department of Archaeology & Tamil Nadu Text BookAnd Educational Services Corporation, Tamil Nadu)

12. Journey of Civilization Indus to Vaigai (R.Balakrishnan) (Published by: RMRL) – Reference Book

| 24HST02 | தமிழரும்தொழில்நுட்பமும் | L | T | P | C |
|---|---|---|---|---|---|
| | | 1 | 0 | 0 | 1 |

**அலகு -I நெசவுமற்றும்பானைதொழில்நுட்பம்: 3**

சங்ககாலத்தில்நெசவுத்தொழில் - பனைத்தொழில்நுட்பம் -கருப்புசிவப்புபாண்டங்கள் - பண்டங்களில்கீறல்குறியீடுகள்.

**அலகு-II வடிவமைப்புமற்றும்கட்டிடத்தொழில்நுட்பம் 3**

சங்ககாலத்தில்வடிவமைப்புமற்றும்கட்டுமானங்கள்&சங்ககாலத்தில்வீட்டுப்பொருட்களில்வடிவமைப்பு - சங்ககாலத்தில்கட்டுமானபொருட்களும்நடுகல்லும் - சிலப்பதிகாரத்தில்மேடைஅமைப்புபற்றியவிவரங்கள் - மாமல்லபுரச்சிற்பங்களும், கோவில்களும் - சோழர்காலத்துப்பெருங்கோயில்கள்மற்றும்பிறவழிப்பாட்டுதலங்கள் - நாயக்கர்காலகோயில்கள் - மாதிரிகட்டமைப்புகள்பற்றிஅறிதல், மதுரைமீனாட்சிஅம்மன்ஆலயம்மற்றும்திருமலைநாயக்கர்மஹால் - செட்டிநாட்டுவீடுகள் - பிரிட்டிஷ்காலத்தில்சென்னையில்இந்தோ - சாரோசெனிக்கட்டிடக்கலை

**அலகு-III உற்பத்திதொழில்நுட்பம் 3**

கப்பல்கட்டும்கலை - உலோகவியல் - இரும்புதொழிற்சாலை - இரும்பைஉருக்குதல், எஃகு - வரலாற்றுச்சான்றுகளாகசெம்புமற்றும்தங்கநாணயங்கள் - நாணயங்கள்அச்சடித்தல் - மணிஉருவாக்கும்தொழிற்சாலைகள் - கல்மணிகள், கண்ணாடிமணிகள் - சுடுமண்மணிகள் - சங்குமணிகள் - எலும்புத்துண்டுகள் - தொல்லியல்சான்றுகள் - சிலப்பதிகாரத்தில்மணிகளின்வகைகள்

**அலகு- IV வேளாண்மைமற்றும்நீர்பாசனதொழில்நுட்பம் 3**

அணை, ஏரி, குளங்கள், மதகு - சோழர்காலக்குமிழித்தூம்பின்முக்கியத்துவம்- கால்நடைபராமரிப்பு - கால்நடைகளுக்காகவடிவமைக்கப்பட்டகிணறுகள் - வேளாண்மைமற்றும்வேளாண்மைசார்ந்தசெயல்பாடுகள் - கடல்சார்அறிவு - மீன்வளம் - முத்துமற்றும்முத்துக்குளித்தல் - பெருங்கடல்குறித்தபண்டையஅறிவுஅறிவுசார்சமூகம்.

**அலகு-V அறிவியல்தமிழ்மற்றும்கணினித்தமிழ்: 3**

அறிவியல்தமிழின்வளர்ச்சி - கணித்தமிழ்வளர்ச்சி - தமிழ்நூல்களைமின்பதிப்புசெய்தல் - தமிழ்மென்பொருட்கள்உருவாக்கம் - தமிழ்இணையக்கல்விக்கழகம் - தமிழ்மின்நூலகம் - இணையத்தில்தமிழ்அகராதிகள் - சொற்குவைத்திட்டம்

**TOTAL: 15 PERIODS**

| 24HS203 | APTITUDE AND SOFT SKILLS – I | L | T | P | C |
|---|---|---|---|---|---|
| | | 0 | 0 | 2 | 1 |

**Module I Aptitude Skills I** **15**

Quantitative Aptitude Modules : Number System, square root and cube root, average, problems on numbers, Ages, Percentages, Profit and Loss, Ratio and Proportion, Partnership, Chain rule, time and work, time and distance.

**Module II Soft Skills I** **15**

Self-Introduction - Self analysis, Attitude, perceptions, Positive approach to challenges, Change management –ideas and approach, Goal setting vision, Time management, Planning, Entrepreneurial skills - Leadership skills, presentation and performance giving and receiving feedback, setting expectations and exhibiting professional behavior – Group Discussion.

**TOTAL: 30 PERIODS**

**REFERENCES:**


1. Quantitative aptitude for competitive examinations , R.S.Agarwal, S.Chand publications
2. Quantitative Aptitude – AbijithGuha, TMH
3. Quantitative Aptitude for Cat – ArunSharma,TMH
4. Gulati. S., (2006) “Corporate Soft Skills”, New Delhi, India: Rupa& Co.
5. Prasad, HariMohan,A Handbook of Spotting Errors, Mcgraw Hill Education, 2010

| 24EE2L1 | ELECTRIC CIRCUITS LABORATORY | L | T | P | C |
|---|---|---|---|---|---|
| | | 0 | 0 | 4 | 2 |

**OBJECTIVES:**

- To simulate various electric circuits using circuit simulation software.
- To gain practical experience on electric circuits and verification of theorems.
- To familiarize the concepts of resonance and coupled circuit experimentally.

**PRE-REQUISITE: NIL**

**LIST OF EXPERIMENTS:**

1. Simulation and experimental verification of electrical circuit problems using Ohm's law, Kirchhoff's voltage and current laws.
2. Simulation and experimental verification of electrical circuit problems using Thevenin's theorem.
3. Simulation and experimental verification of electrical circuit problems using Norton's theorem.
4. Simulation and experimental verification of electrical circuit problems using Superposition theorem.
5. Simulation and experimental verification of Maximum Power transfer Theorem.
6. Simulation and experimental verification of Reciprocity theorem.
7. Simulation and experimental determination of time constant of RL and RC series circuits.
8. Study of measurement of self and mutual inductance.
9. Design and Simulation of series & parallel resonance circuit.
10. Simulation of three phase balanced and unbalanced star, delta network.

**TOTAL: 60 PERIODS**

**LIST OF EQUIPMENT FOR A BATCH OF 30 STUDENTS:**

1. Regulated Power Supply: 0 – 15 V D.C - 10 Nos.
2. Function Generator (1 MHz) - 10Nos.
3. Self and Mutual inductance measurement kit – 2 Nos.
4. 10 Nos. of PC with Circuit Simulation Software (min 10 Users) ( e-Sim /Scilab/ Pspice / MATLAB /other Equivalent software Package) and Printer (1No.)
5. AC/DC - Voltmeters (10 Nos.), Ammeters (10 Nos.) and Multi-meters (10Nos.)
6. Decade Resistance Box, Decade Inductance Box, Decade Capacitance Box - 6 Nos each.
7. Circuit Connection Boards - 10 Nos.
8. Oscilloscope (20 MHz) – 5 Nos.
9. Digital storage Oscilloscope (20MHz)-1No.
10. Necessary Quantities of Resistors, Inductors, Capacitors of various capacities (Quarter Watt to 10 Watt)

**OUTCOMES:**
**AT THE END OF THE COURSE, LEARNERS WILL BE ABLE TO:**

| Course Name : ELECTRIC CIRCUITS LABORATORY | | Course Code : 24EE2L1 | | | |
|---|---|---|---|---|---|
| **CO** | **Course Outcomes** | **EXP** | **K –CO** | **POs** | **PSO** |
| **C119.1** | Conduct an experiment to verify the electrical circuits using Ohm's law, Kirchhoff's voltage and current laws. Simulate the same using Circuit Simulation Software. | 1 | K3 | | |
| **C119.2** | Conduct an experiment to verify the network theorems. Simulate the same using Circuit Simulation Software. | 2,3,4,5,6 | K3 | | |
| **C119.3** | Determine the Time Constant of RC and RL series circuits and Simulate the same using Circuit Simulation Software. Demonstrate the self and mutual inductance measurement. | 7,8 | K3 | | |
| **C119.4** | Experiment with simulation of series and parallel resonance circuit using Circuit Simulation Software. | 9 | K3 | | |
| **C119.5** | Experiment with simulation of three phase balanced and unbalanced star, delta network using Circuit Simulation Software. | 10 | K3 | | |

| 24GE2L1 | PYTHON PROGRAMMING LABORATORY | L | T | P | C |
|---|---|---|---|---|---|
| | | 0 | 0 | 3 | 1.5 |

**OBJECTIVES:**

- To write, test, and debug simple Python programs using conditional statements.
- To implement Python programs using loops.
- To use functions for structuring Python programs.
- To implement Python programs using lists.
- To write Python programs for implementing file operations and data manipulation on data base.

**PRE-REQUISITE: NIL**

**LIST OF EXPERIMENTS:**

1. Biggest of three numbers, odd or even number, Leap year.
2. GCD, Armstrong Number, Palindrome, Fibonacci Series, Prime number
3. Find the square root and exponentiation of a number with and without built-in functions
4. Linear search and Binary search using Recursion.
5. Find the maximum of a list of numbers
6. Selection sort, Insertion sort
7. First n prime numbers
8. Transpose of a Matrix
9. Multiply matrices
10. Programs that take command line arguments (word count)
11. Find the most frequent words in a text read from a file
12. Merge two files
13. Data Manipulation operations using python SQL database access

**PLATFORM NEEDED:** Python 3 interpreter for Windows/Linux

**TOTAL: 45 PERIODS**

**LIST OF EQUIPMENT FOR A BATCH OF 30 STUDENTS:**

Systems with Linux or Windows 7 or later Operating System with Python versions: 2.7.X, 3.6.X.,3.8.X, MySQL software.

**OUTCOMES:**

**AT THE END OF THE COURSE, LEARNERS WILL BE ABLE TO:**

| Course Name : PYTHON PROGRAMMING LABORATORY | | Course Code : 24GE2L1 | | | |
|---|---|---|---|---|---|
| **CO** | **Course Outcomes** | **EXP** | **K –CO** | **POs** | **PSO** |
| **C120.1** | Develop simple Python programs using conditional and iterative constructs | 1,2,7 | K3 | | |
| **C120.2** | Construct simple Python programs using built-in functions, user-defined functions and recursion functions. | 3,4 | K3 | | |
| **C120.3** | Make use of array concepts to develop programs for solving various sorting and matrix operations. | 5,6,8,9 | K3 | | |
| **C120.4** | Apply command line arguments and file handling methods to implement programs to read word from text file and merging files. | 10,11,12 | K3 | | |
| **C120.5** | Make use of python SQL database to implement and solve data Manipulation operations. | 13 | K3 | | |

| 24GE2L2 | INDUSTRIAL PRACTICES WORKSHOP | L | T | P | C |
|---|---|---|---|---|---|
| | | 0 | 0 | 3 | 1.5 |

**OBJECTIVES:**

- To understand various pipe fittings used in common household plumbing work and wood work.
- To know about arc welding and machining processes.
- To gain knowledge on sheet metal work.
- Wiring various electrical joints in common household electrical wire work.
- Soldering and testing simple electronic circuits; Assembling and testing simple electronic components on PCB.

**PRE-REQUISITE: NIL**

**GROUP A (CIVIL AND MECHANICAL)**

**PART I CIVIL ENGINEERING PRACTICE**

**CARPENTRY PRACTICE:**

1. Sawing, Planning and making T-Joint / Cross lap joint / Dovetail joint

**PLUMBING PRACTICE:**

2. Providing basic water line connection for a residential house using plumbing components and household utilities like water heater, wash basin etc.,

**PART II MECHANICAL ENGINEERING PRACTICE**

**SHEET METAL PRACTICE:**

3. Preparation of a Model of Rectangular Tray/ Conical Funnel.

**WELDING PRACTICE:**

4. Joining two metal plates by single butt joint / T fillet joint / lap joint using arc welding.
5. Demonstration on Gas welding

**BASIC MACHINING PRACTICE:**

6. Exercise on Simple turning, Facing / Taper turning / Drilling and Tapping.

Simple model development using above practices

**GROUP – B (ELECTRICAL AND ELECTRONICS)**

**PART- III ELECTRICAL ENGINEERING PRACTICES**

7. Residential house wiring using switches, fuse, indicator, Fluorescent lamp and Energy Meter
8. Staircase wiring
9. Fluorescent Lamp wiring.
10. Energy meter wiring and related calculations
11. Study of Iron Box wiring and assembly
12. Study of Fan Regulator / emergency lamp wiring

**PART IV ELECTRONIC ENGINEERING PRACTICES**

13. Resistor Colour coding and verification of series parallel connections.
14. Measurement of AC signals parameters. (Amplitude and Frequency)
15. Verification of logic gates.
16. Soldering simple electronic circuits and checking continuity.
17. PN Diode as a switch.
18. Study of Lap Top

**TOTAL: 45 PERIODS**

| EQUIPMENT FOR A BATCH OF 30 STUDENTS: | | |
|---|---|---|
| **CIVIL** | | |
| 1. | Assorted components for plumbing consisting of metallic pipes, plastic pipes, flexible pipes, coupling, unions, elbows, plugs and other fittings | 15 sets |
| 2. | Carpentry Vice (fitted to work bench) | 15 nos |
| 3. | Standard wood working tools | 15 sets |
| 4. | Models of industrial trusses, door joints, furniture joints | 5 each |
| 5. | Power Tools<br>a. Rotary Hammer<br>b. Demolition Hammer<br>c. Circular Saw<br>d. Planer<br>e. Hand Drilling Machine<br>f. Jigsaw | 2 nos<br>2 nos<br>2 nos<br>2 nos<br>2 nos<br>2 nos |
| **MECHANICAL** | | |
| 6. | Arc welding transformer with cables and holders | 5 nos |
| 7. | Welding booth with exhaust facility | 5 nos |
| 8. | Welding accessories like welding shield, chipping hammer, wire brush, etc. | 5 sets |
| 9. | Oxygen and acetylene gas cylinders, blow pipe and other welding outfit. | 2 nos |
| 10. | Centre Lathe | 2 nos |
| 11. | Power Tool: Angle Grinder | 2 nos |
| 12. | Standard Sheet metal working tools | 15 sets |
| **ELECTRICAL** | | |
| 1 | Assorted electrical components for house wiring | 5 sets |
| 2 | Electrical measuring instruments (Energy meter, ammeter, voltmeter, wattmeter) | 2 nos each |
| 3 | Study purpose items: Iron box, fan and regulator, emergency lamp | 1 each |
| **ELECTRONICS** | | |
| 1 | Assorted electronic components for making circuits. (Resistor, Capacitor, Diode) | 20 nos each |
| 2 | Small PCBs | 10 nos |
| 3 | Multimeter | 5 nos |
| 4 | CRO, AFO, Transformer | 3 nos each |
| 5 | Soldering guns | 5 nos |
| 6 | IC Trainer kit | 5 nos |
| 7 | AND, OR, NAND, NOR, NOT, XOR Gate ICs | 5 nos each |
| 8 | Used Laptop (for demo purpose) | 1 no |

**OUTCOMES:**
**AT THE END OF THE COURSE, LEARNERS WILL BE ABLE TO:**

| Course Name : INDUSTRIAL PRACTICES WORKSHOP | | Course Code : 24GE2L2 | | | |
|---|---|---|---|---|---|
| GROUP A (CIVIL & MECHANICAL)<br>GROUP B (Electrical & Electronics) | | | | | |
| **CO** | **Course Outcomes** | **EXP** | **K –CO** | **POs** | **PSO** |
| **C121.1** | Apply the knowledge of engineering fundamentals to the professional engineering practice. | 1-18 | K3 | | |
| **C121.2** | Identify, formulate and analyze engineering problems reaching conclusions using engineering sciences | 1-18 | K3 | | |
| **C121.3** | Design solutions for societal and environmental considerations. | 1-18 | K3 | | |
| **C121.4** | Apply reasoning informed by the contextual knowledge relevant to the professional engineering practice. | 1-18 | K3 | | |
| **C121.5** | Function effectively as an individual, as a leader and write effective reports and documentation. | 1-18 | K3 | | |