K.L.N.COLLEGE OF ENGINEERING

Pottapalayam-630612, Sivagangai District

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

Estd: 1994

FIRST YEAR
CURRICULUM AND SYLLABUS

REGULATIONS 2024

For under Graduate Program

B.E. MECHANICAL 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.

VISIONOFTHEDEPARTMENT

To become a centre of excellence for Education and Research in Mechanical Engineering.

MISSIONOFTHEDEPARTMENT

- Attaining academic excellence through effective teaching learning process and state of the art infrastructure.
- Providing research culture through academic and applied research.
- Inculcating social consciousness and ethical values through co-curricular and extra-curricular activities.

K.L.N. COLLEGE OF ENGINEERING, POTTAPALAYAM

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

PROGRAMEDUCATIONALOBJECTIVES(PEOs)

PEO1 Graduates will have successful career in Mechanical Engineering and service industries.

PEO2 Graduates will contribute towards technological development through academic Research and industrial practices.

PEO3 Graduates will practice their profession with good communication, leadership, ethics And social responsibility.

PEO4 Graduates will adapt to evolving technologies through life-long learning.

PROGRAM SPECIFIC OUTCOMES (PSOs)

PSO1 Derive technical knowledge and skills in the design, develop, analyze and manufacture of mechanical systems with sustainable energy, by the use of modern tools and techniques and applying research based knowledge.

PSO2 Acquire technical competency to face continuous technological changes in the field of mechanical engineering and provide creative, innovative and sustainable solutions to complex engineering problems.

PSO3 Attain academic and professional skills for successful career and to serve the society needs in local and global environment.

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

Knowledge and Attitude Profile (WK)

WK1: A systematic, theory-based understanding of the natural sciences applicable to the discipline and awareness of relevant social sciences.
WK2: Conceptually-based mathematics, numerical analysis, data analysis, statistics and formal aspects of computer and information science to support detailed analysis and modelling applicable to the discipline.
WK3: A systematic, theory-based formulation of engineering fundamentals required in the engineering discipline.
WK4: Engineering specialist knowledge that provides theoretical frameworks and bodies of knowledgefortheacceptedpracticeareasintheengineeringdiscipline;muchisatthe forefront of the discipline.
WK5: Knowledge,including efficient resource use, environmental impacts, whole-life cost, re-use of resources, net zero carbon, and similar concepts, that supports engineering design and operations in a practice area.
WK6: Knowledge of engineering practice(technology) in the practice are as in the engineering discipline.
WK7: Knowledge of the role of engineering in society and identified issues in engineering practice in the discipline, such as the professional responsibility of an engineer to public safety and sustainable development.
WK8: Engagement with selected knowledge in the current research literature of the discipline, awareness of the power of critical thinking and creative approaches to evaluate emerging issues.
WK9: Ethics, inclusive behavior and conduct. Knowledge of professional ethics, responsibilities, and norms of engineering practice. Awareness of the need for diversity by reason of ethnicity, gender, age, physical ability etc. with mutual understanding and respect, and of inclusive attitudes

Program Outcomes (POs)

PO1: Engineering Knowledge: Apply knowledge of mathematics, natural science, computing, engineering fundamentals and an engineering specialization as specified in WK1 to WK4 respectively to develop to the solution of complex engineering problems.
PO2: Problem Analysis: Identify, formulate, review research literature and analyze complex engineering problems reaching substantiated conclusions with consideration for sustainable development. (WK1 to WK4)

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

PO4:Conduct Investigations of Complex Problems: Conduct investigations of complex engineering problems using research-based knowledge including design of experiments,modelling,analysis&interpretationofdatatoprovidevalidconclusions. (WK8).

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

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

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

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

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

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

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

K.L.N. COLLEGE OF ENGINEERING, POTTAPALAYAM

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

REGULATIONS 2024

For Under Graduate Program

B.E. MECHANICAL 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)** includes 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. MECHANICAL ENGINEERING

SEMESTERI

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

S. No.	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
		Induction program						
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**

SEMESTERII

S.No	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
THEORY								
1.	24BS201	Advanced Calculus **(Common to B.E. Mech, EEE & ECE)**	BS	4	3	1	0	4
2.	24HS202	Environmental Sciences and Sustainability	HS#	2	2	0	0	2
3.	24GE201	Python Programming	ES#	3	3	0	0	3
4.	24GE202	Basic Electrical and Electronics Engineering	ES@	3	3	0	0	3
5.	24ME201	Engineering Mechanics	PC	4	3	1	0	4
6.	24HST02	தமிழரும்தொழில்நுட்பமும் / Tamils and Technology	HS#	1	1	0	0	1
THEORY CUM PRACTICAL								
7.	24HS201	Professional English – II	HS#	4	2	0	2	3
PRACTICAL								
8.	24GE2L1	Python Programming Laboratory	ES#	3	0	0	3	1.5
9.	24GE2L2	Industrial practices Workshop	ES#	3	0	0	3	1.5
10.	24HS2L1	Aptitude and Soft Skills – I	EEC#	2	0	0	2	1*
TOTAL				**29**	**17**	**2**	**10**	**23**

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

@Common to B.E. Mech, CSE,CSE (CS), CSE(IoT) , B.Tech. IT, AI&DS 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.

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.

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	IV	K3		
C102.5	Apply the various techniques to solve higher order differential equations with constant and variable	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.

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.

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

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
		1	2	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

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: 45PERIODS

TEXT BOOKS:

3. Natarajan K.V., "A text book of Engineering Graphics", Dhanalakshmi Publishers, Chennai, 33rd Edition, 2020.
4. Venugopal K. and Prabhu Raja V., "Engineering Graphics", New Age International (P) Limited, 17th Multicolor Edition, 2021.
5. 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 all 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

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 Conquestof 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	தமிழர்மரபு	L	T	P	C
		1	0	0	1

அலகு -I மொழிமற்றும்இலக்கியம் **3**

இந்தியமொழிக்குடும்பங்கள் - திராவிடமொழிகள் - தமிழ்ஒருசெம்மொழி - தமிழ்செவ்விலக்கியங்கள்சங்கஇலக்கியத்தின்சமயச்சார்பற்றதன்மை - சங்கஇலக்கியத்தில்பகிர்தல்அறம் - திருக்குறளில்மேலாண்மைக்கருத்துக்கள் - தமிழ்க்காப்பியங்கள், தமிழகத்தில்சமணபௌத்துவசமயங்களின்தாக்கம் - பக்திஇலக்கியம், ஆழ்வார்கள்மற்றும்நாயன்மார்கள் - சிற்றிலக்கியங்கள் - தமிழில்நவீனஇலக்கியத்தின்வளர்ச்சி - தமிழ்இலக்கியவளர்ச்சியில்பாரதியார்மற்றும்பாரதிதாசன்ஆகியோரின்பங்களிப்பு

அலகு –II மரபு - பறைஓவியங்கள்முதல்நவீனஓவியங்கள்வரை - சிற்பக்கலை **3**

நடுகல்முதல்நவீனசிற்பங்கள்வரை - ஐம்பொன்சிலைகள் - பழங்குடியினர்மற்றும்அவர்கள்தயாரிக்கும்கைவினைப்பொருட்கள், பொம்மைகள் - தேர்செய்யும்கலை - சுடுமண்சிற்பங்கள் - நாட்டுப்புறத்தெய்வங்கள் - குமரிமுனையில்திருவள்ளுவர்சிலை - இசைக்கருவிகள் - மிருதங்கம், பறை, வீணை, யாழ், நாதஸ்வரம் - தமிழர்களின்சமூகபொருளாதாரவாழ்வில்கோவில்களின்பங்கு.

அலகு –III நாட்டுப்புறகலைகள்மற்றும்வீரவிளையாட்டுகள் **3**

தெருக்கூத்து, கரகாட்டம், வில்லுப்பாட்டு, கனியான்கூத்து, ஒயிலாட்டம், தோல்பாவைக்கூத்து, சிலம்பாட்டம், வளரி, புலியாட்டம், தமிழர்களின்விளையாட்டுகள்

அலகு –IV தமிழர்களின்திணைக்கோட்பாடுகள் **3**

தமிழகத்தின்தாவரங்களும், விலங்குகளும் - தொல்காப்பியம்மற்றும்சங்கஇலக்கியத்தில்அகம்மற்றும்புறக்கோட்பாடுகள் - தமிழர்கள்போற்றியஅறக்கோட்பாடு - சங்ககாலத்தில்தமிழகத்தில்எழுத்தறிவும், கல்வியும் - சங்ககாலநகரங்களும்துறைமுகங்களும் - சங்ககாலத்தில்ஏற்றுமதிமற்றும்இறக்குமதி - கடல்கடந்தநாடுகளில்சோழர்களின்வெற்றி.

அலகு –V இந்தியதேசியஇயக்கம்மற்றும்இந்தியபண்பாட்டிற்க்குத்தமிழர்களின்பங்களிப்பு 3

இந்தியவிடுதலைப்போரில்தமிழர்களின்பங்கு - இந்தியாவின்பிற்ப்பகுதிகளில்தமிழ்பண்பாட்டின்தாக்கம் - சுயமரியாதைஇயக்கம் - இந்தியமருத்துவத்தில், சித்தமருத்துவத்தின்பங்கு - கல்வெட்டுகள், கையெழுத்துப்படிகள் - தமிழ்புத்தகங்களின்அச்சுவரலாறு

TEXT & REFERENCE BOOKS:

1. தமிழகவரலாறு - மக்களும்பண்பாடும் - கே. கே. பிள்ளை (வெளியீடு: தமிழ்நாடுபாடநூல்மற்றும்கல்வியியல்பணிகள்கழகம்)
2. கணினித்தமிழ் - முனைவர்இல. சுந்தரம். (விகடன்பிரசுரம்
3. .கீழடி-வைகைநதிக்கரையில்சங்ககாலநகரநாகரீகம் (தொல்லியல்துறைவெளியீடு)
4. பொருனை - ஆற்றங்கரைநாகரீகம். (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 BookAnd Educational Services Corporation, Tamil Nadu)
12. Journey of Civilization Indus to Vaigai (R.Balakrishnan) (Published by: RMRL) – Reference Book

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.

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

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.

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.

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/UC9-5oT15dxc81Ml-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.

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.fresherslive.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.

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		

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.

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.Devaraj Steohen, '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**
C113.1	Describe the environment, ecosystem and their significances and explain the threats to biodiversity.	I	K2		
C113.2	Describe the sources, effects, and control methods of environmental pollution.	II	K2		
C113.3	Explain the knowledge on various renewable sources and its applications.	III	K2		
C113.4	Describe the disposal techniques of solid waste and record the consequences of natural disasters.	IV	K2		
C113.5	Outline the different goals of sustainable development and apply them for suitable technology and societal	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

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, “Problem Solving and Python Programming”, 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**
C114.1	Explain the basic concepts of python programming like python installation, data types, expression and control statements.	I	K2		
C114.2	Apply Python functions, recursive functions and string functions to solve simple problems and perform linear and binary search.	II	K3		
C114.3	Illustrate the various operations of lists, tuples, sets, dictionaries and arrays and develop programs to solve various sorting and matrix operations.	III	K3		
C114.4	Explain file handling operations, exception handling, modules and packages and develop programs for word count, file copy, merge operations and exception handling.	IV	K3		
C114.5	Apply python SQL database and additional functions like Lambda function and Frozenset to solve real world applications.	V	K3		

24GE202	BASIC ELECTRICAL AND ELECTRONICS ENGINEERING	L	T	P	C
		3	0	0	3

OBJECTIVES:

- To learn the fundamental laws, theorems of electrical circuits and also to analyze them.
- To study the basic principles of electrical machines and their performances.
- To study the different energy sources and their utilizations.
- To study the fundamentals of electronic circuits.
- To understand the principles and operations of operational amplifiers.

.

UNIT - I ELECTRICALCIRCUITSANALYSIS 9

Ohms Law, Kirchhoff's Law - Instantaneous power - series and parallel circuit analysis with resistive, capacitive and inductive network - nodal analysis, mesh analysis - network theorems – DC circuit theorems – Thevenin's theorem, Norton theorem. Star-Delta conversion

UNIT - II ELECTRICALMACHINES 9

DC and AC Rotating Machines: DC Generator, DC Motor, Alternator, single phase and three phase induction motor, Construction, principle, emf and torque equation, Basics of Stepper Motor- Transformers-Introduction- types and construction.

UNIT - III UTILIZATIONOFELECTRICALPOWER 9

Renewable energy sources - wind energy and solar panels. Fluorescent tube. Domestic refrigerator - Electric circuit, construction and working principle. Protection-need for earthing. Energy Tariff calculation for domestic loads.

UNIT - IV ELECTRONICCIRCUITS 9

Semi conductors, Types - PN Junction - VI Characteristics of Diode, zener diode,Rectifiers-BJT- operations of PNP and NPN transistors - Transistors configurations – Common Base, Common Emitter & Common Collector configurations – Common Emitter Amplifier.

UNIT - V OPERATIONALAMPLIFIERSANDDIGITALELECTRONICS 9

Op amp: inverting and non-inverting Amplifier-summer-differential amplifier-differentiator, integrator, Successive Approximation ADC, R-2R Ladder DAC, Number Systems, Basic Digital Logic gates, Universal gates - NAND and NOR Implementation.

TOTAL: 45 PERIODS

TEXT BOOKS:

1. D.P.Kothariand, I.JNagarath, "Basic Electrical and Electronics Engineering", McGrawHill, 2019, Fourth Edition.
2. M.S.Sukhijaand, T.K.Nagsarkar, "Basic Electrical and Electronic Engineering", Oxford, 2019

REFERENCES:

1. S.B.LalSeksena and KaustuvDasgupta, “Fundamentals of Electrical Engineering”, Cambridge, 2017
2. B.LTheraja, “Fundamentals of Electrical Engineering and Electronics”, Chand&Co, 2018
3. S.K.Sahdev, “Basic of Electrical Engineering”, Pearson, 2019.
4. John Bird, “Electrical and Electronic Principles and Technology”, Sixth Edition, Elsevier, 2017.
5. Mittle, Mittal, “Basic Electrical Engineering”, 2nd Edition, Tata McGraw-Hill Edition 2017
6. C.L.Wadhwa, “Generation, Distribution and Utilisation of Electrical Energy”, New Age international pvt. ltd., Revised 4th Edition 2018.

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

COURSE NAME: BASIC ELECTRICAL AND ELECTRONICS ENGINEERING		**Course Code : 24GE202**			
CO	**Course Outcomes**	**Unit**	**K– CO**	**POs**	**PSOs**
C115.1	Solve the electrical circuits by using nodal analysis, mesh analysis and Network theorems.	I	K3		
C115.2	Explain the Construction, working principle of Transformers, DC and AC Rotating Machines.	II	K2		
C115.3	Describe the working principle of wind energy and solar panels. Compile the need for earthing. Explain the Energy Tariff for domestic loads.	III	K2		
C115.4	Summarize the operation and characteristics of PN Junction Diode, Zener diode and BJT configurations. Explain the operation of Rectifiers and Common Emitter Amplifier circuits with its response.	IV	K2		
C115.5	Explain the operation of op-amp applications. Review of number systems and verify the truth table of Basic Digital Logic gates.	V	K2		

24ME201	ENGINEERING MECHANICS	L	T	P	C
		3	1	0	4

OBJECTIVES:

- To determine the resultant forces for composition of forces and applying equilibrium concepts.
- To understand the scalar representation of forces & moments and the static equilibrium of particles and rigid bodies.
- To understand the properties of surfaces and solids.
- To learn the concepts of frictional forces at the contact surfaces of various Engineering systems.
- To enhance skills to carry out kinematic and kinetic analyses for system of particles.

UNIT-I STATICS OF PARTICLES 12

Introduction - Units and Dimensions - Laws of Mechanics - Vectorial representation of forces – Resolution and Composition of forces -Equilibrium of a particle –Forces in space – Equilibrium of a particle in space.

UNIT-II EQUILIBRIUM OF RIGID BODIES AND TRUSSES 12

Principle of transmissibility – Equivalent systems of forces – Single equivalent force - Free body diagram – Types of supports and their reactions – Moments and Couples – Moment of a force about a point and about an axis, Vectorial representation of moments and couples – Scalar components of a moment - Varignon's theorem – Equilibrium of Rigid bodies in two dimensions - Analysis of Trusses - Method of joints and Method of sections.

UNIT-III PROPERTIES OF SURFACES AND SOLIDS 12

First moment of area and the Centroid of sections- Rectangle, circle, triangle from integration- T section, I section, Hollow section by using standard formula Pappus and Guldinus theorems - moment of inertia of plane areas - Parallel and perpendicular axis theorem - radius of gyration.

UNIT- IV FRICTION AND ELEMENTS OF RIGID BODY DYNAMICS 12

Frictional force - Laws of friction – Coefficient of friction- Angles of friction- Simple contact friction — Ladder friction – Translation and Rotation of Rigid Bodies – Velocity and acceleration – General Plane motion of simple rigid bodies. Case study in friction.

UNIT-V DYNAMICS OF PARTICLES 12

Displacements -Velocity and acceleration, their relationship – Rectilinear and Curvilinear motion –Newton's second law and its applications – Work Energy Equation of particles – Impulse and Momentum.

TOTAL: 60 PERIODS

OUTCOMES:

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

- Illustrate the vectorial and scalar representation of forces and moments.
- Evaluate the reaction force for bodies under equilibrium and Predict the support reaction and internal forces of the members of truss
- Determine the centroid and moment of inertia of plane lamina.
- Calculate the friction and the effects by the laws of friction
- Investigate the fundamental principles to solve problems in dynamics of particles.

TEXT BOOKS:

1. Beer, F.P.Johnstonjr. E.R., MazurekD.F.,Cornwell P.J. and Sanghi S, "Vector Mechanics for Engineers: Statics and Dynamics", 12th Edition, McGraw-Companies, Inc.New York 2019.
2. Hibbeler RC, "Engineering Mechanics: Statics & Dynamics", Pearson India Education Services Private Limited, 14th Edition, 2017.
3. Murugaperumal P, "Engineering Mechanics – Sri Krishna Hitech Publishing Company Private Limited., 2013.

REFERENCES:

1. Meriam J.L and Kraige L.G 'Engineering Mechanics, Volume I - Statics, Volume II - Dynamics, SI version 9th Edition, John willey& sons, New York 2018.
2. N.H.Dubey, "Engineering Mechanics – Statics and Dynamics", Tata McGraw Hill, New Delhi 2017.
3. Bhavikatti, S.S, and Rajashekarappa, K.G., "Engineering Mechanics",New age International (P) Limited Publishers, 2019.
4. Palanichamy M.S and Nagan S, "Engineering Mechanics – Statics and Dynamics", Tata McGraw Hill, 5th Edition, 2012.
5. Timoshenko,S. Young, D. Rao . J "Engineering Mechanics". Tata McGraw Hill, Fifth edition 2017.
6. https://nptel.ac.in/courses/112103108 - Engineering Mechanics - Prof. U. S. Dixit Dr. G.Saravanakumar - Indian Institute of Technology, Guwahati.
7. https://archive.nptel.ac.in/courses/112/106/112106180/ - Statics and Dynamics – Dr.Mahesh V. Panchagnula – Indian Institute of Technology, Madras.

OUTCOMES:

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

Course Name :ENGINEERING MECHANICS		**Course Code : 24ME201**			
CO	**Course Outcomes**	**Unit**	**K –CO**	**POs**	**PSOs**
C116.1	Illustrate the vectorial and scalar representation of forces and moments.	I	K3		
C116.2	Evaluate the reaction force for bodies under equilibrium and Predict the support reaction and internal forces of the members of truss	II	K3		
C116.3	Determine the centroid and moment of inertia of plane lamina.	III	K3		
C116.4	Calculate the friction and the effects by the laws of friction	IV	K4		
C116.5	Investigate the fundamental principles to solve problems in dynamics of particles.	V	K4		

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

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

TEXT & REFERENCE BOOKS:

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

2.கணினித்தமிழ் - முனைவர்இல. சுந்தரம். (விகடன்பிரசுரம்)

3.கீழடி - வைகைநதிக்கரையில்சங்ககாலநகரநாகரீகம் (தொல்லியல்துறைவெளியீடு)

4.பொருனை - 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: 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 Civilization 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) (Published by: 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

24HS2L1	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

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.

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**
C119.1	Develop simple Python programs using conditional and iterative constructs	1,2,7	K3		
C119.2	Construct simple Python programs using built-in functions, user-defined functions and recursion functions.	3,4	K3		
C119.3	Make use of array concepts to develop programs for solving various sorting and matrix operations.	5,6,8,9	K3		
C119.4	Apply command line arguments and file handling methods to implement programs to read word from text file and merging files.	10, 11,12	K3		
C119.5	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.

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(ELECTRICALANDELECTRONICS)

PART- III ELECTRICALENGINEERINGPRACTICES

7. Residential house wiring using switches, fuse, indicator, Fluorescent lamp and Energy Meter
8. Stair case 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

PARTIV ELECTRONICENGINEERINGPRACTICES

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 a. Rotary Hammer b. Demolition Hammer c. Circular Saw d. Planer e. Hand Drilling Machine f. Jigsaw	2 nos 2 nos 2 nos 2 nos 2 nos 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)	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	Multi meter	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 Lap top (for demo purpose)	1 no

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

Course Name: INDUSTRIAL PRACTICES WORKSHOP		CourseCode:24GE2L2			
GROUPA(Civil & Mechanical) GROUP B (Electrical & Electronics)					
CO	**Course Outcomes**	**EXP**	**K–CO**	**POs**	**PSO**
C120.1	Apply the knowledge of engineering fundamentals to the professional engineering practice.	1-18	K3		
C120.2	Identify, formulate and analyze engineering problems reaching conclusions using engineering sciences	1-18	K3		
C120.3	Design solutions for societal and environmental considerations.	1-18	K3		
C120.4	Apply reasoning informed by the contextual knowledge relevant to the professional engineering practice.	1-18	K3		
C120.5	Function effectively as an individual, as a leader and write effective reports and documentation.	1-18	K3		