

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



Estd: 1994

FIRST AND SECOND YEAR
CURRICULUM AND SYLLABUS

REGULATIONS 2024

For Under Graduate Program

B.E. COMPUTER SCIENCE AND ENGINEERING
(CYBER SECURITY)

CHOICE BASED CREDIT SYSTEM

(For the students admitted from the academic year 2025-2026 onwards)

Dr.J.S.Kanchana
Professor & Head
Department of CSE(CS)
K.L.N. College of Engineering
Pottapalayam, Sivaganga – 630612



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 develop competent professionals specialized in the field of cyber security through Quality education and research.

MISSION OF THE DEPARTMENT

To produce skilled cyber security professionals by leveraging technological advancements and research initiatives in collaboration with industry and society by inculcating innovative technical education and ethical principles



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



PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

PEO 1 : To Contribute effectively to the society by applying principles of Cyber security for analyzing the real world problems to produce optimal and sustainable technical solutions

PEO 2: To adapt a never changing technology by applying Engineering Principles

PEO 3: To build professionalism, team work, effective communication, ethical values and leadership qualities

PROGRAM SPECIFIC OUTCOMES (PSOs):

PSO1. To develop data, resource and asset protection strategies for organizations, processes and peoples through cyber security-centric skills

PSO2. To apply computer knowledge continuously in the areas of networking, cryptography and web development to meet the industry requirements



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 knowledge for the accepted practice are as in the engineering discipline; much is at the 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 & interpretation of data to provide valid conclusions. (WK8).

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

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

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

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

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

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

PO11: Life- Long Learning:

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



K.L.N. COLLEGE OF ENGINEERING, POTTAPALAYAM

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



REGULATIONS 2024

For Under Graduate Program

B.E. COMPUTER SCIENCE AND ENGINEERING (CYBER SECURITY)

CHOICE BASED CREDIT SYSTEM

CATEGORY OF COURSES

- i. **Humanities Social Sciences and Management (HSM) courses** include Technical English, Foreign Language, Engineering Ethics and Human Values, Communication skills, Entrepreneurship, Physical Education and Environmental Sciences and Sustainability
- ii. **Basic Sciences (BS) courses** include Mathematics, Physics, Chemistry, etc.
- iii. **Engineering Sciences (ES) courses** include Industrial 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 specialization/branch.
- v. **Professional Elective (PE) courses** include the elective courses relevant to the chosen specialization / branch.
- vi. **Open Elective (OE) courses** include the courses from other branches which a student can choose from the list specified in the curriculum of B.E. / B. Tech. Programmes.
- vii. **Employability Enhancement Courses (EEC)** includes Project Work, Internship, Creative and Innovative Project, Seminar, Professional Practices, Industrial/Practical Training.
- viii. **Mandatory Courses (MC)** 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 – 630 612
(An Autonomous Institution, Affiliated to Anna University, Chennai)



B.E. COMPUTER SCIENCE AND ENGINEERING (CYBER SECURITY)
REGULATIONS 2024
CHOICE BASED CREDIT SYSTEM
SEMESTER I

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

SEMESTER II

S. No.	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
THEORY								
1	24BS202	Discrete Mathematics	BS\$	4	3	1	0	4
2	24BS204	Physics for Information Science	BS\$	3	3	0	0	3
3	24HS202	Environmental Sciences and Sustainability	HS#	2	2	0	0	2
4	24GE201	Python Programming	ES#	3	3	0	0	3
5	24GE202	Basic Electrical and Electronics Engineering	ES@	3	3	0	0	3
6.	24HST02	தமிழரும்தொழில்நுட்பமும் /Tamils and Technology	HS#	1	1	0	0	1
7.		Foreign Language	HS#	2	2	0	0	-
THEORY CUM PRACTICAL								
8	24HS201	Professional English – II	HS#	4	2	0	2	3
PRACTICAL								
9	24GE2L1	Python Programming Laboratory	ES#	3	0	0	3	1.5
10	24GE2L2	Industrial practices Workshop	ES#	3	0	0	3	1.5
11	24HS2L1	Aptitude and Soft Skills – I	EEC#	2	0	0	2	1*
12	24HS2L2	Physical Education - I	HS#	2	0	0	2	1*
TOTAL				32	19	1	12	22

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

\$ Common to B.E. CSE, CSE(CS) , CSE (IoT) and B.Tech IT & AIDS programmes

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

*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

KLNCE UG CSE(CS) R2024 (AY 2025 – 2026 admitted)

SEMESTER III

S. No.	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
THEORY								
1	24BS303	Linear Algebra and Numerical Methods (Common to B.E. CSE, CSE(CS), CSE(IOT) and B.Tech. IT, AI&DS programmes)	BS	4	3	1	0	4
2	24SC301	Cyber Security Essentials	PC	3	3	0	0	3
3	24IT301	Data Structures and Algorithms (Common to B.E. CSE(CS),CSE(IOT) and B.Tech. IT, AI&DS programmes)	PC	3	3	0	0	3
4	24CS301	Object Oriented Programming (Common to B.E. CSE, CSE(CS), CSE(IOT) and B.Tech. IT programmes)	PC	3	3	0	0	3
5	24HS301	Human Values and Ethics (Common to all B.E./B.Tech. programmes)	HS	2	1	1	0	2
THEORY CUM PRACTICAL								
6	24CS303	Fundamentals of Digital Principles (Common to B.E. CSE, CSE(CS), CSE(IOT) and B.Tech. IT programmes)	PC	5	3	0	2	4
PRACTICAL								
7	24IT3L1	Data Structures and Algorithms Laboratory (Common to B.E. CSE(CS), CSE(IOT) and B.Tech. IT, AI&DS programmes)	PC	4	0	0	4	2
8	24CS3L1	Object Oriented Programming Laboratory (Common to B.E. CSE, CSE(CS), CSE(IOT) and B.Tech. IT programmes)	PC	4	0	0	4	2
9	24HS3L1	Aptitude and Soft Skills – II (Common to all B.E./B.Tech. programmes)	EEC	2	0	0	2	1*
10	24HS3L2	Physical Education – II (Common to all B.E./B.Tech. programmes)	HS#	2	0	0	2	1*
TOTAL				32	16	2	14	25

KLNCE UG CSE(CS) R2024 (AY 2025 – 2026 admitted)

SEMESTER IV

S. No.	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
THEORY								
1	24BS402	Probability and Statistics (Common to B.E. CSE, CSE(CS), CSE(IoT) and B.Tech. IT, AI&DS programmes)	BS	4	3	1	0	4
2	24CS401	Database Management Systems (Common to B.E. CSE, CSE(CS), CSE(IoT) and B.Tech. IT, AI&DS programmes)	PS	3	3	0	0	3
3	24CS403	Computer Networks (Common to B.E. CSE, CSE(CS), CSE(IoT), B.Tech. IT, AI&DS)	PC	3	3	0	0	3
4	24SC401	Machine Learning for Cyber Security	PC	3	3	0	0	3
5	24SC402	Social Network Security	PC	3	3	0	0	3
THEORY CUM PRACTICAL								
6	24CS404	Operating Systems (Common to B.E. CSE, CSE(CS), CSE(IoT) and B.Tech. IT programmes)	PC	5	3	0	2	4
PRACTICAL								
7	24CS4L1	Database Management Systems Laboratory (Common to B.E. CSE, CSE(CS), CSE(IoT) and B.Tech. IT, AI&DS programmes)	PC	3	0	0	3	1.5
8	24CS4L2	Computer Networks Laboratory (Common to B.E. CSE, CSE(CS), CSE(IoT), B.Tech. IT)	PC	3	0	0	3	1.5
9	24HS4L1	Aptitude and Soft Skills – III (Common to all B.E./B.Tech. programmes)	EEC	2	0	0	2	1*
TOTAL				29	18	1	10	23

*** 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.

CLASS HOURS: 30 PERIODS TERM HOURS: 30 PERIODS TOTAL: 60 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
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 **9+3**

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 **9+3**

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 **9+3**

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 **9+3**

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 **9+3**

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.

CLASS HOURS: 60 PERIODS TERM HOURS: 60 PERIODS TOTAL: 120 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
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

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
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 Brava is 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: H₂-O₂ 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 NANO CHEMISTRY 9

KLNCE UG CSE(CS) R2024 (AY 2025 – 2026 admitted)

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.

CLASS HOURS: 45 PERIODS TERM HOURS: 45 PERIODS TOTAL: 90 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,

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. Shikha Agarwal, *“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
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 pointers
- 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.

CLASS HOURS: 45 PERIODS TERM HOURS: 45 PERIODS TOTAL: 90 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, Pearson Education 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
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

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)

CLASS HOURS: 45 PERIODS TERM HOURS: 45 PERIODS TOTAL: 90 PERIODS

TEXT BOOKS:

1. Natarajan K.V., “A text book of Engineering Graphics”, Dhanalakshmi 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 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
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 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.

KLNCE UG CSE(CS) R2024 (AY 2025 – 2026 admitted)

24HST01	தமிழர்மரபு	L	T	P	C
		1	0	0	1
அலகு -I	மொழி மற்றும் இலக்கியம்				3
<p>இந்தியமொழிக்குடும்பங்கள் - திராவிடமொழிகள் - தமிழ்ஒருசெம்மொழி - தமிழ்செவ்விலக்கியங்கள்சங்கஇலக்கியத்தின்சமயச்சார்பற்றதன்மை - சங்கஇலக்கியத்தில்பகிர்தல்அறம் - திருக்குறளில்மேலாண்மைக்கருத்துக்கள் - தமிழ்க்காப்பியங்கள், தமிழகத்தில்சமணபௌத்தவசமயங்களின்தாக்கம் - பக்திஇலக்கியம், ஆழ்வார்கள்மற்றுமநாயன்மார்கள் - சிற்றிலக்கியங்கள் - தமிழில்நவீனஇலக்கியத்தின்வளர்ச்சி - தமிழ்இலக்கியவளர்ச்சியில்பாரதியார்மற்றுமபாரதிதாசன்ஆகியோரின்பங்களிப்பு</p>					
அலகு -II	மரபு - பறை ஓவியங்கள் முதல் நவீன ஓவியங்கள் வரை - சிற்பக்கலை				3
<p>நடுகல்முதல்நவீனசிற்பங்கள்வரை - ஐம்பொன்சிலைகள் - பழங்குடியினர்மற்றும்அவர்கள்தயாரிக்கும்கைவினைப்பொருட்கள், பொம்மைகள் - தேர்செய்யும்கலை - சுடுமண்சிற்பங்கள் - நாட்டுப்புறத்தெய்வங்கள் - குமரிமுனையில்திருவள்ளூர்சிலை - இசைக்கருவிகள் - மிருதங்கம், பறை, வீணை, யாழ், நாதஸ்வரம் - தமிழர்களின்சமூகபொருளாதாரவாழ்வில்கோவில்களின்பங்கு.</p>					
அலகு -III	நாட்டுப்புறகலைகள் மற்றும் வீரவிளையாட்டுகள்				3
<p>தெருக்கூத்து, கரகாட்டம், வில்லுப்பாட்டு, கனியான்கூத்து, ஓயிலாட்டம், தோல்பாவைக்கூத்து, சிலம்பாட்டம், வளரி, புலியாட்டம், தமிழர்களின்விளையாட்டுகள்</p>					
அலகு -IV	தமிழர்களின் திணைக்கோட்பாடுகள்				3
<p>தமிழகத்தின்தாவரங்களும், விலங்குகளும் - தொல்காப்பியம்மற்றும்சங்கஇலக்கியத்தில்அகம்மற்றும்புறக்கோட்பாடுகள் - தமிழர்கள்போற்றியஅறக்கோட்பாடு - சங்ககாலத்தில்தமிழகத்தில்எழுத்தறிவும், கல்வியும் - சங்ககாலநகரங்களும்துறைமுகங்களும் - சங்ககாலத்திலெற்றுமதிமற்றும்இறக்குமதி - கடல்கடந்தநாடுகளில்சோழர்களின்வெற்றி.</p>					
அலகு -V	இந்திய தேசிய இயக்கம் மற்றும் இந்திய பண்பாட்டிற்குத் தமிழர்களின்பங்களிப்பு				3
<p>இந்தியவிடுதலைப்போரில்தமிழர்களின்பங்கு - இந்தியாவின்பிற்ப்பகுதிகளில்தமிழ்பண்பாட்டின்தாக்கம் - சுயமரியாதைஇயக்கம் - இந்தியமருத்துவத்தில், சித்தமருத்துவத்தின்பங்கு - கல்வெட்டுகள், கையெழுத்துப்படிகள் - தமிழ்புத்தகங்களின்அச்சுவரலாறு.</p>					

CLASS HOURS: 15 PERIODS TERM HOURS: 15 PERIODS TOTAL: 30 PERIODS

TEXT & REFERENCE BOOKS:

1. தமிழகவரலாறு - மக்களும்பண்பாடும் - கே. கே. பிள்ளை (வெளியீடு: தமிழ்நாடுபாடநூல்மற்றும்கல்வியியல்பணிகள்கழகம்)
2. கணிணித்தமிழ் - முனைவர்இல. சுந்தரம். (விகடன்பிரசுரம்)
3. .கீழடி-வைகைநதிக்கரையில்சங்ககாலநகரநாகரீகம் (தொல்லியல்துறைவெளியீடு)
4. பொருளந - 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 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.

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	Qty.
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	Qty.
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
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

KLNCE UG CSE(CS) R2024 (AY 2025 – 2026 admitted)

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
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/UCNbeSPp8RYKmHUIiYBUDizg>
4. British Council | Learn English - <https://www.youtube.com/channel/UCOtnu-KKoAbN47luYMeDPOg>
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
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

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

CLASS HOURS: 30 PERIODS TERM HOURS: 30 PERIODS TOTAL: 90 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.apptitude-test.com/verbal-aptitude.html>
- <https://www.edudose.com>
- <https://www.fresherslive.com/online-test/apptitude-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
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

24BS202	DISCRETE MATHEMATICS	L	T	P	C
		3	1	0	4

OBJECTIVES:

- To understand the basic concepts of Logic and Combinatorics.
- To make the student familiarize the Applications of Graph Theory.
- To understand the concepts and significance of Lattices and Boolean Algebra which are widely used in Computer Science and Engineering.

UNIT - I PROPOSITIONAL LOGIC 9+3

Mathematical logic- Statement and Notation- Connectives- Statement Formulas and Truth tables- Tautologies- Equivalence of Formulas- Duality law. Tautological implications-Theory of inference- validity using truth tables –Rules of inference.

UNIT - II PREDICATE LOGIC 9+3

Quantifiers- Universal quantifier – Existential Quantifier- Negation of a quantified expression-Nested quantifier- Free and Bound variables- Valid formulas and equivalences- Inference Theory of predicate calculus.

UNIT - III COMBINATORICS 9+3

Mathematical Induction –The Pigeonhole Principle – Recurrence Relations – Solving Linear Recurrence Relations – Inclusion and Exclusion Principle and its Applications.

UNIT - IV REPRESENTATION OF STANDARD GRAPHS 9+3

Basic Definitions- Degree of a vertex –Special types of Graphs: Complete graph- Regular graph- Bipartite graph- Matrix Representation of graph: Adjacency Matrix and Incidence matrix (Definition and Examples only).- Graphs and Graph Isomorphism – Connectivity – Euler and Hamilton Paths (Definition and Examples only).

UNIT - V LATTICES AND BOOLEAN ALGEBRA 9+3

Partial Ordering – Hasse diagram– Lattices – Properties of Lattices (Statement only) - Lattices as an Algebraic Systems – Sub Lattices — Some special type of Lattices– Boolean Algebra- Properties of Boolean algebra-Sub Boolean algebra.

CLASS HOURS: 60 PERIODS TERM HOURS: 60 PERIODS TOTAL: 120 PERIODS

TEXT BOOKS:

1. Tremblay.J.P. and Manohar.R, "Discrete Mathematical Structures with Applications to Computer Science", Tata McGraw Hill Publishing company Limited, New Delhi, 30th Reprint,2008.
2. Veerarajan .T, "Discrete Mathematics with graph theory and combinatorics",Tata McGraw –Hill companies, New Delhi, 4th Reprint,2008.

REFERENCES:

1. Grimaldi. R.P., "Discrete and Combinatorial Mathematics: An Applied Introduction", Pearson Education Asia, Delhi, 5thEdition,2007.
2. Rosen.K.H., "Discrete Mathematics and its Applications", Tata McGraw Hill Publishing company Limited, New Delhi, 7th Edition, 2011.

KLNCE UG CSE(CS) R2024 (AY 2025 – 2026 admitted)

3. Koshy.T. "Discrete Mathematics with Applications", Elsevier Publications,2011.
4. Venkatraman.M.K., Sridharan.V.,Chandrasekaran.C., "Discrete Mathematics", National Publishing company, 1stEdition,2001.
5. Tamilarasi.A & NatarajanA.M., "Discrete Mathematics And Its Application", Khanna Publishers, 3rdEdition,2006.

OUTCOMES:

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

Course Name : DISCRETE MATHEMATICS		Course Code : 24BS202	
CO	Course Outcomes	Unit	K –CO
C112.1	Apply the basic formula to formulate the Propositional Logic.	I	K3
C112.2	Apply the basic formula to formulate the Predicate Logic.	II	K3
C112.3	Solve combinatorial problems using the basic counting techniques.	III	K3
C112.4	Apply the concepts of graph theory in the Computer Science and Technologies field.	IV	K3
C112.5	Determine the Partial Ordering, Lattices as Posets and Boolean algebra using Logical Relation.	V	K3

24BS204	PHYSICS FOR INFORMATION SCIENCE	L	T	P	C
		3	0	0	3

OBJECTIVES:

- To introduce the essential principles of semiconductor device and electron transport properties.
- To inculcate proficiency in magnetic & optical properties of materials and their fruitful applications.
- To develop knowledge on nanodevices and quantum computing

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 - Electron effective mass (qualitative) – Concept of hole.

UNIT - II SEMICONDUCTOR PHYSICS 9

Intrinsic semiconductors: energy band diagram – Direct and indirect band gap semiconductors – Carrier concentration in intrinsic semiconductors – 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 impurity concentration – Hall effect and devices.

UNIT - III MAGNETIC PROPERTIES OF MATERIALS 9

Magnetic dipole moment – atomic magnetic moments – magnetic permeability and susceptibility – Magnetic material classification: Diamagnetism – Paramagnetism – Ferromagnetism – Antiferro magnetism – Ferrimagnetism – Domain theory – M versus H behaviour – Hard and soft magnetic materials – Magnetic principle in computer data storage – Magnetic hard disc (GMR sensor).

UNIT - IV OPTICAL PROPERTIES OF MATERIALS 9

Classification of optical materials – Carrier generation and recombination processes – Absorption, emission and scattering of light in metals, insulators and semiconductors (concepts only) - Photo current in a p-n diode – Solar cell – LASER diode - LED – organic LED – Optical data storage techniques.

UNIT - V NANODEVICES AND QUANTUM COMPUTING 9

Quantum confinement – Quantum structures: quantum wells, wires and dots - band gap of nanomaterials - Tunneling: single electron phenomena, single electron transistor – Quantum cellular automaton - Quantum system for information processing - Quantum states – Classical bits – Quantum bits or qubits – CNOT gate - multiple qubits – Bloch sphere – Quantum gates – advantage of quantum computing over classical computing.

CLASS HOURS: 45 PERIODS TERM HOURS: 45 PERIODS TOTAL: 90 PERIODS

TEXT BOOKS:

1. Jasprit Singh, “Semiconductor Devices: Basic Principles”, Wiley (Indian Edition), 2007.
2. S.O. Kasap, “Principles of Electronic Materials and Devices”, McGraw-Hill Education (Indian Edition), 2020.
3. Parag K. Lala, “Quantum Computing: A Beginner's Introduction”, McGraw-Hill Education (Indian Edition), 2020

REFERENCES:

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

OUTCOMES:

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

Course Name :Physics for Information science		Course Code : 24BS204	
CO	Course Outcomes	Unit	K –CO
C113.1	Differentiate classical and quantum electron theory.	I	K2
C113.2	Discuss the various types of semiconductors and Hall effect.	II	K2
C113.3	Explain magnetic properties of materials.	III	K2
C113.4	Classify optical materials for opto – electronic applications like solar cell, LED etc.	IV	K3
C113.5	Discuss different quantum structures and their application on quantum computing.	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.

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, H₂ 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.

CLASS HOURS: 30 PERIODS TERM HOURS: 30 PERIODS TOTAL: 60 PERIODS

TEXT BOOKS:

1. AnubhaKaushik and C. P. Kaushik’s “Perspectives in Environmental Studies”, 6thEdition, 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
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 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

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, Ordered Dict, Default Dict ,Chain Map ,Named Tuple, De Que, User Dict, User List, User String)

CLASS HOURS: 45 PERIODS TERM HOURS: 45 PERIODS TOTAL: 90 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. 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
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 analyse 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 ELECTRICAL CIRCUITS ANALYSIS 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 ELECTRICAL MACHINES 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 UTILIZATION OF ELECTRICAL POWER 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 ELECTRONIC CIRCUITS 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 OPERATIONAL AMPLIFIERS AND DIGITAL ELECTRONICS 9

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

CLASS HOURS: 45 PERIODS TERM HOURS: 45 PERIODS TOTAL: 90 PERIODS

TEXT BOOKS:

1. D.P.Kothari and I.J.Nagarath, "Basic Electrical and Electronics Engineering", McGraw Hill, 2019, Fourth Edition.
2. M.S.Sukhija and T.K.Nagsarkar, "Basic Electrical and Electronic Engineering", Oxford, 2019

REFERENCES:

1. S.B.Lal Seksenaand Kaustuv Dasgupta,“Fundamentals of Electrical Engineering”, Cambridge, 2017
2. B.LTheraja,“Fundamentals of Electrical Engineering and Electronics”. Chand &Co, 2018.
3. JohnBird,“Electrical and Electronic Principles and Technology”, Sixth Edition, Elsevier, 2017.
4. Mittle,Mittal,“ Basic Electrical Engineering” ,2ndEdition,Tata McGraw-Hill Edition2017
5. C.L.Wadhwa,“Generation, Distribution and Utilisation of Electrical Energy”, New Age international pvt. ltd., Revised 4thEdition 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
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

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)-Thirumalai Nayakar Mahal - 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 beads - 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.

KLNCE UG CSE(CS) R2024 (AY 2025 – 2026 admitted)

24HST02

தமிழரும் தொழில்நுட்பமும்

L	T	P	C
1	0	0	1

அலகு -I நெசவு மற்றும் பாளை தொழில்நுட்பம்: 3
 சங்ககாலத்தில் நெசவுத் தொழில் - பனைத் தொழில்நுட்பம் - கருப்புசிவப்பு பாண்டங்கள் -
 பாண்டங்களில் கீறல்குறியீடுகள்.

அலகு-II வடிவமைப்பு மற்றும் கட்டிடத் தொழில்நுட்பம் 3
 சங்ககாலத்தில் வடிவமைப்பு மற்றும் கட்டுமானங்கள் & சங்ககாலத்தில் வீட்டுப்பொருட்களில் வடிவமைப்பு -
 சங்ககாலத்தில் கட்டுமான பொருட்களும் நடுகல்லும் -
 சிலப்பதிகாரத்தில் மேடை அமைப்பு பற்றிய விவரங்கள் - மாமல்லபுரச் சிற்பங்களும், கோவில்களும் -
 சோழர்காலத்துப் பெருங்கோயில்கள் மற்றும் பிற வழிப்பாட்டுத் தலங்கள் - நாயக்கர்கால கோயில்கள் -
 மாதிரிகட்டமைப்புகள் பற்றி அறிதல், மதுரை மீனாட்சி அம்மன் ஆலயம் மற்றும் திருமலை நாயக்கர் மஹால் -
 செட்டிநாட்டு வீடுகள் - பிரிட்டிஷ் காலத்தில் சென்னையில் இந்தோ - சாரோசெனிக்கட்டிடக்கலை

அலகு-III உற்பத்தி தொழில்நுட்பம் 3
 கப்பல்கட்டும்கலை - உலோகவியல் - இரும்புத் தொழிற்சாலை - இரும்பை உருக்குதல், எஃகு -
 வரலாற்றுச் சான்றுகளாக செம்பு மற்றும் தங்க நாணயங்கள் - நாணயங்கள் அச்சடித்தல் -
 மணி உருவாக்கும் தொழிற்சாலைகள் - கல்மணிகள், கண்ணாடி மணிகள் - சுடுமண் மணிகள் -
 சங்கு மணிகள் - எலும்புத்துண்டுகள் - தொல்லியல் சான்றுகள் - சிலப்பதிகாரத்தில் மணிகளின் வகைகள்

அலகு- IV வேளாண்மை மற்றும் நீர்பாசன தொழில்நுட்பம் 3
 அணை, ஏரி, குளங்கள், மதகு - சோழர்காலக் குமிழித்தூம்பின் முக்கியத்துவம் - கால்நடைப் பராமரிப்பு -
 கால்நடைகளுக்காக வடிவமைக்கப்பட்ட கிணறுகள் -
 வேளாண்மை மற்றும் வேளாண்மை சார்ந்த செயல்பாடுகள் - கடல்சார் அறிவு - மீன்வளம் -
 முத்து மற்றும் முத்துக்குளித்தல் - பெருங்கடல் குறித்த பண்டைய அறிவு அறிவுசார் சமூகம்.

அலகு-V அறிவியல் தமிழ் மற்றும் கணிணித்தமிழ்: 3
 அறிவியல் தமிழின் வளர்ச்சி - கணித்தமிழ் வளர்ச்சி - தமிழ்நூல்களையின்பதிப்பு செய்தல் -
 தமிழ்மென்பொருட்கள் உருவாக்கம் - தமிழ் இணையக்கல்விக்கழகம் - தமிழ்மின்நூலகம் -
 இணையத்தில் தமிழ் அகராதிகள் - சொற்குவைத்திட்டம்

CLASS HOURS: 15 PERIODS TERM HOURS: 15 PERIODS TOTAL: 30 PERIODS

TEXT & REFERENCE BOOKS:

1. தமிழக வரலாறு - மக்களும் பண்பாடும் - கே. கே. பிள்ளை (வெளியீடு: தமிழ்நாடு பாடநூல் மற்றும் கல்வியியல் பணிகள்கழகம்)
2. கணிணித்தமிழ் - முனைவர் இல. சுந்தரம். (விகடன் பிரசுரம்)
3. கீழடி - வைகைநதிக்கரையில் சங்ககால நகரநாகரீகம் (தொல்லியல்துறை வெளியீடு)
4. பொருளந - ஆற்றங்கரை நாகரீகம். (தொல்லியல்துறை வெளியீடு)
5. Social Life of Tamils (Dr.K.K.Pillay) A joint publication of TNTB & ESC and RMRL – (in print)

KLNCE UG CSE(CS) R2024 (AY 2025 – 2026 admitted)

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) (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)

24HS203

JAPANESE - I

L	T	P	C
2	0	0	-

OBJECTIVE:

1. To impart fundamentals of the Japanese language, including reading, writing systems, pronunciation.
2. Develop basic communicative competence in everyday Japanese
3. Enable learners to understand and use fundamental grammar pattern

Module- I

Japanese Writing System & Basic Sentence Structure

6

Introduction to Japanese writing systems: Hiragana, Katakana, basic Kanji (introduction), Pronunciation and sound patterns, Greetings and self-introduction.

Module- II Basic Sentence Structure & Vocabulary 4

Sentence pattern: **A は B です**, Question formation using **か**, Particles: **は, の**, Basic vocabulary: nationality, occupations, majors, Subject pronouns, Family.

Module -III Demonstratives, Numbers & Daily Objects 6

Demonstratives: **これ, それ, あれ, どれ**, Demonstratives with noun: **この, その, あの, どの**, Location words: **ここ, そこ, あそこ**, Numbers, time, prices, counters, Particles: **も, ね, よ**, Classroom and daily-use vocabulary.

Module- IV Verbs, Actions , Time Expressions & Present Tense 8

Verb classification: Group I, II, III, Verb **ます** form (present & negative), Time expressions and frequency adverbs, Particles: **を, で**, Making invitations: **～ませんか**, Word order, Days, Weeks, Months, and Years.

Module-V Past Tense & Movement Expressions 6

Past tense forms: **ました/ませんでした** form (past & negative), Location and direction particles: **に, へ, で**, Means of transport, Talking about past events, Basic movement-related expressions.

TOTAL:30PERIODS

Text Books

1. GENKI I – An Integrated Course in Elementary Japanese (3rd Edition)
2. Minna no Nihongo Shokyuu I – Main Text
3. Minna no Nihongo I – Translation & Grammatical Notes (English)

Reference Books

1. GENKI I Workbook (3rd Edition)
2. Minna no Nihongo I Workbook
3. JLPT N5 Official Practice Workbook

OUTCOMES:

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

Course Name: JAPANESE-I	
CO	Course Outcomes
CO1	Understand simple spoken Japanese in everyday contexts.
CO2	Communicate with widely used Japanese words effectively.
CO3	Develop the skills necessary for self-directed learning and continuous improvement in Japanese language.

24HS204

DEUTSCH-I

L	T	P	C
2	0	0	-

OBJECTIVE:

- To impart fundamentals of the German language, including reading, writing systems, pronunciation, and speaking.

Module- I

10

Basic Communication - Sprechen

Basics & Introduction: German alphabet and pronunciation, Vowels (long & short), consonants, Umlauts (ä, ö, ü) and ß. Greetings and farewells (formal & informal), Polite expressions (Bitte, Danke, Entschuldigung). Numbers 1–100 and days of the week, Months, Seasons, Personal pronouns (ich, du, er, sie...), Telling time (Wie spät ist es?) – Official timings and Unofficial timings. Grammar Essentials & Everyday Vocabulary: Present tense of regular verbs (spielen, arbeiten, machen...)
 Activities: Self- Introduction and Talking about hobbies

Module -II Basic German grammar 10

Common irregular verbs: sein (to be), haben (to have), gehen, kommen, Artikel and gender (der, die, das; ein, eine), Modal verbs, and its conjugations. Nouns- Rules for Artikel (Masculine gender, Feminine gender and Neutram gender) Artikel - Nominativ Case. (Was oder Wer, kein oder nicht)
 Activities: Conversation in the office, Hotel Reception, composition of simple texts giving information about person, daily routine, family members etc.,

Module- III German grammar-II 10

Artikel-Akkusativ case (e.g., einen, keinen, doch), Akkusativ case- Pronomen, Possessivartikel, Präpositionen, Es gibt. Describing people and things: adjectives and colors, Family, food, furniture, and common vocabulary with gender.

Activities: Food culture in Germany, Ordering food and drinks at a café or Listening to short conversations and responding appropriately. History, geography and aspects of German culture as group task / project work.

TOTAL:30 PERIODS

REFERENCES:

1. Funk, H., Kuhn, C., & Demme, S. (2015). Menschen A1: Deutsch als Fremdsprache Kursbuch. Hueber Verlag
2. *Studio d A1: Deutschals Fremdsprache*, Hermann Funk and Christina Kuhn Cornelsen Verlag publication (2005).
3. Evans, S., & Pude, A. (2012). *Menschen A1*. HueberVerlag.
4. Niebisch, D., Penning-Hiemstra, S., et al. (2016). *Schritte International Neu A1.1*. HueberVerlag.

OUTCOMES:

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

Course Name: DEUTSCH-I	
CO	Course Outcomes
CO1	Communicate with widely used German words effectively
CO2	Understand German grammar and German culture
CO3	Understand German civilization and Translation

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.

KLNCE UG CSE(CS) R2024 (AY 2025 – 2026 admitted)

- 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:

COURSENAME:PYTHON PROGRAMMING LABORATORY		Course Code :24GE2L1	
CO	Course Outcomes	EXP	K-CO
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 house hold 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(ELECTRICALELANDELECTRONICS)

PART III ELECTRICAL ENGINEERING PRACTICES

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

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 Laptop

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

OUTCOMES:

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

Course Name: INDUSTRIAL PRACTICES WORKSHOP		CourseCode:24GE2L2	
GROUP A(Civil & Mechanical)			
GROUP B (Electrical & Electronics)			
CO	Course Outcomes	EXP	K-CO
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

KLNCE UG CSE(CS) R2024 (AY 2025 – 2026 admitted)

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

24HS2L2	PHYSICAL EDUCATION - I	L	T	P	C
		0	0	2	1

OBJECTIVES:

- To impart the fundamentals of physical education for development of students’ physical, mental, and social well-being.
- To instill a lifelong appreciation for physical activity towards the development of positive attitude and fostering values of team work and sportsmanship.

Introduction to physical education: Exercise for Good Posture – Conditioning and Calisthenics for Before start, Jogging, Bending, Twisting, Standing, Sitting and Relaxation, Training on First Aid practices. **Participation of athletic events:** Rules and regulations of important athletic events, Sprint, Jumps, Throws and Hurdles. **Skill development in any one of the following outdoor games:** Basket Ball, Volley Ball, Ball Badminton, Football, Hockey, Kho-Kho, Kabaddi, Cricket, Hand ball and Tennis. **Skill development in any one of the following indoor games:** Shuttle Badminton, Chess and Table Tennis.

REFERENCES:

1. Singh, A. (2008). Essentials of physical education. Kalyani Publishers.
2. Kamlesh, M. L. (2006). Psychology in physical education and sport (3rd ed.). Metropolitan Book Co.
3. Mangal, S. K. (2009). Psychology of sports performance. Sports Publication.

E-resources: 1. <https://www.who.int/health-topics/physical-activity>

TOTAL: 30 PERIODS

OUTCOMES:

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

Course Name : PHYSICAL EDUCATION - I	
CO	Course Outcomes
CO1	Understand and explain the importance of physical activity for mental and physical health.
CO2	Apply basic principles of exercise science in the routine life
CO3	Develop teamwork, discipline, and leadership through sports and group activities and collaborate effectively
CO4	Demonstrate independent learning in health, nutrition, and fitness-related topics.

24BS303	LINEAR ALGEBRA AND NUMERICAL METHODS	L	T	P	C
		3	1	0	4

OBJECTIVES:

- To understand the concepts of Vector space, linear transformations, inner product spaces and orthogonalization.
- To introduce the Numerical methods for solving algebraic and transcendental equations and interpolation in various intervals
- To acquaint the knowledge of various Numerical methods of solving ordinary differential equations.

UNIT-I VECTOR SPACES 9+3

Vector spaces – Subspaces – Linear combinations and linear system of equations – Linear independence and linear dependence – Bases and dimensions

UNIT-II LINEAR TRANSFORMATION AND INNER PRODUCT SPACES 9+3

Linear transformation - Null spaces and ranges - Dimension theorem (without Proof) - Matrix representation of a linear transformations - Inner product - Norms - Gram Schmidt orthogonalization process (without Proof) - Least square approximation.

UNIT-III SOLUTION OF EQUATIONS AND EIGENVALUE PROBLEMS 9+3

Solution of algebraic and transcendental equations - Fixed point iteration method – Newton Raphson method - Solution of linear system of equations - Gauss elimination method – Gauss Jordan method – Iterativemethods of Gauss Jacobi and Gauss Seidel - Eigen values of a matrix by Power method.

UNIT-IV INTERPOLATION, NUMERICAL DIFFERENTIATION AND NUMERICAL INTEGRATION 9+3

Lagrange's and Newton's divided difference interpolations – Newton's forward and backward difference interpolation – Approximation of derivatives using interpolation polynomials – Numerical single and double integrations using Trapezoidal and Simpson's 1/3 rules.

UNIT- V NUMERICAL SOLUTION OF ORDINARY DIFFERENTIAL EQUATIONS 9+3

Single step methods : Taylor's series method - Euler's method - Modified Euler's method - Fourth order Runge - Kutta method for solving first order equations - Multi step methods : Milne's and Adams - Bash forth predictor corrector methods for solving first order equations

CLASS HOURS: 60 PERIODS TERM HOURS: 60 PERIODS TOTAL: 120 PERIODS

TEXT BOOKS:

1. Friedberg. A.H., Insel. A.J. and Spence. L., "Linear Algebra", Prentice Hall of India, New Delhi, 4th Edition, 2004
2. Grewal.B.S., " Numerical Methods in Engineering and Science", Khanna Publishers, New Delhi, 10th Edition, 2015

REFERENCES:

1. Lay.D.C., "Linear Algebra and it's a Applications", Pearson Education,5th Edition, 2018.
2. Kumaresan. S., "Linear Algebra – A Geometric Approach", Prentice Hallof India, New Delhi, Reprint, 2018.
3. Sastry. S.S, "Introductory Methods of Numerical Analysis", PHI Learning Pvt.Ltd, 5th Edition, 2018.

KLNCE UG CSE(CS) R2024 (AY 2025 – 2026 admitted)

4. Sankara Rao. K., "Numerical Methods for Scientists and Engineers", Prentice Hall of India Pvt. Ltd, 5th Edition, New Delhi, 2007
5. Veerarajan.T , Ramachandran. T, "Numerical Methods With Programs In C", Tata Mcgraw Hill Publishing Company Limited, 8th Edition, Reprint 2011..

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

Course Name : LINEAR ALGEBRA AND NUMERICAL METHODS		Course Code : 24BS303	
CO	Course Outcomes	Unit	K –CO
C201.1	Apply the concepts of Vector space to determine bases and dimensions.	I	K3
C201.2	Construct the least square fit and orthonormal basis for an inner product space by using Gram-Schmidt process	II	K3
C201.3	Solve algebraic, transcendental equations and simultaneous linear equations.	III	K3
C201.4	Solve numerical differentiation and integration using numerical techniques.	IV	K3
C201.5	Apply numerical techniques to solve the ordinary differential equations with initial and boundary conditions with engineering applications.	V	K3

24SC301	CYBER SECURITY ESSENTIALS	L	T	P	C
		3	0	0	3

OBJECTIVES:

- To understand various types of cyber-attacks and cyber-crimes
- To understand the cyber laws & procedure to report a cyber crime
- To study the cyber crimes and frauds in Mobile and wireless devices
- To understand the organizational policies and procedures to manage the security risks
- To study and analyze the case studies

UNIT-I INTRODUCTION 9

History of Internet, internet Addresses , DNS and WWW- Introduction to Information and Cyber Security, Cyber space, Digital assets, Layers of cyber security, CIA Triad - Terminologies: Vulnerability, threat, Malware, Cyber Crime, Cyber Criminal - Cyber Stalking, Cyber Warfare, Cyber terrorism, Cyber Espionage, Motive of attackers - Cyber kill Chain - Classification of Cyber Crimes : Active attacks, Passive attacks, Software attacks, Hardware attacks

UNIT-II CYBER LAW AND PROCEDURES TO REPORT CYBER CRIME 9

Introduction, cyber security regulations, roles of International law - Cyber law in India: Need for cyber law in India, History of cyber law in India, Information Technology Act, 2000, Overview of other laws amended by the IT Act, 2000, National Policy on Information Technology 2012.

Introduction to cybercrime and procedure to report cybercrime: Procedure to report cyber crime, some basic rules for safe operations of the computer and internet, the criminal law (Amendment) Act, 2013: legislative remedies for online harassment and cyber stalking In India

UNIT-III CYBER CRIME: MOBILE AND WIRELESS DEVICES 9

Introduction, Proliferation of Mobile and Wireless Devices, Trends in Mobility, Credit card Frauds in Mobile and Wireless Computing Era, Security Challenges Posed by Mobile Devices, Registry Settings for Mobile Devices, Authentication service Security, Attacks on Mobile/Cell Phones, Organizational security Policies and Measures in Mobile Computing Era, Laptops.

UNIT-IV CYBER SECURITY: ORGANIZATIONAL IMPLICATIONS 9

Introduction: cost of cybercrimes and IPR issues, web threats for organizations, security and privacy implications, social media marketing: security risks and perils for organizations, social computing and the associated challenges for organizations.

UNIT- V PRIVACY ISSUES AND CYBERCRIME 9

Privacy Issues: Basic Data Privacy Concepts: Fundamental Concepts, Data Privacy Attacks, Data linking and profiling, privacy policies and their specifications, privacy policy languages, privacy in different domains - medical, financial, etc

Cybercrime: Examples and Mini-Cases Examples: Official Website of Maharashtra Government Hacked, Indian Banks Lose Millions of Rupees, Parliament Attack, Pune City Police Bust Nigerian Racket, e-mail spoofing instances. Mini-Cases: The Indian Case of online Gambling, An Indian Case of Intellectual Property Crime, Financial Frauds in Cyber Domain.

CLASS HOURS: 45 PERIODS TERM HOURS: 45 PERIODS TOTAL: 90 PERIODS

TEXTBOOKS:

1. Cyber Security Understanding Cyber Crimes, Computer Forensics and Legal Perspectives by Sumit Belapure and Nina Godbole, Wiley India Pvt. Ltd. (First Edition, 2011)
2. Pavan Duggal, Indian Cyber law On Cyber Crimes

REFERENCES:

1. Charles P. Pfleeger, Shari Lawrence, Pfleeger Jonathan Margulies; Security in Computing, Pearson Education Inc . 5th Edition, 2015
2. Brooks, Charles J., Christopher Grow, Philip Craig, and Donald Short. Cyber security essentials. John Wiley & Sons, 2018

OUTCOMES:

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

Course Name : CYBER SECURITY ESSENTIALS		Course Code : 24SC301	
CO	Course Outcomes	Unit	K –CO
C202.1	Apply the knowledge to identify the motive of attackers, vulnerabilities, implementation of countermeasures and types of cyber attacks	I	K3
C202.2	Describe the necessity of cyber-Laws and IT ACT	II	K2
C202.3	Construct security guidelines and various countermeasures for the protection of mobile computing devices and laptops through physical and logical access control measures in organization	III	K3
C202.4	Describe the organizational best policies for IPR issues, data privacy and security challenges for organization	IV	K2
C202.5	Apply policies and procedures to manage privacy issues in in different domains and explore various cyber-crimes cases	V	K3

24IT301	DATA STRUCTURES AND ALGORITHMS	L	T	P	C
		3	0	0	3

OBJECTIVES:

- To understand the concepts of ADTs.
- To understand the basics of algorithm analysis
- To Learn linear data structures – lists, stacks, and queues
- To apply Tree and Graph structures
- To understand sorting, searching and hashing algorithms.

UNIT-I INTRODUCTION TO DATA STRUCTURES AND ALGORITHM ANALYSIS 10

Introduction: Data Structures, Linear Data Structures: Abstract Data Types (ADTs) – List ADT – array-based implementation – linked list implementation–Polynomial Manipulation – Introduction to algorithms - Algorithm Analysis framework - Space and Time Complexity - Asymptotic Notations-Mathematical analysis of Non-Recursive Algorithms- Linear Search and Recursive Algorithms- Binary Search.

UNIT-II LINEAR DATA STRUCTURES – STACKS, QUEUES 8

Stack ADT – Operations – Applications – Evaluating arithmetic expressions- Conversion of Infix to postfix expression – Queue ADT – Operations – Circular Queue – Priority Queue – De Queue – applications of Queues

UNIT-III TREES AND APPLICATIONS 9

Tree ADT – tree traversals – Binary Tree ADT – expression trees – applications of trees – binary search tree ADT –Threaded Binary Trees- AVL Trees – B-Tree – B+ Tree – Heap – Applications of heap

UNIT-IV GRAPHS AND APPLICATIONS 9

Definition – Representation of Graph – Types of graph – Breadth-first traversal – Depth-first traversal – Topological Sort –Dijkstra algorithm- Floyd Warshall Algorithm- Prims Algorithm- Kruskal Algorithm- Bi-connectivity – Cut vertex – Euler circuits – Applications of graphs.

UNIT- V SORTING AND HASHING TECHNIQUES 9

Sorting –Bubble sort, Selection sort, Insertion sort, Merge Sort, Quick Sort, Shell sort, Radix sort. Hashing- Hash Functions – Separate Chaining – Open Addressing – Rehashing – Extendible Hashing

CLASS HOURS: 45 PERIODS TERM HOURS: 45 PERIODS TOTAL: 90 PERIODS

TEXTBOOKS

1. Reema Thareja, — Data Structures Using C, 3rd Edition, Oxford University Press, 2023.
2. Anany Levitin, “Introduction to the Design and Analysis of Algorithm”, Pearson Education Asia, 2013
3. Mark Allen Weiss, — Data Structures and Algorithm Analysis in C, 2nd Edition Reprint, Pearson Education, 2002.
4. Thomas H. Cormen, Charles E. Leiserson, Ronald L.Rivest, Clifford Stein – Introduction to Algorithms, MIT Press, 3rd edition, 2009.

REFERENCES:

1. Stephen G. Kochan, —Programming in C, 3rd edition, Pearson Education, 2005.
2. Ellis Horowitz, Sartaj Sahni, Susan Anderson-Freed, —Fundamentals of Data Structures in C, 2nd Edition, University Press, 2008

OUTCOMES:

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

Course Name : DATA STRUCTURES AND ALGORITHMS		Course Code : 24IT301	
CO	Course Outcomes	Unit	K –CO
C203.1	Describe Linear Data Structure and perform analysis framework	I	K3
C203.2	Implement the applications of stack and queue	II	K3
C203.3	Develop different types of trees and implement its applications	III	K3
C203.4	Implement various operations on graph and its applications	IV	K3
C203.5	Sort the data by using different types of sorting algorithms and implement hashing mechanism for data access.	V	K3

24CS301	OBJECT ORIENTED PROGRAMMING	L	T	P	C
		3	0	0	3

OBJECTIVES:

- To understand Object Oriented Programming concepts and basics of Java programming language
- To know the principles of packages, inheritance and interfaces
- To define exceptions and use I/O streams
- To develop a java application with threads and generics classes
- To design and build Graphical User Interface Application using JAVAFX.

UNIT-I INTRODUCTION TO OOP AND JAVA 9

Overview of OOP – Object oriented programming paradigms – Features of Object Oriented Programming – Java Buzzwords – Overview of Java – Data Types, Variables and Arrays – Operators – Control Statements – Programming Structures in Java – Defining classes in Java – Constructors-Methods -Access specifiers - Static members- Java Doc comments.

UNIT-II INHERITANCE, PACKAGES AND INTERFACES 9

Overloading Methods – Objects as Parameters – Returning Objects –Static, Nested and Inner Classes. Inheritance: Basics– Types of Inheritance -Super keyword -Method Overriding – Dynamic Method Dispatch –Abstract Classes – final with Inheritance. Singleton class – Collections. Packages and Interfaces: Packages – Packages and Member Access –Importing Packages – Interfaces

UNIT-III EXCEPTION HANDLING STRING HANDLING AND I/O 9

Exception Handling basics – Multiple catch Clauses – Nested try Statements – Java’s Built-in Exceptions – User defined Exception. Strings: Basic String class, methods and String Buffer Class. I/O Basics – Reading and Writing Console I/O – Reading and Writing Files

UNIT-IV GENERICS AND MULTITHREADING 9

Generics: Generic Programming – Generic classes – Generic Methods – Bounded Types – Restrictions and Limitations. Multithreaded Programming: Java Thread Model–Creating a Thread and Multiple Threads – Priorities – Synchronization – Inter Thread Communication Suspending –Resuming, and Stopping Threads –Multithreading. Wrappers – Auto boxing.

UNIT- V EVENT HANDLING, CONTROLS AND COMPONENTS 9

JAVAFX Events and Controls: Event Basics – Handling Key and Mouse Events. Controls: Checkbox, Toggle Button – Radio Buttons – List View – Combo Box – Choice Box – Text Controls – Scroll Pane. Layouts – Flow Pane – HBox and VBox – Border Pane – Stack Pane – Grid Pane. Menus – Basics – Menu – Menu bars – Menu Item. JDBC: ODBC – JDBC basics – Steps to build database applications.

CLASS HOURS: 45 PERIODS TERM HOURS: 45 PERIODS TOTAL: 90 PERIODS

TEXT BOOKS:

1. Herbert Schildt, “Java: The Complete Reference”, 11 th Edition, McGraw Hill Education, New Delhi, 2019
2. Herbert Schildt, “Introducing JavaFX 8 Programming”, 1 st Edition, McGraw Hill Education, New Delhi, 2015.

REFERENCES:

1. Cay S. Horstmann, “Core Java Fundamentals”, Volume 1, 11 th Edition, Prentice Hall, 2018.
2. Paul Deitel, Harvey Deitel, —Java SE 8 for programmersll, 3rd Edition, Pearson, 2015.
3. Steven Holzner, —Java 2 Black bookll, Dreamtech press, 2011.
4. Timothy Budd, —Understanding Object-oriented programming with Javall, Updated Edition, Pearson Education, 2000.

OUTCOMES:

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

Course Name : OBJECT ORIENTED PROGRAMMING		Course Code : 24CS301	
CO	Course Outcomes	Unit	K –CO
C204.1	Apply the concepts of classes and objects to solve simple problems	I	K3
C204.2	Develop programs using inheritance, packages and interfaces	II	K3
C204.3	Make use of exception handling mechanisms , I/O packages and string classes	III	K3
C204.4	Build Java applications with generics concept and multithreaded model.	IV	K3
C204.5	Build Java applications with the concepts of event handling and Java FX components and controls for developing GUI based applications	V	K3

24HS301	HUMAN VALUES AND ETHICS	L	T	P	C
		1	1	0	2

OBJECTIVES:

- To create an awareness on Engineering Ethics and Human Values.
- To understand social responsibility of an engineer.
- To appreciate ethical dilemma while discharging duties in professional life.

UNIT - I INTRODUCTION TO VALUE EDUCATION 3+3

Value Education – Definition - Concept and Need for Value Education - Natural acceptance, Self exploration - Fundamentals of value education - Happiness and Prosperity as parts of Value Education- fulfilling human aspirations.

Practice Session: Sharing about Oneself, Exploring Human Consciousness – self exploration, Exploring Natural Acceptance.

UNIT - II HARMONY IN THE HUMAN BEING 3+3

Understanding Myself as Co-existence of the Self and the Body - I' and Body synchronization - Realization of Self, Body needs - Self-regulation and Health.

Practice Session: Exploring the difference of Needs of Self and Body, Exploring Sources of Imagination in the Self, Harmony of Self with the Body - program for ensuring health vs dealing with disease.

UNIT - III HARMONY IN THE FAMILY, SOCIETY AND NATURE 3+3

Family as a basic unit of Human Interaction-Values in Relationships - The Basics for Trust and Respect in today's Crisis: Affection, e-Guidance, Reverence, Glory, Gratitude and Love –Harmony in society: Resolution, Prosperity, Fearlessness and Co-existence as Comprehensive Human Goal- Harmony in Nature: The Four Orders in Nature - The Holistic Perception of Harmony in Existence.

Practice Session: Exploring the Feelings of Trust, Respect and Gratitude, Exploring Systems to fulfil Human Goals considering society and nature - Co-existence in Existence.

UNIT - IV SOCIAL ETHICS 3+3

The Basics for Ethical Human Conduct - Defects in Ethical Human Conduct - Holistic Alternative and Universal Human Order and Ethical Conduct - Human Rights violation and Social Disparities.

Practice Session: Exploring Ethical Human Conduct, Humanistic Models in Education, Exploring Steps of Transition towards Universal Human Order.

UNIT - V PROFESSIONAL ETHICS 3+3

Value based Life and Profession - Professional Ethics and Right Understanding - Competence in Professional Ethics - Issues in Professional Ethics – The Current Scenario - Vision for Holistic Technologies.

Practice Session: Holistic Technologies - Production Systems and Management Models, Holistic vision of life - Socially responsible behaviour and environmentally responsible work.

CLASS HOURS: 30 PERIODS TERM HOURS: 30 PERIODS TOTAL: 60 PERIODS

TEXT BOOKS:

1. R.R. Gaur, R. Asthana, G.P. Bagaria, A Foundation Course in Human Values and Professional Ethics, 2nd revised edition, Excel Books, New Delhi, Reprint 2019.
2. A N Tripathy, Human Values, New Age International Publishers, New Delhi, 2003.

REFERENCES:

1. E G Seebauer & Robert L.Berry, Fundamentals of Ethics for Scientists & Engineers, Oxford University Press, 2000.
2. M Govindrajran, S Natrajan & V.S. Senthil Kumar, Engineering Ethics (including Human Values), Eastern Economy Edition, Prentice Hall of India Ltd, Reprint 2011.
3. Mike Martin and Roland Schinzinger “Ethics in Engineering” McGraw Hill, New York, 4th edition, Reprint 2017.
4. Charles E. Harries, Michael S. Protchard and Michael J. Rabins, “Engineering Ethics- concepts and Cases”, Thomson Learning, 2000.
5. S.K. Chakraborty and Dabangshu Chakraborty, “Human Values and Ethics: Achieving Holistic Excellence”, ICFAI University Press, 2006.

OUTCOMES:

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

Course Name : HUMAN VALUES AND ETHICS		Course Code : 24HS301	
CO	Course Outcomes	Unit	K –CO
C205.1	Explain the significance of value inputs and start applying them in their life and profession to ensure happiness and prosperity.	I	AD
C205.2	Differentiate between Thyself & the Body to ensure competency of an individual.	II	AD
C205.3	Explain the role of a human being in ensuring harmony in family, society, and nature.	III	AD
C205.4	Develop an awareness of human values to appreciate the rights of others and to enable social balance.	IV	AD
C205.5	Differentiate between ethical and unethical professional practices, and apply suitable strategy to actualize a harmonious working environment.	V	AD

TEXTBOOKS:

1. M.MorrisR.Mano, MichaelD.Ciletti,—“Digital Design: With an Introduction to the Verilog HDL, VHDL, and System Verilog”,6thEdition,Pearson Education,2018.
2. Dr.P. Leach and A.P.Malvino, “Digital Principles and Applications”, Tata McGraw Hill, 2011.

REFERENCES:

1. G.K.Kharate, Digital Electronics, Oxford University Press,2012.
2. John F. Wakerly, Digital Design Principles and Practices, Fifth Edition, PearsonEducation,2018.
3. Charles H.RothJr, Larry L. Kinney, Fundamentals of Logic Design, Sixth Edition, CENGAGE Learning,2013.
4. DonaldD.Givone, Digital Principles and Design, Tata McGraw Hill, 2017.

OUTCOMES:

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

Course Name : FUNDAMENTALS OF DIGITAL PRINCIPLES		Course Code : 24CS303	
CO	Course Outcomes	Unit	K –CO
C206.1	Apply Arithmetic operations in any number system and various techniques to simplify the Boolean function.	I	K3
C206.2	Build combinational circuits that perform arithmetic operations.	II	K3
C206.3	Construct and Analyze Synchronous sequential circuits such as counters and registers.	III	K4
C206.4	Analyze Asynchronous sequential circuits to find out the impact of Hazards and Races.	IV	K4
C206.5	Model memory arrays for any Boolean function with the help of PLA, PAL and PROM.	V	K3

24IT3L1	DATA STRUCTURES AND ALGORITHM LABORATORY	L	T	P	C
		0	0	4	2

OBJECTIVES:

- Write functions to implement linear and non-linear data structure operations
- Suggest appropriate linear / non-linear data structure operations for solving a given problem
- Appropriately use the linear / non-linear data structure operations for a given problem
- Apply appropriate hash functions that result in a collision free scenario for data storage and retrieval

LIST OF EXPERIMENTS

1. Implementation of List Using Array
2. Implementation of List Using Linked list
3. Implementation of Linear Search and Binary Search
4. Perform polynomial addition using Linked list
5. Perform Infix to postfix conversion using stack
6. Implementation of Binary Search tree
7. Implementation of AVL Trees
8. Implementation of Heaps using Priority Queues
9. Implementation of Graph Traversal Using Breadth First Search and Depth First Search
10. Implementation of Dijkstra algorithm and Floyd Warshall Algorithm
11. Implementation of Prims Algorithm and Kruskal Algorithm
12. Implementation of bubble sort, selection sort and insertion sort
13. Implementation of Quick sort and Merge sort
14. Implementation of Linear probing, Quadratic probing and Double hashing.
15. Case study problem using linked list

TOTAL: 60 PERIODS

LIST OF EQUIPMENT FOR A BATCH OF 30 STUDENTS:

Software Requirement :

- Sublime editor / Turbo C

OUTCOMES:

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

Course Name : DATA STRUCTURES AND ALGORITHM LABORATORY		Course Code : 24IT3L1	
CO	Course Outcomes	Exp. No.	K – CO
C207.1	Compute various operations on list by using Array and Linked list	1,2,4,5,15	K3
C207.2	Manipulate Linear Search and Binary search	3	K3
C207.3	Compute graph representation and Traversal algorithms	6,7,9	K3
C207.4	Implement Graph algorithms: Dijkstra algorithm- Floyd Warshall Algorithm- Prims and Kruskal algorithm	10,11	K3
C207.5	Examine various sorting and hashing algorithms.	12,13,14	K3

24CS3L1	OBJECT ORIENTED PROGRAMMING LABORATORY	L	T	P	C
		0	0	4	2

OBJECTIVES:

- To build software development skills using java programming for real-world applications.
- To understand and apply the concepts of classes, packages, interfaces, inheritance, exception handling and file processing.
- To develop applications using event handling

LIST OF EXPERIMENTS

1. Write a java program for the following programs:

- a) Write java program that inputs 5 numbers, each between 10 and 100 inclusive. As each number is read display it only if it's not a duplicate of any number already read. Display the complete set of unique values input after the user enters each new value.
- b) Develop Rational number class in Java with numerator and denominator as private data members. Write necessary constructors and methods. Use Java Doc comments for documentation. Your implementation should use efficient representation for a rational number, i.e. (500 / 1000) should be represented as (1/2). Also, write method that adds and subtract two rational numbers.

Eg.: 160 / 290 , 230 / 290

O/p for add: 390/290 (39/29) Sub: -70/290 (-7/29).

- c) Write a Program to print factors of an entered number. Create the class 'factors' with the following specifications:

Data Member:

Private int n: to define a Private instance variable to store an integer value.

Member Functions:

Void input() to take an integer number from an user.

Void find_fact() To print all the factors of the number.

- d) Solve problems by using sequential search, binary search, and sorting algorithms (selection, insertion).
- e) Develop a class to overload a function Polygon() to do following tasks:

Void polygan (int n,char ch) : To draw a filled square of side using 'n' character:

Output:

```
If n is A
AAAA
AAAA
AAAA
AAAA
```

Void Polygan(int x,int y) : To draw a rectangle of length'x' breadth 'y' using the Symbol '@'

Output:

```
X: 5
Y:3
@@@@@
@@@@@
@@@@@
```

Void polygan() : To draw a right angled triangle as shown:

Output:

```
*
**
```

2. Develop a java application with an Employee class with Emp_name, Emp_id, Address, Mail_id, Mobile_no as members. Inherit the classes, Assistant Professor, Associate Professor and Professor from employee class. Add Basic Pay (BP) as the member of all the inherited classes with 97% of BP as DA, 10 % of BP as HRA, 12% of BP as PF, 0.1% of BP for staff club funds. Generate pay slips for the employees with their gross and net salary.
3. Write a java program to create a super class called Figure that receives the dimensions of two dimensional objects. It also defines a method called area that computes the area of an object. The program derives two subclasses from Figure. The first is Rectangle and second is Triangle. Each of the sub classes override area() so that it returns the area of a rectangle and triangle respectively.
4. Design a Vehicle class hierarchy in Java. Write a test program to demonstrate polymorphism. You should call the super class constructor from your derived class. Eg: Derived class { Two Wheeler, Four Wheeler } or { Geared Vehicle, Non Geared Vehicle }.
5. Write a Java Program to create an abstract class named Shape that contains two integers and an empty method named print Area(). Provide three classes named Rectangle, Triangle and Circle such that each one of the classes extends the class Shape. Each one of the classes contains only the method print Area() that prints the area of the given shape.
 - a. Solve the above problem using an interface.
6. Write a Java program to demonstrate the user defined package creation. Create a package “vehicle” and store the classes Two Wheeler and Four Wheeler. Develop an application to access these two classes.
7. Write a Java program that creates a user interface to perform integer divisions. The user enters two numbers in the text fields, Num1 and Num2. The division of Num1 and Num 2 is displayed in the Result field when the Divide button is clicked. If Num1 or Num2 were not an integer, the program would throw a Number Format Exception. If Num2 were Zero, the program would throw an Arithmetic Exception. Display the exception in a message dialog box.
8. Write a Java program that creates three threads. First thread displays “Good Morning” every one second, the second thread displays “Hello” every two seconds and the third thread displays “Welcome” every three seconds.
9. Develop applications using Java FX controls, layouts and menus and Use JDBC Connections.
10. Develop a mini project for any application using Java concepts.

TOTAL: 60 PERIODS

LABORATORY REQUIREMENT FOR BATCH OF 30 STUDENTS HARDWARE:

1. Net Beans,
2. Eclipse.

OUTCOMES:

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

Course Name : OBJECT ORIENTED PROGRAMMING LABORATORY		Course Code : 24CS3L1	
CO	Course Outcomes	Exp. No.	K-CO
C208.1	Design and develop java programs using object oriented programming concepts	1,2,3	K3
C208.2	Develop simple applications using polymorphism, abstract class and interface	4,5	K3
C208.3	Develop simple applications using the concepts – Packages and Exceptions.	6, 7	K3
C208.4	Implement the concept of multithreading.	8	K3
C208.5	Create GUIs and event driven programming applications and solve real world problems with OOPs concept.	9,10	K3

24HS3L2	PHYSICAL EDUCATION – II	L	T	P	C
		0	0	2	1

Objective:

To impart knowledge on gymnastic exercises and pressing needs for up skilling in a particular game.

Basic gymnastics exercises: Warming up, Suitable exercise, Lead up games, Safety education, Movement education, Balanced Walk, execution, floor exercise, tumbling/acrobatics, grip, release, swinging, horizontal bar exercise, flic-flac-walk

Up skilling in any one of the athletics: Broad Jump, High Jump, Triple Jump, Relay Sprints, Javelin Throw, Discuss Throw, Shot Put, Short and Long-distance Running.

Advance skills in any one of the indoor/outdoor games, which has been opted by the student in the previous semester.

TOTAL: 30 PERIODS

References:

1. Singh, A. (2008). Essentials of physical education. Kalyani Publishers.
2. Kamlesh, M. L. (2006). Psychology in physical education and sport (3rd ed.). Metropolitan Book Co.
3. Mangal, S. K. (2009). Psychology of sports performance. Sports Publication.
4. Kandappan, K. (2004). Foundations of physical education. Friends Publications.

E-resources: 1. <https://www.who.int/health-topics/physical-activity>

KLNCE UG CSE(CS) R2024 (AY 2025 – 2026 admitted)

2. Spiegel.M.R.,Schiller.J and Srinivasan.R.A., "Schaum's Outline of Theory and Problems of Probability and Statistics", Tata McGrawHill,3rdEdition,2004.
3. Walpole.R.E.,Myers.R.H.,Myers.S.L. and Ye.K., "Probability and Statistics for Engineers and Scientists",Pearson Education,Asia,8thEdition,2011.
4. Gupta.S.C., Kapoor.V.K,, "Fundamental of Mathematical Statistics", Sultanch and & Sons Educational Publishers, New Delhi, Reprint 2013.

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

Course Name : PROBABILITY AND STATISTICS		Course Code : 24BS402	
CO	Course Outcomes	Unit	K –CO
C209.1	Build the parameters of statistical distributions using basic probability theory concepts.	I	K3
C209.2	Calculate the statistical measures for two dimensional random variables.	II	K3
C209.3	Apply the concepts of testing of hypothesis for large and small samples.	III	K3
C209.4	Apply the basic concepts of design of experiments in the field of agriculture.	IV	K3
C209.5	Use control charts for quality control problems.	V	K3

OUTCOMES:

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

Course Name : DATABASE MANAGEMENT SYSTEMS		Course Code : 24CS401	
CO	Course Outcomes	Unit	K –CO
C210.1	Illustrate the fundamental elements of relational database management systems and also ability to design the database using ER modeling.	I	K3
C210.2	Apply SQL queries to interact with database.	II	K3
C210.3	Apply normalization to design the database efficiently through elimination of anomalies	III	K3
C210.4	Analyze database transactions and can control them by applying ACID properties and Summarize concurrency control protocols.	IV	K3
C210.5	Illustrate database storage structures and access techniques: file organization, indexing methods including B+ tree and hashing.	V	K3

24CS403	COMPUTER NETWORKS	L	T	P	C
		3	0	0	3

OBJECTIVES:

- To understand the concept of layering and functions of each layers of the protocol suit
- To be familiar with the components required to build different types of networks
- To learn concepts related to network addressing and routing
- To familiarize the functions and protocols of the layer of Transport layer
- To understand the working of various application layer protocols

Unit - I INTRODUCTION TO NETWORKS 8

Network Introduction: Evolution of Computer Networks, Classification of computer Networks LAN, WAN, MAN, Software Defined Networks (SDN), Network Topology: BUS, STAR, RING, MESH, OSI Layered Architecture, TCP/IP Protocol Suite.

Unit - II MEDIA ACCESS & INTER NETWORKING 12

Medium Access Control Techniques: Random, Round Robin, Reservation: ALOHA Pure and Slotted, CSMA/CD-CSMA/CA- Ethernet-Token Ring-Token Bus-ARQ 3 Types, Data Link Layer design issues: Error Detection Codes, Parity Check, Checksum Error Correction Codes, Hamming codes, IEEE Standards: Bluetooth (802.15), Basic Internetworking: IP - CIDR - ARP -DHCP - ICMP.

Unit - III NETWORK DEVICES AND NETWORK LAYER 8

Network Devices: Router, Switch, HUB, Bridge, Routing: Static Routing, Dynamic Routing, Categories of Routing – RIP v1 and RIP v2 –IPV4 Addressing - IPV6 Addressing

Unit - IV TRANSPORT LAYER 9

Overview of Transport layer: UDP - Reliable byte stream (TCP), Connection Management: Flow control – Retransmission – TCP Congestion control, Congestion avoidance:

Unit - V APPLICATION LAYER 8

Traditional applications: SSH – HTTP – FTP –DNS – SNMP – Telnet

CLASS HOURS: 45 PERIODS TERM HOURS: 45 PERIODS TOTAL: 90 PERIODS

TEXT BOOKS:

1. Behrouz A. Forouzan, Data Communications and Networking, Fifth Edition TMH, 2013.
2. William Stallings, Data and Computer Communications, Tenth Edition, Pearson Education, 2013.

REFERENCES

1. Larry L. Peterson, Bruce S. Davie, Computer Networks: A Systems Approach, Fifth Edition, Morgan Kaufmann Publishers Inc., 2012.
2. Nader F. Mir, Computer and Communication Networks, Second Edition, Prentice Hall, 2014.
3. Ying-Dar Lin, Ren-Hung Hwang and Fred Baker, Computer Networks: An OpenSource Approach, McGraw Hill Publisher, 2011.

KLNCE UG CSE(CS) R2024 (AY 2025 – 2026 admitted)

4. James F. Kurose, Keith W. Ross, Computer Networking, A Top-Down Approach Featuring the Internet, Sixth Edition, Pearson Education, 2013.

OUTCOMES:

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

Course Name : COMPUTER NETWORKS		Course Code : 24CS403	
CO	Course Outcomes	Unit	K –CO
C211.1	Identify the different types of computer networks and their layered architectures to determine suitable networking solutions.	I	K3
C211.2	Analyze various MAC techniques and apply link-layer error-handling methods in communication scenarios.	II	K4
C211.3	Apply routing concepts to evaluate the functioning of network devices and analyze IPv4/IPv6 addressing schemes	III	K4
C211.4	Generalize the transport-layer mechanisms by applying TCP/UDP concepts to real-time data transmission problems	IV	K4
C211.5	Illustrate application-layer protocols to analyze how common network services enable end-to-end communication.	V	K4

REFERENCES:

1. D. K. Bhattacharyya and J. K. Kalita, Network Anomaly Detection: A Machine Learning Perspective, 1st Edition, Chapman and Hall/CRC, 2013.
2. Stephen Marsland, “Machine Learning: An Algorithmic Perspective”, CRC Press, 2009.
3. Mehryar Mohri, Afshin Rostamizadeh and Ameet Talwalkar, “Foundations of Machine Learning”, MIT Press, 2012

OUTCOMES:

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

Course Name : MACHINE LEARNING FOR CYBER SECURITY		Course Code : 24SC401	
CO	Course Outcomes	Unit	K –CO
C212.1	Identify the category of the learning problem, apply linear regression and measure it's performance like recall, precision and F-Measure	I	K3
C212.2	Apply the classification algorithms like KNN, Decision Tree, Naive Bayes to classify the data set...	II	K4
C212.3	Apply unsupervised algorithms namely K-means and PCA to cluster the given data set.	III	K4
C212.4	Understand the concept of network and malware analysis to measure the efficacy	IV	K2
C212.5	Identify and analyze the problem in phishing & spam detection and Implement network cyber threat detection using suitable machine learning techniques.	V	K3

REFERENCES

1. Learning Ne04j 3.x – Second Edition Jerome Baton , Rik Van Bruggen, Packet Publishing
2. Easley D. Kleinberg J., “Networks, Crowds, and Markets – Reasoning about a Highly Connected World”, Cambridge University Press, 2010.
3. Jackson, Matthew O., “Social and Economic Networks”, Princeton University Press, 2008.
4. GuandongXu ,Yanchun Zhang and Lin Li, “Web Mining and Social Networking – Techniques and applications”, First Edition, Springer, 2011.
5. Dion Goh and Schubert Foo, “Social information Retrieval Systems: Emerging Technologies and Applications for Searching the Web Effectively”, IGI Global Snippet, 2008.
6. Max Chevalier, Christine Julien and Chantal Soulé-Dupuy, “Collaborative and Social Information Retrieval and Access: Techniques for Improved user Modeling”, IGI Global Snippet, 2009.
7. John G. Breslin, Alexander Passant and Stefan Decker, “The Social Semantic Webl, Springer, 2009

OUTCOMES:

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

Course Name : SOCIAL NETWORK SECURITY		Course Code : 24SC402	
CO	Course Outcomes	Unit	K –CO
C213.1	Develop semantic web related simple applications	I	K3
C213.2	Address Privacy and Security issues in Social Networking	II	K3
C213.3	Apply tools and algorithms to detect communities in social network and evaluate it	III	K3
C213.4	Predict human behavior for social communities	IV	K3
C213.5	Describe the applications of social networks	V	K2

24CS404	OPERATING SYSTEMS	L	T	P	C
		3	0	2	4

OBJECTIVES:

- To understand the basic concepts and functions of operating systems.
- To understand Processes, Threads and Scheduling algorithms.
- To understand the concept of Deadlocks.
- To analyze various memory and I/O management schemes.
- To study various operating systems like Distributed OS, Real-Time OS, Virtual machine and basic concepts of virtualization.

UNIT-I OPERATING SYSTEM OVERVIEW 6

Operating System Overview - Objectives and Functions, Evolution of Operating Systems, Operating System Structure and Operations- System Calls, System Programs, Operating Systems Generation and System Boot.

LAB COMPONENT 6

- Basic Linux Commands and Overview
- Write Shell Script to experiment with system calls like fork, grep, pipe, open, create read, write, etc.

UNIT-II PROCESS MANAGEMENT AND CONCURRENCY CONTROL 10

Processes - Process Concept and Scheduling, Operations on Processes, Inter Process Communication - CPU Scheduling - Scheduling criteria, Scheduling algorithms; Threads- Overview, Multithreading models, Threading issues - Process Synchronization - The critical-section problem, Mutex locks, Semaphores, Classic problems of synchronization, critical region, Monitors.

LAB COMPONENT 6

- Implementation of FCFS, SJF, Round Robin, Priority Scheduling Algorithms and analyzing their performance
- Implement semaphore for solving producer-consumer problem using threads.

UNIT - III DEADLOCK AND STORAGE MANAGEMENT 10

Deadlock - System model, Deadlock characterization, Methods for handling deadlocks, Deadlock prevention, Deadlock avoidance, Deadlock detection, Recovery from deadlock; Main Memory - Background, Swapping, Contiguous Memory Allocation, Paging, Segmentation; Virtual Memory - Background, Demand Paging, Page Replacement, Allocation, Thrashing - Allocating Kernel Memory.

LAB COMPONENT 6

- Simulate situations for testing Deadlock avoidance algorithm.
- Implementation Of FIFO, LRU, Optimal Page Replacement Algorithms

UNIT - IV MASS STORAGE AND FILE SYSTEMS 10

Overview of Mass Storage System and Structure- Disk Structure, Disk Scheduling and Management Swap space management; File-System-Interface- File concept, Access methods, File Sharing and Protection, Allocation Methods, Free Space Management; Directory- Structure, organization, implementation.

LAB COMPONENT 6

- Implementation of Directory organizations like - single, two-level, hierarchy
- Implementation of Allocation methods used for files like - sequential, indexed, linked

24CS4L1	DATABASE MANAGEMENT SYSTEMS LABORATORY	L	T	P	C
		0	0	3	1.5

OBJECTIVES:

- To write and debug Database commands.
- To implement advanced query in Database tool.
- To use functions and procedures for implementing simple logics in Database.
- To design real time applications using front end tool and Database.
- To implement Database connectivity for real time application.

LIST OF EXPERIMENTS

1. Implementation of Data Definition and Data Manipulation Language Commands of SQL with suitable examples.
2. Implementation of Data Control and Transaction Control Language Commands of SQL with suitable examples.
3. Implementation of Aggregate Functions and Set Operations with suitable examples.
4. Implementation of different types of constraints and Group by, Order by, Having clause with suitable examples
5. Implementation of different types of Joins with suitable examples.
6. Implementation of Nested Sub queries and Views.
7. Study of PL/SQL programs
8. PL/SQL - procedures
9. PL/SQL - Functions
10. PL/SQL – Triggers and Cursor
11. Front end application development – Create Forms, Menu and Reports.
12. Implementation of Database Connectivity

PLATFORM NEEDED: Oracle/Mysql/Visual Basics/Netbeans IDE

TOTAL: 45 PERIODS

COURSE OUTCOMES:

Upon completion of the course, the students will be able to

Course Name : DATABASE MANAGEMENT SYSTEMS LABORATORY		Course Code : 24CS4L1	
CO	Course Outcomes	Exp. No.	K –CO
C215.1	Develop simple Database using DDL, DML and TCL commands.	1,2,3	K3
C215.2	Create Relational Database for real time application through Database constraints.	4	K3
C215.3	Write and execute nested sub queries and join queries with privileges.	5,6	K3
C215.4	Develop PL/SQL programs using Procedure, Functions, Triggers and Cursor.	7,8,9,10	K3
C215.5	Design real time applications with Database Connectivity.	11,12	K3

24CS4L2

COMPUTER NETWORKS LABORATORY

L	T	P	C
0	0	3	1.5

OBJECTIVES:

- To learn and use network commands.
- To learn socket programming.
- To implement and analyze various network protocols.
- To learn and use simulation tools.
- To use simulation tools to analyze the performance of various network protocols.

LIST OF EXPERIMENTS

1. Study of Network Devices
2. Identify the IP address of a workstation and the class of the address and configure the IP Address on a workstation.
3. Learn to use commands like TCP dump, netstat, ifconfig, nslookup and traceroute. Capture ping and trace route PDUs using a network protocol analyzer and examine.
4. Configure a Network topology using packet tracer software
5. Write a code simulating ARP /RARP protocols
6. Configure Network using Link State Vector Routing protocol & Distance Vector Routing protocol.
7. Echo client and server Applications using TCP sockets
8. Chat Applications using UDP sockets
9. File Transfer Applications using TCP sockets
10. Simulation of DNS using UDP sockets

LABORATORY REQUIREMENT FOR BATCH OF 30 STUDENTS:

1. Windows 7 or higher
2. C / C++ / Java / Python / Equivalent Compiler
3. Network simulator Cisco Packet Tracer/GNS3

TOTAL: 45 PERIODS

OUTCOMES:

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

Course Name : COMPUTER NETWORKS LABORATORY		Course Code : 24CS4L2	
CO	Course Outcomes	Exp. No.	K –CO
C216.1	Demonstrate the configuration of network devices and IP addressing in basic networking scenarios	1,2	K3
C216.2	Use network diagnostic commands and tools to examine, capture, and interpret protocol operations	3	K3
C216.3	Demonstrate network topologies and protocol behaviors using simulation tools such as Packet Tracer.	4	K3
C216.4	Make use of routing and address-resolution protocols (ARP, RARP, LS, DV) to validate network connectivity and routing decisions	5,6,7	K3
C216.5	Develop client–server network applications using TCP and UDP socket programming	8,9,10	K3

