K.L.N. COLLEGE OF ENGINEERING

Pottapalayam-630612, Sivagangai District

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

Estd: 1994

THIRD SEMESTER

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 2024-2025 onwards)

K.L.N. COLLEGE OF ENGINEERING, POTTAPALAYAM

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

VISION OF THE INSTITUTION

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

MISSION OF THE INSTITUTION

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

VISION OF THE DEPARTMENT

To 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 an ever changing technologies 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

K.L.N. COLLEGE OF ENGINEERING, POTTAPALAYAM

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

PROGRAM OUTCOMES

PO1. Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO2. Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO3. Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO4. Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO5. Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

PO6. The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO7. Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO8. Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO9. Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO10. Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO11. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

K.L.N. COLLEGE OF ENGINEERING, POTTAPALAYAM

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

REGULATIONS 2024

For Under Graduate Program

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

CHOICE BASED CREDIT SYSTEM

CATEGORY OF COURSES

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

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

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

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

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

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

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

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

K.L.N. COLLEGE OF ENGINEERING, POTTAPALAYAM – 630 612

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

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

REGULATIONS – 2024

CURRICULUM AND SYLLABUS

CHOICE BASED CREDIT SYSTEM

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), 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), 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), 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), 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), 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), 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*
TOTAL				**30**	**16**	**2**	**12**	**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**

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 – Iterative methods 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

TOTAL: 45+15 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", KhannaPublishers, 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.
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

HoD/CSE(CS)

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.

TOTAL: 45 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 Cyberlaw 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. Cybersecurity 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	Derive 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

HoD/CSE(CS)

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 NTRODUCTION 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 – DeQueue – 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

TOTAL:45 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. StephenG.Kochan, —ProgramminginC,3rd edition,PearsonEducation,2005.
2. Ellis Horowitz, SartajSahni, Susan Anderson-Freed, —Fundamentals of Data Structures inC,2nd Edition,UniversityPress,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 soring algorithms and implement hashing mechanism for data access.	V	K3

HoD/CSE(CS)

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 ANDI/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.

TOTAL: 45 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 programmers‖, 3rd Edition, Pearson, 2015.
3. Steven Holzner, —Java 2 Black book‖, Dreamtech press, 2011.
4. Timothy Budd, —Understanding Object-oriented programming with Java‖, 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 JavaFX components and controls for developing GUI based applications	V	K3

HoD/CSE(CS)

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.

TOTAL: 30 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

HoD/CSE(CS)

24CS303 FUNDAMENTALS OF DIGITAL PRINCIPLES **L T P C**
3 0 2 4

OBJECTIVES:

- To design digital circuits using simplified Boolean function
- To design and analyze combinational circuits
- To design and analyze synchronous and asynchronous sequential circuits
- To understand Memory and Programmable Logic Devices

UNIT– I BOOLEAN ALGEBRA AND LOGIC GATES **9**

Number Systems - Arithmetic Operations - Binary Codes- Boolean Algebra and Logic Gates -Theorems and Properties of Boolean Algebra - Boolean Functions - Canonical and Standard Forms - Simplification of Boolean Functions using Karnaugh Map - Logic Gates — NAND and NOR Implementations.

PRACTICAL ACTIVITY **6**

1. Verification of Boole and Theorems using basic gates
2. Design and implementation of combinational circuits using basic gates for arbitrary functions.
3. Design and implementation of code converters.

UNIT– II COMBINATIONAL LOGIC **9**

Combinational Circuits – Analysis and Design Procedures - Binary Adder-Subtractor – Decimal Adder - Magnitude Comparator - Decoders – Encoders – Multiplexers.

PRACTICAL ACTIVITY **6**

1. Design and implement Half/Full Adder and Subtractor.
2. Design and implement combinational circuits using MSI devices:
3. Magnitude Comparator
4. Multiplexers

UNIT–III SYNCHRONOUS SEQUENTIAL LOGIC **9**

Sequential Circuits - Storage Elements: Latches, Flip-Flops-Characteristic table-Excitation table-Characteristic equation-Conversion of one flip-flop into another - Analysis of Clocked Sequential Circuits - State Reduction and Assignment - Design Procedure - Registers and Counters.

PRACTICAL ACTIVITY **6**

1. Design and implement shift registers.
2. Design and implement synchronous counters.

UNIT– IV ASYNCHRONOUS SEQUENTIAL LOGIC **9**

Analysis and Design of Asynchronous Sequential Circuits–Reduction of State and Flow Tables– Race - Free State Assignment–Hazards.

PRACTICAL ACTIVITY **6**

1. Design and implement asynchronous counters.

2.

UNIT– V MEMORY AND PROGRAMMABLE LOGIC 9

RAM – Error Detection and Correction – ROM - Programmable Logic Array — Programmable Array Logic.

PRACTICAL ACTIVITY 6

1. Design and implementation of a simple real time digital system(Mini Project).

TOTAL: 45+30 PERIODS

TEXTBOOKS:

1. M.MorrisR.Mano, MichaelD.Ciletti,—"Digital Design: With an Introduction to the Verilog HDL, VHDL, and System Verilog",6thEdition,PearsonEducation,2018.
2. Dr.P. Leach and A.P.Malvino, "Digital Principles and Applications",TataMcGrawHill, 2011.

REFERENCES:

1. G.K.Kharate, Digital Electronics, OxfordUniversityPress,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, TataMcGrawHill,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

HoD/CSE(CS)

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.**	**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

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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 JavaDoc comments for documentation. Your implementation should use efficient representation for a rational number, i.e. (500 / 1000) should be represented as (½). 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 { TwoWheeler, FourWheeler } or { GearedVehicle, NonGearedVehicle }.
5. Write a Java Program to create an abstract class named Shape that contains two integers and an empty method named printArea(). 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 printArea( ) 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 JavaFX 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**	**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

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24HS3L1 APTITUDE AND SOFT SKILLS – II

L	T	P	C
0	0	2	1

Module I Aptitude Skills II **15**

Pipes and cisterns, boats and streams, Problems on trains, Alpha Numeric Puzzles, Simple Interest, Compound Interest, Mixtures and Allegations, calendar, clock, permutation and combination, probability, height and distance.

Module II Soft Skills II **15**

Introduction to Soft skills – Non-Verbal Communication - Role play - Learning styles – Writing Bio-data and Process description - Peak Life Moment / Challenging moment - People management – team work, leadership, Decision making – problem identification - Email and Essay writing - Just a minute (JAM).

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

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