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 (IOT)

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 evolve in the field of Computer Science & Engineering through sustainable technical education with innovative research and to foster competent professionals to serve and lead the society

MISSION OF THE DEPARTMENT

- Imparting demand based proficient education through quality teaching – learning process in tune with the interdisciplinary needs of global work environment.
- Inculcating the attitude of continuous learning through industry institution interaction, consultancy and research activities.
- Cultivating professionalism, ethics and integrity of character for positive contributions to society.

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

PROGRAM EDUCATIONAL OBJECTIVES

PEO I	Contribute effectively to the society by applying principles of Computer Science and Engineering for analyzing the real world problems to produce optimal and sustainable technical solutions.
PEO II	Sustain as good professionals by pursuing career / advanced studies and practice innovation in emerging technologies and current trends through lifelong learning.
PEO III	Build professionalism, team work, effective communication, ethical values and leadership qualities**.**

PROGRAM SPECIFIC OUTCOMES

PSO 1	Ability to apply good analytical design and implementation skills to formulate and solve scientific and business applications pertaining to Algorithms, Computer Systems, Networks, Security, Data Analytics and Artificial Intelligence.
PSO 2	Ability to update knowledge continuously in various domains like Virtualization, Mobile Application Development, Data Visualization, Machine Learning and Technologies like Storage, Computing, Communication to meet the industry requirements.

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

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
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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 areas 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 areas 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

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REGULATIONS 2024

For Under Graduate Program

B.E. COMPUTER SCIENCE AND ENGINEERING (IOT)

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 branches which a student can choose from the list specified in the curriculum of the students B.E. / B.Tech. Programmes.

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

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

K.L.N. COLLEGE OF ENGINEERING, POTTAPALAYAM
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B.E. COMPUTER SCIENCE AND ENGINEERING (IOT)
REGULATIONS 2024
CHOICE BASED CREDIT SYSTEM
CURRICULUM AND SYLLABUS
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, B.E. CSE(CS) , B.E. CSE (IoT), B.Tech IT & B.Tech AIDS programmes)**	BS	4	3	1	0	4
2	24CS301	Object Oriented Programming **(Common to B.E. CSE, B.E. CSE(CS) , B.E. CSE (IoT) and B.Tech IT programmes)**	PC	3	3	0	0	3
3	24IT301	Data Structures and Algorithms (Common to B.E CSE(CS), B.E CSE(IoT),B.Tech IT and B.Tech AIDS Programmes)	PC	3	3	0	0	3
4	24CS304	Computer Organization and Architecture	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, B.E. CSE(CS) , B.E. CSE (IoT), and B.Tech IT programmes)**	PC	5	3	0	2	4
PRACTICAL								
7	24CS3L1	Object Oriented Programming Laboratory (Common to B.E. CSE, B.E. CSE(CS) , B.E. CSE (IoT) and B.Tech IT programmes)	PC	4	0	0	4	2
8	24IT3L1	Data Structures and Algorithms Laboratory (Common to B.E CSE(CS),CSE(IoT),B.Tech IT and B.Tech AIDS 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**	**17**	**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 Hall of 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(IOT)

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.

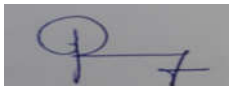
REFERENCES:

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**
C202.1	Apply the concepts of classes and objects to solve simple problems	I	K3
C202.2	Develop programs using inheritance, packages and interfaces	II	K3
C202.3	Make use of exception handling mechanisms , I/O packages and string classes	III	K3
C202.4	Build Java applications with generics concept and multithreaded model .	IV	K3
C202.5	Build Java applications with the concepts of event handling and Java FX components and controls for developing GUI based applications	V	K3



HOD/CSE(IOT)

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 and their analysis.

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 – 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

TEXT BOOKS

1. Reema Thareja, — Data Structures Using C, Third 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 – Introductionto Algorithms, MIT Press, 3rd edition, 2009.

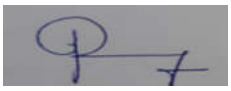
REFERENCES:

1. Stephen G. Kochan, —Programming in C, 3rd edition, Pearson Education,2005.
2. Ellis Horowitz, SartajSahni, 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 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(IOT)

24CS304	COMPUTER ORGANIZATION AND ARCHITECTURE	L	T	P	C
		3	0	0	3

OBJECTIVES:

- To learn the fundamentals of a computer system and operations.
- To learn the arithmetic and logic unit and implementation of fixed-point and floating point arithmetic unit.
- To learn the basics of pipelined execution.
- To understand parallelism and multi-core processors.
- To understand the memory hierarchies and different ways of communication with I/O devices.

UNIT - I FUNDAMENTALS OF A COMPUTER SYSTEM 9

Functional Units – Basic Operational Concepts- Bus structures – Performance Metrics – Instructions: Language of the Computer – Operations, Operands – Instruction Set Architecture- Instruction representation- RISC and CISC Architectures – Amdahl's Law – Logical operations – decision making – MIPS Addressing.

UNIT - II ARITHMETIC FOR COMPUTERS 9

ALU design - Addition and Subtraction – Multiplication – Division – Floating Point Representation – Floating Point Operations – Subword Parallelism.

UNIT - III PROCESSOR AND CONTROL UNIT 9

Components of the Processor - Hardwired control – Micro programmed control – Nano programming-A Basic MIPS implementation – Building a Datapath – Control Implementation Scheme – Pipelining – Pipelined datapath and control – Hazards – Structural, Data and Control Hazards –Exception handling.

UNIT - IV PARALLELISIM 9

Parallel processing challenges – Instruction Level Parallelism - Exploitation of more ILP – Hardware and Software Approaches – Dynamic Scheduling – Speculation – Compiler Approaches – Multiple Issue Processors - ILP and Thread Level Parallelism-Flynn's classification – SISD, MIMD, SIMD, SPMD, and Vector Architectures - Hardware multithreading – Multi-core processors and other Shared Memory Multiprocessors.

UNIT - V MEMORY & I/O SYSTEMS 9

Memory Hierarchy - memory technologies – cache memory – measuring and improving cache performance – virtual memory- Memory management techniques – Associative memories - TLB's – Accessing I/O Devices – Interrupts – Direct Memory Access.Case Study: Design of Memory Systems using Raspberry Pi.

TOTAL: 45 PERIODS

TEXT BOOKS:

1. David A. Patterson and John L. Hennessy, Computer Organization and Design: The Hardware/Software Interface, Fifth Edition, Morgan Kaufmann /Elsevier, 2014.
2. Carl Hamacher, Zvonko Vranesic, Safwat Zaky and Naraig Manjikian, Computer Organization and Embedded Systems, Sixth Edition, Tata McGraw Hill, 2012.

REFERENCES:

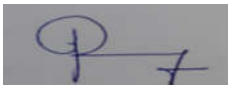
1. John L. Hennessey and David A. Patterson, Computer Architecture – A Quantitative Approach, Morgan Kaufmann / Elsevier Publishers, Fifth Edition, 2012.
2. John P. Hayes, Computer Architecture and Organization, Third Edition, Tata McGraw Hill, 2012.
3. William Stallings, Computer Organization and Architecture – Designing for

Performance, Eighth Edition, Pearson Education, 2010.
4. Learning Computer Architecture using Raspberry pi – Eben Upton, Jeffrey Duntemann 2016 (1st Edition)

OUTCOMES:

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

Course Name : COMPUTER ORGANIZATION AND ARCHITECTURE		**Course Code : 24CS304**	
CO	**Course Outcomes**	**Unit**	**K-CO**
C204.1	Explain the computer organization components, instructions and addressing modes.	1	K2
C204.2	Compute the arithmetic operations such as Addition, Subtraction, Multiplication and Division.	2	K3
C204.3	Discuss the basics of MIPS implementation and pipelining.	3	K2
C204.4	Illustrate the basic concepts of parallelism and multi-core processor.	4	K2
C204.5	Utilize Raspberry-pi for demonstrating memory systems.	5	K3



HOD/CSE(IOT)

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: 15+15 PERIODS

TEXT BOOKS:

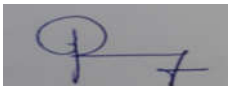
1. R.R. Gaur, R. Asthana, G.P. Bagaria, A Foundation Course in Human Values and Professional Ethics, 2nd revised edition, Excel Books, New Delhi, Reprint 2019.
2. A N Tripathy, Human Values, New Age International Publishers, New Delhi, 2003.

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(IOT)

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 BOOLEANALGEBRAANDLOGICGATES **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.

PRACTICALACTIVITY **6**

1. Verification of Boole and Theorems using basic gates
2. Designandimplementationofcombinationalcircuitsusingbasicgatesforarbitrary functions.
3. Design and implementation of code converters.

UNIT– II COMBINATIONALLOGIC **9**

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

PRACTICALACTIVITY **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 SYNCHRONOUSSEQUENTIALLOGIC **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.

PRACTICALACTIVITY **6**

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

UNIT– IV ASYNCHRONOUSSEQUENTIALLOGIC **9**

AnalysisandDesignofAsynchronousSequentialCircuits–ReductionofStateandFlowTables –Race-FreeState Assignment–Hazards.

PRACTICALACTIVITY **6**

1. Design and implement asynchronous counters.

UNIT– V MEMORYANDPROGRAMMABLELOGIC **9**

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

PRACTICALACTIVITY **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",6th Edition,PearsonEducation,2018.
2. Dr.P. Leach and A.P.Malvino, "Digital Principles and Applications",TataMcGrawHill, 2011.

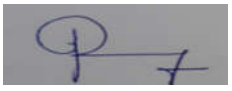
REFERENCES:

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.	III	K4
C206.5	Model memory arrays for any Boolean function with the help of PLA, PAL and PROM.	IV	K3



HOD/CSE(IOT)

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 (intn,charch) : To draw a filled square of side using 'n' character:
      Output:

      If n is A
      AAAA
      AAAA
      AAAA
      AAAA

      Void Polygan(intx,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:

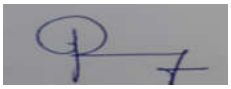
*
**
***
****

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 JavaFX controls, layouts and menus and Use JDBC Connections.
10. Develop a mini project for any application using Java concepts.

TOTAL: 60 PERIODS

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

Course Name : OBJECT ORIENTED PROGRAMMING LABORATORY		**Course Code : 24CS3L1**	
CO	**Course Outcomes**	**Expt.No.**	**K-CO**
C207.1	Design and develop java programs using object oriented programming concepts	1,2,3	K3
C207.2	Develop simple applications using polymorphism, abstract class and interface	4,5	K3
C207.3	Develop simple applications using the concepts – Packages and Exceptions.	6, 7	K3
C207.4	Implement the concept of multithreading.	8	K3
C207.5	Create GUIs and event driven programming applications and solve real world problems with OOPs concept.	9,10	K3



HOD/CSE(IOT)

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

LISTOFEXPERIMENTS

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 post fix 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

Software Requirement: Sublime editor/TurboC **TOTAL: 60 PERIODS**

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**	**Expt.No.**	**K – CO**
C208.1	Compute various operations on list by using Array and Linked list	1,2,4,5,8,15	K3
C208.2	Manipulate Linear Search and Binary search	3	K3
C208.3	Compute graph representation and Traversal algorithms	6,7,9	K3
C208.4	Implement Graph algorithms: Dijkstra algorithm- Floyd Warshall Algorithm- Prims and Kruskal algorithm	10,11	K3
C208.5	Examine various sorting and hashing algorithms.	12,13,14	K3

HOD/CSE(IOT)

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.

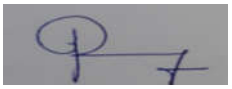
Module II Soft Skills II **15**

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



HOD/CSE(IOT)