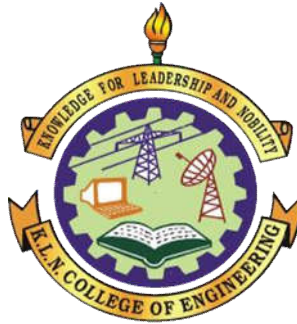


K.L.N.COLLEGE OF ENGINEERING

Pottapalayam – 630612, Sivagangai District

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



Estd:1994

THIRD SEMESTER CURRICULUM & SYLLABUS

REGULATIONS 2024

For Under Graduate Program

B.Tech. ARTIFICIAL INTELLIGENCE AND DATA SCIENCE

CHOICE BASED CREDIT SYSTEM

(For the students admitted from the academic year 2024-2025 onwards)



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



VISION OF THE INSTITUTION

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

MISSION OF THE INSTITUTION

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

VISION OF THE DEPARTMENT

- To become a centre of Excellence in producing competent and futuristic professionals in Artificial Intelligence and Data Science through quality Education and Research to the Society and Industry.

MISSION OF THE DEPARTMENT

- To produce intellectual, innovative and ethical professionals by imparting technical and industry oriented skills with ethical values in Artificial Intelligence and allied areas to pursue their career in Industry and Research.



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



PROGRAM SPECIFIC OUTCOMES (PSOs)

PSO 1: Ability to apply major key algorithms, techniques and theoretical findings in the field of Artificial Intelligence, Machine Learning and Deep Learning.

PSO 2: Ability to incorporate data science theories and methodologies into new research in data management, data visualization, and statistical analysis of data.

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

PEO 1: To excel in professional career and pursue higher education in the field of artificial intelligence and data science.

PEO 2: To apply their knowledge and skills to develop innovative solutions for real world problem through lifelong learning.

PEO 3: To excel as socially committed engineers or entrepreneurs with good communication and team work skills with high regard to ethical and moral values.



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



Knowledge and Attitude Profile (WK)

WK1: A systematic, theory-based understanding of the natural sciences applicable to the discipline and awareness of relevant social sciences.

WK2: Conceptually-based mathematics, numerical analysis, data analysis, statistics and formal aspects of computer and information science to support detailed analysis and modelling applicable to the discipline.

WK3: A systematic, theory-based formulation of engineering fundamentals required in the engineering discipline.

WK4: Engineering specialist knowledge that provides theoretical frameworks and bodies of 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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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)



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REGULATIONS 2024

For Under Graduate Program

B.Tech. ARTIFICIAL INTELLIGENCE AND DATA SCIENCE

CHOICE BASED CREDIT SYSTEM

CATEGORY OF COURSES

- i. **Humanities and Social Sciences(HS) Courses** include Technical English, Environmental Science and Engineering ,Engineering Ethics and human values, Communication Skills and Management courses.
- ii. **Basic Sciences(BS) Courses** include Mathematics, Physics, and Chemistry.
- iii. **Engineering Sciences (ES) Courses** include Engineering Practices, Engineering Graphics, Basics of Electrical / Electronics / Mechanical / Computer Engineering /Instrumentation etc.
- iv. **Professional Core (PC) Courses** include the core courses relevant to the chosen programme of study.
- v. **Professional Elective (PE) Courses** include the elective courses relevant to the chosen programme of study.
- vi. **Open Elective(OE)Courses** include courses from other departments which a student can choose from the list specified in the curriculum of the students B.E. /B.Tech. Programmes.
- vii. **Employability Enhancement Courses(EEC)**include Project Work and/or Internship, Seminar, Professional Practices, Case Study and Industrial/Practical Training.
- viii. **Mandatory 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
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B.Tech. ARTIFICIAL INTELLIGENCE AND DATA SCIENCE
REGULATIONS 2024
SEMESTER III

S.No.	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
THEORY								
1	24BS303	Linear Algebra and Numerical Methods <small>(Common to B.E.CSE,B.E.CSE(CS),B.E.CSE(IoT) , B.Tech.IT and B.Tech.AIDS)</small>	BS	4	3	1	0	4
2	24AD301	Foundations of Data Science	PC	3	3	0	0	3
3	24AD302	Principles of Digital System	PC	3	3	0	0	3
4	24IT301	Data Structures and Algorithms <small>(Common to B.E.CSE(CS),B.E.CSE(IoT),B.Tech IT and B.Tech AIDS Programme)</small>	PC	3	3	0	0	3
5	24HS301	Human Values and Ethics <small>(Common to all B.E / B.Tech Programmes)</small>	HS	2	1	1	0	2
THEORY CUM PRACTICAL								
6	24CS305	Object oriented programming using java	PC	5	3	0	2	4
PRACTICAL								
7	24AD3L1	Data Science Laboratory	PC	4	0	0	4	2
8	24IT3L1	Data Structures and Algorithms Laboratory <small>(Common to B.E.CSE(CS),B.E.CSE(IoT),B.Tech IT and B.Tech.AIDS Programme)</small>	PC	4	0	0	4	2
9	24HS3L1	Aptitude and Soft Skills – II <small>(Common to all B.E / B.Tech Programmes)</small>	EEC	2	0	0	2	1*
TOTAL				30	16	2	12	23

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 EIGEN VALUE 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 - Bashforth 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", Khanna Publishers, New Delhi, 10th Edition, 2015

REFERENCES:

1. Lay.D.C., "LinearAlgebraandit'saApplications", PearsonEducation, 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",PHILearning Pvt.Ltd,5th Edition,2018.
- 4.Sankara Rao. K., "Numerical Methods for Scientists and Engineers", Prentice Hall ofIndia Pvt.Ltd,5th Edition,New Delhi,2007.
5. Veerarajan.T,Ramachandran.T,"Numerical Methods With Programs In C", Tata McgrawHill Publishing Company Limited,8th Edition, Reprint2011.

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	V	K3

HOD/AI&DS

24AD301	FOUNDATIONS OF DATA SCIENCE	L	T	P	C
		3	0	0	3

OBJECTIVES:

- Learn the data analysis basics with Python
- Study Data Analysis and interpretation with Numpy on statistical parameters
- Understand various methods of Data Preparation and Manipulation with Pandas
- Learn about the relationship between data.
- Learn Data Visualization using matplotlib and seaborn

UNIT-I INTRODUCTION TO DATA ANALYSIS 9

Data Analysis - Mathematics and Statistics Basic Concepts - The Data Analysis Process - Data Extraction -Data Preparation- Data Exploration/Visualization -Predictive Modeling-Model Validation- Quantitative and Qualitative Analysis.

UNIT-II INTRODUCTION TO NUMPY 9

Python data types - NumPy Arrays with Computations - Aggregations: Min, Max, and Everything In Between-Broadcasting - Comparisons, Masks, and Boolean Logic – Sorting Arrays - Structured Data with NumPy's Arrays

UNIT-III DATA MANIPULATION WITH PANDAS 9

Introducing Pandas Objects - Data Indexing and Selection - Operating on Data in Pandas - Handling Missing Data - Hierarchical Indexing - Combining Datasets - Vectorized String Operations - Working with Time Series - High-Performance.

UNIT- IV DESCRIBING RELATIONSHIPS 9

Correlation –correlation coefficient for quantitative data –computational formula, correlation coefficient – Regression –regression line –least squares regression line – Standard error of estimate – interpretation of r^2 –multiple regression equations –regression towards the mean

UNIT-V VISUALIZATION WITH MATPLOTLIB 9

Various Plots - Simple Line - Scatter Plots - Error Visualization - Density and Contour Plots - Histograms, Binnings, and Density - Customizing Plots-Multiple Subplots – Three Dimensional Plotting in Matplotlib - Geographic Data with Basemap - Visualization with Seaborn

TOTAL: 45 PERIODS**TEXT BOOKS:**

1. Fabio Nelli 2015, Python DataAnalytics,Apress, USA.
2. Jake VanderPlas, 2016, Python Data Science Handbook: Essential Tools for Working with Data, O'Reilly Media, Inc
3. Robert S. Witte and John S. Witte, "Statistics", Eleventh Edition, Wiley Publications, 2017.

REFERENCES:

1. McKinney, W 2017, Python for Data Analysis, 2nd ed, O'Reilly Media, Inc.
2. John V Guttag 2013, Introduction to Computation and Programming Using Python, Revised and Expanded Edition, MIT Press.
3. Timothy A. Budd 2015, Exploring Python, Mc-Graw Hill Education Private Ltd. Reema Thareja, "Programming in C", Oxford University Press, Second Edition, 2016

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

COURSE NAME : FOUNDATIONS OF DATA SCIENCE		COURSE CODE : 24AD301	
CO	Course Outcomes	Unit	K –CO
C202.1	Determine the various data analysis process in data science	I	K2
C202.2	Apply data analysis and interpretation with Numpy on statistical parameters	II	K3
C202.3	Demonstrate various methods of Data Preparation and Manipulation with Pandas	III	K3
C202.4	Determine the knowledge on relationships between data.	IV	K2
C202.5	Apply visualization Libraries in Python to interpret and explore data	V	K3

HOD/AI&DS

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

Course Name : PRINCIPLES OF DIGITAL SYSTEM		Course Code : 24AD302	
CO	Course Outcomes	Unit	K-CO
C203.1	Apply Arithmetic operations in any number system and various techniques to simplify the Boolean function.	I	K3
C203.2	Build combinational circuits that perform arithmetic operations.	II	K3
C203.3	Design and Analyze Synchronous sequential circuits such as counters and registers.	III	K3
C203.4	Analyze asynchronous sequential circuits.	IV	K3
C203.5	Model memory arrays for any Boolean function with the help of PLD's	V	K3

HOD/AI&DS

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 – 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, 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 – Introduction to Algorithms, MIT Press, 3rd edition, 2009.

REFERENCES:

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

OUTCOMES:

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

COURSE NAME : DATASTRUCTURES AND ALGORITHMS		COURSE CODE : 24IT301	
CO	Course Outcomes	Unit	K –CO
C204.1	Describe Linear Data Structure and perform analysis framework	I	K3
C204.2	Implement the applications of stack and queue	II	K3
C204.3	Develop different types of trees and implement its applications	III	K3
C204.4	Implement various operations on graph and its applications	IV	K3
C204.5	Sort the data by using different types of soring algorithms and implement hashing mechanism for data access.	V	K3

HOD/AI&DS

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.

3+3**UNIT - I INTRODUCTION TO VALUE EDUCATION**

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/AI&DS

24CS305	OBJECT ORIENTED PROGRAMMING USING JAVA	L	T	P	C
		3	0	2	4

OBJECTIVES:

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

UNIT-I INTRODUCTION TO OOP AND JAVA FUNDAMENTALS 9

Object oriented programming– Abstraction–objects and classes–Encapsulation– Polymorphism–OOP in Java–Programming Structures in java – Defining classes in Java– Data Types, Variables and Arrays – Operators – Control Statements –Constructors-Methods -Access specifiers - Static members.

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. Packages and Interfaces: Packages –Packages and Member Access –Importing Packages – Interfaces.

UNIT-III EXCEPTION HANDLING AND MULTITHREADING 9

Exception Handling basics – Multiple catch Clauses – Nested try Statements – Java’s Built-in

Exceptions – User defined Exception. Multithreaded Programming: Java Thread Model– Creating a

Thread and Multiple Threads – Priorities – Synchronization – Inter Thread CommunicationSuspending –Resuming, and Stopping Threads.

UNIT- IV I/O, GENERICS AND STRING HANDLING 9

I/O Basics – Reading and Writing Console I/O – Reading and Writing Files. Generics: Generic Programming – Generic classes – Generic Methods – Bounded Types – Restrictions and Limitations. Strings: Basic String class, methods and String Buffer Class.

UNIT-V EVENT DRIVEN PROGRAMMING 9

JAVAFX Events and Controls: Event Basics – Handling Key and Mouse Events. Controls: Checkbox, ToggleButton – RadioButtons – ListView – ComboBox – ChoiceBox – Text Controls –ScrollPane. Layouts – FlowPane – HBox and VBox – BorderPane – StackPane – GridPane. Menus – Basics – Menu – Menu bars – MenuItem.

TOTAL: 45 PERIODS

PRACTICAL EXERCISES:

1. Write a program to implement the usage of constructors, static members with different datatypes.
2. Develop a java application with Employee class with Emp_name, Emp_id, Address, Mail_id, Mobile_no as members. Inherit the classes, Programmer, 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 fund. Generate payslips for the employees with their gross and net salary.
3. 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.
4. Solve the above problem using an interface.
5. Implement exception handling and creation of user defined exceptions.
6. Write a java program that implements a multi-threaded application that has three threads. First thread generates a random integer every 1 second and if the value is even, the second thread computes the square of the number and prints. If the value is odd, the third thread will print the value of the cube of the number.
7. Write a program to perform file operations.
8. Develop applications to demonstrate the features of generics classes.
9. Develop applications using JavaFX controls, layouts and menus.

TOTAL: 30 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.

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

COURSE NAME :OBJECT ORIENTED PROGRAMMING USING JAVA		COURSE CODE : 24CS305	
CO	Course Outcomes	Unit	K –CO
C206.1	Apply the principles of Object-Oriented Programming	I	K3
C206.2	Apply the concepts of inheritance and interfaces.	II	K3
C206.3	Apply use defined java exceptions and multithread.	III	K3
C206.4	Construct concepts of string handling, I/O packages and generics in java	IV	K3
C206.5	Develop event handling GUI based applications using JavaFX	V	K3

HOD/AI&DS

24AD3L1

DATA SCIENCE LABORATORY

L	T	P	C
0	0	4	2

- Learn the data analysis basics with Python
- Study Data Analysis and interpretation with Numpy on statistical parameters
- Understand various methods of Data Preparation and Manipulation with Pandas
- Learn Data Visualization using matplotlib and seaborn

LIST OF EXPERIMENTS:

1. NumPy Arrays Computations - Aggregations-Sorting -Arrays-Structured Data
2. Pandas Data frame- Manipulations from CSV
3. Data Acquisition using python web Scraping
4. Classification and tabulation of data and Graphical and diagrammatic presentation of data.
5. Perform calculations that measure the central tendency and dispersion of data and Implementation of measures of Skewness, moments and kurtosis.
6. Determination of point and interval estimates.
7. Solving linear regression, polynomial regression and non-linear regression based problems and solving multiple regression and correlation analysis based problems.
8. Solving the problems based on Time series analysis and forecasting and implementing statistical quality control charts.
9. Visualizing Geographic Data with Basemap.
10. Mini Project.

TOTAL: 60 PERIODS

Software Requirement: Jupyter Notebook/Python

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

COURSE NAME :DATA SCIENCE LABORATORY		COURSE CODE : 24AD3L1	
CO	Course Outcomes	Exp	K –CO
C207.1	Apply various analysis methods, data acquisition in NumPy and Pandas	1,2,3,10	K3
C207.2	Apply the concept of Classification and tabulation of data	4,10	K3
C207.3	Calculate the central tendency and dispersion of data and Implementation of measures of Skewness, moments and kurtosis	5,6,10	K3
C207.4	Apply the concepts regression and correlation analysis to solve problems	7,10	K3
C207.5	Solve the problems based on Time series analysis, forecasting and visualization	8,9,10	K3

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24IT3L1 DATA STRUCTURES AND ALGORITHMS 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

Software Requirement: Sublime editor / Turbo C

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

COURSE NAME :DATA STRUCTURES AND ALGORITHMS LABORATORY		COURSE CODE : 24IT3L1	
CO	Course Outcomes	Exp	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 Binarysearch	3	K3
C208.3	Compute graph representation and Travers 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

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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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