K.L.N. COLLEGE OF ENGINEERING

Pottapalayam-630612, Sivagangai District

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

Estd: 1994

FOURTH SEMESTER

CURRICULUM AND SYLLABUS

REGULATIONS 2024

For under Graduate Program

B.Tech. INFORMATION TECHNOLOGY

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 emerge as a center of excellence through innovative technical education and research in Information Technology

MISSION OF THE DEPARTMENT

- To produce competent Information Technology professionals to face the industrial and societal challenges by imparting quality education with ethical values

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K.L.N. COLLEGE OF ENGINEERING, POTTAPALAYAM

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

PROGRAM SPECIFIC OUTCOMES (PSOs)

PSO1 : To create better learning environment in line with technological updation and research progress

PSO2: To give industry exposure through research and consultancy in Information and communication Technologies

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

PEO 1: To excel in industrial or graduate work in Information Technology and multi-disciplinary Environments.

PEO 2: To adapt to ever changing technologies by applying Engineering Principles.

PEO 3: To practice professionalism conforming to ethical values, team work and Leadership.

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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 are as in the engineering discipline much is at the forefront of the discipline.

WK5: Knowledge,including efficient resource use, environmental impacts, whole-life cost, re-use of resources, net zero carbon, and similar concepts, that supports engineering design and operations in a practice area.

WK6: Knowledge of engineering practice(technology)in the practice are as in the engineering discipline.

WK7: Knowledge of the role of engineering in society and identified issues in engineering practice in the discipline, such as the professional responsibility of an engineer to public safety and sustainable development.

WK8: Engagement with selected knowledge in the current research literature of the discipline, awareness of the power of critical thinking and creative approaches to evaluate emerging issues.

WK9: Ethics, inclusive behavior and conduct. Knowledge of professional ethics, responsibilities, and norms of engineering practice Awareness of the need for diversity by reason of ethnicity, gender, age, physical ability etc. with mutual understanding and respect, and of inclusive attitudes

Program Outcomes (POs)

PO1: Engineering Knowledge: Apply knowledge of mathematics, natural science, computing, engineering fundamentals and an engineering specialization as specified in WK1 to WK4 respectively to develop to the solution of complex engineering problems.

PO2: Problem Analysis: Identify, formulate, review research literature and analyze complex engineering problems reaching substantiated conclusions with consideration for sustainable development. (WK1 to WK4)

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

PO4:Conduct Investigations of Complex Problems: Conduct investigations of complex engineering problems using research-based knowledge including design of experiments, modeling, analysis & interpretation of data to provide valid conclusions. (WK8).

PO5:EngineeringToolUsage: Create,select and apply appropriate techniques, resources and modern engineering & IT tools, including prediction and modeling 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 frame work, 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 Teamwork: 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 report sand 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 fori)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. INFORMATION TECHNOLOGY

CHOICE BASED CREDIT SYSTEM

CATEGORYOFCOURSES

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

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B.Tech. INFORMATION TECHNOLOGY

REGULATIONS 2024

CHOICE BASED CREDIT SYSTEM

CURRICULUM AND SYLLABUS

SEMESTER IV

S.No.	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
THEORY								
1	24BS402	Probability and Statistics (Common to B.E.CSE,CSE(CS),CSE(IoT) , B.Tech. IT &AI&DS Programmes)	BS	4	3	1	0	4
2	24CS401	Database Management Systems (Common to B.E. CSE,CSE(CS),CSE(IoT),B.Tech IT &AI&DS Programmes)	PC	3	3	0	0	3
3	24CS304	Computer Organization and Architecture (Common to B.E CSE,CSE(CS), CSE(IoT) &B.Tech IT Programmes)	PC	3	3	0	0	3
4	24IT401	Machine Learning (Common to B.E CSE,CSE(IoT)&B.Tech IT Programmes)	PC	3	3	0	0	3
THEORY CUM PRACTICAL								
5	24CS404	Operating Systems (Common to B.E. CSE, CSE(CS) ,CSE(IoT) Programmes & B.Tech. IT)	PC	5	3	0	2	4
PRACTICAL								
6	24CS4L1	Database Management Systems Laboratory (Common to B.E.CSE, CSE(CS),CSE(IoT), B.Tech. IT & AI&DS Programmes)	PC	3	0	0	3	1.5
7	24IT4L1	Machine Learning Laboratory (Common to B.E CSE & B.Tech IT Programmes)	PC	3	0	0	3	1.5
8	24HS4L1	Aptitude and Soft Skills – III (Common to all B.E. / B.Tech programmes)	EEC	2	0	0	2	1*
TOTAL				**26**	**15**	**1**	**10**	**20**

***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**

Dr.P Ganesh Kumar
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24BS402 PROBABILITY AND STATISTICS L T P C

3 1 0 4

OBJECTIVES:

- This course aims at providing the required skill to apply the statistical tools in engineering problems.
- To introduce the basic concepts of probability and random variables of one and two dimensions.
- To acquaint the knowledge of testing of hypothesis for small and large samples and to introduce the basic concepts of classifications of design of experiments which plays very important roles in the field of agriculture and statistical quality control.

UNIT – I PROBABILITY AND RANDOM VARIABLES 9+3

Probability–Discrete and continuous random variables –Moments–Moment generating functions– Binomial, Poisson, Uniform, Exponential and Normal distributions(Except derivations).

UNIT – II TWO-DIMENSIONAL RANDOM VARIABLES 9+3

Joint distributions – Marginal and conditional distributions – Covariance – Correlation and linear regression –Transformation of random variables–Central limit theorem(for independent and identically distributed random variables).

UNIT - III TESTING OF HYPOTHESIS 9+3

Sampling distributions - Estimation of parameters - Statistical hypothesis - Large sample tests based on Normaldistributionforsinglemeananddifferenceofmeans-Testsbasedont,Chi-squareandFdistributions for mean, variance and proportion-Contingency table (test for independence)-Goodness of fit.

UNIT - IV DESIGN OF EXPERIMENTS 9+3

One way and Two way classifications – Completely randomized design–Randomized block design–Latinsqu are design-2^2factorialdesign.

UNIT - V STATISTICAL QUALITY CONTROL 9+3

Control charts for measurements(X and R charts)– Control charts for attributes(p,candnp charts)–Tolerance limits-Acceptance sampling.

TOTAL: 45+15 PERIODS

TEXT BOOKS:

1. Johnson.R.A.,Miller ,I and Freund J.,"Miller and Freund's Probability and Statistics for Engineers", Pearson Education, Asia,8th Edition, 2015.
2. Veerarajan.T.,"Probability, Statistics and Random Processes", Tata Mc Graw Hill, New Delhi, 2006.

REFERENCES:

1. Papoulis.A. and Unnikrishnapillai.S., "Probability, Random Variables and Stochastic Processes", McGraw Hill Education India, New Delhi, 4thEdition, 2002.
2. Spiegel.M.R.,Schiller.J and Srinivasan.R.A.,"Schaum's Outline of Theory and Problems of Probability and Statistics", Tata McGrawHill,3rdEdition,2004.
3. Walpole.R.E.,Myers.R.H.,Myers.S.L. and Ye.K., "Probability and Statistics for Engineers and Scientists",Pearson Education,Asia,8thEdition,2011.
4. Gupta.S.C., Kapoor.V.K,, "Fundamental of Mathematical Statistics", Sultanch and & Sons Educational Publishers, New Delhi, Reprint 2013.
5. Kandasamy.P.,Thilagvathi. K.,Gunavathi.K., "Probability R and om Variables& Random Processes",S.Chand&Co.Ltd.,Reprint2008.

OUTCOMES:

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

Course Name :PROBABILITY AND STATISTICS		**Course Code : 24BS402**	
CO	**Course Outcomes**	**Unit**	**K –CO**
CO1	Build the parameters of statistical distributions using basic probability theory concepts.	I	K3
CO2	Calculate the statistical measures for two dimensional random variables.	II	K3
CO3	Apply the concepts of testing of hypothesis for large and small samples.	III	K3
CO4	Apply the basic concepts of design of experiments in the field of agriculture.	IV	K3
CO5	Use control charts for quality control problems.	V	K3

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24CS401	DATABASE MANAGEMENT SYSTEMS	L	T	P	C
		3	0	0	3

OBJECTIVES:

- To learn the fundamentals of data models and to depict a database system using ER Diagrams
- To study relational database model and to write SQL queries for store/retrieve database
- To understand Normalization technique to improve the performance data base design
- To understand the concepts of Transaction processing, concurrency control techniques and recovery procedures for real time applications.
- To understand working procedures of query processing and internal storage structures using different file and indexing techniques which will help in physical DB design

UNIT - I DATABASE FUNDAMENTALS 9

Purpose of Database System – Views of data – Data abstraction and data independence-Instances and schemas- Database System Architecture – Difference between File system and DBMS, Compare Centralized vs Distributed database, Data Models –Constraints-Keys with its types, Entity Relationship Model: Entity Sets – Relationship sets-Types of mapping constraints-Attributes–Relationships in ER diagram- E-R design issues– Extended ER features: Generalization, Specialization and Aggregation in ER model

UNIT - II RELATIONAL DATABASE 9

Relational Algebra: Relational operators- Joins - Relational Calculus: Tuple relational calculus and Domain relational calculus, SQL: Types of commands- set operations, Constraints- Aggregate Functions- Clauses- operators, Subqueries: Correlated and Nested Subqueries – Joins – Views – Authorization – Advanced SQL – Triggers – Cursors – Procedure – Functions – Embedded SQL – Dynamic SQL

UNIT - III RELATIONAL DATABASE DESIGN 9

Need for Database Design – Functional Dependencies – Closure of Functional Dependencies – Canonical Cover – Armstrong Axioms - Problem of Redundancy in database-Lossless join and Dependency Preserving decomposition, Normalization: First Normal Form– Second Normal Form – Third Normal Form –Boyce Code Normal Form – Fourth Normal Form – Fifth Normal Form

UNIT - IV TRANSACTIONS AND CONCURRENCY CONTROL 9

Transaction: ACID properties and their necessity – Transaction States – Schedule and conflict: Types of schedules–Conflict Serializable schedule–View Serializable schedule-Conflict equivalent schedule-Recoverability in DBMS: Recoverable and Irrecoverable Schedule- Cascading rollback, Cascade less and strict schedule, Equivalence of schedule, Concurrency Control: Lock Based Protocols–Time stamp based Protocols –Validation Based Protocols - Deadlock handling

UNIT - V STORAGE AND QUERY PROCESSING 9

File Organization – RAID- Indexing and Hashing: Ordered Indices – Static Hashing – Dynamic Hashing, Comparison of Ordered indexing and Hashing, B+ tree Index Files, Query Processing – Measures of Query cost, Algorithms for SELECT and JOIN operations – Evaluation of expressions.

TOTAL: 45 PERIODS

TEXT BOOKS:

1. Abraham Silberschatz, Henry F. Korth, S. Sudharshan — Database System Concepts, Seventh Edition, Tata McGraw Hill, 2019.
2. RamezElmasri, Shamkant B. Navathe —Fundamentals of Database Systems, Seventh Edition, Pearson Education, 2016.

REFERENCES:

1. Raghu Ramakrishnan —Database Management Systems, Fourth Edition, McGraw-Hill College Publications, 2015.
2. C.J.Date, A.Kannan, S.Swamynathan -An Introduction to Database Systems, Eighth Edition, Pearson Education, 2006.

OUTCOMES:

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

Course Name :DATABASE MANAGEMENT SYSTEMS		**Course Code : 24CS401**	
CO	**Course Outcomes**	**Unit**	**K –CO**
CO1	Illustrate the fundamental elements of relational database management systems and also ability to design the database using ER modeling.	I	K3
CO2	Apply SQL queries to interact with database.	II	K3
CO3	Apply normalization to design the database efficiently through elimination of anomalies	III	K3
CO4	Analyze database transactions and can control them by applying ACID properties and also Summarize concurrency control protocols.	IV	K3
CO5	Illustrate database storage structures and access techniques: file organization, indexing methods including B+ tree and hashing.	V	K3

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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 Data path – Control Implementation Scheme – Pipelining – Pipelined data path 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, ZvonkoVranesic, SafwatZaky and NaraigManjikian, 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**
CO1	Explain the computer organization components, instructions and addressing modes.	I	K2
CO2	Compute the arithmetic operations such as Addition, Subtraction, Multiplication and Division.	II	K3
CO3	Discuss the basics of MIPS implementation and pipelining.	III	K2
CO4	Illustrate the basic concepts of parallelism and multi-core processor.	IV	K2
CO5	Utilize Raspberry-pi for demonstrating memory systems.	V	K3

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24IT401	MACHINE LEARNING	L	T	P	C
		3	0	0	3

OBJECTIVES:

- To understand machine learning basics and regression.
- To learn key supervised algorithms such as KNN, DT, NB, SVM
- To explore clustering and PCA.
- To build simple recommender systems.
- To study Bayesian Networks, MRFs, and HMMs.

UNIT - I SUPERVISED LEARNING:REGRESSION 9

Paradigms of Machine Learning-Examples-Types of Learning-Types of supervised learning-Introduction to Regression–Types of Regression-Linear regression-Iterative solution: Gradient descent-Performance metrics of machine learning-Python libraries suitable for Machine Learning.

UNIT - II SUPERVISED LEARNING:CLASSIFICATION 9

K-Nearest Neighbour Classification-Distance metric and Cross-Validation-Computational efficiency of KNN –Introduction to Decision Trees-Entropy and Information Gain-Naïve Bayes classifier-Support Vector Machine –Twitter Sentiment Analysis**:**Analyse the tweets poste don twitter to predict the sentiment of the tweeti.e.positive,negative or neutral.

UNIT - III UNSUPERVISED LEARNING 9

Clustering algorithms – Proximity measures —Types —Partitioning methods: K-Means clustering – DBSCAN –Hierarchical clustering– Case study on various clustering applications – Dimensionality Reduction–PCA

UNIT - IV RECOMMENDER SYSTEMS 9

Recommender Systems-Introduction-Non-Personalized Recommender Systems-Content-Based Recommender Systems-Collaborative Filtering: User-based nearest neighbour recommendation, Item based nearest neighbour recommendation, Model based and pre-processing based approaches-Recommender System Evaluation.

UNIT - V GRAPHICALMODELS 9

Bayesian Networks – Conditional Independence - Markov Random Fields – Learning - Naïve Bayes Classifiers – MarkovModel – Hidden MarkovModel.

TOTAL:45PERIODS

TEXTBOOKS:

1. Tom M. Mitchell, Machine Learning, McGraw Hill, 1st Edition, 2017.
2. StephenMarsland,“MachineLearning:AnAlgorithmicPerspective”,CRCPress,2015

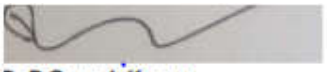
REFERENCES:

1. MehryarMohri,AfshinRostamizadehandAmeetTalwalkar,“FoundationsofMachineLearning”,MITPress,2012.
2. Kevin P. Murphy, Machine Learning: A Probabilistic Perspective, MIT Press, 2012.
3. Ethem Alpaydin, Introduction to Machine Learning, MIT Press, 4th Edition, 2020.
4. Charu C. Aggarwal, Recommender Systems: The Textbook, Springer, 2016.

OUTCOMES:

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

Course Name : MACHINE LEARNING		**Course Code :24IT401**	
CO	**Course Outcomes**	**Unit**	**K-CO**
CO1	Classify the various paradigms of machine learning and develop regression models using suitable performance evaluation metrics	1	K3
CO2	Apply classification algorithms such as KNN, Decision Trees, Naive Bayes, and SVM to real-world problems	2	K3
CO3	Examine clustering algorithms and dimensionality reduction techniques like PCA for data analysis.	3	K4
CO4	Apply Content-based recommender systems and Collaborative Filtering to implement recommender systems.	4	K3
CO5	Build probabilistic graphical models such as Bayesian Networks and HMMs	5	K3



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

OBJECTIVES:

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

UNIT-I OPERATING SYSTEM OVERVIEW 6

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

LAB COMPONENT 6

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

UNIT-II PROCESS MANAGEMENT AND CONCURRENCY CONTROL 10

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

LAB COMPONENT 6

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

UNIT - III DEADLOCK AND STORAGE MANAGEMENT 10

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

LAB COMPONENT **6**

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

UNIT - IV MASS STORAGE AND FILE SYSTEMS **10**

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

LAB COMPONENT **6**

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

UNIT - V ADVANCED OPERATING SYSTEMS AND VIRTUALIZATION **9**

Basics of Network Operating System, Server Operating System, Real Time Operating System and Distributed Operating Systems - Virtual Machines - Types and Structure - virtualization - Types, Techniques and Application - supporting multiple operating systems simultaneously on a single hardware platform; Running one operating system on top of another.

LAB COMPONENT **6**

- Case Study to Learn Virtualization platforms - VM Ware, etc.
- Installation of Raspbian OS in Raspberry pi and execute OS services using simple C programs

TOTAL: 45+30 PERIODS

TEXT BOOKS:

1. Abraham Silberschatz, Peter Baer Galvin and Greg Gagne, - Operating System Concepts, 10th Edition, John Wiley and Sons Inc., 2018.
2. William Stallings, “Operating Systems - Internals and Design Principles”, 9th Edition, Prentice Hall, 2018

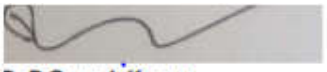
REFERENCES:

1. Andrew S. Tanenbaum, “Modern Operating Systems”, Fifth Edition, Pearson Publications, 2022.
2. AchyutS.Godbole, AtulKahate, - Operating Systemsǁ, McGraw Hill Education, 2016.
3. RamazElmasri, A. Gil Carrick, David Levine, - Operating Systems - A Spiral Approach, Tata McGraw Hill Edition, 2010.

OUTCOMES:

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

Course Name :OPERATING SYSTEMS		**Course Code : 24CS404**	
CO	**Course Outcomes**	**Unit**	**K –CO**
CO1	Explain the basic functions, structure and operations of Operating System.	I	K2
CO2	Analyze process synchronization methods and performance of CPU scheduling algorithms like FCFS, SJF, Priority and Round Robin.	II	K4
CO3	Apply the concept of deadlock avoidance and memory management schemes using paging and segmentation.	III	K3
CO4	Generalize the concepts of mass storage systems, various file allocation methods and directory structures.	IV	K3
CO5	Classify different operating systems based on application requirements and utilize virtualization platform to build virtual machines.	V	K3



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

OBJECTIVES:

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

LIST OF EXPERIMENTS

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

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

TOTAL: 45 PERIODS

OUTCOMES:

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

Course Name :DATABASE MANAGEMENT SYSTEMS LABORATORY		Course Code : 24CS4L1	
CO	**Course Outcomes**	**Exp.No**	**K –CO**
CO1	Develop simple Database using DDL, DML and TCL commands.	1,2	K3
CO2	Create Relational Database for real time application through Database constraints.	3,4	K3
CO3	Write and execute nested sub queries and join queries with privileges.	5-6	K3
CO4	Develop PL/SQL programs using Procedure, Functions, Triggers and Cursor.	7-10	K3
CO5	Design real time applications with Database Connectivity.	11-12	K3

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24IT4L1	MACHINE LEARNING LABORATORY	L	T	P	C
		0	0	3	1.5

OBJECTIVES:

- To install and configure essential machine learning tools and libraries.
- Topre-process and analyzed at a using statistical and visualization techniques
- To implement essential supervised learning algorithms such as logistic regression and decision trees.
- To develop and implement advanced machine learning algorithms for specific problem-solving techniques.

LIST OF EXPERIMENTS

1. Installing Anaconda-Jupiter Notebook-Learn Python ML Packages.
2. Implement data loading methods - understanding data with statistics, visualization – Data Preprocessing - Data Labeling.
3. Implement the standard Logistic Regression model generally used for classifying data into binary classes such as pass/fail, win/lose, alive/dead or healthy/sick
4. Implement the standard Decision Tree Class used for classifying data into various classes using a tree-like model of decisions and their possible consequences.
5. Implement Support Vector Machine for Classification
6. Implement K-Nearest Neighbor's Algorithm
7. Implement K-Means Clustering to find Natural Patterns in Data.
8. Detect Brain tumor images from the given data set.
9. Analyze PCA for the appropriate data set.
10. Movie/Book/Any Product recommendation by using content-based filtering

Mini Project

PLATFORM NEEDED: Anaconda Navigator or Python and Jupyter notebook

TOTAL: 45 PERIODS

OUTCOMES:

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

Course Name : MACHINELEARNINGLABORATORY		Course Code :24IT4L1	
CO	**Course Outcomes**	**Exp.No**	**K-CO**
CO1	Examine Anaconda, Jupyter, and Python ML libraries for model development.	1	K4
CO2	Analyse and preprocess data using statistics and visualization	2	K4
CO3	Implement ML algorithms like Logistic Regression, Decision Trees, SVM, KNN, and K-Means	3-8	K4
CO4	Analyse PCA for dimensionality reduction.	9	K4
CO5	Build real-world recommendation models through a mini-project.	10-11	K3

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24HS4L1	APTITUDE AND SOFT SKILLS -III	L	T	P	C
		0	0	2	1

Module I LOGICAL REASONING SKILLS 10

Logical Reasoning, Letter and Symbol series, Number series, Analyzing arguments, Making judgments, Logical Reasoning, Direction Sense test, Venn diagrams, Seating arrangements, Cause and effect, Blood relation test, Dice Logical, verbal puzzles, Analytical puzzles and sudoku.

Module II BEHAVIOURAL SKILLS 5

Interview Etiquettes - Body language, Dress code, Eye contacts, Handshakes for Interview - Interview handling – Mock Interview Videos - High Frequency words in resume and interviews - Visual Interpretation – HR Interview question – Sell yourself -Interpersonal and intrapersonal communication

Module III VERBAL SKILLS 15

Vocabulary basics, Grammar basics, Critical Reasoning, Reading comprehension, Synonyms, Antonyms, Idioms and phrases - sentence completion, Spotting errors, Error correction, Sentence correction, Writing Resume, Letter writing, Official mail correspondence -Ways to communicate in different scenarios-job interview, business meeting, project proposal submission, informal gathering, speech for a large audience and debate.

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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