PALLAVI ENGINEERING COLLEGE

College code: 6F

(UGC AUTONOMOUS)

Accredited by NBA and NAAC with 'A' grade, Approved by AICTE, New Delhi & Affiliated to JNTUH-Hyderabad
Certified by ISO 9001 : 2015 | ISO 14001 : 2015 | ISO 50001 : 2018
Kuntloor(V), Adibullapur(M), Near Hayathnagar, R.R. Dist, Hyd - 501505, (T.S.) India

B.Tech.in COMPUTER SCIENCE AND ENGINEERING
DATA SCIENCE
Course Structure & Syllabus (PR25Regulations) Applicable from AY 2025-2026 Batch

I Year I-Semester

S. No.	Course Code	Course Title	L	T	P	Credits
1	PMA101BS	Matrices and Calculus	3	1	0	4
2	PCH102BS	Engineering Chemistry	3	0	0	3
3	PEN103BS	English for Skill Enhancement	3	0	0	3
4	PEC104ES	Electronic Devices and Circuits	3	0	0	3
5	PCS105ES	Programming for Problem Solving	3	0	0	3
6	PCH106BS	Engineering Chemistry Lab	0	0	2	1
7	PCS107ES	Programming for Problem Solving Lab	0	0	2	1
8	PEN108BS	English Language and Communication Skills Lab	0	0	2	1
9	PME109ES	Engineering Workshop	0	0	2	1
10	PCS110ES	IT Workshop	0	0	2	1
		Induction Program				
		Total Credits	**15**	**1**	**10**	**21**

I Year II-Semester

S. No.	Course Code	Course Title	L	T	P	Credits
1	PMA201BS	Ordinary Differential Equations and Vector Calculus	3	0	0	3
2	PPH202BS	Advanced Engineering Physics	3	0	0	3
3	PME203ES	Computer Aided Engineering Graphics	2	0	2	3
4	PEE204ES	Basic Electrical Engineering	3	0	0	3
5	PCS205ES	Data Structures	3	0	0	3
6	PPH206BS	Advanced Engineering Physics Lab	0	0	2	1
7	PCS207ES	Data Structures Lab	0	0	2	1
8	PCS208ES	Python Programming Lab	0	0	2	1
9	PEE209ES	Basic Electrical Engineering Lab	0	0	2	1
		Total Credits	**14**	**0**	**10**	**19**

II YEAR I SEMESTER

S. No.	Course Code	Course Title	L	T	P	Credits
1	PMA301BS	**Mathematical and Statistical Foundations**	3	0	0	3
2	PCS302PC	Computer Organization and Architecture	3	0	0	3
3	PCS303PC	Object Oriented Programming through java	3	0	0	3
4	PCS304PC	Software Engineering	3	0	0	3
5	PCS305PC	Data Base Management Systems	3	0	0	3
6	PMA306BS	**Computational Mathematics Lab**	0	0	2	1
7	PCS307PC	Object Oriented Programming through java Lab	0	0	2	1
8	PCS308PC	Software Engineering Lab	0	0	2	1
9	PCS309PC	Data Base Management Systems Lab	0	0	2	1
10	PCS310PC	Skill Development Course–1(NodeJs /React JS/Django)	0	0	2	1
		Total Credits	**15**	**0**	**10**	**20**

D. Saikrishna

II YEAR II SEMESTER

S. No.	Course Code	Course Title	L	T	P	Credits
1	PCS401PC	Discrete Mathematics	3	0	0	3
2	PCS402PC	Operating Systems	3	0	0	3
3	PCsS403PC	Algorithm Design and Analysis	3	0	0	3
4	PCS404PC	Computer Networks	3	0	0	3
5	PCS405PC	Machine Learning	3	0	0	3
6	PSM406MS	Innovation and Entrepreneurship	2	0	0	2
7	PCS407PC	Operating Systems Lab	0	0	2	1
8	PCS408PC	Computer Networks Lab	0	0	2	1
9	PCS409PC	Machine Learning Lab	0	0	2	1
10	PCS410PC	Skill Development Course–2(Data Visualization -R/ Python/ Power BI)	0	0	2	1
11	PVA411HS	Indian Knowledge System	1	0	0	1
		Total Credits	**18**	**0**	**8**	**22**

***Note:** Students who wish to exit after II Year II Semester has to register for this optional course and acquire the credits allotted by doing 6 weeks Work-based Vocational Course/ Internship or Apprenticeship. Please refer PR25 Academic Regulations for more information.

PCS304PC:SOFTWAREENGINEERING

B.Tech.IIYearISem. **LT PC**
3 0 03

CourseObjectives

- Theaim of thecourseistoprovideanunderstandingof the workingknowledge of the techniques for estimation, design, testing and quality management of large software development projects.
- Topics include process models, software requirements, software design, software testing, softwareprocess/product metrics,riskmanagement,qualitymanagementandUMLdiagrams

CourseOutcomes

- Abilitytotranslateend-userrequirementsintosystemandsoftwarerequirements,usinge.g.
- UML,andstructuretherequirementsinaSoftwareRequirementsDocument(SRD).
- Identifyandapplyappropriatesoftwarearchitecturesandpatternstocarryouthighleveldesign of a system and be able to critically compare alternative choices.
- Willhaveexperienceand/orawarenessoftestingproblemsandwillbeabletodevelopasimple testing report

UNIT-I

Introduction to Software Engineering: The evolving role of software, changing nature of software, software myths. A Generic view of process: Software engineering- a layered technology, a process framework, the capability maturity model integration (CMMI). Process models: The waterfall model, Spiral model, Incremental Process Models, Concurrent Models, Component based development and Agile Development.

UNIT-II

Software Requirements: Functional and non-functional requirements, user requirements, system requirements, interface specification, the software requirements document.
Requirements engineering process: Feasibility studies, requirements elicitation and analysis, requirements validation, requirements management.

UNIT-III

DesignEngineering:Designprocessanddesignquality,designconcepts,thedesignmodel.
Creating an architectural design: software architecture, data design, architectural styles and patterns, architectural design, conceptual model of UML, basic structural modeling, use case diagrams, class diagrams, sequence diagrams, collaboration diagrams, activity diagrams and component diagrams.

UNIT-IV

Testing Strategies: A strategic approach to software testing, test strategies for conventional software, black-box and white-box testing, validation testing, system testing, the art of debugging.
MetricsforProcessandProducts:Softwaremeasurement,metricsforsoftwarequality.

UNIT-V

Risk management: Reactive Vs proactive risk strategies, software risks, risk identification, risk projection,riskrefinement,RMMM.QualityManagement:Qualityconcepts,softwarequalityassurance, software reviews, formal technical reviews, statistical software quality assurance, software reliability, the ISO 9000 quality standards.

TEXTBOOKS:

1. SoftwareEngineering,Apractitioner'sApproach-RogerS.Pressman,6thedition,McGrawHill International Edition.

D. Sai Kiran

PCS305PC:DATABASEMANAGEMENTSYSTEMS

B.Tech.IIYearISem. **LT PC**
3 0 03

Prerequisites:Acourseon"DataStructures".

CourseObjectives:

1. Tounderstandthebasicconceptsandtheapplicationsofdatabasesystems.
2. Tomasterthebasicsof SQLandconstructqueriesusingSQL.
3. Topics include data models, database design, relational model, relational algebra, transaction control, concurrency control, storage structures and access techniques.

CourseOutcomes:

1. GainknowledgeoffundamentalsofDBMS,databasedesignandnormalforms
2. Masterthebasicsof SQLforretrievalandmanagementofdata.
3. Beacquaintedwiththebasicsoftransactionprocessingandconcurrencycontrol.
4. Familiaritywithdatabasestoragestructuresandaccesstechniques

UNIT-I

Database System Applications: A Historical Perspective, File Systems versus a DBMS, the Data Model, Levels of Abstraction in a DBMS, Data Independence, Structure of a DBMS
IntroductiontoDatabaseDesign: DatabaseDesignandERDiagrams,Entities,Attributes,andEntity Sets, Relationships and Relationship Sets, Additional Features of the ER Model, Conceptual Design With the ER Model

UNIT-II

Introduction to the Relational Model: Integrity constraint over relations, enforcing integrity constraints,queryingrelationaldata,logicaldatabasedesign,introductiontoviews,destroying/altering tables and views.
RelationalAlgebra,TuplerelationalCalculus,Domainrelationalcalculus.

UNIT-III

SQL:QUERIES,CONSTRAINTS,TRIGGERS:formofbasicSQLquery,UNION,INTERSECT,and EXCEPT, Nested Queries, aggregation operators, NULL values, complex integrityconstraints in SQL, triggers and active databases.
Schema Refinement: Problems caused by redundancy, decompositions, problems related to decomposition, reasoning about functional dependencies, FIRST, SECOND, THIRD normal forms, BCNF, lossless join decomposition, multivalued dependencies, FOURTH normal form, FIFTH normal form.

UNIT-IV

Transaction Concept, Transaction State, Implementation of Atomicity and Durability, Concurrent Executions, Serializability, Recoverability, Implementation of Isolation, Testing for serializability, Lock Based Protocols, Timestamp Based Protocols, Validation- Based Protocols, Multiple Granularity, Recovery and Atomicity, Log-Based Recovery, Recovery with Concurrent Transactions.

UNIT-V

Data on External Storage, File Organization and Indexing, Cluster Indexes, Primary and Secondary Indexes, Index data Structures, Hash Based Indexing, Tree based Indexing, Comparison of File Organizations, Indexes- Intuitions for tree Indexes, Indexed Sequential Access Methods (ISAM), B+Trees:A DynamicIndexStructure.

D. Sai Kiran

PCS402PC:OPERATINGSYSTEMS

B.Tech.IIYearIISem.

LT	PC
3 0	03

Prerequisites:

1. Acourseon"ComputerProgrammingandData Structures".
2. Acourseon"ComputerOrganizationand Architecture".

CourseObjectives:

1. Introduceoperatingsystemconcepts(i.e.,processes, threads,scheduling,synchronization, deadlocks, memory management, file and I/O subsystems and protection)
2. Introducetheissuestobeconsideredinthedesignanddevelopmentofoperating system
3. Introduce basic Unix commands, system call interface for process management, interprocess communication and I/O in Unix

CourseOutcomes:

1. Willbeableto controlaccesstoacomputer andthefilesthatmaybe shared
2. Demonstratetheknowledgeofthecomponentsofcomputersandtheirrespectiverolesin computing.
3. Abilitytorecognizeandresolveuserproblemswithstandardoperatingenvironments.
4. Gainpracticalknowledgeofhowprogramminglanguages,operatingsystems,and architectures interact and how to use each effectively.

UNIT-I

Operating System - Introduction, Structures - Simple Batch, Multiprogrammed, Time-shared, Personal Computer, Parallel, Distributed Systems, Real-Time Systems, System components, Operating System services, System Calls

Process - Process concepts and scheduling, Operations on processes, Cooperating Processes, Threads

UNIT-II

CPU Scheduling - Scheduling Criteria, Scheduling Algorithms, Multiple -Processor Scheduling. System call interface for process management-fork, exit, wait, waitpid, exec

Deadlocks - System Model, Deadlocks Characterization, Methods for Handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, and Recovery from Deadlock

UNIT-III

ProcessManagementandSynchronization-TheCriticalSectionProblem,Synchronization Hardware, Semaphores, and Classical Problems of Synchronization, Critical Regions, Monitors **Interprocess Communication Mechanisms:** IPC between processes on a single computer system, IPC between processes on different systems, using pipes, FIFOs, message queues, shared memory.

UNIT-IV

Memory Management and Virtual Memory - Logical versus Physical Address Space, Swapping, Contiguous Allocation, Paging, Segmentation, Segmentation with Paging, Demand Paging, Page Replacement, Page Replacement Algorithms.

UNIT-V

FileSystemInterfaceandOperations-Accessmethods,DirectoryStructure,Protection,FileSystem Structure, Allocation methods, Free-space Management. Usage of open, create, read, write, close, lseek, stat, ioctl system calls.

D. Sailaja

PCS302PC:COMPUTERORGANIZATIONANDARCHITECTURE

B.Tech.IIYearISem.

LT		PC
3	0	03

Prerequisites:Noprerequisites.
Co-requisite:ACourseon"DigitalElectronics".

CourseObjectives:

- The purpose of the course is to introduce principlesof computer organization and the basicarchitectural concepts.
- It begins with basic organization, design, and programming of a simple digital computer and introduces simple register transfer language to specify various computer operations.
- Topicsincludecomputerarithmetic,instructionsetdesign,microprogrammedcontrolunit, pipelining and vector processing, memoryorganization and I/O systems, and multiprocessors

CourseOutcomes:

- Understandthebasicsofinstructionsetsandtheirimpactonprocessordesign.
- Demonstrateanunderstandingof thedesignof thefunctionalunitsofadigitalcomputersystem.
- Evaluatecost performance anddesigntrade-offsin designingand constructinga computer processor including memory.
- Designapipelineforconsistentexecutionofinstructionswithminimum hazards.
- Recognizeandmanipulaterepresentationsofnumbersstoredindigitalcomputers

UNIT-I:

Boolean Algebra and Logic Gates: Binary codes, Binary Storage and Registers, Binary logic.**Digital logic gates. Data Representation**: Datatypes, Complements, FixedPointRepresentation, Floating Point Representation
DigitalComputers: Introduction,BlockdiagramofDigitalComputer,DefinitionofComputer Organization, Computer Design and Computer Architecture.

UNIT-II:

Combinational Logic: Combinational Circuits, Analysis procedure Design procedure, Binary Adder-SubtractorDecimalAdder,Binarymultiplier,magnitudecomparator,Decoders,Encoders,Multiplexers, HDL for combinational circuits.
SequentialLogic: Sequentialcircuits,latches,Flip-FlopsAnalysisofclockedsequentialcircuits,state Reduction and Assignment, Design Procedure. Registers, shift Registers, Ripple counters, synchronous counters, other counters.

UNITIII

Register Transfer Language and Micro operations: Register Transfer language, Register Transfer, Bus and memorytransfers, Arithmetic Micro operations, logic micro operations, shift micro operations, Arithmetic logic shift unit.
Basic Computer Organization and Design: Instruction codes, Computer Registers Computer instructions, Timing and Control, Instruction cycle, MemoryReference Instructions, Input - Output and Interrupt.

UNIT-IV

Microprogrammed Control: Control memory, Address sequencing, micro program example, design of control unit.
Central Processing Unit: General Register Organization, Instruction Formats, Addressing modes, Data Transfer and Manipulation, Program Control.

D. Sai Kiran Yallam

PCS303PC:OBJECTORIENTEDPROGRAMMINGTHROUGHJAVA

B.Tech.IIYearISem.

LT		PC
3	0	03

CourseObjectives:

1. To Understand the basic object-oriented programming concepts and apply them in problemsolving.
2. TolIlustrateinheritanceconceptsforreusingtheprogram.
3. ToDemonstratemultitaskingbyusingmultiplethreadsandeventhandling
4. ToDevelopdata-centricapplicationsusingJDBC.
5. ToUnderstandthebasicsof javaconsoleandGUI based programming

CourseOutcomes:

1. Demonstratethebehaviorofprogramsinvolvingthebasicprogrammingconstructslikecontrol structures, constructors, string handling and garbage collection.
2. Demonstrate the implementation of inheritance (multilevel, hierarchical and multiple) byusing extend and implement keywords
3. Usemultithreadingconceptstodevelopinterprocesscommunication.
4. Understand the process of graphical user interface design and implementation using AWT or swings.
5. Developappletsthatinteractabundantlywiththeclientenvironmentanddeployontheserver.

UNIT-I

Object oriented thinking and Java Basics- Need for oop paradigm, summary of oop concepts, coping with complexity, abstraction mechanisms. History of Java, Java buzzwords, data types, variables, scopeandlifetimeofvariables,arrays,operators,expressions,controlstatements,typeconversionand casting,simplejavaprogram,conceptsof classes,objects,constructors,methods,accesscontrol,this keyword, garbage collection, overloading methods and constructors, parameter passing, recursion, nested and inner classes, exploring String class.

UNIT-II

Inheritance,PackagesandInterfaces–Hierarchicalabstractions,Baseclassobject,subclass,subtype, substitutability, forms of inheritance specialization, specification, construction, extension, limitation, combination, benefits of inheritance, costs of inheritance. Member access rules, super keyword uses, using final keyword with inheritance, polymorphism- method overriding, abstract classes, the Object class.Defining,CreatingandAccessingaPackage,UnderstandingCLASSPATH,importingpackages, differences between classes and interfaces, defining an interface, implementing interface, applying interfaces, variables in interface and extending interfaces.

UNIT-III

Exception handling and Multithreading-- Concepts of exception handling, benefits of exception handling, Termination or resumptive models, exception hierarchy, usage of try, catch, throw, throws andfinally,builtinexceptions,creatingownexceptionsubclasses.Differencesbetweenmultithreading andmultitasking,threadlifecycle,creatingthreads,threadpriorities,synchronizingthreads,interthread communication, thread groups, daemon threads.

UNIT-IV

ExploringStringclass,Objectclass,Exploringjava.utilpackage,Exploringjava.iopackage
Event Handling: Events, Event sources, Event classes, Event Listeners, Delegation event model, handling mouse and keyboard events, Adapter classes. graphics, layout manager - layout manager types–border,grid,flow,cardandgridbag.

D. Sai Kiran Yadlamy

PCS403PC:ALGORITHMSDESIGNANDANALYSIS

B.Tech.IIYearIISem. **LT PC**
3 0 03

Prerequisites: ProgrammingforproblemsolvingandDataStructures

CourseObjectives

1. Develop proficiency in evaluating algorithms using asymptotic notations, including best-, average-, and worst-case time/space complexities, and solving related recurrence relations.
2. Master various algorithmic strategies–divide-and-conquer, greedy, dynamic programming, backtracking, and branch-and-bound–identifying suitable use cases and demonstrating their application.
3. Critically assess and contrast different algorithms in terms of efficiency, scalability, and correctness through rigorous analytical reasoning and empirical evaluation.
4. Differentiate between tractable (polynomial-time) and intractable (super-polynomial or exponential-time) problems;
5. **Identify and classify** problems as P, NP, NP-hard, or NP-complete, and **assess** their relationships through polynomial-time reductions and Cook's theorem.

CourseOutcomes

1. AbletoApplyspaceandtimecomplexityanalysisusingasymptoticnotations.
2. Able to Design divide-and-conqueralgorithms and critically assess their runtime and spacetrade-offs.
3. AbletoDevicebacktrackinganddynamicprogrammingsolutions.
4. AbletoApplygreedymethodsandgraphtraversalalgorithms
5. AbletoAnalyseandDesignbranch-and-boundalgorithmsforNP-hardproblems

UNIT-I

Introduction:Algorithm,PerformanceAnalysis-Spacecomplexity,Timecomplexity,AsymptoticNotations-Big oh notation, Omega notation, Theta notation, and Little oh notation.
Divideand conquer: General method, applications-Binarysearch, Quick sort, Merge sort, Strassen's matrix multiplication.

UNIT-II

Disjoint Sets: Disjoint set operations, union and find algorithms, Priority Queue- Heaps, Heapsort
Backtracking:Generalmethod,applications,n-queensproblem,sumofsubsetsproblem,graph coloring, Hamiltonian cycles.

UNIT-III

DynamicProgramming:Generalmethod,applications-Optimalbinarysearchtree,0/1knapsack problem, All pairs shortest path problem, Traveling salesperson problem, Reliability design.

UNIT-IV

Greedy method: General method, applications- Job sequencing with deadlines, knapsack problem, Minimum cost spanning trees, Single source shortest path problem.
BasicTraversalandSearchTechniques:TechniquesforBinaryTrees,TechniquesforGraphs, Connected components, Biconnected components.

UNIT-V

Branch and Bound: General method, applications -Travelling salesperson problem, 0/1 knapsackproblem - LC Branch and Bound solution, FIFO Branch and Bound solution.
NP-Hard and NP-Complete problems: Basic concepts, non-deterministic algorithms, NP - Hard and NP-Complete classes, Cook's theorem.

PCS404PC:COMPUTERNETWORKS

B.Tech.IIYearIISem. **LT PC**
3 0 03

Prerequisites

1. Acourseon"Programmingforproblemsolving".
2. Acourseon"DataStructures".

CourseObjectives

1. Equipthestudentswithageneraloverviewoftheconceptsandfundamentalsofcomputer networks.
2. Familiarize the students with the standard models for the layered approach to communication between machines in a network and the protocols of the various layers.
3. Elucidatethestudentsaboutworkingandimplementationofprotocolsatvariouslayersin protocols stack.
4. Appreciatingtheprotocolworkingbyobservingandanalysingoutputsofthepacketsniffer,

CourseOutcomes

1. Gaintheknowledgeofthebasiccomputernetwork technology.
2. GaintheknowledgeofthefunctionsofeachlayerintheISO-OSIandTCP/IPreferencemodel.
3. Obtaintheskillsofsubnettingandroutingmechanisms.
4. Familiarity with the essential protocols of computer networks, and how they can be applied in network design and implementation.
5. Understandingworkingoftheprotocolsthroughtraces capturedbyapacketsniffer

UNIT-I

Introduction: The Internet, Protocol, Network Edge, Access Networks, Network Core, Packet Switching, Circuit Switching, Delay, Loss, and Throughput in Packet-Switched Networks, Protocol reference models: ISO-OSI, TCP/IP, Types of Network attacks, History of Computer Networking and the Internet.

UNIT-II

Application Layer: Principles of Network Applications, Network Application Architectures, Processes Communicating, Transport Services Available to Applications, Transport Services Provided by the Internet, Application-Layer Protocols, The Web and HTTP, File Transfer: FTP, Electronic Mail in the Internet,SMTP,DNS,Peer-to-PeerApplications,SocketProgramming:CreatingNetworkApplications.

UNIT-III

Transport Layer: Transport-Layer Services, Multiplexing and Demultiplexing, Connectionless Transport:UDP,PrinciplesofReliableDataTransfer,BuildingaReliableDataTransfer Protocol,Pipelined Reliable Data Transfer Protocols, Go-Back-N (GBN), Selective Repeat (SR), Connection-Oriented Transport: TCP, The TCP Connection, Segment Structure, Round-Trip Time Estimation and Timeout, Reliable Data Transfer, Flow Control, TCP Connection Management, Principles of Congestion Control, TCP Congestion Control, Fairness.

UNIT-IV

NetworkLayer:DataandControlplane,ForwardingandRouting308,NetworkService Models,VirtualCircuitandDatagramNetworks,Routerworking,TheInternetProtocol(IP):Forwarding andAddressingintheInternet,Datagram Format,IPv4Addressing,InternetControlMessageProtocol (ICMP), IPv6, IP Security, Routing Algorithms- The Link-State (LS) Routing Algorithm, The Distance-Vector (DV) Routing Algorithm, Hierarchical Routing, Routing in the Internet-Intra-AS Routing in the Internet:RIP, Intra-ASRoutinginthe Internet: OSPF,Inter-ASRouting: BGP, Broadcastand Multicast Routing, Broadcast Routing Algorithms, Multicasting.

PCS405PC:MACHINELEARNING

B.Tech.IIYearIISem. **LTPC**
3003

CourseObjectives:

1. Tointroducestudentstothebasicconceptsandtechniquesof Machine Learning.
2. Tohaveathoroughunderstandingofthe SupervisedandUnsupervisedlearningtechniques
3. Tostudythevariousprobability-basedlearningtechniques

CourseOutcomes:

1. Distinguishbetween,supervised,unsupervisedandsemi-supervisedlearning.
2. Understandalgorithmsforbuildingclassifiersappliedondatasetsofnon-linearlyseparable classes
3. Designanensemblemodeltoincreasetheclassificationaccuracy
4. UnderstandtheprinciplesofRLevolutionarycomputingalgorithms

UNIT-I

Introduction to Machine Learning: Types of Human learning, machine learning process, Well-posed learning problem, Types of machine learning and comparison, applications of machine learning.
Model Preparation, Evaluation and feature engineering: Machine learning activities, Types of data in machine learning, dataset understanding, plotting and exploration, checking data quality, remediation, data pre-processing, selecting a model, predictive and descriptive models, supervised learning model training,cross-validationandbootstrapping,lazyvseagerlearner,interpretingthemodel-underfitting, overfitting, bias-variance trade-off. Parameter for evaluating performance of classification, regression, and clustering model. Improving performance of a model.

UNIT-II

Feature Engineering: Feature transformation - feature construction, feature extraction by PCA, SVD, LDA. Feature subset selection –feature relevancy and redundancy measures. Feature selection process and approaches.
Review of Probabilityconcepts:joint probability, conditional probability, bayes rule,Common discrete and continuous distributions, dealing with multiple random variables, central limit theorem. Bayes classifier, Multi-class Classification, Naïve Bayes classifier, Bayesian belief network.

UNIT-III

SupervisedLearning-Introductiontosupervisedlearning,
Regression:Introductionofregression,Regressionalgorithms:Simplelinearregression,Multiplelinear regression, Polynomial regression model, Logistic regression, Maximum likelihood estimation.
Classification:Classificationmodelandlearningsteps,Classificationalgorithms:NaïveBayesclassifier, Distance measures,k-Nearest Neighbor (kNN), Decision tree, Support vector machines, Kernel trick, Random Forest.

UNIT-IV

Unsupervised Learning: Introduction to unsupervised learning, Unsupervised vs supervised learning, Applicationofunsupervisedlearning,Clusteringanditstypes,Partitioningmethod:k-MeansandK-Medoids, Hierarchical clustering, Density-based methods -DBSCAN.

UNIT-V

Artificial Neural Network: Biological neuron, Artificial neuron, Activation functions, neural network architecture, perceptron, learning process in ANN, Back propagation.
Introductiontodeeplearning,overviewofreinforcementlearning,Representationlearning,Evolutionary learning.Case-studyofMLapplications:Imagerecognition,Emailspamfiltering,Onlinefrauddetection.

D. Sai Kiran

PCS408PC:COMPUTERNETWORKSLAB

B.Tech.IIYearIISem. **LTPC**
0021

CourseObjectives:

- Tounderstandtheworkingprincipleofvariouscommunicationprotocols.
- Tounderstandthenetworksimulatorenvironmentandvisualizeanetworktopologyand observe its performance
- Toanalyzethetrafficflowandthecontentsof protocolframes

CourseOutcomes:

- Implementdatalinklayerfarmingmethods
- Analyzeerrordetectionanderrorcorrectioncodes.
- Implementandanalyzeroutingandcongestionissuesinnetwork design.
- ImplementEncodingandDecodingtechniquesusedinpresentation layer
- Tobeableto work withdifferentnetwork tools

Listof Experiments

1. Implement the data link layer framing methods such as character, character-stuffing and bitstuffing.
2. Writeaprogram tocomputeCRCcodeforthepolynomialsCRC-12,CRC-16andCRCCCIP
3. Developasimpledatalinklayerthatperformstheflowcontrolusingtheslidingwindowprotocol, and loss recovery using the Go-Back-N mechanism.
4. ImplementDijsktra'salgorithm tocomputetheshortestpaththroughanetwork
5. Takeanexamplesubnetof hostsandobtaina broadcasttreeforthe subnet.
6. Implementdistancevectorroutingalgorithmforobtainingroutingtablesateachnode.
7. Implementdataencryptionanddatadecryption
8. WriteaprogramforcongestioncontrolusingLeakybucketalgorithm.
9. Writeaprogram forframesorting techniquesusedin buffers.
10. **Wireshark**
    i. PacketCaptureUsingWireshark
    ii. StartingWireshark
    iii. ViewingCapturedTraffic
    iv. AnalysisandStatistics&Filters.
1. HowtorunNmapscan
2. OperatingSystemDetectionusingNmap
3. DothefollowingusingNS2Simulator
    I. NS2Simulator-Introduction
    II. SimulatetoFindtheNumberofPacketsDropped
    III. SimulatetoFindtheNumberofPacketsDroppedbyTCP/UDP
    IV. SimulatetoFindtheNumberofPacketsDroppedduetoCongestion
    V. SimulatetoCompareDataRate&Throughput.
    VI. SimulatetoPlotCongestionforDifferentSource/Destination
    VII. SimulatetoDeterminethePerformancewithrespecttoTransmissionof Packets

TEXTBOOK:

1. ComputerNetworks,AndrewSTanenbaum,David.j.Wetherall,5thEdition.Pearson Education/PHI

REFERENCES:

1. AnEngineeringApproachtoComputerNetworks,S.Keshav,2ndEdition,PearsonEducation
2. DataCommunicationsandNetworking-BehrouzA. Forouzan.3rdEdition, TMH.

PCS401PC:DISCRETEMATHEMATICS

B.Tech.IIYearIISem.

LT		PC
3	0	03

CourseObjectives:

1. Introduceselementarydiscretemathematicsforcomputerscienceandengineering.
2. Topics include formal logic notation, methods of proof, induction, sets, relations, algebraic structures, elementary graph theory, permutations and combinations, counting principles; recurrence relations and generating functions.

CourseOutcomes:

1. Understandandconstructprecisemathematicalproofs
2. Applylogicandsettheorytoformulateprecisestatements
3. Analyzeandsolvecountingproblemsonfiniteanddiscretestructures
4. Describeandmanipulatesequences
5. Applygraphtheoryinsolvingcomputing problems

UNIT-I

Mathematical logic: Introduction, Statements and Notation, Connectives, Normal Forms, Theory of Inference for the Statement Calculus, The Predicate Calculus, Inference Theory of the Predicate Calculus.

UNIT-II

Set theory: Introduction, Basic Concepts of Set Theory, Representation of Discrete Structures, Relations and Ordering, Functions.

UNIT-III

AlgebraicStructures: Introduction,AlgebraicSystems,SemigroupsandMonoids,LatticesasPartially Ordered Sets, Boolean Algebra.

UNIT-IV

Elementary Combinatorics: Basics of Counting, Combinations and Permutations, Enumeration of Combinations and Permutations, Enumerating Combinations and Permutations with Repetitions, Enumerating Permutation with Constrained Repetitions, Binomial Coefficient, The Binomial and Multinomial Theorems, The Principle of Exclusion.

UNIT-V

Graph Theory: Basic Concepts, Isomorphism and Subgraphs, Trees and their Properties, Spanning Trees, Directed Trees, BinaryTrees, Planar Graphs, Euler's Formula, Multi-graphs and Euler Circuits, Hamiltonian Graphs, Chromatic Numbers, The Four-Color Problem.

TEXTBOOKS:

1. Discrete Mathematical Structures with Applications to Computer Science: J.P. Tremblay, R. Manohar, McGraw-Hill, 1st ed.
2. DiscreteMathematicsforComputerScientists&Mathematicians:Joel.Mott,AbrahamKandel, Teodore P. Baker, Prentis Hall of India, 2nd ed.

REFERENCEBOOKS:

1. Discrete and Combinatorial Mathematics - an applied introduction: Ralph. P. Grimald,Pearson education, 5th edition.
2. DiscreteMathematicalStructures:ThomasKosy,TataMcGrawHillPublishing co.

D. Sai Kiran

PCS309PC:DATABASEMANAGEMENTSYSTEMSLAB

B.Tech.IIYearISem. **LT PC**
0 0 21

CourseObjectives:

- IntroduceERdatamodel,databasedesignandnormalization
- LearnSQLbasicsfordatadefinitionanddatamanipulation

CourseOutcomes:

- Designdatabaseschemaforagivenapplicationandapplynormalization
- AcquireskillsinusingSQLcommandsfordatadefinitionanddatamanipulation.
- Developsolutionsfordatabaseapplicationsusingprocedures,cursorsandtriggers

Listof Experiments:

1. ConceptdesignwithE-RModel
2. RelationalModel
3. Normalization
4. PracticingDDLcommands
5. PracticingDMLcommands
6. A)Querying(usingANY,ALL,UNION,INTERSECT,JOIN,Constraints etc.)B)Nested, Correlated subqueries
7. Queries usingAggregatefunctions,GROUPBY,HAVINGandCreationanddroppingof Views.
8. Triggers(Creationofinserttrigger,deletetrigger,updatetrigger)
9. Procedures
10. Usageof Cursors

TEXTBOOKS:

1. DatabaseManagementSystems,RaghuramaKrishnan,JohannesGehrke,TataMcGraw Hill,3rd Edition
2. DatabaseSystemConcepts,Silberschatz,Korth,McGrawHill,Vedition.

REFERENCESBOOKS:

1. DatabaseSystemsdesign, Implementation,and Management,PeterRob&Carlos Coronel 7thEdition.
2. FundamentalsofDatabaseSystems,ElmasriNavrate,PearsonEducation
3. IntroductiontoDatabaseSystems,C.J.Date,Pearson Education
4. OracleforProfessionals,TheXTeam,S.ShahandV.Shah,SPD.
5. DatabaseSystemsUsingOracle:ASimplifiedguidetoSQLandPL/SQL,Shah,PHI.
6. FundamentalsofDatabaseManagementSystems,M.L.Gillenson,WileyStudentEdition.

D. Saj Kumar

computesthesquareofthenumberandprints.Ifthe valueisodd, thethirdthread willprint the value of the cube of the number.

7. Write a Java program for the following:Create
   a doubly linked list of elements.
   Deleteagivenelementfromtheabovelist.
   Displaythecontentsofthelistafterdeletion.

8. WriteaJavaprogramthatsimulatesatrafficlight.Theprogramletstheuserselectoneofthree lights:red, yellow, or green with radio buttons. On selecting abutton, anappropriate message with "Stop" or "Ready" or "Go" should appear above the buttons in the selected color. Initially, there is no message shown.

9. WriteaJavaprogram tocreateanabstractclassnamedShapethatcontainstwo integersand an emptymethod 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.

10. SupposethatatablenamedTable.txtisstoredinatextfile.Thefirstlineinthefileistheheader, and the remaining lines correspond to rows in the table. The elements are separated by commas.
11. Writeajavaprogramtodisplaythetableusing Labels inGrid Layout.

12. Write a Java program that handles all mouse events and shows the event name at the center of the window when a mouse event is fired (Use Adapter classes).

13. WriteaJavaprogram thatloads namesandphonenumbersfromatextfilewherethe datais
14. organized as one line per record and each field in a record are separated bya tab (\t). It takes a
15. name or phone number as input and prints the corresponding other value from the hash table (hint:
16. usehash tables).

17. Write a Javaprogramthatcorrectlyimplementstheproducer- consumer problemusingthe
18. conceptofinterthreadcommunication.

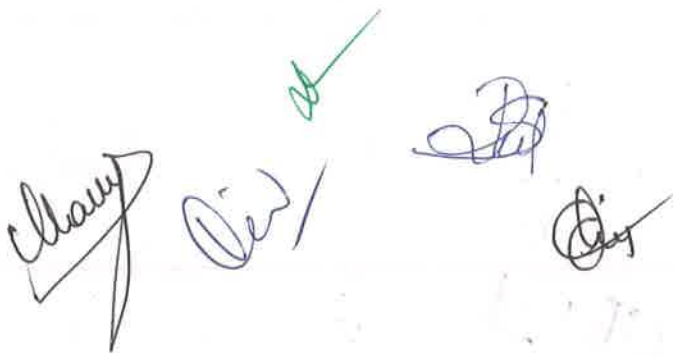
19. WriteaJavaprogram tolistallthefilesinadirectoryincludingthefilespresentinallits
20. subdirectories.

TEXTBOOKS:

1. JavaforProgrammers,P.J.DeitelandH.M.Deitel,10thEditionPearson education.
2. ThinkinginJava,BruceEckel,Pearson Education.

REFERENCEBOOKS

1. JavaProgramming,D.S.MalikandP.S.Nair,CengageLearning.
2. CoreJava, Volume1,9thedition, CayS.HorstmannandGCornell, Pearson.



PCS410SD:DATAVISUALIZATION-RPROGRAMMING/POWERBI

B.Tech.IIYearIISem.

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CourseObjectives:

- EffectiveuseofBusinessIntelligence(BI)technology(Tableau)toapplydata visualization
- Todiscernpatternsandrelationshipsinthedata.
- TobuildDashboardapplications.
- Tocommunicatetheresultsclearlyandconcisely.
- Tobeabletoworkwithdifferentformatsofdatasets.

CourseOutcomes: Attheendofthecourseastudentshouldbeableto

- UnderstandHowtoimportdataintoTableau.
- UnderstandTableauconceptsofDimensionsandMeasures.
- DevelopProgramsandunderstandhowtomapVisualLayoutsandGraphicalProperties.
- CreateaDashboardthatlinksmultiplevisualizations.
- Usegraphicaluser interfacestocreateFramesforprovidingsolutionstorealworldproblems.

LabProblems:

1. UnderstandingData,Whatisdata,wheretofinddata,FoundationsforbuildingData Visualizations, Creating Your First visualization?
2. GettingstartedwithTableauSoftwareusingDatafileformats,connectingyourDatatoTableau, creating basic charts(line, bar charts, Tree maps),Using the Show me panel.
3. TableauCalculations,OverviewofSUM,AVR,andAggregatefeatures,Creatingcustom calculations and fields.
4. Applyingnewdatacalculationstoyourvisualizations,FormattingVisualizations,Formatting Tools and Menus, Formatting specific parts of the view.
5. EditingandFormattingAxes,ManipulatingDatainTableaudata,PivotingTableaudata.
6. Structuringyourdata,SortingandfilteringTableaudata,PivotingTableaudata.
7. Advanced Visualization Tools: Using Filters, Using the Detail panel, using the Size panels, customizing filters, Using and Customizing tooltips, Formatting your data with colors.
8. Creating Dashboards & Storytelling, creating your first dashboard and Story, Design for different displays, adding interactivity to your Dashboard, Distributing & Publishing your Visualization.
9. Tableau file types, publishing to Tableau Online, Sharing your visualizations, printing, and Exporting.
10. Creatingcustomcharts,cyclicaldataandcirculararеacharts,DualAxischarts.

REFERENCES:

1. MicrosoftPowerBIcookbook,BrettPowell,2nd edition.
2. RProgrammingforData SciencebyRogerD.Peng (References)
3. TheArtof RProgrammingbyNormanMatloff CengageLearningIndia.