PDS511PE:DATAWAREHOUSINGANDBUSINESSINTELLIGENCE
(ProfessionalElective–I)

B.Tech.IIIYearISem.   **LTPC**
                                                                           3003

CourseObjectives:

- This course is concerned with extracting data from the information systems that deal with the day-to-day operations and transforming it into data that can be used by businesses to drive high-level decision making
- Studentswilllearnhowtodesignandcreateadatawarehouse,andhowtoutilize   theprocess   of extracting, transforming, and loading (ETL) data into data warehouses.

CourseOutcomes:

- UnderstandarchitectureofdatawarehouseandOLAPoperations.
- UnderstandFundamentalconceptsofBI
- ApplicationofBIKeyPerformanceindicators
- UnderstandUtilizationofAdvancedBIToolsandtheirImplementation.
- ImplementationofBITechniquesandBIEthics.

UNIT-I
DataWarehouse,DataWarehouseModelling,OLAPoperations,DataQubeComputationmethods

UNIT- II
BusinessIntelligenceIntroduction–Definition,LeveragingDataandKnowledgeforBI,BIComponents,   BI Dimensions, Information Hierarchy, Business Intelligence and Business Analytics. BI Life Cycle. Datafor BI - Data Issues and Data Quality for BI.

UNIT- III
BI Implementation - Key Drivers, Key Performance Indicators and Performance Metrics, BI Architecture/Framework, Best Practices, Business Decision Making, Styles of BI-vent-Driven alerts-A cyclicprocessofIntelligenceCreation.ThevalueofBusinessIntelligence-ValuedrivenandInformation use.

UNIT-IV
AdvancedBI-BigDataandBI,SocialNetworks,MobileBI,emergingtrends,Descriptionofdifferent   BI-Tools (Pentaho, KNIME)

UNIT-V
Business Intelligence and integration implementation-connecting in BI systems- Issues of legality-Privacy and ethics- Social networking and BI.

TEXTBOOKS:

1. DataMining–ConceptsandTechniques-JIAWEIHAN&MICHELINEKAMBER, Elsevier, 4th Edition.
2. RajivSabherwal"BusinessIntelligence"WileyPublications,2012.

REFERENCEBOOKS:

1. Efraim Turban,Ramesh Sharda, JayAronson, David King, Decision Support and Business Intelligence Systems, 9th Edition, Pearson Education, 2009.
2. DavidLoshin,BusinessIntelligence-TheSavyManager'sGuideGettingOnboardwith Emerging IT, Morgan Kaufmann Publishers, 2009.
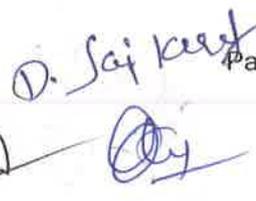
PDS512PE:ARTIFICIALINTELLIGENCE(ProfessionalElective–I)

B.Tech.IIIYearISem.   **LTPC**
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Prerequisites:
1. Programmingforproblemsolving,DataStructures.

CourseObjectives:
- TolearnthedistinctionbetweenoptimalreasoningVs.humanlikereasoning
- Tounderstandtheconceptsofstatespacerepresentation,exhaustivesearch,heuristic search together with the time and space complexities.
- Tolearndifferentknowledgerepresentationtechniques.
- TounderstandtheapplicationsofAI,namelygameplaying,theoremproving,andmachine learning.

CourseOutcomes:
- Understandsearchstrategiesandintelligentagents
- Understanddifferentadversarialsearchtechniques
- Applypropositionallogic,predicatelogicforknowledgerepresentation
- ApplyAItechniquestosolveproblemsofgameplaying,andmachinelearning.

UNIT-I
Introduction to AI, Intelligent Agents, problem-Solving Agents, Searching for Solutions, Uninformed Search Strategies: Breadth-first search, Uniform cost search, Depth-first search, Iterative deepening Depth-first search, Bidirectional search, Informed (Heuristic) Search Strategies: Greedy best-first search, A* search, Heuristic Functions, Beyond Classical Search: Hill-climbing search, Simulated annealing search, Local Search in Continuous Spaces

UNIT- II
ProblemSolvingbySearch-IIandPropositionalLogic
AdversarialSearch: Games,OptimalDecisions   inGames,Alpha-BetaPruning,   ImperfectReal-Time Decisions. Constraint Satisfaction Problems: Defining Constraint Satisfaction Problems, Constraint Propagation, Backtracking Search for CSPs, Local Search for CSPs, The Structure of Problems. Propositional Logic: Knowledge-Based Agents, The Wumpus World, Logic, Propositional Logic, Propositional Theorem Proving: Inference and proofs, Proof by resolution, Horn clauses and definite clauses, Forward and backward chaining, Effective Propositional Model Checking, Agents Based on Propositional Logic.

UNIT-III
LogicandKnowledgeRepresentation
First-Order Logic: Representation, Syntax and Semantics of First-Order Logic, Using First-Order Logic, Knowledge Engineering in First-Order Logic.
Inference in First-Order Logic: Propositional vs. First-Order Inference, Unification and Lifting, Forward Chaining, Backward Chaining, Resolution.

UNIT-IV
Knowledge Representation: Ontological Engineering, Categories and Objects, Events. Mental Events and Mental Objects, Reasoning Systems for Categories, Reasoning with Default Information.
Classical Planning: Definition of Classical Planning, Algorithms for Planningwith State-Space Search, Planning Graphs, other Classical Planning Approaches, Analysis of Planning approaches.

PDS513PE:WEBPROGRAMMING(ProfessionalElective–I)

B.Tech.IIIYearISem.   **LTPC**
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CourseObjectives:
- UnderstandthetechnologiesusedinWebProgramming.
- Knowtheimportanceofobject-orientedaspectsofScripting.
- UnderstandcreatingdatabaseconnectivityusingJDBC.
- Learntheconceptsofweb-basedapplicationusingsockets.

CourseOutcomes:
- Designwebpages.
- UsetechnologiesofWebProgramming.
- Applyobject-orientedaspectstoScripting.
- CreatedatabaseswithconnectivityusingJDBC.
- Buildweb-basedapplicationusingsockets.

UNIT–IClientsideProgramming
HTML-BasicTags-List,Tables,Images,Forms,Frames,CSS
JAVAScript -
Web page Designing using HTML, Scripting basics- Client side and server side scripting. Java ScriptObject,names,literals,operatorsandexpressions-statementsandfeatures-events-windows-documents - frames - data types - built-in functions- Browser object model - Verifying forms.-HTML5-CSS3- HTML 5 canvas - Web site creation using tools.

UNIT–IIJAVA
Introductiontoobject-orientedprogramming-Features ofJava-Datatypes,variablesandarrays-Operators-Controlstatements-ClassesandMethods-Inheritance.PackagesandInterfaces-ExceptionHandling-Multithreaded Programming -Input/Output-Files-UtilityClasses-String Handling.

UNIT–IIIJDBC
JDBCOverview-JDBCimplementation-Connectionclass-Statements-CatchingDatabase Results,handlingdatabaseQueries.Networking-InetAddressclass-URLclass-TCPsockets-UDP sockets,JavaBeans-RMI.

UNIT–IVAPPLETS
Javaapplets-Lifecycleofanapplet–Addingimagestoanapplet–Addingsoundtoanapplet. Passingparameterstoanapplet.EventHandling.IntroducingAWT:WorkingwithWindowsGraphics andText.UsingAWTControls,LayoutManagersandMenus.Servlet–lifecycleofaservlet.The ServletAPI,HandlingHTTPRequestandResponse,usingCookies,SessionTracking.Introductionto JSP.

UNIT–VXMLANDWEBSERVICES
Xml-Introduction-FormNavigation-XMLDocuments-XSL-XSLT-Webservices-UDDI-WSDL-Java webservices–Webresources.

TEXTBOOKS:
1. HarveyDeitel,AbbeyDeitel,InternetandWorldWideWeb:HowToProgram5thEdition.
2. HerbertSchildt,Java-TheCompleteReference,7thEdition.TataMcGraw-HillEdition.
3. MichaelMorrisonXMLUnleashedTechmediaSAMS.

REFERENCEBOOKS:
1. JohnPollock,Javascript-ABeginnersGuide,3rdEdition–TataMcGraw-HillEdition.
2. KeyurShah,GatewaytoJavaProgrammerSunCertification,TataMcGrawHill,2002.
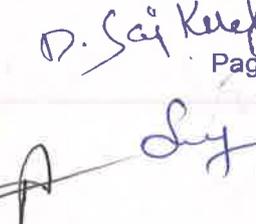
PDS515PE:COMPUTERGRAPHICS(ProfessionalElective–I)

B.Tech.IIIYearISem.   **LTPC**
                                                                            3003

Prerequisites
1. ProgrammingforproblemsolvingandDataStructures

CourseObjectives
- ProvidethebasicsofgraphicssystemsincludingPointsandlines,linedrawingalgorithms,2D, 3D objective transformations

CourseOutcomes
- Exploreapplicationsofcomputergraphics
- Understand2D,3Dgeometrictransformationsandclippingalgorithms
- Understand3Dobjectrepresentations,curves,surfaces,polygonrenderingmethods,color models
- Analyzeanimationsequenceandvisiblesurfacedetectionmethods

UNIT-I
Introduction: Application areas of Computer Graphics, overview of graphics systems, video-display devices, raster-scan systems, random-scan systems, graphics monitors and work stations and input devices
Outputprimitives: Pointsandlines,linedrawingalgorithms(DDAandBresenham'sAlgorithm)circle-generating algorithms and ellipse - generating algorithms
PolygonFilling: Scan-linealgorithm,boundary-fillandflood-fillalgorithms

UNIT- II
2-D geometric transformations: Translation, scaling, rotation, reflection and shear transformations, matrix representations and homogeneous coordinates, composite transforms, transformations between coordinate systems
2-Dviewing: Theviewingpipeline,viewingcoordinatereferenceframe,windowtoview-portcoordinate transformation, viewing functions, clipping operations, point clipping, Line clipping-Cohen Sutherland algorithms, Polygon clipping-Sutherland Hodgeman polygon clipping algorithm.

UNIT- III
3-Dobjectrepresentation: Polygonsurfaces,quadricsurfaces,splinerepresentation,Hermitecurve, Bezier curve and B-Spline curves, Bezier and B-Spline surfaces, Polygon rendering methods, color models and color applications.

UNIT-IV
3-DGeometric transformations: Translation, rotation, scaling, reflection and shear transformations, composite transformations.
3-D viewing: Viewing pipeline, viewing coordinates, projections, view volume and general projection transforms and clipping.

UNIT-V
Computer animation: Design of animation sequence, general computer animation functions, raster animations, computer animation languages, key frame systems, motion specifications.
Visible surface detection methods: Classification, back-face detection, depth-buffer method, BSP-tree method, area sub-division method and octree method.

TEXTBOOKS:
1."ComputerGraphicsCversion",DonaldHearnandM.PaulineBaker,PearsonEducation

PDS521PE:SPATIALANDMULTIMEDIADATABASES(ProfessionalElective-II)

B.Tech.IIIYearISem.	LT	PC
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CourseObjective:
- Introducethebasicconcepts,datamodelsandindexingstructuresforspatialdata, multimedia data.

CourseOutcomes:
- Understanddatamodels,storage,indexinganddesignofspatialdatabases.
- Evaluatemultidimensionaldatastructures
- RepresentimagedatabasewithR-tree
- Storeandretrieveaudio,videoandmultimediadata.

UNIT-I

IntroductiontoSpatialDatabases: Overview,beneficiaries,GIAandSDBMS,users,Spacetaxonomy, query language, query processing, query optimization.
SpatialConceptsandDataModels:ModelsofSpatialinformation,threestepdatabasedesign, ExtendingtheERmodelwithspatialconcept,object-orienteddatamodeling,SpatialQueryLanguages.

UNIT- II

Spatial Storage and Indexing: Storage-disks and files, spatial indexing, TR*, spatial join index. Queryprocessing and optimization –Evaluation of Spatial operations, query optimization, Analysis of Spatial index structures, distributed and parallel spatial database system.
MultidimensionalDataStructures:k-dTrees,PointQuadtrees,TheMX-Quadtree,R-Trees,comparison of Different Data Structures.

UNIT- III

Image Databases: Raw Images, Compressed Image Representations, Image Processing: Segmentation,Similarity-BasedRetrieval,AlternativeImageDBParadigms,RepresentingImageDBs withRelations,RepresentingImageDBswithR-Trees,RetrievingImagesBySpatialLayout, Implementations.
Text/Document Databases: Precision and Recall, Stop Lists, Word Stems, and Frequency Tables, Latent Semantic Indexing, TV-Trees, Other Retrieval Techniques

UNIT-IV

VideoDatabases: Organizing Content of a Single Video, Querying Content of Video Libraries, Video Segmentation, video Standards
Audio Databases: A General Model of Audio Data, Capturing Audio Content through Discrete Transformation, Indexing Audio Data
Multimedia Databases: Design and Architecture of a Multimedia Database, Organizing Multimedia Data Based on The Principle of Uniformity, Media Abstractions, Query Languages for Retrieving Multimedia Data, Indexing SMDSs with Enhanced Inverted Indices, Query Relaxation/Expansion.

UNIT-V

Creating Distributed Multimedia Presentations: Objects in Multimedia Presentations, Specifying Multimedia Documents with Temporal Constraints, Efficient Solution of Temporal Presentation Constraints, Spatial Constraints.
Distributed Media Servers: Distributed multimedia server architecture, distributed retrieval plans, optimal distributed retrieval plans.

TEXTBOOKS:
1. ShashiShekhar,SanjivChawla,SpatialDatabases-ATour,PearsonEducation.
2. V.S.SubrahmanianPrinciplesofMultimediaDatabaseSystems,MorganKauffman.

REFERENCEBOOKS:
1. MultimediaDatabases:Anobjectrelationalapproach,LynneDunckley,PearsonEducation.
2. MultimediaDatabaseSystems,Prabhakaram,Springer.

PDS523PE:SOFTWAREPROJECTMANAGEMENT(ProfessionalElective–II)

B.Tech.IIIYearISem.   **LTPC**
                                                                                  3003

Prerequisites:
1. Acourseon"SoftwareEngineering".

CourseObjectives
- Toacquireknowledgeonsoftwareprocessmanagement
- Toacquiremanagerialskillsforsoftwareprojectdevelopment
- Tounderstandsoftwareeconomics,workflowsandframeworks.

CourseOutcomes
- Understandthesoftwareeconomicstoimprovevariousphasesofdevelopment.
- Examinethelifecyclephases,artifacts,workflowsandcheckpointsofaprocess.
- Demonstratethesoftwareprojectframeworkcomponents.
- Analyzetheneedforvarioussoftwaremanagementdisciplinesandmetrics.

UNIT-I
SoftwareManagementRenaissance
Conventional Software Management: The waterfall model, conventional software Management performance. Evolution of Software Economics-Software economics, pragmatic software cost estimation. Improving Software Economics- Reducing Software product size, improving software processes, improving team effectiveness, improving automation, Achieving required quality, peer inspections.

UNIT–II
ASoftwareManagementProcessFramework-I
The principles of conventional software Engineering, principles of modern software management, transitioningtoaniterativeprocess.Lifecyclephases-Engineeringandproductionstages,inception, Elaboration,construction,transitionphases.Artifactsoftheprocess-Theartifactsets,Management artifacts, Engineering artifacts, programmatic artifacts.

UNIT–III
ASoftwareManagementProcessFramework-II
Model based software architectures- A Management perspective and technical perspective. Work Flowsoftheprocess-Softwareprocessworkflows,Iterationworkflows.Checkpointsoftheprocess- Major milestones, Minor Milestones, Periodic status assessments.

UNIT–IV
SoftwareManagementDiscipline-I
Iterative Process Planning- Work breakdown structures, planning guidelines, cost and schedule estimating, Iteration planning process, Pragmatic planning. Project Organizations and Responsibilities- Line-of-Business Organizations, Project Organizations, evolution of Organizations. Process Automation: Automation building blocks, The Project Environment.

UNIT–V
SoftwareManagementDiscipline-II
ProjectControlandProcessinstrumentation:ThesevencoreMetrics,Managementindicators,quality indicators, life cycle expectations, pragmatic Software Metrics, Metrics automation. Tailoring the Process:Processdiscriminates.FutureSoftwareProjectManagement:modernProjectProfiles,Next

PDS524PE:DEVOPS(ProfessionalElective–II)

B.Tech.IIIYearISem.   **LTPC**
                                                                                  3003

Pre-Requisites:
1. SoftwareEngineering
2. SoftwareProjectManagement

CourseObjectives:
- Understand the skill sets and high-functioning teams involved in Agile, DevOps and related methods to reach a continuous delivery capability.
- ImplementautomatedsystemupdateandDevOpslifecycle.

CourseOutcomes:
- UnderstandthevariouscomponentsofDevOpsenvironment.
- IdentifySoftwaredevelopmentmodelsandarchitecturesofDevOps
- Usedifferentprojectmanagementandintegrationtools.
- Selectanappropriatetestingtoolanddeploymentmodelforproject.

UNIT-I
IntroductiontoDevOps:
Introduction, Agile development model, DevOps and ITIL. DevOps process and Continuous Delivery, Release management, Scrum, Kanban, delivery pipeline, identifying bottlenecks.

UNIT-II:
SoftwaredevelopmentmodelsandDevOps:
DevOps Lifecycle for Business Agility, DevOps, and Continuous Testing. DevOps influence on Architecture: Introducing software architecture, The monolithic scenario, Architecture rules of thumb, Theseparation ofconcerns,Handling databasemigrations,Microservices andthe data tier,DevOps, architecture, and resilience.

UNIT-III
Introductiontoprojectmanagement:
The need for source code control, the history of source code management, Roles and code, source code management system and migrations, shared authentication, Hosted Git servers, Different Git server implementations, Docker intermission, Gerrit, The pull request model, GitLab.

UNIT-IV
Integratingthesystem:
Build systems, Jenkins build server, Managing build dependencies, Jenkins plugins, and file system layout,Thehostserver,Buildslaves,Softwareonthehost,Triggers,Jobchainingandbuildpipelines, Buildserversandinfrastructureascode,Buildingbydependencyorder,Buildphases,Alternativebuild servers, Collating quality measures.

UNIT-V
TestingToolsandDeployment:
Various types of testing, Automation of testing Pros and cons, Selenium - Introduction, Selenium features, JavaScript testing, Testing backend integration points, Test-driven development, REPL-driven development.Deploymentofthesystem:Deploymentsystems,Virtualizationstacks,codeexecutionat the client, Puppet master and agents, Ansible, Deployment tools: Chef, SaltStackand Docker.

TEXTBOOK:
1. JoakimVerona.,PracticalDevOps,PacktPublishing,2016.

REFERENCEBOOKS:
1. DeepakGaikwad,ViralThakkar.DevOpsToolsfromPractitioner'sViewpoint.Wiley publications.
2. LenBass,IngoWeber,LimingZhu.DevOps:ASoftwareArchitect'sPerspective.Addison Wesley.

Common sensing techniques for Reactive Robots: Logical sensors, Behavioural Sensor Fusion, Pro- prioceptive sensors, Proximity Sensors, Topological Planning and Metric Path Planning

TEXTBOOKS:
1. DavidA.Forsythand JeanPonce:ComputerVision–AModernApproach,PHILearning (Indian Edition), 2009.
2. RobinMurphy,IntroductiontoAIRobotics,MITPress

REFERENCEBOOKS:
1. E.R.Davies:ComputerandMachineVision-Theory,AlgorithmsandPracticalities,Elsevier (AcademicPress),4thedition,2013.
2. TheRoboticspremier,MajaJMatari,MITPress
3. RichardSzeliski"ComputerVision:AlgorithmsandApplications"Springer-VerlagLondon Limited 2011.

PDS505PC:COMPUTERNETWORKSLAB

B.Tech.IIIYearISem.   **LTPC**
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CourseObjectives

- Tounderstandtheworkingprincipleofvariouscommunicationprotocols.
- Tounderstandthenetworksimulatorenvironmentandvisualizeanetworktopologyand observe its performance
- Toanalyzethetrafficflowandthecontentsofprotocolframes

CourseOutcomes

- Implementdatalinklayerfarmingmethods
- Analyzeerrordetectionanderrorcorrectioncodes.
- Implementandanalyzeroutingandcongestionissuesinnetworkdesign.
- ImplementEncodingandDecodingtechniquesusedinpresentationlayer
- Tobeabletoworkwithdifferentnetworktools

ListofExperiments

1. Implement the data link layer framing methods such as character, character-stuffing and bit stuffing.
2. WriteaprogramtocomputeCRCcodeforthepolynomialsCRC-12,CRC-16andCRCCCIP
3. Develop a simpledata link layer thatperforms the flow control using the sliding window protocol, and loss recovery using the Go-Back-N mechanism.
4. ImplementDijsktra'salgorithmtocomputetheshortestpaththroughanetwork
5. Takeanexamplesubnetofhostsandobtainabroadcasttreeforthesubnet.
6. Implementdistancevectorroutingalgorithmforobtainingroutingtablesateachnode.
7. Implementdataencryptionanddatadecryption
8. WriteaprogramforcongestioncontrolusingLeakybucketalgorithm.
9. Writeaprogramforframesortingtechniquesusedinbuffers.
10. **Wireshark**
    i.   PacketCaptureUsingWireshark
    ii. StartingWireshark
    iii. ViewingCapturedTraffic
    iv. AnalysisandStatistics&Filters.

    How to run Nmap scan
    OperatingSystemDetectionusingNmap Do
    the following using NS2 Simulator
    i.   NS2Simulator-Introduction
    ii. SimulatetoFindtheNumberofPacketsDropped
    iii. SimulatetoFindtheNumberofPacketsDroppedbyTCP/UDP
    iv. SimulatetoFindtheNumberofPacketsDroppedduetoCongestion
    v.   SimulatetoCompareDataRate&Throughput.
    vi. SimulatetoPlotCongestionforDifferentSource/Destination
    vii. SimulatetoDeterminethePerformancewithrespecttoTransmissionofPackets

TEXTBOOK:

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

REFERENCEBOOKS:

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

D. Sai Kiran

PDS601PC:AUTOMATATHEORYANDCOMPILERDESIGN

B.Tech.IIIYearII Sem.   **LTPC**
                                                                                          3003

CourseObjectives

- Tointroducethefundamentalconceptsofformallanguages,grammarsandautomatatheory.
- Tounderstanddeterministicandnon-deterministicmachinesandthedifferencesbetween decidability and undecidability.
- Introducethemajorconceptsof language translationand compiler designandimpartthe knowledge of practical skills necessary for constructing a compiler.
- Topicsincludephasesofcompiler,parsing,syntaxdirectedtranslation,typecheckinguseof symbol tables, intermediate code generation

CourseOutcomes

- Abletoemployfinitestatemachinesformodelingandsolvingcomputingproblems.
- Abletodesigncontextfreegrammarsforformallanguages.
- Abletodistinguishbetweendecidabilityandundecidability.
- Demonstratetheknowledgeofpatterns,tokens&regularexpressionsforlexicalanalysis.
- AcquireskillsinusinglextoolanddesignLRparsers

UNIT-I

Introduction to Finite Automata: Structural Representations, Automata and Complexity, the Central Concepts ofAutomata Theory-Alphabets, Strings,Languages,Problems.
NondeterministicFiniteAutomata:FormalDefinition,anapplication,TextSearch,FiniteAutomata with Epsilon-Transitions.
Deterministic Finite Automata: Definition of DFA, How A DFA Process Strings, The language of DFA,ConversionofNFAwith€-transitionstoNFAwithout€-transitions.ConversionofNFAtoDFA

UNIT- II

Regular Expressions: Finite Automata and Regular Expressions, Applications of Regular Expressions,Algebraic Laws for Regular Expressions, Conversion of Finite Automata to Regular Expressions.
PumpingLemmaforRegularLanguages:
Statementofthepumpinglemma,ApplicationsofthePumpingLemma.
Context-Free Grammars: Definition of Context-Free Grammars, Derivations Using a Grammar, Leftmost and Rightmost Derivations, the Language of a Grammar, Parse Trees, Ambiguity in Grammars and Languages.

UNIT- III

PushDownAutomata:DefinitionofthePushdownAutomaton,theLanguagesofaPDA,Equivalence   of PDA's and CFG's, Acceptance by final state
TuringMachines:
Introduction to Turing Machine, Formal Description, Instantaneous description, The language of a Turing machine
Undecidability:
Undecidability, A Language that is Not Recursively Enumerable, An Undecidable Problem That is RE, Undecidable Problems about Turing Machines

UNIT-IV,

Introduction: Thestructureofacompiler
Lexical Analysis: The Role of the Lexical Analyzer, Input Buffering, Recognition of Tokens, TheLexical- Analyzer Generator Lex

PDS602PC:MACHINELEARNING

B.Tech.IIIYearII Sem.   **LTPC**
                                                                    3003

CourseObjectives:
- TointroducestudentstothebasicconceptsandtechniquesofMachineLearning.
- TohaveathoroughunderstandingoftheSupervisedandUnsupervisedlearningtechniques
- Tostudythevariousprobability-basedlearningtechniques

CourseOutcomes:
- Distinguishbetween,supervised,unsupervisedandsemi-supervisedlearning
- Understand algorithms forbuildingclassifiersappliedondatasetsofnon-linearlyseparable classes
- Understandtheprinciplesofevolutionarycomputingalgorithms
- Designanensemblertoincreasetheclassificationaccuracy

UNIT-I

Learning-TypesofMachineLearning-SupervisedLearning-TheBrainandtheNeuron-Designa Learning System - Perspectives and Issues in Machine Learning - Concept Learning Task - Concept LearningasSearch-FindingaMaximallySpecificHypothesis-VersionSpacesandtheCandidate EliminationAlgorithm-LinearDiscriminants:-Perceptron-LinearSeparability-LinearRegression.

UNIT- II

Multi-layer Perceptron- Going Forwards - Going Backwards: Back Propagation Error - Multi-layer PerceptroninPractice- Examples of using the MLP -Overview - DerivingBack-Propagation- Radial Basis Functions and Splines - Concepts - RBF Network - Curse of Dimensionality - Interpolations and Basis Functions - Support VectorMachines

UNIT- III

LearningwithTrees-DecisionTrees-ConstructingDecisionTrees-ClassificationandRegression Trees-EnsembleLearning-Boosting-Bagging-DifferentwaystoCombineClassifiers-Basic Statistics - Gaussian Mixture Models - Nearest Neighbor Methods - Unsupervised Learning - K means Algorithms

UNIT-IV

Dimensionality Reduction - Linear Discriminant Analysis - Principal Component Analysis - Factor Analysis-IndependentComponentAnalysis-LocallyLinearEmbedding-Isomap-LeastSquares Optimization
Evolutionary Learning - Genetic algorithms - Genetic Offspring: - Genetic Operators - Using Genetic Algorithms

UNIT-V

ReinforcementLearning-Overview-GettingLostExample
MarkovChainMonteCarloMethods-Sampling-ProposalDistribution-MarkovChainMonteCarlo-   Graphical Models - Bayesian Networks - Markov Random Fields - Hidden Markov Models - Tracking Methods

TEXTBOOKS:
1. StephenMarsland, MachineLearning – AnAlgorithmicPerspective,SecondEdition, ChapmanandHall/CRCMachineLearningandPatternRecognitionSeries,2014.

PDS603PC:BIGDATAANALYTICS

B.Tech.IIIYearII Sem.   **LTPC**
                                                                   3003

CourseObjectives
- ProvidetheknowledgeofprinciplesandtechniquesforBigdataAnalyticsandgivean exposure of the frontiers of Big data Analytics

CoursesOutcomes
- Understandtheimportanceofbigdataanalyticsanditstypes
- Performanalyticsonbigdata
- ProficiencyinbigdatastorageandprocessinginHadoop
- DataanalyticsthroughMongoDB
- DataanalyticsthroughR

UNIT-I
TypesofDigitaldata:ClassificationofDigitalData,
Introductionto Big Data: Evolution of Big Data,definition ofbig data,TraditionalBusiness Intelligence vs BigData, Coexistence of Big Data and Data Warehouse.
Big Data Analytics: introduction to Big Data Analytics, What Big Data Analytics Isn't, Sudden Hype AroundBigDataAnalytics,ClassificationofAnalytics,GreatestChallengesthatPreventBusinessfrom CapitalizingBigData,TopChallengesFacingBigData,BigDataAnalyticsImportance,DataScience, Terminologies used in Big Data Environments.

UNIT- II
Hadoop: Features of Hadoop, Key advantages of hadoop, versions of hadoop, overview of hadoop ecosystem, Hadoop distributions. Need of hadoop, RDBMS vs Hadoop, Distribution computing challenges, History of hadoop, Hadoop overview,HDFS

UNIT- III
Processing data with hadoop, introduction to mapreduce programming, mapper, reducer, combiner, partitioner
NoSQL:TypesofNoSQLDatabases,advantagesofNoSQL,UseofNoSQLinindustry,SQLvs NoSQL, newSQL, comparison of Nosql, sql and newsql

UNIT-IV
MongoDB,necessityofmongodb,termsusedinmongodbandRDBMS,datatypesinmongoDB, mongodb query language

UNIT-V
IntroductiontoRprogramming,operators,controlstatementsandfunctions,interfacingwithR,vectors, matrices,lists,dataframes,factorsandtables,accessinginputandoutput,graphsinR,Rapplyfamily

TEXTBOOKS:
1. BigDataAnalytics,SeemaAcharya,SubhashiniChellappan,Wiley2015.
2. Rprogrammingforbeginners,sandhyaarora,lateshmalik,universitypress.

REFERENCEBOOKS:
1. chandramoulisubramanian,AshaAGeroge,CRReneRobin,bigdataanalytics,University press.
2. BigData,BigAnalytics:EmergingBusinessIntelligenceandAnalytic TrendsforToday'sBusiness, Michael Minelli, Michehe Chambers, 1stEdition,Ambiga Dhiraj, Wiley CIO Series, 2013.
3. Hadoop:TheDefinitiveGuide,TomWhite,3rdEdition,O'ReillyMedia,2012.
4. BigDataAnalytics:DisruptiveTechnologiesforChangingtheGame,ArvindSathi,1stEdition, IBM Corporation, 2012.

D. Sai Kiref

PDS632PE: DATA VISUALIZATION TECHNIQUES (Professional Elective – III)

B.Tech. III Year II Sem.	L T P C
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Course Objectives:
- To understand various data visualization techniques

Course Outcomes:
- Know the historical development and evolution of data visualization techniques.
- Analyze and visualize high-dimensional datasets using appropriate techniques.
- Visualize large multidimensional datasets using appropriate methods.
- Create insightful visual representations for diverse types of data.

UNIT - I
Introduction, A Brief History of Data Visualization, Good Graphics, Static Graphics.

UNIT - II
Data Visualization Through Their Graph Representations, Graph-theoretic Graphics, High-dimensional Data Visualization, Multivariate Data Glyphs: Principles and Practice, Linked Views for Visual Exploration, Linked Data Views, Visualizing Trees and Forests.

UNIT - III
Multidimensional Scaling, Huge Multidimensional Data Visualization, Multivariate Visualization by Density Estimation, Structured Sets of Graphs, Structural Adaptive Smoothing by Propagation-Separation Methods, Smoothing Techniques for Visualization.

UNIT - IV
Data Visualization via Kernel Machines, Visualizing Cluster Analysis and Finite Mixture Models, Visualizing Contingency Tables, Mosaic Plots and their Variants.

UNIT - V
Parallel Coordinates: Visualization, Exploration and Classification of High- Dimensional Data, Matrix Visualization, Visualization in Bayesian Data Analysis.

TEXT BOOKS:
1. Handbook of Data Visualization by Chun-houh Chen, 2008.
2. Matthew Ward, Georges Grinstein and Daniel Keim, "Interactive Data Visualization Foundations, Techniques, Applications", 2010.
3. Colin Ware, "Information Visualization Perception for Design", 2nd edition, Margon Kaufmann Publishers, 2004.

REFERENCE BOOKS:
1. Robert Spence "Information visualization - Design for interaction", Pearson Education, 2nd Edition, 2007.
2. Alexandru C. Telea, "Data Visualization: Principles and Practice," A. K. Peters Ltd, 2008.

PDS634PE:MOBILEAPPLICATIONDEVELOPMENT(ProfessionalElective–III)

B.Tech.IIIYearII Sem.   **LTPC**
                                                                       3003

Prerequisites
1. AcquaintancewithJAVAprogramming.
2. ACourseonDBMS.

CourseObjectives
- TodemonstratetheirunderstandingofthefundamentalsofAndroidoperatingsystems
- ToimprovestheirskillsofusingAndroidsoftwaredevelopmenttools
- Todemonstratetheirabilitytodevelopsoftwarewithreasonablecomplexityonmobile platform
- Todemonstratetheirabilitytodeploysoftwaretomobiledevices
- Todemonstratetheirabilitytodebugprogramsrunningonmobiledevices

CourseOutcomes
- UnderstandtheworkingofAndroidOSPractically.
- DevelopAndroiduserinterfaces
- Develop,deployandmaintaintheAndroidApplications.

UNIT-I
Introduction to Android Operating System: Android OS design and Features - Android development framework,SDKfeatures,InstallingandrunningapplicationsonAndroidStudio,CreatingAVDs,Types ofAndroidapplications,BestpracticesinAndroidprogramming,AndroidtoolsAndroidapplication components - Android Manifest file, Externalizing resources like values, themes, layouts, Menus etc, Resourcesfordifferentdevicesandlanguages,RuntimeConfigurationChanges AndroidApplicationLifecycle-Activities,Activitylifecycle,activitystates,monitoringstatechanges

UNIT- II
Android   UserInterface:Measurements-Deviceandpixeldensityindependentmeasuringunit-s Layouts-Linear,Relative,GridandTableLayouts
User Interface (UI) Components -Editable and non-editable TextViews, Buttons, Radio and Toggle Buttons, Checkboxes, Spinners, Dialog and pickers
EventHandling-HandlingclicksorchangesofvariousUIcomponents
Fragments - Creating fragments, Lifecycle of fragments, Fragment states, Adding fragments to Activity, adding,removingandreplacingfragmentswithfragmenttransactions,interfacingbetweenfragments andActivities,Multi-screenActivities

UNIT- III
Intentsand Broadcasts:Intent–Using intents to launch Activities, Explicitlystarting new Activity, Implicit Intents, Passing data to Intents, Getting results from Activities, Native Actions, using Intent to dial a number or to send SMS
Broadcast Receivers - Using Intent filters to service implicit Intents, Resolving Intent filters, finding and usingIntentsreceivedwithinanActivity
Notifications-CreatingandDisplayingnotifications,DisplayingToasts

UNIT-IV
Persistent Storage: Files - Using application specific folders and files, creating files, reading data fromfiles,listingcontentsofadirectorySharedPreferences–Creatingsharedpreferences,savingand retrievingdatausingSharedPreference

UNIT-V

Database - Introduction to SQLite database, creating and opening a database, creating tables, inserting retrieving and etindelg data, Registering Content Providers, Using content Providers (insert, delete, retrieve and update)

TEXTBOOK:

1. ProfessionalAndroid4ApplicationDevelopment,RetoMeier,WileyIndia,(Wrox),2012

REFERENCEBOOKS:

1. AndroidApplicationDevelopmentforJavaProgrammers,JamesCSheusi,CengageLearning, 2013
2. BeginningAndroid4ApplicationDevelopment,Wei-MengLee,WileyIndia(Wrox),2013

TEXTBOOKS:

1. CryptographyandNetworkSecurity-PrinciplesandPractice:WilliamStallings,Pearson Education, 6th Edition
2. CryptographyandNetworkSecurity:AtulKahate,McGrawHill,3rdEdition

REFERENCEBOOKS:

1. Cryptography and Network Security: C K Shyamala, N Harini, Dr T R Padmanabhan, Wiley India, 1st Edition.
2. CryptographyandNetworkSecurity:ForouzanMukhopadhyay,McGrawHill,3rdEdition
3. InformationSecurity,Principles,andPractice:MarkStamp,WileyIndia.
4. PrinciplesofComputerSecurity:WM.ArthurConklin,GregWhite,TMH
5. IntroductiontoNetworkSecurity:NealKrawetz,CENGAGELearning
6. NetworkSecurityandCryptography:BernardMenezes,CENGAGELearning

TEXTBOOKS:
1. Doing Data Science, Straight Talk from The Frontline. Cathy O'Neil and Rachel Schutt, O'Reilly, 2014.
2. KGSrinivas,GMSiddesh,"StatisticalprogramminginR",OxfordPublications.

REFERENCEBOOKS:
1. Jiawei Han, Micheline Kamber and Jian Pei. Data Mining: Concepts and Techniques, 3rd ed. The Morgan Kaufmann Series in Data Management Systems.
2. IntroductiontoDataMining,Pang-NingTan,VipinKumar,MichaelSteinbanch,Pearson Education.
3. BrainS.Everitt,"AHandbookofStatisticalAnalysisUsingR",SecondEdition,4LLC,2014.
4. Dalgaard,Peter,"IntroductorystatisticswithR",SpringerScience&BusinessMedia,2008.
5. PaulTeetor,"RCookbook",O'Reilly,2011.

PDS604PC:MACHINELEARNINGLAB

B.Tech.IIIYearII Sem.   **LTPC**
                                                              0021

CourseObjective:

- Theobjectiveofthislabistogetanoverviewofthevariousmachinelearningtechniquesand can demonstrate them using python.

CourseOutcomes:

- Understandmodernnotionsinpredictivedataanalysis
- Selectdata,modelselection,modelcomplexityandidentifythetrends
- Understandarangeofmachinelearningalgorithmsalongwiththeirstrengthsand weaknesses
- Buildpredictivemodelsfromdataandanalyzetheirperformance

ListofExperiments

1. WriteapythonprogramtocomputeCentralTendencyMeasures:Mean,Median,Mode Measure of Dispersion: Variance, Standard Deviation
2. StudyofPythonBasicLibrariessuchasStatistics,Math,NumpyandScipy
3. StudyofPythonLibrariesforMLapplicationssuchasPandasandMatplotlib
4. WriteaPythonprogramtoimplementSimpleLinearRegression
5. ImplementationofMultipleLinearRegressionforHousePricePredictionusingsklearn
6. ImplementationofDecisiontreeusingsklearnanditsparametertuning
7. ImplementationofKNNusingsklearn
8. ImplementationofLogisticRegressionusingsklearn
9. ImplementationofK-MeansClustering
10. PerformanceanalysisofClassificationAlgorithmsonaspecificdataset(MiniProject)

TEXTBOOK:

1.MachineLearning-TomM.Mitchell,-MGH

REFERENCEBOOK:

1.MachineLearning:AnAlgorithmicPerspective,StephenMarshland,Taylor&Francis

PDS611PE:SOFTWARETESTINGMETHODOLOGIESLAB(ProfessionalElective–III)

B.Tech.IIIYearII Sem.   **LTPC**
                0021

Prerequisites
- Abasicknowledgeofprogramming.

CourseObjectives
- Toprovideknowledgeofsoftwaretestingmethods.
- Todevelopskillsinautomationofsoftwaretestingandsoftwaretestautomationmanagement using the latest tools.

CourseOutcomes
1. Designanddevelopthebestteststrategiesinaccordancewiththedevelopmentmodel.
2. DesignanddevelopGUI,Bitmapanddatabasecheckpoints
3. Developdatabasecheckpointsfordifferentchecks
4. Performbatchtestingwithandwithoutparameterpassing

ListofExperiments
1. Recordingincontextsensitivemodeandanalogmode
2. GUIcheckpointforsingleproperty
3. GUIcheckpointforsingleobject/window
4. GUIcheckpointformultipleobjects
5.
    a. Bitmapcheckpointforobject/window
    b. Bitmapcheckpointforscreenarea
6.DatabasecheckpointforDefault check
6.Databasecheckpointforcustomcheck
6. Databasecheckpointforruntimerecordcheck 6.
    a. Datadriventestfordynamictestdatasubmission
    b. Datadriventestthroughflatfiles
    c. Datadriventestthroughfrontgrids
    d. Datadriventestthroughexceltest

    a. Batchtestingwithoutparameterpassing
    b. Batchtestingwithparameterpassing
11. Datadrivenbatch
11. Silentmodetestexecutionwithoutanyinterruption
12. Testcaseforcalculatorinwindowsapplication

TEXTBOOKS
1. SoftwareTestingtechniques,BarisBeizer,2^{nd}Edition,Dreamtech.
2. SoftwareTestingTools,Dr.K.V.K.K.Prasad,Dreamtech.

REFERENCEBOOKS
1. Thecraftofsoftwaretesting,BrianMarick,PearsonEducation.
2. SoftwareTestingTechniques-SPD(Oreille)
3. SoftwareTestingintheRealWorld,EdwardKit,Pearson.
4. EffectivemethodsofSoftwareTesting,Perry,JohnWiley.
5. ArtofSoftwareTesting,Meyers,JohnWiley.

PDS613PE:SCRIPTINGLANGUAGESLAB(ProfessionalElective–III)

B.Tech.IIIYearII Sem.   LTPC
                                                                                                 0021

Prerequisites: AnyHighlevelprogramminglanguage(C,C++)

CourseObjectives
- ToUnderstandtheconceptsofscriptinglanguagesfordevelopingwebbasedprojects
- TounderstandtheapplicationstheofRuby,TCL,Perlscriptinglanguages

CourseOutcomes
- AbilitytounderstandthedifferencesbetweenScriptinglanguagesandprogramminglanguages
- GainsomefluencyprogramminginRuby,Perl,TCL

LISTOFEXPERIMENTS

1. WriteaRubyscripttocreateanewstringwhichisncopiesofagivenstringwherenisanon-negative integer
2. WriteaRubyscriptwhichaccepttheradiusofacirclefromtheuserandcomputetheparameterand area.
3. WriteaRubyscriptwhichaccepttheusersfirstandlastnameandprinttheminreverseorderwitha space between them
4. WriteaRubyscripttoacceptafilenamefromtheuserprinttheextensionofthat
5. WriteaRubyscripttofindthegreatestofthreenumbers
6. WriteaRubyscripttoprintoddnumbersfrom10to1
7. Write a Ruby script to check two integers and return true if one of them is 20 otherwise return their sum
8. Write a Ruby script to check two temperatures and return true if one is less than 0 and the other is greater than 100
9. WriteaRubyscripttoprinttheelementsofagivenarray
10. WriteaRubyprogramtoretrievethetotalmarkswheresubjectnameandmarksofastudentstored in a hash
11. WriteaTCLscripttofindthefactorialofanumber
12. WriteaTCLscriptthatmultipliesthenumbersfrom1to10
13. WriteaTCLscriptforsortingalistusingacomparisonfunction
14. WriteaTCLscriptto(i)createalist(ii)appendelementstothelist(iii)Traversethelist(iv) Concatenate the list
15. WriteaTCLscripttocomparingthefilemodifiedtimes.
16. WriteaTCLscripttoCopyafileandtranslatetonativeformat.
17.   a)WriteaPerlscripttofindthelargestnumberamongthreenumbers.
        b)WriteaPerlscripttoprintthemultiplicationtablesfrom1-10usingsubroutines.
18. WriteaPerlprogramtoimplementthefollowinglistofmanipulatingfunctions
        a) Shift
        b) Unshift
        c) Push
19. a)WriteaPerlscripttosubstituteaword,withanotherwordinastring.
        b)WriteaPerlscripttovalidateIPaddressandemailaddress.
20. WriteaPerlscripttoprintthefileinreverseorderusingcommandlinearguments

TEXTBOOKS:
1. TheWorldofScriptingLanguages,DavidBarron,WileyPublications.
2. RubyProgramminglanguagebyDavidFlanaganandYukihiroMatsumotoO'Reilly
3. "ProgrammingRuby"ThePramaticProgammersguidebyDabveThomasSecondedition

PDS614PE:MOBILEAPPLICATIONDEVELOPMENTLAB(ProfessionalElective–III)

B.Tech.IIIYearII Sem.   **LTPC**
                                                                                0021

CourseObjectives:
- TolearnhowtodevelopApplicationsinanandroidenvironment.
- Tolearnhowtodevelopuserinterfaceapplications.
- TolearnhowtodevelopURLrelatedapplications.

CourseOutcomes:
- UnderstandtheworkingofAndroidOSPractically.
- Developuserinterfaces.
- Develop,deployandmaintaintheAndroidApplications.

LISTOFEXPERIMENTS:

1. CreateanAndroidapplicationthatshowsHello+nameoftheuserandrunitonanemulator.
(b)Createanapplicationthattakesthenamefromatextboxandshowshellomessagealongwiththe   name entered in the text box, when the user clicks the OK button.

2. Create a screen that has input boxes for User Name, Password, Address, Gender (radio buttons for male and female), Age (numeric), Date of Birth (Datepicker), State (Spinner) and a Submit button. On clicking the submit button, print all the data below the Submit Button. Use (a) Linear Layout (b) Relative Layout and (c) Grid Layout or Table Layout.

3. Develop an application that shows names as a list and on selecting a name it should show the detailsofthecandidateonthenextscreenwitha"Back"button.Ifthescreenisrotatedtolandscape   mode (width greater than height), then the screen should show list on left fragment and details on the right fragment instead of the second screen with the back button. Use Fragment transactions and Rotation event listeners.

4. Develop an application that uses a menu with 3 options for dialing a number, opening a website andtosendanSMS.Onselectinganoption,theappropriateactionshouldbeinvokedusingintents.

5. Develop an application that inserts some notifications into Notification area and whenever a notification is inserted, it should show a toast with details of the notification.

6. Createanapplicationthatusesatextfiletostoreusernames   andpasswords(tabseparatedfields andonerecordperline).Whentheusersubmitsaloginnameandpasswordthroughascreen,the detailsshouldbeverifiedwiththetextfiledataandiftheymatch,showadialogsayingthatloginis successful. Otherwise, show the dialog with a Login Failed message.

7. Createauserregistrationapplicationthatstorestheuserdetailsinadatabasetable.

8. Create a database and a user table where the details of login names and passwords are stored. Insert some names and passwords initially. Now the login details entered by the user should be verified with the database and an appropriate dialog should be shown to the user.

9. Createanadminapplicationfortheusertable,whichshowsallrecordsasalistandtheadmincan   select any record for edit or modify. The results should be reflected in the table.

10. Develop an application that shows all contacts of the phone along with details like name, phone number, mobile number etc.

11. Createanapplicationthatsavesuserinformationlikename,age,genderetc.insharedpreference   and retrieves them when the program restarts.

12. CreateanalarmthatringseverySundayat8:00AM.Modifyittouseatimepickertosetalarmtime.

TEXTBOOKS:
1. ProfessionalAndroid4ApplicationDevelopment,RetoMeier,WileyIndia,(Wrox),2012.
2. AndroidApplicationDevelopmentforJavaProgrammers,JamesCSheusi,Cengage,2013.

REFERENCEBOOK:
1. BeginningAndroid4ApplicationDevelopment,Wei-MengLee,WileyIndia(Wrox),2013.

PDS606PC:UIDESIGN-FLUTTER

B.Tech.IIIYearII Sem.   **LTPC**
                                                              0042

CourseObjectives:
- LearnstoImplementFlutterWidgetsandLayouts
- UnderstandsResponsiveUIDesignandwithNavigationinFlutter
- KnowledgeonWidgesandcustomizewidgetsforspecificUIelements,Themes
- Understandtoincludeanimationapartfromfetchingdata

CourseOutcomes:
- ImplementsFlutterWidgetsandLayouts
- ResponsiveUIDesignandwithNavigationinFlutter
- Create custom widgets for specific UI elements and also Apply styling using themes and custom styles.
- Designaformwithvariousinputfields,alongwithvalidationanderrorhandling
- FetchesdataandwritecodeforunitTestforUIcomponentsandalsoanimation

ListofExperiments: Studentsneedtoimplementthefollowingexperiments

1. a)InstallFlutterandDartSDK.
   b) WriteasimpleDartprogramtounderstandthelanguagebasics.

2. a)ExplorevariousFlutterwidgets(Text,Image,Container,etc.).
   b) ImplementdifferentlayoutstructuresusingRow,Column,andStackwidgets.

3. a)DesignaresponsiveUIthatadaptstodifferentscreensizes.
   b) Implementmediaqueriesandbreakpointsforresponsiveness.

4. a)SetupnavigationbetweendifferentscreensusingNavigator.
   b) Implementnavigationwithnamedroutes.

5. a)Learnaboutstatefulandstatelesswidgets.
   b) ImplementstatemanagementusingsetStateandProvider.

6. a)CreatecustomwidgetsforspecificUIelements.
   b) Applystylingusingthemesandcustomstyles.

7. a)Designaformwithvariousinputfields.
   b) Implementformvalidationanderrorhandling.

8. a)AddanimationstoUIelementsusingFlutter'sanimationframework.
   b) Experimentwithdifferenttypesofanimations(fade,slide,etc.).

9. a)FetchdatafromaRESTAPI.
   b) DisplaythefetcheddatainameaningfulwayintheUI.

10. a)WriteunittestsforUIcomponents.
    b) UseFlutter'sdebuggingtoolstoidentifyandfixissues.

TEXTBOOK:
1.MarcoL.Napoli,BeginningFlutter:AHands-onGuidetoAppDevelopment.

PDS702PC:WEBANDSOCIALMEDIAANALYTICS

B.Tech.IVYearISem.   **LTPC**

                                                                            3003

CourseObjectives:
- Exposuretovariouswebandsocialmediaanalytictechniques.

CourseOutcomes:
- Knowledgeondecisionsupportsystems
- Applynaturallanguageprocessingconceptsontextanalytics
- Understandsentimentanalysis
- Knowledgeonsearchengineoptimizationandwebanalytics

UNIT-I
AnOverviewofBusinessIntelligence,Analytics,andDecisionSupport
AnalyticstoManageaVaccineSupplyChainEffectivelyandSafely,ChangingBusinessEnvironments andComputerizedDecisionSupport,InformationSystemsSupportforDecision Making,TheConcept of Decision Support Systems (DSS), Business Analytics Overview, Brief Introduction to Big Data Analytics

UNIT- II
TextAnalyticsandTextMining
Machine Versus MenonJeopardy:TheStoryofWatson,TextAnalytics andText MiningConcepts andDefinitions,NaturalLanguageProcessing,TextMiningApplications,TextMiningProcess,Text Mining Tools

UNIT- III
SentimentAnalysis
SentimentAnalysisOverview,SentimentAnalysisApplications,SentimentAnalysisProcess, Sentiment Analysis and Speech Analytics

UNIT-IV
WebAnalytics,WebMining
SecurityFirstInsuranceDeepensConnectionwithPolicyholders,WebMiningOverview,WebContent and Web Structure Mining, Search Engines, Search Engine Optimization, Web Usage Mining (Web Analytics), Web Analytics Maturity Model and Web Analytics Tools

UNIT-V
SocialAnalyticsandSocialNetworkAnalysis
SocialAnalyticsandSocialNetworkAnalysis,SocialMediaDefinitionsandConcepts,SocialMedia Analytics
PrescriptiveAnalytics-OptimizationandMulti-CriteriaSystems:
MultipleGoals,SensitivityAnalysis,What-IfAnalysis,andGoalSeeking

TEXTBOOK:
1. RameshSharda,DursunDelen,EfraimTurban,BusinessIntelligenceandAnalytics:Systems for Decision Support, Pearson Education

REFERENCEBOOKS:
1. Rajiv Sabherwal, Irma Becerra- Fernandez," BusinessIntelligence-Practice, Technologies and Management", John Wiley 2011.
2. LarissT.Moss,ShakuAtre,"BusinessIntelligenceRoadmap",Addison-WesleyItService.
3. YuliVasiliev,"OracleBusinessIntelligence:TheCondensedGuidetoAnalysisand Reporting", SPD Shroff, 2012.

PDS742PE:DATABASESECURITY(ProfessionalElective–IV)

B.Tech.IVYearISem.   **LTPC**
                                                                                 3003

CourseObjectives:
- Tolearnthesecurityofdatabases
- Tolearnthedesigntechniquesofdatabasesecurity
- Tolearnthesecuritysoftwaredesign

CourseOutcomes:
- Identifydatabasesecurityproblems
- Implementdifferentsecuritymodels
- Providesecurityforsoftwaredesign
- Protectobject-orientedsystems
- Handlesecurityissuesforactivedatabases

UNIT-I
Introduction: Introduction to Databases Security, Problems in Databases Security, Controls, Conclusions
SecurityModels-1: IntroductionAccessMatrixModel,Take-GrantModel,ActenModel,PNModel.

UNIT- II
Security Models -2: Hartson and Hsiao's Model, Fernandez's Model, Bussolati and Martella's Model for Distributed databases, Bell and LaPadula's Model, Biba's Model, Dion's Model, Sea View Model, Jajodia and Sandhu's Model, The Lattice Model for the Flow Control.

UNIT- III
SecurityMechanisms: Introduction   UserIdentification/Authentication,MemoryProtection,Resource Protection, Control Flow Mechanisms, Isolation Security Functionalities in Some Operating Systems Trusted Computer System Evaluation Criteria

Security Software Design: Introduction A Methodological Approach to Security Software Design SecureOperatingSystemDesignSecureDBMSDesignSecurityPackagesDatabaseSecurityDesign

UNIT-IV
Statistical Database Protection &Intrusion Detection Systems: Introduction Statistics Concepts and Definitions Types of Attacks Inference Controls Evaluation Criteria for Control Comparison. Introduction IDES System RETISS System ASES System Discovery

UNIT-V
Models For the Protection of New Generation Database Systems: Introduction A Model for the Protection of Frame Based Systems A Model for the Protection of Object-Oriented Systems SORION ModelfortheProtectionofObject-OrientedDatabases,TheOrionModel,JajodiaandKogan'sModel-   A Model for the Protection of Active Databases Conclusions

TEXTBOOKS:
1. DatabaseSecuritybyCastano*PearsonEdition(*1/e)

REFERENCEBOOK:
1. Databasesecuritybyalfredbasta,melissazgola,CENGAGElearning.
2. DatabaseSecurityandAuditing:ProtectingDataIntegrityandAccessibility,1stEdition, Hassan Afyouni, THOMSON Edition.

PDS744PE:INFORMATIONSTORAGEMANAGEMENT(ProfessionalElective–IV)

B.Tech.IVYearISem.   **LTPC**
                                                                                          3003

CourseObjectives:
- Tounderstandvarioussegmentsofstoragetechnologyandarchitectures
- Toexploretheinherentpowerofinformation
- Todescribethedifferentbackup,recoveryandreplicationstrategies

CourseOutcomes:
- UnderstandtheevolutionofstoragetechnologyandIntelligentStorageSystems
- ExplorethekeyconceptsofvariousStorageNetworkingTechnologies-DAS,SANs,NASand CAS
- UnderstandthebasicsofStorageVirtualization
- UnderstandtheconceptsofStoragesecurityandStorageInfrastructureManagement
- Analyzethepurposeofbackup,recoveryandreplicationStrategies

UNIT-I
Introduction to Information Storage and Management: Information Storage, Evolution of Storage Technology and Architecture, Data Center Infrastructure, Key Challenges in Managing Information, Information Lifecycle. Storage System Environment - Data Protection: RAID - Intelligent Storage System.

UNIT- II
Direct-AttachedStorageandIntroductiontoSCSI
TypesofDAS,DASBenefitsandLimitations,DiskDriveInterfaces,IntroductiontoParallelSCSI,SCSI Command Model,
StorageAreaNetworks
Fibre Channel: Overview, The SAN and Its Evolution, Components of SAN, FC Connectivity, Fibre Channel Ports, Fibre Channel Architecture, Zoning, Fibre Channel Login Types, FC Topologies, Concepts in Practice: EMC Connectrix
Network-AttachedStorage
General-PurposeServersvs.NASDevices,BenefitsofNAS,NASFileI/O,ComponentsofNAS,NAS Implementations, NAS File-Sharing Protocols, NAS I/O Operations, Factors Affecting NAS Performance and Availability, Concepts in Practice: EMC Celerra

UNIT- III
Content-AddressedStorage
Fixed Content and Archives, Types of Archives, Features and Benefits of CAS, CAS Architecture, Object Storage and Retrieval in CAS, CAS Examples, Concepts in Practice: EMC Centera
StorageVirtualization
Forms of Virtualization, SNIAStorage Virtualization Taxonomy, StorageVirtualization Configurations, Storage Virtualization Challenges, Types of Storage Virtualization, Concepts in Practice

UNIT-IV
BackupandRecovery
Backup Purpose, Backup Considerations, Backup Granularity, Recovery Considerations, Backup Methods, Backup Process, Backup and Restore Operations, Backup Topologies, Backup in NAS Environments, Backup Technologies, Concepts in Practice: EMC NetWorker
LocalReplication

PDS745PE:INTERNETOFTHINGS(ProfessionalElective–IV)

B.Tech.IVYearISem.   **LTPC**
                                                                                3003

Pre-Requisites: Computerorganization,ComputerNetworks
CourseObjectives:
- Tointroducetheterminology,technologyanditsapplications
- TointroducetheconceptofM2M(machinetomachine)withnecessaryprotocols
- TointroducethePythonScriptingLanguagewhichisusedinmanyIoTdevices
- TointroducetheRaspberryPIplatform,thatiswidelyusedinIoTapplications
- Tointroducetheimplementationofweb-basedservicesonIoTdevices

CourseOutcomes:
- InterprettheimpactandchallengesposedbyIoTnetworksleadingtonewarchitectural models.
- Compareandcontrastthedeploymentofsmartobjectsandthetechnologiestoconnectthem to network.
- AppraisetheroleofIoTprotocolsforefficientnetworkcommunication.
- IdentifytheapplicationsofIoTinIndustry.

UNIT-I
Introduction to Internet of Things -Definition and Characteristics of IoT, Physical Design of IoT, Logical Design of IoT, IoT Enabling Technologies, IoT Levels and Deployment Templates
DomainSpecificIoTs-Homeautomation,Environment,Agriculture,HealthandLifestyle

UNIT- II
IoTandM2M-M2M,DifferencebetweenIoTandM2M,SDNandNFVforIoT,
IoT System Management with NETCOZF, YANG- Need for IoT system Management, Simple Network managementprotocol,Networkoperatorrequirements,NETCONF,YANG,IoTSystemsManagement with NETCONF-YANG

UNIT- III
IoTSystems–LogicaldesignusingPython-IntroductiontoPython–PythonDatatypes&Data structures, Control flow, Functions, Modules, Packaging, File handling, Data/Time operations, Classes, Exception,PythonpackagesofInterestforIoT

UNIT-IV
IoTPhysicalDevicesandEndpoints-RaspberryPi,LinuxonRaspberryPi,RaspberryPiInterfaces, Programming Raspberry PI with Python, Other IoT devices.

IoT Physical Servers and Cloud Offerings – Introduction to Cloud Storage models and communicationAPIs,WAMP-AutoBahnforIoT,XivelyCloudforIoT,Pythonwebapplicationframework   - Django, Designing a RESTful web API

UNITV
Case studies- Home Automation, Environment-weather monitoring-weather reporting- air pollution monitoring, Agriculture.

TEXTBOOK:
1.Internet of Things - A Hands-on Approach, Arshdeep Bahga and Vijay Madisetti, Universities Press, 2015, ISBN: 9788173719547.

REFERENCEBOOK:
1.Getting Started with Raspberry Pi, Matt Richardson & Shawn Wallace, O'Reilly (SPD), 2014, ISBN: 9789350239759.

PDS752PE:CLOUDCOMPUTING(ProfessionalElective–V)

B.Tech.IVYearISem.   **LTPC**
                                                                          3003

Pre-requisites:
1. Acourseon"ComputerNetworks".
2. Acourseon"OperatingSystem".

CourseObjectives:
- Thiscourseprovidesaninsightintocloudcomputing.
- Topicscoveredinclude-CloudComputingArchitecture,DeploymentModels,ServiceModels, Technological Drivers for Cloud Computing, Networking for Cloud Computing and Security in Cloud Computing.

CourseOutcomes:
- Understanddifferentcomputingparadigmsandpotentialoftheparadigmsandspecifically cloud computing
- Understand cloud service types, cloud deployment models and technologies supporting and driving the cloud
- Acquiretheknowledgeofprogrammingmodelsforcloudanddevelopmentofsoftware application that runs the cloud and various services available from major cloud providers
- Understandthesecurityconcernsandissuesincloudcomputing
- Acquiretheknowledgeofadvancesincloudcomputing.

UNIT-I
Computing Paradigms, Cloud Computing Fundamentals, Cloud Computing Architecture and Management

UNIT- II
CloudDeploymentModels,CloudServiceModels,TechnologicalDriversforCloudComputing: SOA and Cloud, Multicore Technology, Web 2.0 and Web 3.0, Pervasive Computing, Operating System, Application Environment

UNIT- III
Virtualization, Programming Models forCloudComputing: MapReduce, Cloud Haskell, Software Development in Cloud

UNIT-IV
Networking for Cloud Computing: Introduction, Overview of Data Center Environment, Networking Issues in Data Centers, Transport Layer Issues in DCNs, Cloud Service Providers

UNIT-V
SecurityinCloudComputing,andAdvancedConceptsinCloudComputing

TEXTBOOK:
1. Chandrasekaran,K.*Essentialsofcloudcomputing*.CRCPress,2014

REFERENCEBOOKS:
1. CloudComputing:PrinciplesandParadigms,Editors:RajkumarBuyya,JamesBroberg, Andrzej M. Goscinski, Wiley, 2011
2. EnterpriseCloudComputing-Technology,Architecture,Applications,GautamShroff, Cambridge University Press, 2010
3. CloudComputingBible,BarrieSosinsky,Wiley-India,2010

PDS754PE:MININGMASSIVEDATASETS(ProfessionalElective–V)

B.Tech.IVYearISem.   **LTPC**
                                                          3003

Prerequisites:
1. StudentsshouldbefamiliarwithDatamining,algorithms,basicprobabilitytheoryand Discrete math.

CourseObjectives:
1. This course will cover practical algorithms for solving key problems in mining of massive datasets.
2. Thiscoursefocusesonparallelalgorithmictechniquesthatareusedforlargedatasets.
3. This course will cover stream processing algorithms for data streams that arrive constantly, pagerankingalgorithmsforwebsearch,andonlineadvertisementsystemsthatarestudiedin detail.

CourseOutcomes:
1. HandlemassivedatausingMapReduce.
2. Developandimplementalgorithmsformassivedatasetsandmethodologiesinthecontextof data mining.
3. Understandthealgorithmsforextractingmodelsandinformationfromlargedatasets
4. Developrecommendationsystems.
5. Gainexperienceinmatchingvariousalgorithmsforparticularclassesofproblems.

UNIT-I
DataMining-Introduction-DefinitionofDataMining-StatisticalLimitsonDataMining,
MapReduce and the New Software Stack-Distributed File Systems, MapReduce, Algorithms Using MapReduce.

UNIT- II
SimilaritySearch: FindingSimilarItems-ApplicationsofNear-NeighborSearch,Shinglingof Documents, Similarity-Preserving Summaries of Sets, Distance Measures.
StreamingData: MiningDataStreams-TheStreamDataModel,SamplingDatainaStream,Filtering Streams

UNIT- III
LinkAnalysis-PageRank,EfficientComputationofPageRank,LinkSpam
FrequentItemsets-HandlingLargerDatasetsinMainMemory,Limited-PassAlgorithms,Counting Frequent Items in a Stream.
Clustering-TheCUREAlgorithm,ClusteringinNon-EuclideanSpaces,ClusteringforStreamsand Parallelism

UNIT-IV
Advertisingon the Web-Issues in On-Line Advertising, On-Line Algorithms, The Matching Problem, The Adwords Problem, Adwords Implementation.
Recommendation Systems-A Model for Recommendation Systems, Content-Based Recommendations, Collaborative Filtering, Dimensionality Reduction, The NetFlix Challenge.

UNIT- V:
Mining Social-Network Graphs-Social Networks asGraphs, ClusteringofSocial-Network Graphs, Partitioning of Graphs, Simrank, Counting Triangles

PDS755PE:EXPLORATORYDATAANALYSIS(ProfessionalElective–V)

B.Tech.IVYearISem.　　　　　　　　　　　　　　　　　　　　**LTPC**
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CourseObjectives:
- Analysisofdata,exploringvariousmodelsinexploratorydataanalysis,questionanswering and predictive analysis

CourseOutcomes:
- ApplytheEpicycleofAnalysisprocesseffectively.
- Articulateandrefinedata-relatedquestionsusingtheEpicycleapproach.
- ConductExploratoryDataAnalysis(EDA).
- Developtheskillsnecessarytouseformalmodelingtechniquesfordatainference.

UNIT–I

Epicycles of Analysis: Setting the Scene, Epicycle of Analysis, Setting Expectations, Collecting Information, Comparing Expectations to Data, Applying the Epicycle of Analysis process.

UNIT–II

Stating and Refining the Question: Types of Questions, Applying the Epicycle to stating and Refining Your Question, Characteristics of good Question, Translating a Question into a Data Problem, Case Study.

UNIT-III

ExploratoryDataAnalysis:Formulateyourquestion,readinyourdata,CheckingPackaging,lookatthe topandbottomofthedata,alwaysbechecking,validatewithatleastoneExternalSource,makeaplot, Try the Easy Solution First.

UNIT–IV

Using Models to Explore your data: Models as Expectations, Reacting to Data Refining Our Expectations, Examining Linear Relationships, Stopping Criteria.
Inference: Identify the population, Describe the sampling process, Describe the Model for the population, Factors Affecting the Quality of Inference, Case Study.

UNIT–V

Formal Modeling: Goals of Formal Modeling, General Frame work, Associational Analysis, Prediction Analysis, and Summary

TEXTBOOK:
1. "The Art of Data Science: A Guide for Anyone Who Works with Data" by Roger D. Peng and Elizabeth Matsui.

REFERENCEBOOKS:
1. "ExploratoryDataAnalytics"byJohnTukey.
2. "PythonforDataAnalysis"byWesMcKinney

PDS722OE:DATAANALYTICS(OpenElective–II)

B.Tech.IVYearISem.   **LTPC**
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Prerequisites
1. Acourseon"DatabaseManagementSystems".
2. Knowledgeofprobabilityandstatistics.

CourseObjectives:
- Toexplorethefundamentalconceptsofdataanalytics.
- Tolearntheprinciplesandmethodsofstatisticalanalysis
- Discoverinteresting patterns,analyzesupervised and unsupervised models and estimatethe accuracy of the algorithms.
- Tounderstandthevarioussearchmethodsandvisualizationtechniques.

CourseOutcomes: Aftercompletionofthiscoursestudentswillbeable to
- Understandtheimpactofdataanalyticsforbusinessdecisionsandstrategy
- Carryoutdataanalysis/statisticalanalysis
- Tocarryoutstandarddatavisualizationandformalinferenceprocedures
- DesignDataArchitecture
- UnderstandvariousDataSources

UNIT-I
Data Management: Design Data Architecture and manage the data for analysis, understand various sources of Data like Sensors/Signals/GPS etc. Data Management, Data Quality(noise, outliers, missing values, duplicate data) and Data Processing & Processing.

UNIT- II
Data Analytics: Introduction to Analytics, Introduction to Tools and Environment, Application of ModelinginBusiness,Databases&TypesofDataandVariables,DataModelingTechniques,Missing Imputations etc. Need for Business Modeling.

UNIT- III
Regression – Concepts, Blue property assumptions, Least Square Estimation, Variable Rationalization,andModelBuildingetc.
LogisticRegression: ModelTheory,ModelfitStatistics,ModelConstruction,Analyticsapplicationsto various Business Domains etc.

UNIT-IV
Object Segmentation: Regression Vs Segmentation - Supervised and Unsupervised Learning, Tree Building - Regression, Classification, Overfitting, Pruning and Complexity, Multiple Decision Trees etc.
Time Series Methods: Arima, Measures of Forecast Accuracy, STL approach, Extract features from generatedmodelasHeight,AverageEnergyetcandAnalyzeforprediction

UNIT-V
Data Visualization: Pixel-Oriented Visualization Techniques, Geometric Projection Visualization Techniques, Icon-BasedVisualization Techniques, Hierarchical VisualizationTechniques, Visualizing Complex Data and Relations.

TEXTBOOKS:
1. Student'sHandbookforAssociateAnalytics-II,III.

PDS703PC:PREDICTIVEANALYTICSLAB

B.Tech.IVYearISem.   **LTPC**
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CourseObjectives:
- Tolearnthebasicsandapplicationsofpredictiveanalyticsusingdifferenttechniques

CourseOutcomes:
- Understandtheprocessingstepsforpredictiveanalytics
- Constructanddeploypredictionmodelswithintegrity
- Explorevarioustechniques(machinelearning/datamining,ensemble)forpredictiveanalytics.
- Applypredictiveanalyticstorealworldexamples.

ListofExperiments: FollowingexperimentstobecarriedoutusingPython/SPSS/SAS/R/PowerBI
1. SimpleLinearregression
2. MultipleLinearregression
3. LogisticRegression
4. CHAID
5. CART
6. ARIMA-stockmarketdata
7. ExponentialSmoothing
8. Hierarchicalclustering
9. Ward'smethodofclustering
10. Crowdsourcepredictiveanalytics-Netflixdata

TEXTBOOKS:
1. EricSiegel,Predictiveanalytics-thepowertopredictwhowillClick,buy,lie,ordie,JohnWiley & Sons, 2013.
2. Dean Abbott, Applied Predictive Analytics - Principles and Techniques for the Professional Data Analyst, 2014.

REFERENCEBOOKS:
1. TrevorHastie,RobertTibshirani,JeromeFriedman,TheElementsofStatisticalLearning-Data Mining, Inference, and Prediction, Second Edition, Springer Verlag, 2009.
2. G.James,D.Witten,T.Hastie,R.Tibshirani-Anintroductiontostatisticallearningwith applications in R, Springer, 2013
3. E.Alpaydin,IntroductiontoMachineLearning,PrenticeHallofIndia,2010

PDS862PE:WEBSECURITY(ProfessionalElective–VI)

B.Tech.IVYearIISem.	LT	PC
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CourseObjectives:
1. GiveanOverviewofinformationsecurity
2. GiveanoverviewofAccesscontrolofrelationaldatabases

CourseOutcomes: Studentsshouldbeableto
1. UnderstandtheWebarchitectureandapplications
2. Understandclientsideandservicesideprogramming
3. Understandhowcommonmistakescanbebypassedandexploittheapplication
4. Identifycommonapplicationvulnerabilities

UNIT-I

TheWebSecurity,TheWebSecurityProblem,RiskAnalysisandBestPracticesCryptographyandthe   Web: Cryptography and Web Security, Working Cryptographic Systems and Protocols, Legal Restrictions on Cryptography, Digital Identification

UNIT- II

The Web's War on Your Privacy, Privacy-Protecting Techniques, Backups and Antitheft, Web Server Security, Physical Security for Servers, Host Security for Servers, Securing Web Applications

UNIT- III

Database Security: Recent Advances in Access Control, Access Control Models for XML, Database IssuesinTrustManagementandTrustNegotiation,SecurityinDataWarehousesandOLAPSystems

UNIT-IV

Security Re-engineering for Databases: Concepts and Techniques, Database Watermarking for Copyright Protection, Trustworthy Records Retention, Damage Quarantine and Recovery in Data Processing Systems, Hippocratic Databases: Current Capabilities

UNIT-V

Future Trends Privacy in Database Publishing: A Bayesian Perspective, Privacy-enhanced Location BasedAccessControl,EfficientlyEnforcingtheSecurityandPrivacyPoliciesinaMobileEnvironment

TEXTBOOKS:
1. WebSecurity,PrivacyandCommerceSimsonGArfinkel,GeneSpafford,O'Reilly.
2. HandbookonDatabasesecurityapplicationsandtrendsMichaelGertz,SushilJajodia
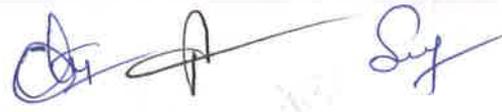
2. Rama Chellappa, Amit K. Roy-Chowdhury, Kevin Zhou. S, "Recognition of Humans and their Activities using Video", Morgan & Claypool Publishers, 2005.
3. Yunqian Ma, Gang Qian, "Intelligent Video Surveillance: Systems and Technology", CRC Press (Taylor and Francis Group), 2009.

REFERENCEBOOKS:
1. RichardSzeliski,"ComputerVision:AlgorithmsandApplications",Springer,2011.
2. Yao Wang, Jorn Ostermann and Ya-Qin Zhang, "Video Processing and Communications", Prentice Hall, 2001.
3. Thierry Bouwmans, Fatih Porikli, Benjamin Höferlin and Antoine Vacavant, "Background Modeling and Foreground Detection for Video Surveillance: Traditional and Recent Approaches,Implementations,BenchmarkingandEvaluation",CRCPress,TaylorandFrancis Group, 2014.
4. Md. Atiqur Rahman Ahad, "Computer Vision and Action Recognition-A Guide for Image Processing and ComputerVisionCommunityforActionUnderstanding",Atlantis Press,2011.

Applications of Blockchain: Introduction, Blockchain in Banking and Finance, Blockchain in Education, Blockchain in Energy, Blockchain in Healthcare, Blockchain in Real-estate, Blockchain In Supply Chain, The Blockchain and IoT. Limitations and Challenges of Blockchain.

UNIT-V

BlockchainCaseStudies: CaseStudy1-Retail,CaseStudy2-BankingandFinancialServices, CaseStudy3-Healthcare, CaseStudy4-EnergyandUtilities.
BlockchainPlatformusingPython: Introduction,LearnHowtoUsePythonOnlineEditor,Basic Programming Using Python, Python Packages for Blockchain.
Blockchain platform using Hyperledger Fabric: Introduction, Components of Hyper ledger Fabric Network, Chain codes from Developer.ibm.com, Blockchain Application Using Fabric Java SDK.

TEXTBOOK:

1. Blockchain Technology, Chandramouli Subramanian, Asha A. George, Abhilasj K A and Meena Karthikeyan, Universities Press.

REFERENCEBOOKS:

1. MichaelJuntaoYuan,BuildingBlockchainApps,Pearson,India.
2. BlockchainBlueprintforEconomy,MelanieSwan,SPDO'reilly.
3. BlockchainforBusiness,JaiSinghArun,JerryCuomo,NitinGaur,Pearson.

PDS831OE:INTRODUCTIONTOSOCIALMEDIAMINING(OpenElective–III)

B.Tech.IVYearIISem.	LT	PC
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Prerequisites
1. DataAnalytics.

CourseObjectives
- The purpose of this course is to provide the students with knowledge of social media mining principles and techniques.
- Thiscourseisalsodesignedtogiveanexposureofthefrontiersofsocialmediamining (Facebook, twitter)
- TointroducenewtechnologyfordataanalyticsandintroducecommunityAnalysis
- TointroducevariousRecommendationalgorithms

CourseOutcomes
- Understandsocialmediaanditsdata.
- Applyminingtechnologiesontwitter,Facebook,LinkedInandGoogle.
- Learnaboutcommunity
- ApplyvariousRecommendationAlgorithms
- AnalyzetheBehaviorofpeople

UNIT-I
Introduction
SocialMediaMining,NewChallengesforMining
GraphEssentials
GraphBasics,GraphRepresentation,TypesofGraphs,ConnectivityinGraphs,SpecialGraphs,Graph Algorithms

UNIT- II
NetworkMeasures
Centrality,TransitivityandReciprocity,BalanceandStatus,Similarity.
NetworkModels
PropertiesofReal-WorldNetworks,RandomGraphs,Small-WorldModel,PreferentialAttachment Model

UNIT- III
DataMiningEssentials
Data,DataPreprocessing,DataMiningAlgorithms,SupervisedLearning,UnsupervisedLearning
CommunityAnalysis
CommunityDetection,CommunityEvaluation,CommunityEvaluation

UNIT-IV
InformationDiffusioninSocialMedia
HerdBehavior,InformationCascades,Diffusionofinnovations,Epidemics
InfluenceandHomophily
MeasuringAssortativity,Influence,Homophily,DistinguishingInfluenceandHomophily

UNIT-V
RecommendationinSocialMedia
Challenges,ClassicalRecommendationAlgorithms,RecommendationUsingSocialContext, Evaluating Recommendations

PDS832OE:DATAVISUALIZATIONUSINGPYTHON(OpenElective–III)

B.Tech.IVYearIISem.

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CourseObjectives:
- Learndatawranglingtechniques
- Introducevisualperceptionandcoreskillsforvisualanalysis

CourseOutcomes:
- Performdatawrangling
- Explainprinciplesofvisualperception
- Applycoreskillsforvisualanalysis
- Applyvisualizationtechniquesforvariousdataanalysistasks
- Evaluatevisualizationtechniques

UNIT-I
An Introduction to Data Visualization in Python, Types of Plots- statistical plots, Images, Networks/ Graphs, Geographical, 3D and Interactive, Grids and Meshes

UNIT- II
Manipulating and visualizing data with Pandas: defining data frames, Creating andmanipulating data frames, visualization with pandas
Matplotlib: Features of matplotlib, Anatomy and Customization of matplotlib plot, Plotting and plot customization, Customizing a plot, Visualization examples,

UNIT- III
Seaborn: Featuresofseaborn,Creatingplotswithseaborn,Visualizationexamples
Altair: Altair's declarative API, creating an Altair Chart and Plot, Changing mark/PlotTypes, Global Configuration,Encodingarguments,AltairDatatypes,CreatingTitles,Properties,Tooltips,SavingAltair Charts, Making Plots Interactive, Visualization Examples,

UNIT-IV
Plotly: Plotly and JSON, Online and Offline plotting, Structure of Plotly Plot, Graph Objectives VS Dictionaries, Plotly Express, updating plots- Adding and Updating Traces, Creating Subplots, Drop-Down Menus, Dash Interactivity, Example Plots

UNIT-V
CGPlot2/Plotnine: The Gammar of Graphics, Creating Plots, Changing Geoms, Stats, Faceting, Coordinates, Annotations, Scaling, Themes, Legends, and Palettes, Visualization Examples.

TEXTBOOKS:
1. DanielNelson,DataVisualizationinPython
2. Ward,GrinsteinKeim,InteractiveDataVisualization:Foundations,Techniques,and Applications. Natick A K Peters, Ltd.

REFERENCEBOOKS:
1. Jacqueline Kazil and Katharine Jarmul, Data Wrangling with Python: Tips and Tools to Make Your Life Easier, O'Reilly.
2. E.Tufte,TheVisualDisplayofQuantitativeInformation,GraphicsPress.

PCS103ES: PROGRAMMING FOR PROBLEM SOLVING
(Adopted From CSE BOS)

B.Tech. I Year I Sem.

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Course Objectives:
- To learn the fundamentals of computers.
- To understand the various steps in program development.
- To learn the syntax and semantics of the C programming language.
- To learn the usage of structured programming approaches in solving problems.

Course Outcomes: The student will learn
- To write algorithms and to draw flowcharts for solving problems.
- To convert the algorithms/flowcharts to C programs.
- To code and test a given logic in the C programming language.
- To decompose a problem into functions and to develop modular reusable code.
- To use arrays, pointers, strings and structures to write C programs.
- Searching and sorting problems.

UNIT - I: Introduction to Programming
Compilers, compiling and executing a program.
Representation of Algorithm - Algorithms for finding roots of a quadratic equations, finding minimum and maximum numbers of a given set, finding if a number is prime number Flowchart/Pseudocode with examples, Program design and structured programming
Introduction to C Programming Language: variables (with data types and space requirements), Syntax and Logical Errors in compilation, object and executable code, Operators, expressions and precedence, Expression evaluation, Storage classes (auto, extern, static and register), type conversion, The main method and command line arguments Bitwise operations: Bitwise AND, OR, XOR and NOT operators
Conditional Branching and Loops: Writing and evaluation of conditionals and consequent branching with if, if-else, switch-case, ternary operator, goto, Iteration with for, while, do- while loops
I/O: Simple input and output with scanf and printf, formatted I/O, Introduction to stdin, stdout and stderr. Command line arguments

UNIT - II: Arrays, Strings, Structures and Pointers:
Arrays: one- and two-dimensional arrays, creating, accessing and manipulating elements of arrays Strings: Introduction to strings, handling strings as array of characters, basic string functions availablein C (strlen, strcat, strcpy, strstr etc.), arrays of strings
Structures: Defining structures, initializing structures, unions, Array of structures
Pointers: Idea of pointers, Defining pointers, Pointers to Arrays and Structures, Use of Pointers in self-referential structures, usage of self-referential structures in linked list (no implementation) Enumeration data type

UNIT - III: Preprocessor and File handling in C:
Preprocessor: Commonly used Preprocessor commands like include, define, undef, if, ifdef, ifndef Files: Text and Binary files, Creating and Reading and writing text and binary files, Appending data toexisting files, Writing and reading structures using binary files, Random access using fseek, ftell andrewind functions.

UNIT - IV: Function and Dynamic Memory Allocation:

Functions: Designing structured programs, Declaring a function, Signature of a function, Parameters and return type of a function, passing parameters to functions, call by value, Passing arrays to functions, passing pointers to functions, idea of call by reference, Some C standard functions and libraries

Recursion: Simple programs, such as Finding Factorial, Fibonacci series etc., Limitations of Recursive functions Dynamic memory allocation: Allocating and freeing memory, Allocating memory for arrays of different data types

UNIT - V: Searching and Sorting:

Basic searching in an array of elements (linear and binary search techniques), Basic algorithms to sortarray of elements (Bubble, Insertion and Selection sort algorithms), Basic concept of order of complexity through the example programs

TEXT BOOKS:
1. Jeri R. Hanly and Elliot B.Koffman, Problem solving and Program Design in C 7th Edition, Pearson
2. B.A. Forouzan and R.F. Gilberg C Programming and Data Structures, Cengage Learning, (3rd Edition)

REFERENCE BOOKS:
1. Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, Prentice Hall ofIndia
2. E. Balagurusamy, Computer fundamentals and C, 2nd Edition, McGraw-Hill
3. Yashavant Kanetkar, Let Us C, 18th Edition, BPB
4. R.G. Dromey, How to solve it by Computer, Pearson (16th Impression)
5. Programming in C, Stephen G. Kochan, Fourth Edition, Pearson Education.
6. Herbert Schildt, C: The Complete Reference, Mc Graw Hill, 4th Edition
7. Byron Gottfried, Schaum's Outline of Programming with C, McGraw-Hill

PCS108ES: PROGRAMMING FOR PROBLEM SOLVING LABORATORY
Adopted From CSE BOS

B.Tech. I Year I Sem.   L T P C
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[Note: The programs may be executed using any available Open Source/ Freely available IDE Some of the Tools available are:

Code Lite: https://codelite.org/

Code: Blocks: http://www.codeblocks.org/

Dev Cpp: http://www.bloodshed.net/devcpp.html

Eclipse: http://www.eclipse.org

This list is not exhaustive and is NOT in any order of preference]

Course Objectives: The students will learn the following:
- To work with an IDE to create, edit, compile, run and debug programs
- To analyze the various steps in program development.
- To develop programs to solve basic problems by understanding basic concepts in C like operators, control statements etc.
- To develop modular, reusable and readable C Programs using the concepts like functions,arrays etc.
- To Write programs using the Dynamic Memory Allocation concept.
- To create, read from and write to text and binary files

Course Outcomes: The candidate is expected to be able to:
- formulate the algorithms for simple problems
- translate given algorithms to a working and correct program
- correct syntax errors as reported by the compilers
- identify and correct logical errors encountered during execution
- represent and manipulate data with arrays, strings and structures
- use pointers of different types
- create, read and write to and from simple text and binary files
- modularize the code with functions so that they can be reused

Practice sessions:
a. Write a simple program that prints the results of all the operators available in C (including pre/ post increment , bitwise and/or/not , etc.). Read required operand values from standard input.
b. Write a simple program that converts one given data type to another using auto conversion and casting. Take the values from standard input.

Simple numeric problems:
a. Write a program for finding the max and min from the three numbers.
b. Write the program for the simple, compound interest.
c. Write a program that declares Class awarded for a given percentage of marks, where mark <40%= Failed, 40% to <60% = Second class, 60% to <70%=First class, >= 70% = Distinction.Read percentage from standard input.
d. Write a program that prints a multiplication table for a given number and the number of rows in the table. For example, for a number 5 and rows = 3, the output should be:
e. 5 x 1 = 5
f. 5 x 2 = 10
g. 5 x 3 = 15
h. Write a program that shows the binary equivalent of a given positive number between 0 to 255.

Expression Evaluation:

a. A building has 10 floors with a floor height of 3 meters each. A ball is dropped from the top of the building. Find the time taken by the ball to reach each floor. (Use the formula $s = ut+(1/2)at^2$ where u and a are the initial velocity in m/sec (= 0) and acceleration in m/sec^2 (= 9.8 m/s^2)).

b. Write a C program, which takes two integer operands and one operator from the user, performsthe operation and then prints the result. (Consider the operators +,-,*, /, % and use Switch Statement)

c. Write a program that finds if a given number is a prime number

d. Write a C program to find the sum of individual digits of a positive integer and test given numberis palindrome.

e. A Fibonacci sequence is defined as follows: the first and second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence. Writea C program to generate the first n terms of the sequence.

f. Write a C program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.

g. Write a C program to find the roots of a Quadratic equation.

h. Write a C program to calculate the following, where x is a fractional value.i. $1-x/2 +x^2/4-x^3/6$

j. Write a C program to read in two numbers, x and n, and then compute the sum of this geometric progression: $1+x+x^2+x^3+x^n$. For example: if n is 3 and x is 5, then the program computes 1+5+25+125.

Arrays, Pointers and Functions:

a. Write a C program to find the minimum, maximum and average in an array of integers.

b. Write a function to compute mean, variance, Standard Deviation, sorting of n elements in asingle dimension array.

c. Write a C program that uses functions to perform the following:

d. Addition of Two Matrices

e. Multiplication of Two Matrices

f. Transpose of a matrix with memory dynamically allocated for the new matrix as row and column counts may not be the same.

g. Write C programs that use both recursive and non-recursive functions

h. To find the factorial of a given integer.

i. To find the GCD (greatest common divisor) of two given integers.

j. To find x^n

k. Write a program for reading elements using a pointer into an array and display the values usingthe array.

l. Write a program for display values reverse order from an array using a pointer.

m. Write a program through a pointer variable to sum of n elements from an array.

Files:

a. Write a C program to display the contents of a file to standard output device.

b. Write a C program which copies one file to another, replacing all lowercase characters withtheir uppercase equivalents.

c. Write a C program to count the number of times a character occurs in a text file. The file nameand the character are supplied as command line arguments.

d. Write a C program that does the following:
   It should first create a binary file and store 10 integers, where the file name and 10 values aregiven in the command line. (hint: convert the strings using atoi function)
   Now the program asks for an index and a value from the user and the value at that index shouldbe changed to the new value in the file. (hint: use fseek function)
   The program should then read all 10 values and print them back.

e. Write a C program to merge two files into a third file (i.e., the contents of the first file followedby those of the second are put in the third file).

Strings:

a. Write a C program to convert a Roman numeral ranging from I to L to its decimal equivalent.
b. Write a C program that converts a number ranging from 1 to 50 to Roman equivalent
c. Write a C program that uses functions to perform the following operations:
d. To insert a sub-string into a given main string from a given position.
e. To delete n Characters from a given position in a given string.
f. Write a C program to determine if the given string is a palindrome or not (Spelled same in both directions with or without a meaning like madam, civic, noon, abcba, etc.)
g. Write a C program that displays the position of a character ch in the string S or – 1 if S doesn't contain ch.
h. Write a C program to count the lines, words and characters in a given text.

Miscellaneous:

a. Write a menu driven C program that allows a user to enter n numbers and then choose between finding the smallest, largest, sum, or average. The menu and all the choices are to be functions. Use a switch statement to determine what action to take. Display an error message if an invalid choice is entered.
b. Write a C program to construct a pyramid of numbers as follows:

```
1           *           1          1          *
1 2         * *         2 3        2 2        * *
1 2 3       * * *       4 5 6      3 3 3      * * *
                                   4 4 4 4    * *
                                              *
```

Sorting and Searching:

a. Write a C program that uses non recursive function to search for a Key value in a given
b. list of integers using linear search method.
c. Write a C program that uses non recursive function to search for a Key value in a given
d. sorted list of integers using binary search method.
e. Write a C program that implements the Bubble sort method to sort a given list of
f. integers in ascending order.
g. Write a C program that sorts the given array of integers using selection sort in descending order
h. Write a C program that sorts the given array of integers using insertion sort in ascending order
i. Write a C program that sorts a given array of names

TEXT BOOKS:

1. Jeri R. Hanly and Elliot B.Koffman, Problem solving and Program Design in C 7th Edition, Pearson
2. B.A. Forouzan and R.F. Gilberg C Programming and Data Structures, Cengage Learning, (3rd Edition)

REFERENCE BOOKS:

1. Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, PHI
2. E. Balagurusamy, Computer fundamentals and C, 2nd Edition, McGraw-Hill
3. Yashavant Kanetkar, Let Us C, 18th Edition, BPB
4. R.G. Dromey, How to solve it by Computer, Pearson (16th Impression)
5. Programming in C, Stephen G. Kochan, Fourth Edition, Pearson Education.
6. Herbert Schildt, C: The Complete Reference, Mc Graw Hill, 4th Edition
7. Byron Gottfried, Schaum's Outline of Programming with C, McGraw-Hill

PCS106ES: ELEMENTS OF COMPUTER SCIENCE AND ENGINEERING
Adopted From CSE BOS

B.Tech. I Year I Sem.

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Course Objective: To provide an overview of the subjects of computer science and engineering.

Course Outcomes:
- Know the working principles of functional units of a basic Computer
- Understand program development, the use of data structures and algorithms in problem solving.
- Know the need and types of operating system, database systems.
- Understand the significance of networks, internet, WWW and cyber security.
- Understand Autonomous systems, the application of artificial intelligence.

UNIT – I

Basics of a Computer – Hardware, Software, Generations of computers. Hardware - functional units, Components of CPU, Memory – hierarchy, types of memory, Input and output devices. Software –systems software, application software, packages, frameworks, IDEs.

UNIT – II

Software development – waterfall model, Agile, Types of computer languages – Programming, markup, scripting Program Development – steps in program development, flowcharts, algorithms, datastructures – definition, types of data structures

UNIT – III

Operating systems: Functions of operating systems, types of operating systems, Device & Resource management

Database Management Systems: Data models, RDBMS, SQL, Database Transactions, data centers, cloud services

UNIT – IV

Computer Networks: Advantages of computer networks, LAN, WAN, MAN, internet, WiFi, sensornetworks, vehicular networks, 5G communication.

World Wide Web – Basics, role of HTML, CSS, XML, Tools for web designing, Social media, Onlinesocial networks.

Security – information security, cyber security, cyber laws

UNIT – V

Autonomous Systems: IoT, Robotics, Drones, Artificial Intelligence – Learning, Game Development, natural language processing, image and video processing. Cloud Basics

TEXT BOOK:

1. Invitation to Computer Science, G. Michael Schneider, Macalester College, Judith L. Gersting University of Hawaii, Hilo, Contributing author: Keith Miller University of Illinois, Springfield.

REFERENCE BOOKS:

1. Fundamentals of Computers, Reema Thareja, Oxford Higher Education, Oxford University Press.
2. Introduction to computers, Peter Norton, 8th Edition, Tata McGraw Hill.
3. Computer Fundamentals, Anita Goel, Pearson Education India, 2010.
4. Elements of computer science, Cengage.

PCS206ES: PYTHON PROGRAMMING LABORATORY
Adopted From CSE BOS

B.Tech. I Year II Sem.   **L T P C**
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Course Objectives:
- To install and run the Python interpreter
- To learn control structures.
- To Understand Lists, Dictionaries in python
- To Handle Strings and Files in Python

Course Outcomes: After completion of the course, the student should be able to
- Develop the application specific codes using python.
- Understand Strings, Lists, Tuples and Dictionaries in Python
- Verify programs using modular approach, file I/O, Python standard library
- Implement Digital Systems using Python

Note: The lab experiments will be like the following experiment examples

Week -1:
1. i) Use a web browser to go to the Python website http://python.org. This page contains informationabout Python and links to Python-related pages, and it gives you the ability to search the Python documentation.
   ii) Start the Python interpreter and type help() to start the online help utility.
2. Start a Python interpreter and use it as a Calculator.3.
   i) Write a program to calculate compound interest when principal, rate and number of periods aregiven.
   ii) Given coordinates (x1, y1), (x2, y2) find the distance between two points
4. Read name, address, email and phone number of a person through keyboard and print the details.

Week - 2:
1. Print the below triangle using for loop.

   5

   4 4

   3 3 3

   2 2 2 2

   1 1 1 1 1
2. Write a program to check whether the given input is digit or lowercase character or uppercase character or a special character (use 'if-else-if' ladder)
3. Python Program to Print the Fibonacci sequence using while loop
4. Python program to print all prime numbers in a given interval (use break)

Week - 3:
1. i) Write a program to convert a list and tuple into arrays.
   ii) Write a program to find common values between two arrays.
2. Write a function called gcd that takes parameters a and b and returns their greatest common divisor.
3. Write a function called palindrome that takes a string argument and returnsTrue if it is a palindromeand False otherwise. Remember that you can use the built-in function len to check the length

of a string.

Week - 4:

1. Write a function called is_sorted that takes a list as a parameter and returns True if the list is sorted in ascending order and False otherwise.

   i). Write a function called has_duplicates that takes a list and returns True if there is any element thatappears more than once. It should not modify the original list.

   ii). Write a function called remove_duplicates that takes a list and returns a new list with only the unique elements from the original. Hint: they don't have to be in the same order.
   iii). The wordlist I provided, words.txt, doesn't contain single letter words. So you might want to add"I", "a", and the empty string.
   iv). Write a python code to read dictionary values from the user. Construct a function to invert itscontent. i.e., keys should be values and values should be keys.
2. i) Add a comma between the characters. If the given word is 'Apple', it should become 'A,p,p,l,e'

   ii) Remove the given word in all the places in a string?

   iii) Write a function that takes a sentence as an input parameter and replaces the first letter of every word with the corresponding upper case letter and the rest of the letters in the word by corresponding letters in lower case without using a built-in function?
3. Writes a recursive function that generates all binary strings of n-bit length

Week - 5:

1. i) Write a python program that defines a matrix and prints
   ii) Write a python program to perform addition of two square matrices
   iii) Write a python program to perform multiplication of two square matrices
2. How do you make a module? Give an example of construction of a module using different geometrical shapes and operations on them as its functions.
3. Use the structure of exception handling all general purpose exceptions.

Week-6:

1. a. Write a function called draw_rectangle that takes a Canvas and a Rectangle as arguments and draws a representation of the Rectangle on the Canvas.
   b. Add an attribute named color to your Rectangle objects and modify draw_rectangle so that ituses the color attribute as the fill color.
   c. Write a function called draw_point that takes a Canvas and a Point as arguments and draws arepresentation of the Point on the Canvas.
   d. Define a new class called Circle with appropriate attributes and instantiate a few Circle objects. Write a function called draw_circle that draws circles on the canvas.
2. Write a Python program to demonstrate the usage of Method Resolution Order (MRO) in multiplelevels of Inheritances.
3. Write a python code to read a phone number and email-id from the user and validate it forcorrectness.

Week- 7

1. Write a Python code to merge two given file contents into a third file.
2. Write a Python code to open a given file and construct a function to check for given words present init and display on found.
3. Write a Python code to Read text from a text file, find the word with most number of occurrences
4. Write a function that reads a file file1 and displays the number of words, number of vowels, blankspaces, lower case letters and uppercase letters.

Week - 8:

1. Import numpy, Plotpy and Scipy and explore their functionalities.
2. a) Install NumPy package with pip and explore it.
3. Write a program to implement Digital Logic Gates – AND, OR, NOT, EX-OR
4. Write a program to implement Half Adder, Full Adder, and Parallel Adder
5. Write a GUI program to create a window wizard having two text labels, two text fields and two buttonsas Submit and Reset.

TEXT BOOKS:

1. Supercharged Python: Take your code to the next level, Overland
2. Learning Python, Mark Lutz, O'reilly

REFERENCE BOOKS:

1. Python for Data Science, Dr. Mohd. Abdul Hameed, Wiley Publications - 1st Ed. 2021.
2. Python Programming: A Modern Approach, Vamsi Kurama, Pearson
3. Python Programming A Modular Approach with Graphics, Database, Mobile, and Web Applications, Sheetal Taneja, Naveen Kumar, Pearson
4. Programming with Python, A User's Book, Michael Dawson, Cengage Learning, India Edition
5. Think Python, Allen Downey, Green Tea Press
6. Core Python Programming, W. Chun, Pearson
7. Introduction to Python, Kenneth A. Lambert, Cengage

PCS301PC: DIGITAL ELECTRONICS
Adopted from ECE BoS

B.Tech. II Year I Sem.   L   T   P   C
                                                                          3   0   0   3

Course Objectives: This course aims at through understanding of binary number system, logic gates,combination logic and synchronous and asynchronous logic.

UNIT - I:
BOOLEAN ALGEBRA AND LOGIC GATES: Digital Systems, Binary Numbers, Number base conversions, Octal and Hexadecimal Numbers, complements, Signed binary numbers, Binary codes, Binary Storage and Registers, Binary logic.
Basic Definitions, Axiomatic definition of Boolean Algebra, Basic theorems and properties of Boolean algebra, Boolean functions, canonical and standard forms, other logic operations, Digital logic gates.

UNIT - II:
GATE – LEVEL MINIMIZATION: The map method, Four-variable map, Five-Variable map, product ofsums simplification Don't-care conditions, NAND and NOR implementation other Two-level implementations, Exclusive – Or function.

UNIT - III:
COMBINATIONAL LOGIC: Combinational Circuits, Analysis procedure Design procedure, Binary Adder-Subtractor Decimal Adder, Binary multiplier, magnitude comparator, Decoders, Encoders, Multiplexers, HDL for combinational circuits.

UNIT - IV:
SEQUENTIAL LOGIC: Sequential circuits, latches, Flip-Flops Analysis of clocked sequential circuits, state Reduction and Assignment, Design Procedure. Registers, shift Registers, Ripple counters, synchronous counters, other counters.

UNIT - V
MEMORIES AND ASYNCHRONOUS SEQUENTIAL LOGIC: Introduction, Random-Access Memory, Memory Decoding, Error Detection and correction Read-only memory, Programmable logic Array programmable Array logic, Sequential Programmable Devices.
Introduction, Analysis Procedure, Circuits with Latches, Design Procedure, Reduction of state and FlowTables, Race-Free state Assignment Hazards, Design Example.

TEXT BOOKS:
1. Digital Design – Third Edition, M. Morris Mano, Pearson Education/PHI.
2. Digital Principles and Applications Albert Paul Malvino Donald P. Leach TATA McGraw HillEdition.
3. Fundamentals of Logic Design, Roth, 5th Edition, Thomson.

REFERENCE BOOKS:
1. Switching and Finite Automata Theory by Zvi. Kohavi, Tata McGraw Hill.
2. Switching and Logic Design, C.V.S. Rao, Pearson Education
3. Digital Principles and Design – Donald D.Givone, Tata McGraw Hill, Edition.
4. Fundamentals of Digital Logic and Microcomputer Design, 5th Edition, M. Rafiquzzaman John Wiley.

PCS302PC: DATA STRUCTURES

B.Tech. II Year I Sem.	L	T	P	C
	3	0	0	3

Prerequisites: Programming for Problem Solving

Course Objectives

- Exploring basic data structures such as stacks and queues.
- Introduces a variety of data structures such as hash tables, search trees, tries, heaps, graphs.
- Introduces sorting and pattern matching algorithms

Course Outcomes

- Ability to select the data structures that efficiently model the information in a problem.
- Ability to assess efficiency trade-offs among different data structure implementations or combinations.
- Implement and know the application of algorithms for sorting and pattern matching.
- Design programs using a variety of data structures, including hash tables, binary and general tree structures, search trees, tries, heaps, graphs, and AVL-trees.

UNIT - I

Introduction to Data Structures, abstract data types, Linear list — singly linked list implementation, insertion, deletion and searching operations on linear list, Stacks- Operations, array and linked representations of stacks, stack applications, Queues- operations, array and linked representations.

UNIT - II

Dictionaries: linear list representation, operations - insertion, deletion and searching.
Hash Table Representation: hash functions, collision resolution-separate chaining, open addressing-linear probing, quadratic probing, double hashing, rehashing, extendible hashing.

UNIT - III

Search Trees: Binary Search Trees, Definition, Implementation, Operations- Searching, Insertion and Deletion, AVL Trees, Definition, Height of an AVL Tree, Operations – Insertion, Deletion and Searching, Red –Black Trees.

UNIT - IV

Graphs: Graph Implementation Methods. Graph Traversal Methods.
Sorting: Quick Sort, Heap Sort, External Sorting- Model for external sorting, Merge Sort.

UNIT - V

Pattern Matching and Tries: Pattern matching algorithms-Brute force, the Boyer –Moore algorithm, theKnuth-Morris-Pratt algorithm, Standard Tries, Compressed Tries, Suffix tries.

TEXT BOOKS:

1. Fundamentals of Data Structures in C, 2 nd Edition, E. Horowitz, S. Sahni and Susan Anderson Freed, Universities Press.
2. Data Structures using C – A. S.Tanenbaum, Y. Langsam, and M.J. Augenstein, PHI/Pearson Education.

REFERENCE BOOK:

1. Data Structures: A Pseudocode Approach with C, 2 nd Edition, R. F. Gilberg and B.A.Forouzan, Cengage Learning.

PCS303PC: COMPUTER ORIENTED STATISTICAL METHODS
Adopted from Mathematics BoS

B.Tech. II Year I Sem.   L T P C
                                                                             3 1 0 4

Pre-requisites: Mathematics courses of first year of study.

Course Objectives: To learn
- The theory of Probability, Probability distributions of single and multiple random variables
- The sampling theory, testing of hypothesis and making statistical inferences
- Stochastic process and Markov chains.

Course outcomes: After learning the contents of this paper the student must be able to
- Apply the concepts of probability and distributions to case studies.
- Formulate and solve problems involving random variables and apply statistical methods foranalyzing experimental data.
- Apply concept of estimation and testing of hypothesis to case studies.
- Correlate the concepts of one unit to the concepts in other units.

UNIT - I: Probability   **10 L**
Sample Space, Events, Counting Sample Points, Probability of an Event, Additive Rules, Conditional Probability, Independence, and the Product Rule, Baye's Rule,
Random Variables and Probability Distributions: Concept of a Random Variable, Discrete Probability Distributions, Continuous Probability Distributions.

UNIT - II: Expectation and discrete distributions   **10 L**
Mean of a Random Variable, Variance and Covariance of Random Variables, Means and Variances of Linear Combinations of Random Variables, Chebyshev's Theorem.
Discrete Probability Distributions: Binomial Distribution, Poisson distribution.

UNIT - III: Continuous and Sampling Distributions   **10 L**
Uniform Distribution, Normal Distribution, Areas under the Normal Curve, Applications of the NormalDistribution, Normal Approximation to the Binomial Distributions.
Fundamental Sampling Distributions: Random Sampling, Some Important Statistics, Sampling Distributions, Sampling Distribution of Means and the Central Limit Theorem, t - Distribution, F-Distribution.

UNIT - IV: Sample Estimation & Tests of Hypotheses   **10 L**
Introduction, Statistical Inference, Classical Methods of Estimation, Single Sample: Estimating the mean, standard error of a point estimate, prediction interval. Two sample: Estimating the difference between two means, Single sample: Estimating a proportion, Two samples: Estimating the difference between two proportions, Two samples: Estimating the ratio of two variances.
Statistical Hypotheses: General Concepts, Testing a Statistical Hypothesis, Single sample: Tests concerning a single mean, Two samples: tests on two means, One sample: test on a single proportion. Two samples: tests on two proportions, Two- sample tests concerning variances.

UNIT-V: Stochastic Processes and Markov Chains   8L

Introduction to Stochastic processes- Markov process. Transition Probability, Transition ProbabilityMatrix, First order and Higher order Markov process, n-step transition probabilities, Markov chain,Steady state condition, Markov analysis.

TEXT BOOKS:

1. Ronald E. Walpole, Raymond H. Myers, Sharon L. Myers, Keying Ye, Probability & Statistics For Engineers & Scientists, 9th Ed. Pearson Publishers.

2. S C Gupta and V K Kapoor, Fundamentals of Mathematical statistics, Khanna publications.

3. S.D.Sharma, Operations Research, Kedarnath and Ramnath Publishers, Meerut, Delhi.

REFERENCE BOOKS:

1. T.T. Soong, Fundamentals of Probability and Statistics For Engineers, John Wiley & Sons, Ltd, 2004.

2. Sheldon M Ross, Probability and statistics for Engineers and scientists, academic press.

3. Miller and Freund's, Probability and Statistics for Engineers, 8th Edition, Pearson Educations.

PCS304PC: COMPUTER ORGANIZATION AND ARCHITECTURE

B.Tech. II Year I Sem.

L	T	P	C
3	0	0	3

Co-requisite: A Course on "Digital Electronics".

Course Objectives

- The purpose of the course is to introduce principles of computer organization and the basic architectural concepts.
- It begins with basic organization, design, and programming of a simple digital computer andintroduces simple register transfer language to specify various computer operations.
- Topics include computer arithmetic, instruction set design, microprogrammed control unit, pipelining and vector processing, memory organization and I/O systems, and multiprocessors

Course Outcomes

- Understand the basics of instruction sets and their impact on processor design.
- Demonstrate an understanding of the design of the functional units of a digital computer system.
- Evaluate cost performance and design trade-offs in designing and constructing a computer processor including memory.
- Design a pipeline for consistent execution of instructions with minimum hazards.
- Recognize and manipulate representations of numbers stored in digital computers

UNIT - I

Digital Computers: Introduction, Block diagram of Digital Computer, Definition of Computer Organization, Computer Design and Computer Architecture.

Register Transfer Language and Micro operations: Register Transfer language, Register Transfer, Bus and memory transfers, Arithmetic Micro operations, logic micro operations, shift micro operations, Arithmetic logic shift unit.

UNIT - II

Microprogrammed Control: Control memory, Address sequencing, micro program example, design of control unit.

Central Processing Unit: General Register Organization, Instruction Formats, Addressing modes, DataTransfer and Manipulation.

UNIT - III

Data Representation: Data types, Complements, Fixed Point Representation, Floating Point Representation.

Computer Arithmetic: Addition and subtraction, multiplication Algorithms, Division Algorithms, Floating

– point Arithmetic operations. Decimal Arithmetic unit, Decimal Arithmetic operations.

UNIT - IV
Input-Output Organization: Input-Output Interface, Asynchronous data transfer, Modes of Transfer,Priority Interrupt Direct memory Access.

Memory Organization: Memory Hierarchy, Main Memory, Auxiliary memory, Associate Memory, CacheMemory.

UNIT - V
Reduced Instruction Set Computer: CISC Characteristics, RISC Characteristics.

Pipeline Processing: Parallel Processing, Pipelining, Arithmetic Pipeline, InstructionPipeline, RISC Pipeline, Timing and Control, Instruction cycle.

Multi Processors: Characteristics of Multiprocessors, Interconnection Structures, Interprocessor arbitration, Interprocessor communication and synchronization, Cache Coherence.

TEXT BOOK:
1. Computer System Architecture – M. Morris Mano, Third Edition, Pearson/PHI.

REFERENCE BOOKS:
1. Computer Organization – Carl Hamacher, Zvonks Vranesic, SafeaZaky, V th Edition, McGrawHill.
2. Computer Organization and Architecture – William Stallings Sixth Edition, Pearson/PHI.
3. Structured Computer Organization – Andrew S. Tanenbaum, 4 th Edition, PHI/Pearson.

PCS305PC: OBJECT ORIENTED PROGRAMMING THROUGH JAVA

B.Tech. II Year I Sem.   L T P C
                                                                               3 0 0 3

Course Objectives
- To Understand the basic object-oriented programming concepts and apply them in problem solving.
- To Illustrate inheritance concepts for reusing the program.
- To Demonstrate multitasking by using multiple threads and event handling
- To Understand the basics of java console and GUI based programming

Course Outcomes
- Demonstrate the behavior of programs involving the basic programming constructs like controlstructures, constructors, string handling.
- Demonstrate the implementation of inheritance (multilevel, hierarchical and multiple) by usingextend and implement keywords
- Use multithreading concepts to develop inter process communication.
- Understand the process of graphical user interface design and implementation using AWT orswings.
- Develop applets that interact abundantly with the client environment and deploy on the server.

UNIT - I
Object oriented thinking and Java Basics- Need for oop paradigm, Principles of oop concepts, Java buzzwords, data types, variables, scope and lifetime of variables, arrays, operators, expressions, control statements, type conversion and casting, concepts of classes, objects, constructors, methods, access control, simple java programs.

UNIT - II
Inheritance, Packages and Interfaces — Hierarchical abstractions, Base class object, subclass, subtype, substitutability, forms of inheritance specialization, specification, construction, extension, limitation, combination, benefits of inheritance, costs of inheritance. Member access rules, super uses, using final with inheritance, polymorphism- method overriding, abstract classes, the Object class. Defining, Creating and Accessing a Package, Understanding CLASSPATH, importing packages, 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, exception hierarchy, usage of try, catch, throw, throws and finally, built in exceptions, creating own exception subclasses. String handling, Exploring java.util. Differences between multithreading and multitasking, thread life cycle, creating threads, thread priorities, synchronizing threads, inter thread communication, thread groups.

UNIT - IV

Event Handling: Events, Event sources, Event classes, Event Listeners, Delegation event model, handling mouse and keyboard events, Adapter classes. The AWT class hierarchy, user interface components- labels, button, canvas, scrollbars, text components, check box, checkbox groups, choices,

lists panels – scrollpane, dialogs, menubar, graphics, layout manager – layout manager types – border,grid, flow, card and grid bag.

UNIT - V

Applets – Concepts of Applets, differences between applets and applications, life cycle of an applet, types of applets, creating applets, passing parameters to applets. Swing – Introduction, limitations of AWT, MVC architecture, components, containers, exploring swing- JApplet, JFrame and JComponent,Icons and Labels, text fields, buttons – The JButton class, Check boxes, Radio buttons, Combo boxes,Tabbed Panes, Scroll Panes, Trees, and Tables.

TEXT BOOKS:
1. Java the complete reference, 7th edition, Herbert schildt, TMH.
2. Understanding OOP with Java, updated edition, T. Budd, Pearson education.

REFERENCE BOOKS:
1. An Introduction to programming and OO design using Java, J.Nino and F.A. Hosch, John wiley& sons.
2. An Introduction to OOP, third edition, T. Budd, Pearson education.
3. Introduction to Java programming, Y. Daniel Liang, Pearson education.
4. An introduction to Java programming and object-oriented application development, R.A. Johnson- Thomson.
5. Core Java 2, Vol 1, Fundamentals, Cay.S. Horstmann and Gary Cornell, eighth Edition, Pearson Education.
6. Core Java 2, Vol 2, Advanced Features, Cay.S. Horstmann and Gary Cornell, eighth Edition, Pearson Education
7. Object Oriented Programming with Java, R.Buyya, S.T.Selvi, X.Chu, TMH.
8. Java and Object Orientation, an introduction, John Hunt, second edition, Springer. 9. Maurach's Beginning Java2 JDK 5, SPD.

PCS306PC: DATA STRUCTURES LAB

B.Tech. II Year I Sem.   **L T P C**

                                             0 0 3 1.5

Prerequisites: A Course on "Programming for Problem Solving".

Course Objectives:
- It covers various concepts of C programming language
- It introduces searching and sorting algorithms
- It provides an understanding of data structures such as stacks and queues.

Course Outcomes:
- Ability to develop C programs for computing and real-life applications using basic elements likecontrol statements, arrays, functions, pointers and strings, and data structures like stacks, queues and linked lists.
- Ability to Implement searching and sorting algorithms

List of Experiments:
1. Write a program that uses functions to perform the following operations on singly linked list.:

   i) Creation   ii) Insertion   iii) Deletion   iv) Traversal
2. Write a program that uses functions to perform the following operations on doubly linkedlist.:

   i) Creation   ii) Insertion   iii) Deletion   iv) Traversal
3. Write a program that uses functions to perform the following operations on circular linkedlist.:

   i) Creation   ii) Insertion   iii) Deletion   iv) Traversal
4. Write a program that implement stack (its operations) using

   i) Arrays   ii) Pointers
5. Write a program that implement Queue (its operations) using

   i) Arrays   ii) Pointers
6. Write a program that implements the following sorting methods to sort a given list of integers in ascending order

   i) Quick sort   ii) Heap sort   iii) Merge sort
7. Write a program to implement the tree traversal methods (Recursive and Non Recursive).
8. Write a program to implement

   i) Binary Search tree   ii) AVLtrees   iii) Red - Black trees
9. Write a program to implement the graph traversal methods.
10. Implement a Pattern matching algorithms using Boyer- Moore, Knuth-Morris-Pratt

TEXT BOOKS:

1. Fundamentals of Data Structures in C, 2nd Edition, E. Horowitz, S. Sahni and Susan Anderson Freed, Universities Press.
2. Data Structures using C – A. S. Tanenbaum, Y. Langsam, and M. J. Augenstein, PHI/Pearson Education.

REFERENCE BOOK:

1. Data Structures: A Pseudocode Approach with C, 2nd Edition, R. F. Gilberg and B. A. Forouzan, Cengage Learning.

PCS307PC: OBJECT ORIENTED PROGRAMMING THROUGH JAVA LAB

B.Tech. II Year I Sem.   L T P C
                                                                              0 0 3 1.5

Course Objectives:
- To write programs using abstract classes.
- To write programs for solving real world problems using the java collection framework.
- To write multithreaded programs.
- To write GUI programs using swing controls in Java.
- To introduce java compiler and eclipse platform.
- To impart hands-on experience with java programming.

Course Outcomes:
- Able to write programs for solving real world problems using the java collection framework.
- Able to write programs using abstract classes.
- Able to write multithreaded programs.
- Able to write GUI programs using swing controls in Java.

Note:

1. Use LINUX and MySQL for the Lab Experiments. Though not mandatory, encourage the useof the Eclipse platform.

2. The list suggests the minimum program set. Hence, the concerned staff is requested to addmore problems to the list as needed.

List of Experiments:

1. Use Eclipse or Net bean platform and acquaint yourself with the various menus. Create a test project,add a test class, and run it. See how you can use auto suggestions, auto fill. Try code formatter and code refactoring like renaming variables, methods, and classes. Try debug step by step with a small program of about 10 to 15 lines which contains at least one if else condition and a for loop.

2. Write a Java program that works as a simple calculator. Use a grid layout to arrange buttons for thedigits and for the +, -,*, % operations. Add a text field to display the result. Handle any possible exceptions like divided by zero.

3. A) Develop an applet in Java that displays a simple message.
B) Develop an applet in Java that receives an integer in one text field, and computes its factorialValue and returns it in another text field, when the button named "Compute" is clicked.

4. Write a Java program that creates a user interface to perform integer divisions. The user enters twonumbers in the text fields, Num1 and Num2. The division of Num1 and Num 2 is displayed in the Resultfield when the Divide button is clicked. If Num1 or Num2 were not an integer, the program would throwa Number Format Exception. If Num2 were Zero, the program would throw an Arithmetic Exception. Display the exception in a message dialog box.

5.   Write a Java program that implements a multi-thread 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.

6.   Write a Java program for the following:Create a doubly linked list of elements.
Delete a given element from the above list. Display the contents of the list after deletion.

7.   Write a Java program that simulates a traffic light. The program lets the user select one of three lights: red, yellow, or green with radio buttons. On selecting a button, an appropriate message with "Stop" or "Ready" or "Go" should appear above the buttons in the selected color. Initially, there is no message shown.

8.   Write a Java program to create an abstract class named Shape that contains two integers and an empty method named print Area (). Provide three classes named Rectangle, Triangle, and Circle suchthat 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.

9.Write a java program to display the table using Labels in Grid Layout.

10.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).

11.Write a Java program that loads names and phone numbers from a text file where the data is organized as one line per record and each field in a record are separated by a tab (\t). It takes a name or phone number as input and prints the corresponding other value from the hash table (hint:use hash tables).

12.Write a Java program that correctly implements the producer – consumer problem using the concept of inter thread communication.

REFERENCE BOOKS:
1.   Java for Programmers, P. J. Deitel and H. M. Deitel, 10th Edition Pearson education.
2.   Thinking in Java, Bruce Eckel, Pearson Education.
3.   Java Programming, D. S. Malik and P. S. Nair, Cengage Learning.
4.   Core Java, Volume 1, 9th edition, Cay S. Horstmann and G Cornell, Pearson.

PCS308PC: DATA VISUALIZATION - Tableau

B.Tech. II Year I Sem.

L	T	P	C
0	0	2	1

Course Objectives:
- Effective use of Business Intelligence (BI) technology (Tableau) to apply data visualization
- To discern patterns and relationships in the data.
- To build Dashboard applications.
- To communicate the results clearly and concisely.
- To be able to work with different formats of data sets.

Course Outcomes: At the end of the course a student should be able to
- Understand How to import data into Tableau.
- Understand Tableau concepts of Dimensions and Measures.
- Develop Programs and understand how to map Visual Layouts and Graphical Properties.
- Create a Dashboard that links multiple visualizations.
- Use graphical user interfaces to create Frames for providing solutions to real world
- problems.

Lab Problems:

1. Understanding Data, What is data, where to find data, Foundations for building Data Visualizations,Creating Your First visualization?

2. Getting started with Tableau Software using Data file formats, connecting your Data to Tableau, creating basic charts(line, bar charts, Tree maps),Using the Show me panel.

3. Tableau Calculations, Overview of SUM, AVR, and Aggregate features, Creating custom calculations and fields.

4. Applying new data calculations to your visualizations, Formatting Visualizations, Formatting Toolsand Menus, Formatting specific parts of the view.

5. Editing and Formatting Axes, Manipulating Data in Tableau data, Pivoting Tableau data.

6. Structuring your data, Sorting and filtering Tableau data, Pivoting Tableau data.

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. Creating custom charts, cyclical data and circular area charts, Dual Axis charts.

REFERENCE BOOKS:
1. Microsoft Power BI cookbook, Brett Powell, 2nd edition.
2. R Programming for Data Science by Roger D. Peng (References)
3. The Art of R Programming by Norman Matloff Cengage Learning India.

POS409PC: NODE JS / REACT JS/ DJANGO

B.Tech. II Year II Sem.   L T P C
                                                               0 0 2 1

Prerequisites: Object Oriented Programming through Java, HTML Basics
Course Objectives:
- To implement the static web pages using HTML and do client-side validation using JavaScript.
- To design and work with databases using Java
- To develop an end-to-end application using java full stack.
- To introduce Node JS implementation for server-side programming.
- To experiment with single page application development using React.

Course Outcomes: At the end of the course, the student will be able to,
- Build a custom website with HTML, CSS, and Bootstrap and little JavaScript.
- Demonstrate Advanced features of JavaScript and learn about JDBC
- Develop Server – side implementation using Java technologies like
- Develop the server – side implementation using Node JS.
- Design a Single Page Application using React.

Exercises:
1. Build a responsive web application for shopping cart with registration, login, catalog and cart pages using CSS3 features, flex and grid.
2. Make the above web application responsive web application using Bootstrap framework.
3. Use JavaScript for doing client – side validation of the pages implemented in experiment 1 and experiment 2.
4. Explore the features of ES6 like arrow functions, callbacks, promises, async/await. Implement an application for reading the weather information from openweathermap.org and display the information in the form of a graph on the web page.
5. Develop a java stand alone application that connects with the database (Oracle / mySql) and perform the CRUD operation on the database tables.
6. Create an xml for the bookstore. Validate the same using both DTD and XSD.
7. Design a controller with servlet that provides the interaction with application developed inexperiment 1 and the database created in experiment 5.
8. Maintaining the transactional history of any user is very important. Explore the various sessiontracking mechanism (Cookies, HTTP Session)
9. Create a custom server using http module and explore the other modules of Node JS like OS, path, event.
10. Develop an express web application that can interact with REST API to perform CRUD operations on student data. (Use Postman)
11. For the above application create authorized end points using JWT (JSON Web Token).
12. Create a react application for the student management system having registration, login, contact, about pages and implement routing to navigate through these pages.
13. Create a service in react that fetches the weather information from openweathermap.org and the display the current and historical weather information using graphical representation usingchart.js
14. Create a TODO application in react with necessary components and deploy it into GitHub.

REFERENCE BOOKS:
1. Jon Duckett, Beginning HTML, XHTML, CSS, and JavaScript, Wrox Publications, 2010
2. Bryan Basham, Kathy Sierra and Bert Bates, Head First Servlets and JSP, O'Reilly Media, 2ndEdition, 2008.
3. Vasan Subramanian, Pro MERN Stack, Full Stack Web App Development with Mongo,Express, React, and Node, 2nd Edition, A Press.

PCS407PC: DATABASE MANAGEMENT SYSTEMS LAB

B.Tech. II Year II Sem.

L T P C
0 0 2 1

Co-requisites: "Database Management Systems"

Course Objectives:
- Introduce ER data model, database design and normalization
- Learn SQL basics for data definition and data manipulation

Course Outcomes:
- Design database schema for a given application and apply normalization
- Acquire skills in using SQL commands for data definition and data manipulation.
- Develop solutions for database applications using procedures, cursors and triggers

List of Experiments:
1. Concept design with E-R Model
2. Relational Model
3. Normalization
4. Practicing DDL commands
5. Practicing DML commands
6. A. Querying (using ANY, ALL, UNION, INTERSECT, JOIN, Constraints etc.)
   B. Nested, Correlated subqueries
7. Queries using Aggregate functions, GROUP BY, HAVING and Creation and dropping of Views.
8. Triggers (Creation of insert trigger, delete trigger, update trigger)
9. Procedures
10. Usage of Cursors

TEXT BOOKS:
1. Database Management Systems, Raghurama Krishnan, Johannes Gehrke, Tata Mc Graw Hill, 3rd Edition
2. Database System Concepts, Silberschatz, Korth, McGraw Hill, V edition.

REFERENCE BOOKS:
1. Database Systems design, Implementation, and Management, Peter Rob & Carlos Coronel 7th Edition.
2. Fundamentals of Database Systems, Elmasri Navrate, Pearson Education
3. Introduction to Database Systems, C.J. Date, Pearson Education
4. Oracle for Professionals, The X Team, S. Shah and V. Shah, SPD.
5. Database Systems Using Oracle: A Simplified guide to SQL and PL/SQL, Shah, PHI.
6. Fundamentals of Database Management Systems, M. L. Gillenson, Wiley Student Edition.

PC S406PC: OPERATING SYSTEMS LAB

B.Tech. II Year II Sem.   L T P C
                                                                          0 0 2 1

Prerequisites: A course on "Programming for Problem Solving", A course on "Computer Organizationand Architecture".

Co-requisite: A course on "Operating Systems".

Course Objectives:
- To provide an understanding of the design aspects of operating system concepts through simulation
- Introduce basic Unix commands, system call interface for process management, inter process communication and I/O in Unix

Course Outcomes:
- Simulate and implement operating system concepts such as scheduling, deadlock management, file management and memory management.
- Able to implement C programs using Unix system calls

List of Experiments:

1. Write C programs to simulate the following CPU Scheduling algorithms a) FCFS b) SJF c) Round Robin d) priority

2. Write programs using the I/O system calls of UNIX/LINUX operating system (open, read, write, close,fcntl, seek, stat, opendir, readdir)

3. Write a C program to simulate Bankers Algorithm for Deadlock Avoidance and Prevention.

4. Write a C program to implement the Producer – Consumer problem using semaphores usingUNIX/LINUX system calls.

5. Write C programs to illustrate the following IPC mechanisms a) Pipes b) FIFOs c) Message Queues d) Shared Memory

6. Write C programs to simulate the following memory management techniques a) Paging b) Segmentation

7. Write C programs to simulate Page replacement policies a) FCFS b) LRU c) Optimal

TEXT BOOKS:

1. Operating System Principles- Abraham Silberchatz, Peter B. Galvin, Greg Gagne 7th Edition, John Wiley
2. Advanced programming in the Unix environment, W.R.Stevens, Pearson education.

REFERENCE BOOKS:

1. Operating Systems – Internals and Design Principles, William Stallings, Fifth Edition–2005, Pearson Education/PHI
2. Operating System - A Design Approach-Crowley, TMH.
3. Modern Operating Systems, Andrew S Tanenbaum, 2nd edition, Pearson/PHI
4. UNIX Programming Environment, Kernighan and Pike, PHI/Pearson Education
5. UNIX Internals: The New Frontiers, U. Vahalia, Pearson Education

PC S405PC: SOFTWARE ENGINEERING

B.Tech. II Year II Sem.

L T P C
3 0 0 3

Course Objectives
- The aim of the course is to provide an understanding of the working knowledge 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, software process/product metrics, risk management, quality management and UML diagrams

Course Outcomes
- Ability to translate end-user requirements into system and software requirements, using e.g. UML, and structure the requirements in a Software Requirements Document (SRD).
- Identify and apply appropriate software architectures and patterns to carry out high level designof a system and be able to critically compare alternative choices.
- Will have experience and/or awareness of testing problems and will be able to develop a simple 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 and Agile methodology.

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
Design Engineering: Design process and design quality, design concepts, the design model. Creating an architectural design: software architecture, data design, architectural styles and patterns, architectural design, conceptual model of UML, basic structural modeling, class diagrams, sequence diagrams, collaboration diagrams, use case diagrams, 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.
Metrics for Process and Products: Software measurement, metrics for software quality.

UNIT - V

Risk management: Reactive Vs proactive risk strategies, software risks, risk identification, risk projection, risk refinement, RMMM.

Quality Management: Quality concepts, software quality assurance, software reviews, formal technical reviews, statistical software quality assurance, software reliability, the ISO 9000 quality standards.

TEXT BOOKS:

1. Software Engineering, A practitioner's Approach- Roger S. Pressman, 6th edition, McGraw HillInternational Edition.
2. Software Engineering- Sommerville, 7th edition, Pearson Education.

REFERENCE BOOKS:

1. The unified modeling language user guide Grady Booch, James Rambaugh, Ivar Jacobson, Pearson Education.
2. Software Engineering, an Engineering approach- James F. Peters, Witold Pedrycz, John Wiley.
3. Software Engineering principles and practice- Waman S Jawadekar, The McGraw-Hill Companies.
4. Fundamentals of object-oriented design using UML Meiler page-Jones: Pearson Education.

PCS404PC: DATABASE MANAGEMENT SYSTEMS

B.Tech. II Year II Sem.   L T P C
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Prerequisites: A course on "Data Structures".

Course Objectives:
- To understand the basic concepts and the applications of database systems.
- To master the basics of SQL and construct queries using SQL.
- Topics include data models, database design, relational model, relational algebra, transaction control, concurrency control, storage structures and access techniques.

Course Outcomes:
- Gain knowledge of fundamentals of DBMS, database design and normal forms
- Master the basics of SQL for retrieval and management of data.
- Be acquainted with the basics of transaction processing and concurrency control.
- Familiarity with database storage structures and access techniques

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
Introduction to Database Design: Database Design and ER Diagrams, Entities, Attributes, and Entity 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, querying relational data, logical database design, introduction to views, destroying/alteringtables and views.
Relational Algebra, Tuple relational Calculus, Domain relational calculus.

UNIT - III

SQL: QUERIES, CONSTRAINTS, TRIGGERS: form of basic SQL query, UNION, INTERSECT, and EXCEPT, Nested Queries, aggregation operators, NULL values, complex integrity constraints 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 Dynamic Index Structure.

TEXT BOOKS:

1. Database System Concepts, Silberschatz, Korth, McGraw hill, V edition.3rd Edition
2. Database Management Systems, Raghurama Krishnan, Johannes Gehrke, Tata Mc Graw Hill

REFERENCE BOOKS:

1. Database Systems design, Implementation, and Management, Peter Rob & Carlos Coronel 7th Edition.
2. Fundamentals of Database Systems, Elmasri Navrate, Pearson Education
3. Introduction to Database Systems, C. J. Date, Pearson Education
4. Oracle for Professionals, The X Team, S.Shah and V. Shah, SPD.
5. Database Systems Using Oracle: A Simplified guide to SQL and PL/SQL, Shah, PHI.
6. Fundamentals of Database Management Systems, M. L. Gillenson, Wiley Student Edition.

PCS403PC: OPERATING SYSTEMS

B.Tech. II Year II Sem.

L T P C
3 0 0 3

Prerequisites:
1. A course on "Computer Programming and Data Structures".
2. A course on "Computer Organization and Architecture".

Course Objectives:
- Introduce operating system concepts (i.e., processes, threads, scheduling, synchronization, deadlocks, memory management, file and I/O subsystems and protection)
- Introduce the issues to be considered in the design and development of operating system
- Introduce basic Unix commands, system call interface for process management, interprocess communication and I/O in Unix

Course Outcomes:
- Will be able to control access to a computer and the files that may be shared
- Demonstrate the knowledge of the components of computers and their respective roles in computing.
- Ability to recognize and resolve user problems with standard operating environments.
- Gain practical knowledge of how programming languages, operating systems, 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
Process Management and Synchronization - The Critical Section Problem, 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

File System Interface and Operations -Access methods, Directory Structure, Protection, File System Structure, Allocation methods, Free-space Management. Usage of open, create, read, write, close, lseek, stat, ioctl system calls.

TEXT BOOKS:

1. Operating System Principles- Abraham Silberchatz, Peter B. Galvin, Greg Gagne 7th Edition, John Wiley.
2. Advanced programming in the UNIX environment, W.R. Stevens, Pearson education.

REFERENCE BOOKS:

1. Operating Systems- Internals and Design Principles, William Stallings, Fifth Edition–2005, Pearson Education/PHI
2. Operating System A Design Approach- Crowley, TMH.
3. Modern Operating Systems, Andrew S. Tanenbaum 2nd edition, Pearson/PHI
4. UNIX programming environment, Kernighan and Pike, PHI/ Pearson Education
5. UNIX Internals -The New Frontiers, U. Vahalia, Pearson Education.

PC S401PC: DISCRETE MATHEMATICS

B.Tech. II Year II Sem.   L T P C
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Course Objectives:
- Introduces elementary discrete mathematics for computer science and engineering.
- 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.

Course Outcomes:
- Understand and construct precise mathematical proofs
- Apply logic and set theory to formulate precise statements
- Analyze and solve counting problems on finite and discrete structures
- Describe and manipulate sequences
- Apply graph theory in solving computing 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

Algebraic Structures: Introduction, Algebraic Systems, Semi groups and Monoids, Lattices as Partially 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, Binary Trees, Planar Graphs, Euler's Formula, Multi-graphs and Euler Circuits, Hamiltonian Graphs, Chromatic Numbers, The Four-Color Problem.

TEXT BOOKS:
1. Discrete Mathematical Structures with Applications to Computer Science: J.P. Tremblay, R. Manohar, McGraw-Hill, 1st ed.
2. Discrete Mathematics for Computer Scientists & Mathematicians: Joe l. Mott, Abraham Kandel, Teodore P. Baker, Prentis Hall of India, 2nd ed.

REFERENCE BOOKS:
1. Discrete and Combinatorial Mathematics - an applied introduction: Ralph.P. Grimald, Pearsoneducation, 5th edition.