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Introduction to Data Analytics III B.Tech – VI Semester (Code: 14CS601)

Lectures	:	4 Periods/Week	Continuous Assessment	:	40
Final Exam	:	3 hours	Final Exam Marks	:	60

UNIT – I

(13 Periods)

Introduction to R - Why use R? Obtaining and installing R.

The R Environment - Command line interface, RStudio.

R Packages - Installing packages, loading packages, Building packages.

Basics of R - basic Math, variables, Data types, vectors, calling function, function documentation, missing data.

Advanced Data Structures - data. Frames, Lists, Matrices, Arrays.

Reading Data into R - Reading CSVs, Excel data, reading from databases.

UNIT – II

(12 Periods)

Basic Data Management- A working example, creating new variables, recoding variables, renaming variables, missing values, date values, type conversion, sorting data, merging data set, Subsetting datasets, Using SQL statement to manipulate data.

Advanced Data Management- A data management challenge, Numerical and character functions, a solution for data management challenge, control flow, User Written functions, Aggregate and reshaping.

Basic graphs- Bar plot, pie chart, Histograms, Kernel Density plots, Box plots, dot plots

UNIT-III

(13 Periods)

Probability Distribution - Normal distribution, binomial distribution

Basic statistics - summary statistics, correlation and covariance, T-test, ANOVA

Manipulating Strings- paste, sprintf, extracting text, regular expression.

Linear Models: Simple linear regression, multiple linear regressions.

UNIT – IV

(12 Periods)

Cluster Analysis: Cluster Analysis-common steps in cluster analysis, calculating distances, Hierarchical cluster analysis, Partitioning cluster analysis, avoiding nonexistence clusters.

Classifications - Preparing the data, logistic regression, decision trees, random forests, support vector machines, choosing a best predictive solution.

Text Book:

1. R for Every One ,Advanced analytics and graphics by Jared P Lander, Addison Wisley Data and analytics series. (UNIT-I, III)
2. R in Action, Data Analysis and graphics with R,Robert L Kabacoff, Manning Publisher (UNIT-II, IV)

References:

1. Beginning R by Dr. Mark Gardener, Wrox publisher.
2. Associate Analytics Facilitator Guide provided by NASSCOM.
<http://183.82.43.252/~gopam/html/NASSCOM>



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COMPILER DESIGN

III B.Tech – VI Semester (Code: 14CS602)

Lectures	:	4 Periods/Week	Continuous Assessment	:	40
Final Exam	:	3 hours	Final Exam Marks	:	60

UNIT – I

(13 Periods)

Introduction to compiling: Compilers, The Phases of a compiler.

Simple one-pass compiler: Overview, syntax definition, syntax direct translation, parsing, a translator for simple expressions.

Lexical Analysis: The role of the lexical analyzer, input buffering, simplification of tokens, Recognition of tokens, implementing transition diagrams, a language for specifying lexical analyzers.

Syntax analysis: Top down parsing - Recursive descent parsing, Predictive parsers.

UNIT – II

(13 Periods)

Syntax Analysis: Bottom up parsing - Shift Reduce parsing, LR Parsers – Construction of SLR, Canonical LR and LALR parsing techniques, Parser generators – Yacc Tool.

Syntax – Directed Translation: Syntax Directed definition, construction of syntax trees, Bottom-up evaluation of S – attributed definitions.

UNIT – III

(12 Periods)

Runtime Environment: Source language issues, Storage organization, Storage-allocation strategies, Access to nonlocal names, Parameter passing..

Symbol Tables: Symbol table entries, Data structures to symbol tables, representing scope information.

UNIT – VI

(12 Periods)

Intermediate code Generation: Intermediate languages, Declarations, Assignment statements, Boolean expressions, Back patching.

Code Generation- Issues in the design of code generator, the target machines, Basic blocks and flow graphs, Next use information, A simple code generator

TEXT BOOK:

1. Alfred V.Aho, RaviSethi, JD Ullman, “Compilers Principles, Techniques and Tools”, Pearson Education, 2007.

REFERENCE BOOKS:

1. Ifred V.Aho, Jeffrey D. Ullman, “Principles of Compiler Design”, Narosa publishing.
2. Lex&Yacc”, John R. Levine, Tony Mason, Doug Brown, O’reilly.
3. Modern Compiler Implementation in C”, Andrew N. Appel, CambridgeUniversity Press.
4. “Engineering a Compiler”, Cooper & Linda, Elsevier.
5. Compiler Construction”, Loudon, Thomson.



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COMPUTER NETWORKS

III B.Tech – VI Semester (Code: 14CS603)

Lectures	:	4 Periods/Week, Tutorial: 1	Continuous Assessment	:	40
Final Exam	:	3 hours	Final Exam Marks	:	60

UNIT – I

(14 Periods)

Data Communications & Networking Overview: A Communications Model, Data Communications, Data Communication Networking.

Protocol Architecture: The Need for a Protocol Architecture, A Simple Protocol Architecture, OSI, The TCP/IP Protocol Architecture.

Digital Data Communication Techniques: Asynchronous & Synchronous Transmission, Types of Errors, Error Detection, Error Correction

Data Link Control: Flow Control, Error Control, High-Level Data link Control (HDLC)..

UNIT – II

(16 Periods)

Network Layer: Network Layer Design Issues: Store-and-Forward Packet Switching, Services Provided to the Transport Layer, Implementation of Connectionless Service, Implementation of Connection-Oriented Service, Comparison of Virtual-Circuit & Datagram Subnets.

Routing Algorithms: The Optimality Principle, Shortest Path, Routing, Flooding, Distance Vector Routing, Link State Routing, Hierarchical Routing

Congestion Control Algorithms: General Principles of Congestion Control, Congestion Prevention Policies, Congestion Control in Virtual-Circuit Subnets, Congestion Control in Datagram Subnets, Load Shedding, Jitter Control.

Quality of Service: Requirements, Techniques for Achieving Good Quality of Service

The Network Layer in the Internet: The IP Protocol, IP Addresses, Internet Control Protocols.

UNIT – III

(15 Periods)

The Transport Layer: The Transport Service: Services Provided to the Upper Layers, Transport Service Primitives, Berkeley sockets

Elements of Transport Protocols: Addressing, Connection Establishment, Connection Release, Flow Control and Buffering, Multiplexing, Crash Recovery,

The Internet Transport Protocol (UDP): Introduction to UDP, Remote Procedure Call, The Real-Time Transport Protocol.

The Internet Transport Protocols (TCP): Introduction to TCP, The TCP Service Model, The TCP Protocol, The TCP Segment Header, TCP Connection Establishment, TCP Connection Release, Modeling TCP Connection Management, TCP Transmission Policy, TCP Congestion Control, TCP Timer Management.

UNIT – IV

(15 Periods)

Application Layer: The Domain Name System(DNS): The DNS Name Space, Resource Records, Name Servers. **Electronic Mail:** Architecture & Services, The User Agent, Message Formats, Message Transfer, Final Delivery.

The World Wide Web: Architectural Overview, Static Web Documents, Dynamic Web Documents, HTTP – Hyper Text Transfer Protocol, Performance Enhancements.



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TEXT BOOK:

1. Behrouz A.Forouzan, “Data Communications and Networking”, 4th edition, TMH.
2. Tanenbaum, “Computer Networks”, 4th Edition, (Pearson Education / PHI).

REFERENCE BOOKS:

1. Wayne Tomasi, “Introduction to Data Communications and Networking”, PHI.
2. BehrouzA.Forouzan, “Data Communications and Networking”, Fourth edition, TMH.
3. GodBole, “Data Communications & Networking”, TMH.
4. Kurose & Ross, “COMPUTER NETWORKS– A Top-down approach featuring the Internet”, Pearson Education, Alberto Leon, Garciak.
5. LeonGartia, IndraWidjaja, “Communication Networks Fundamental Concepts and Key Architectures”, TMH.
6. Nader F.Mir, “Computer and Communication Networks”, PHI.



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ENTERPRISE PROGRAMMING-II

III B.Tech – VI Semester (Code: 14CS604)

Lectures	:	4 periods/week, Tutorial:1	Continuous Assessment	:	40
Final Exam	:	3 hours	Final Exam Marks	:	60

UNIT – I

(16 periods)

The Big Picture: Java EE Architecture, Hello Java EE - Running Hello Java EE, The Many Variations of Java EE Applications, Packaging and Deploying the Hello Java EE Application, Java EE Platform and Implementations.

Classic Memories: JDBC - Introduction to JDBC, Hello JDBC Example, Structured Query Language, The JDBC APIs.

Java Servlets and Web Applications: Foundations of the Web Tier: The HTTP Protocol, Introducing Java Servlets, Understanding the Java Servlet API, Web Applications, Java Servlets: The Good and the Bad.

UNIT – II

(15 periods)

Dynamic Web Pages: JSP - JSP Runtime Architecture, A JSP Clock, JSP Syntax, the Java Environment for JSPs, JSP Standard Tags, Custom Tag Libraries, Expression Language.

Assembling Dynamic Web Pages: Java Server Faces - Architecture of a JSF Application, Java Server Faces Tags, and Java EE Managed Beans, f: Core Tags, JSTL Core Tags, Extensibility and Modularity.

UNIT – III

(15 periods)

Web Sites for Non-browsers: JAX-RS - What Are RESTful Web Services, The Java API for RESTful Web Services, HelloResource Example: Server Side, Deploying JAX-RS Resources, HelloResource Example and the Rich Client, Content Production, Content Consumption, Accessing Web Service Context, Exception Mapping, Number of Instances of Resource Classes, Path Mapping.

Adding Sparkle: Java Web Sockets - Introduction to the Web Socket Protocol, the Web Socket Lifecycle, Overview of the Java Web Socket API, Web Socket Clock, Java Web Socket Encoders and Decoders, Message Processing Modes, Path Mapping, Deployment of Server Endpoints.

UNIT – IV

(14 periods)

The Fundamentals of Enterprise Beans: Introduction to Enterprise Beans, Hello Enterprise Beans, Flavors of Enterprise Beans, Exposing Enterprise Beans, Finding Enterprise Beans, EJB Lifecycle, Packaging Enterprise.

Advanced Thinking with Enterprise Beans: Multi-threading and Enterprise Beans, Asynchronous Enterprise Beans, Enterprise Bean Contexts, the Timer Service, Transactions and Enterprise Beans, Interceptors.



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Modern Memories: The Java Persistence API - The Library Service, with Java Persistence, Persistence Entities, The Entity Manager, Java Persistence Query Language, Configuring JPA Applications.

TEXT BOOK:

2. Dr. Danny Coward, "**Java EE 7: The Big Picture**", oracle press.

REFERENCE BOOKS:

1. Arun Gupta "**Java EE 7 Essentials**" O'Reilly.
2. Antonio Goncalves "**Beginning Java EE 7**" apress.



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NATURAL LANGUAGE PROCESSING

ELECTIVE - II

III B.Tech – VI Semester (Code: 14CS606/A)

Lectures	:	4 Periods/Week	Continuous Evaluation	:	40
Final Exam	:	3 hours	Semester End Exam	:	60

UNIT – I

(12 Periods)

Introduction to Natural Language Understanding, Syntactic Processing: Grammars and Parsing.

UNIT – II

(13 Periods)

Features and Augmented Grammars, Toward Efficient Parsing, Ambiguity Resolution: Statistical Methods: Probabilistic Context-Free Grammars, Best-First Parsing.

UNIT – III

(12 Periods)

Semantic Interpretation: Linking Syntax and Semantics, Ambiguity Resolution, other Strategies for Semantic Interpretation.

UNIT – IV

(13 Periods)

Context and World Knowledge: Using World Knowledge, Discourse Structure, Defining a Conversational Agent.

TEXT BOOK:

1. Natural Language Understanding – James Allen, Second Edition, Pearson Education.

REFERENCE BOOKS:

1. Speech and Language Processing – Daniel Jurafsky, James H. Martin.
2. Foundations of Statistical Natural Language Processing – Christopher Manning, Hinrich Schutze, MIT Press.
3. Artificial Intelligence, Elaine Rich and Kevin Knight, Second Edition, Tata McGraw Hill.



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PARALLEL PROCESSING

ELECTIVE - II

III B.Tech – VI Semester (Code: 14CS606/B)

Lectures	:	4 Periods/Week	Continuous Evaluation	:	40
Final Exam	:	3 hours	Semester End Exam	:	60

UNIT – I

(13 Periods)

Introduction: Parallel Processing Architecture: Parallelism in sequential machines, Abstract model of parallel computer, Multiprocessor Architecture, Pipelining, Array Processors.

Programmability Issues: An overview, Operating System Support, Types of operating Systems, Parallel Programming Model, Software Tools.

Data Dependency Analysis: Types of Dependencies, Loop and Array Dependencies, Loop Dependency Analysis, Solving Diophantine equations, Program Transformations.

UNIT – II

(12 Periods)

Shared Memory Programming: General model of shared memory programming, Process model under UNIX.

Algorithms for Parallel Machines: Speed-up, Complexity and Cost, Histogram Computation, Parallel Reduction, Quadrature Problem, Matrix Multiplication, Parallel Sorting Algorithms, Solving Linear Systems, Probabilistic Algorithms.

Message Passing Programming: Introduction, Model, Interface, Circuit Satisfiability, Introducing Collective, Benchmarking Parallel Performance.

UNIT – III

(13 Periods)

Parallel Programming Languages: Fortran90, nCUBE C, Occam, n-Linda.

Debugging Parallel Programs: Debugging Techniques, Debugging Message Passing Parallel Programs, Debugging Shared Memory Parallel Programs.

Memory and I/O Subsystems: Hierarchical Memory Structure, Virtual Memory System, Memory Allocation and Management, Cache Allocation and Management, Cache Memories and Management, Input Output Systems.

UNIT – IV

(12 Periods)

Other Parallelism Paradigms: Dataflow Computing, Systolic Architectures, Functional and Logic Paradigms, Distributed Shared Memory.

Performance of Parallel Processors: Speed-up and Efficiency, Amdahl's Law, Gustafson-Barsis's Law, Karf-Flatt Matrix, Isoefficiency Matrix.



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TEXT BOOK:

1. Hawang Kai and Briggs F.A, "Computer Architecture and Parallel Processing", McGraw Hill.
2. Jordon H.F. and Alaghaband G., "Fundamentals of Parallel Processing".
- 3.M.J. Quinn, "Parallel Processing", TMH.

REFERENCE BOOKS:

1. Shasikumar M., "Introduction to Parallel Processing", PHI.
2. Wilson G.V., "Practical Parallel Programming", PHI.
- 3.Singh, A.Gupta, "Parallel Computer Architecture", Morgan Kaufman.



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DIGITAL IMAGE PROCESSING

ELECTIVE - II

III B.Tech – VI Semester (Code: 14CS606/C)

Lectures	:	4 Periods/Week	Continuous Evaluation	:	40
Final Exam	:	3 hours	Semester End Exam	:	60

UNIT – I

(13 Periods)

INTRODUCTION: Digital Image Processing, Fundamental Steps in Digital Image Processing, Components of an Image Processing System.

DIGITAL IMAGE FUNDAMENTALS: Elements of Visual Perception, Image Sensing and Acquisition, Image Sampling and Quantization, Some basic Relationships between Pixels.

UNIT – II

(12 Periods)

IMAGE ENHANCEMENT IN THE SPATIAL DOMAIN: Some Basic Gray Level Transformation, Histogram Processing, Enhancement using Arithmetic/ Logic Operations, Basics of Spatial Filtering, Smoothing Spatial Filters, Sharpening Spatial Filters.

IMAGE ENHANCEMENT IN THE FREQUENCY DOMAIN: Introduction to the Fourier Transform, and The Frequency Domain, Smoothing Frequency Domain Filters, Sharpening Frequency Domain Filters, Homomorphic Filtering, Implementation.

UNIT – III

(13 Periods)

IMAGE RESTORATION: A Model of the Image Degradation/Restoration Process, Linear, Position –Invariant Degradations, Inverse Filtering, Minimum Mean Square Error(Wiener) Filtering, Constrained Least Squares Filtering.

WAVELETS AND MULTIREOLUTION PROCESSING: Multiresolution Expansions, Wavelet Transforms in One Dimension, The Fast Wavelet Transform, Wavelet Transforms in Two-Dimensions.

UNIT – IV

(12 Periods)

IMAGE COMPRESSION: Image Compression Models, Error Free Compression, Lossy Compression, Image Compression Standards.

IMAGE SEGMENTATION: Detection of Discontinuities, Edge Linking and Boundary Detection, Thresholding, Region Based Segmentation.

TEXT BOOK:

1. Rafael C. Gonzalez, Richard E. Woods, 'Digital Image Processing' Addison Wesley Pubs (Second Edition)

REFERENCE BOOKS:

1. Milan Sonka, Vaclav Hlavac, Roger Boyle Image Processing. Analysis, and Machine Vision (Second Edition).
2. A.K.Jain, 'Fundamentals of Digital Image Processing' PHI.
3. Philips, 'Image Processing in C', BPB Publications.



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ADVANCED COMPUTER ARCHITECTURE

ELECTIVE - II

III B.Tech – VI Semester (Code: 14CS606/D)

Lectures	:	4 Periods/Week	Continuous Evaluation	:	40
Final Exam	:	3 hours	Semester End Exam	:	60

UNIT – I

(13 Periods)

Parallel Computer Models: The state of computing, Classification of parallel computers, Multiprocessors and Multi computers, Multi vector and SIMD computers.

Program and network properties: Conditions of parallelism, Data and resource Dependences, Hardware and Software parallelism, Program partitioning and scheduling, Grain Size and latency, Program flow mechanisms, Control flow versus data flow, Data flow Architecture, Demand driven mechanisms, Comparisons of flow mechanisms.

System Interconnect Architectures: Network properties and routing, Static interconnection Networks, Dynamic interconnection Networks, Hierarchical bus systems, Crossbar switch and multi-port memory, Multistage and combining network.

UNIT – II

(13 Periods)

Principles of Scalable Performance: Performance Metrics and Measures, Parallel Processing Applications. Speedup Performance Laws - Amdahl's law for fixed load, Gustafson's law for scaled problems, Memory Bounded Speedup Model.

Pipelining: Linear pipeline processor, nonlinear pipeline processor, Instruction pipeline Design, Mechanisms for instruction pipelining, Dynamic instruction scheduling, Branch Handling techniques, branch prediction, Arithmetic Pipeline Design, Computer Arithmetic principles, Static Arithmetic pipeline, Multifunctional arithmetic pipelines.

UNIT – III

(12 Periods)

MULTI Processors: Multiprocessor System Interconnect, Cache Coherence and Synchronization Mechanisms, Message-passing Mechanism.

Scalable, Multi-Threaded and Dataflow Architectures: Latency-Hiding Techniques, Principles of Multithreading, Scalable and Multithreaded Architectures.

UNIT – IV

(12 Periods)

Parallel Models, Languages and Compilers: Parallel Programming Models, Parallel Languages and Compilers, Dependence analysis of Data Arrays, code optimization and Scheduling, Loop parallelization and pipelining.

TEXT BOOK:

1. Kai Hwang, "Advanced Computer Architecture", TMH.

REFERENCE BOOKS:

1. D.A. Patterson and J.L.Hennessey, "Computer organization and Design", MorganKaufmann, 2nd Edition.
2. V.Rajaram&C.S.R.Murthy, "Parallel Computer", PHI.
3. Barry Wilkinson and Michael Allen, "Parallel Programming", Pearson Education.



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INTRODUCTION TO DATA ANALYTICS LAB

III B.Tech – VI Semester (Code: 14CSL601)

Lectures	:	3 Periods/Week	Continuous Evaluation	:	40
Final Exam	:	3 hours	Semester End Exam	:	60

Data Analytics Lab Using R

1. a). Write R Code using R as a calculator.
b). Write R Code on Vector Operation.
c). Write R code which demonstrate i) Array ii) List iii) Matrix iv) stack v) Data Frames
2. Write R Code to Importing & Exporting data from i) CSV file ii) Excel file
3. Write R code Which Demonstrate i) Missing Value Treatment ii) Outliers
4. Write R code which demonstrate i) Missing Values ii) Date Values iii) Type Conversion
5. Write R code to demonstrate character functions
6. Write R code which demonstrate functions and control loops
7. Write R code which demonstrate SQL operations using R
8. Write R code which demonstrate plotting of graphs i) Histogram ii) Pie Graph iii) Plot Graph iv) Box Plot v) Dot Plot vi) Kernel Density Plots
9. Write R code which demonstrate statistics functions i) Mean ii) Median iii) Range iv) Variance v) Co variance
10. Write R Code which demonstrate i) Normal Distribution ii) Binomial Distribution
11. Write R code which demonstrates Linear Regression.
12. Write R code which demonstrate i) T-Test ii) ANOVA test
13. Write R code which demonstrates string operations
14. Write R code for cluster analysis on IRIS data set using i) Hierarchical Clustering ii) Partitioning Clustering (K-Means, K-medoids)
15. Write R code for classification on IRIS data set using i) Decision trees ii) Random Forest iii) Support vector machines



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ENTERPRISE PROGRAMMING-II LAB

III B.Tech – VI Semester (Code: 14CSL602)

Lectures	:	3 Periods/Week	Continuous Evaluation	:	40
Final Exam	:	3 hours	Semester End Exam	:	60

LIST OF EXPERIMENTS

1. Write a JDBC application to implement DDL and DML commands.
2. Write an application to demonstrate HTTP Servlets.
3. Write an application to demonstrate cookie & Sessions.
4. Write an application to integrate JSP & Servlets.
5. Write an application to implement Photo Album using JSP.
6. Create a Photo application using JSF.
7. Write an application to demonstrate web service.
8. Write a chat application using Web sockets.
9. Write an application to demonstrate Session Bean and Entity Bean (persistence).
10. Write an application to demonstrate Asynchronous and Timer services of Enterprise Bean.



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CLOUD AND MOBILE APPLICATION DEVELOPMENT LAB

III B.Tech – VI Semester (Code: 14CSL603)

Lectures	:	3 Periods/Week	Continuous Evaluation	:	40
Final Exam	:	3 hours	Semester End Exam	:	60

LIST OF EXPERIMENTS

1. Website development using Razor C#
2. Website Development using PHP.
3. Cloud Service to access Windows Azure Blob Storage.
4. Cloud Service to access Windows Azure Table Storage.
5. Cloud Service to access Windows Azure Queue Storage.
6. Windows Azure Virtual Machine Creation and configuring with SQL Server and J2EE Platform.
7. Cloud Service (or) C# Console Application to access Azure SQL.
8. SQL Server Database Migration.
9. C# Console Application to implement Service Bus Relayed Messaging.
10. C# Console Application to implement Service Bus Brokered Messaging using Queues.
11. C# Console Application to implement Service Bus Brokered Messaging using Topics.

Design the following Android Application:

1. Which demonstrating Layout Design
2. Which implementing animation
3. Which implementing Activities
4. Which Demonstrating Device independent User Interface.
5. To demonstrate Fragments
6. To demonstrate Compound Controls
7. To demonstrate Intents and Broadcast Receivers
8. To work with Internet Resources
9. To demonstrate saving application data.
10. To work with SQL Lite.