

**R23 B.TECH III Year IT COURSE STRUCTURE & SYLLABUS**

III Year I Semester	ADVANCED JAVA	L	T	P	C
		3	0	0	3

Course Objectives:

This course develops programming ability of students to create dynamic web applications using server side technology with Java Database Connectivity. Students can learn networking and remote method invocation using Java API and different Java frameworks like Spring will increase ability of students in web application development.

Unit I:

JDBC Programming: JDBC Architecture, Types of JDBC Drivers, Introduction to major JDBC Classes and Interface, Creating simple JDBC Application, Types of Statement (Statement Interface, Prepared Statement, Callable Statement), Exploring Result Set Operations, Batch Updates in JDBC, Creating CRUD Application, Using Row sets Objects, Managing Database Transaction.

Unit II:

J2EE and Web Development: J2EE Architecture Types, J2EE Containers, Types of Servers in J2EE Application, HTTP Protocols and API, Request Processing in Web Application, Web Application Structure, Web Containers and Web Architecture Models.

Unit III:

Servlet API and Overview: Servlet Introduction, Servlet Life Cycle(SLC), Types of Servlet, Servlet Configuration with Deployment Descriptor, Working with ServletContext and ServletConfig Object, Attributes in Servlet, Response and Redirection using Request Dispatcher and using sendRedirect Method, Session Tracking: using Cookies, HttpSession, Hidden Form Fields and URL Rewriting, Types of Servlet Event: ContextLevel and SessionLevel.

Unit IV:

Java Server Pages(JSP): Introduction to JSP , Comparison with Servlet, JSP Architecture, JSP: Life Cycle, Scripting Elements, Directives, Action Tags, Implicit Objects, Expression Language(EL), JSP Standard Tag Libraries(JSTL), Custom Tag, Session Management, Exception Handling, CRUD Application

Unit V:

Java Web Frameworks: Spring MVC Spring: Introduction, Architecture, Spring MVC Module, Life Cycle of Bean Factory, Database Transaction Management, CRUD Operation using DAO and Spring API.

Text Books:

1. Black Book “Java server programming” J2EE, 1st ed., Dream Tech Publishers, 2008.
2. Complete Reference J2EE, James Keogh, McGraw Hill publication
3. Professional Java Server Programming, Subrahmanyam Allamaraju, Cedric Buest, Wiley Publication
4. Spring in Action, 3rd edition , Craig walls, Manning Publication

Reference Books:

1. Core Java, Volume II: Advanced Features, Cay Horstmann, Gary Cornell Pearson Publication
2. JDBC™ API Tutorial and Reference, Third Edition, Maydene Fisher, Jon Ellis, Jonathan Bruce, Addison Wesley
3. Beginning JSP, JSF and Tomcat, Giulio Zambon, Apress

**R23 B.TECH III Year IT COURSE STRUCTURE & SYLLABUS**

III Year I Semester	AUTOMATA THEORY & COMPILER DESIGN	L	T	P	C
		3	0	0	3

Course Objectives:

- Introduce the notion of formal languages and grammars
- Design of Grammars, FAs and PDAs
- To become familiar with the underlying theory and methods used in compiler design
- To Introduce the parsing techniques, code optimization techniques and generate code

UNIT – I: Regular Expressions, Languages and Finite Automata

Formal Languages and the Chomsky Hierarchy, Regular Expressions and Regular Languages, Algebraic Laws for Regular Expressions, Applications of Regular Expressions, Abstract model of Finite Automaton, Transition Tables and Transition Graphs, Deterministic Finite Automata (DFA), Nondeterministic Finite Automata (NFA), Converting NFA to DFA, Finite Automata with ϵ transitions (NFA- ϵ), Converting NFA- ϵ to NFA/DFA, Minimization of Finite Automata, Equivalence of FA and Regular Expressions

UNIT-II: Context Free Grammars and Push Down Automata:

Context Free Grammars (CFG) and Context Free Languages (CFL), Design of CFGs, Leftmost and Rightmost Derivations, Parse Trees, Applications of CFGs, Ambiguity in Grammars and Languages, Push Down Automata (PDA), The Language of a PDA, Equivalence of PDAs and CFGs

UNIT-III: Lexical Analysis and Top-Down Parsing

The structure of a compiler, Role of lexical analyzer, Input Buffering, Specification of tokens, Recognition of tokens, The Lexical Analyser Generator –LEX
Introduction to Syntax Analysis, Eliminating ambiguity and left recursion from a CFG, Recursive Descent Parsing, LL(1) Grammars, Nonrecursive Predictive Parsing

UNIT-IV: Bottom-Up Parsing and Syntax Directed Translation

Shift-Reduce Parsing, Simple LR parsing, Canonical LR(1) Parsing, LALR Parsing, Parser Generators
Syntax Directed Definitions, Evaluation Orders for SDDs, Syntax Directed Translation Schemes

UNIT-V: Intermediate Code Generation, Code Generation and Optimization:

Three address code, Types and Declarations, Translation of Expressions, Type Checking, Control Flow, Issues in the design of a Code Generator, The Target Language, A simple Code Generator Basic Blocks and Flow Graphs, Optimization of Basic Blocks, Peephole Optimization

Textbooks:

1. Introduction to Automata Theory, Languages and Computation, J.E.Hopcroft, R.Motwani and J.D.Ullman, 3rd Edition, Pearson, 2008.
2. Compilers Principles, Techniques and Tools, 2nd Edition, Alfred V.Aho, Monica S. Lam, Ravi Sethi, Jeffrey D. Ullman, Pearson

Reference Books:

1. Introduction to Languages and The Theory of Computation, John C. Martin, McGraw Hill.
2. Theory of Computer Science-Automata, Languages and Computation, K.L.P.Mishra and N.Chandrasekaran, 3rd Edition, PHI, 2007
3. Compiler Construction, K.V.N. Sunitha, Pearson, 2013
4. Compiler Design, Sandeep Saxena, Rajkumar Singh Rathore, S.Chand publication



TIRUMALA ENGINEERING COLLEGE

(AUTONOMOUS)

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R23 B.TECH III Year IT COURSE STRUCTURE & SYLLABUS

III Year I Semester	COMPUTER NETWORKS	L	T	P	C
		3	0	0	3

Course Objectives:

- To provide insight about networks, topologies, and the key concepts.
- To gain comprehensive knowledge about the layered communication architectures (OSI and TCP/IP) and its functionalities.
- To understand the principles, key protocols, design issues, and significance of each layers in ISO and TCP/IP.
- To know the basic concepts of network services and various network applications.

UNIT I: Introduction: Network Types, LAN, MAN, WAN, Network Topologies Reference models- The OSI Reference Model- the TCP/IP Reference Model - A Comparison of the OSI and TCP/IP Reference Models, OSI Vs TCP/IP.

Physical Layer –Introduction to Guided Media- Twisted-pair cable, Coaxial cable and Fiber optic cable and introduction about unguided media.

UNIT II: Data link layer: Design issues, **Framing:** fixed size framing, variable size framing, flow control, error control, error detection and correction codes, CRC, Checksum: idea, one's complement internet checksum, services provided to Network Layer, **Elementary Data Link Layer protocols:** simplex protocol, Simplex stop and wait, Simplex protocol for Noisy Channel.

Sliding window protocol: One bit, Go back N, Selective repeat-Stop and wait protocol, Data link layer in HDLC, Point to point protocol (PPP)

UNIT – III: Media Access Control: Random Access: ALOHA, Carrier sense multiple access (CSMA), CSMA with Collision Detection, CSMA with Collision Avoidance, **Controlled Access:** Reservation, Polling, Token Passing, **Channelization:** frequency division multiple Access(FDMA), time division multiple access(TDMA), code division multiple access(CDMA).

Wired LANs: Ethernet, Ethernet Protocol, Standard Ethernet, Fast Ethernet(100 Mbps), Gigabit Ethernet, 10 Gigabit Ethernet.

UNIT – IV: The Network Layer Design Issues – Store and Forward Packet Switching-Services Provided to the Transport layer- Implementation of Connectionless Service-Implementation of Connection Oriented Service.

Routing Algorithms-The Optimality principle-Shortest path, Flooding, Distance vector, Link state, Hierarchical, Congestion Control algorithms, Congestion prevention policies. Traffic Control Algorithm-Leaky bucket & Token bucket.

Internet Working: Tunnelling, Fragmentation, network layer in the internet – IP protocols-IP Version 4 protocol-IPV4 Header Format, IP addresses, Class full Addressing, CIDR, Subnets-IP Version 6-The main IPV6 header, Transition from IPV4 to IPV6, Comparison of IPV4 & IPV6.

UNIT –V: The Transport Layer: Transport layer protocols: Introduction-services- port number-User data gram protocol-User datagram-UDP services-UDP applications-Transmission control protocol: TCP services- TCP features.

Application Layer — World Wide Web: HTTP, Electronic mail-Architecture- web based mail- email security- TELENET-local versus remote Logging-Domain Name System.

Text Books:

1. Computer Networks, Andrew S Tanenbaum, Fifth Edition. Pearson Education/PHI
2. Data Communications and Networks, Behrouz A. Forouzan, Fifth Edition TMH.

References Books:

1. Data Communications and Networks- Achut S Godbole, AtulKahate
2. Computer Networks, Mayank Dave, CENGAGE

**R23 B.TECH III Year IT COURSE STRUCTURE & SYLLABUS**

III Year I Semester	DATA WAREHOUSING & DATA MINING	L	T	P	C
		3	0	0	3

Pre-requisites: Data Structures, Algorithms, Probability & Statistics, Data Base Management Systems

Course Objectives: The main objective of the course is to

- Introduce basic concepts and techniques of data warehousing and data mining
- Examine the types of the data to be mined and apply pre-processing methods on raw data
- Discover interesting patterns, analyze supervised and unsupervised models and estimate the accuracy of the algorithms.

UNIT-I: Data Warehousing and Online Analytical Processing: Basic concepts, Data Warehouse Modeling: Data Cube and OLAP, OLAP VS OLTP, Data Warehouse Design and Usage, Data Warehouse Implementation, Cloud Data Warehouse, Data Mining and Pattern Mining, KDD Process, Technologies, Applications, Major issues, Data Objects & Attribute Types, Basic Statistical Descriptions of Data, Data Mining System Architecture. (Text Book- 1)

UNIT II: Data Preprocessing: An Overview, Data Cleaning, Data Integration, Data Reduction, Data Transformation and Data Discretization and Concept of Hierarchical Generation. (Text Book- 1)

UNIT-III: Classification: Basic Concepts, General Approach to solving a classification problem, Decision Tree Induction: Attribute Selection Measures, Tree Pruning, Bayesian Classification Methods: Bayes Theorem, Naïve Bayes Classification, Rule-Based Classification, Model Evaluation and Selection. (Text Book- 2)

UNIT-IV: Association Analysis: Problem Definition, Frequent Itemset Generation, Rule Generation: Confident Based Pruning, Rule Generation in Apriori Algorithm, Compact Representation of frequent item sets, FP-Growth Algorithm. (Text Book- 2)

UNIT-V: Cluster Analysis: Overview, Basics and Importance of Cluster Analysis, Clustering techniques, Different Types of Clusters; K-means: The Basic K-means Algorithm, K-means Additional Issues, Bi-Sectioning K Means, Agglomerative Hierarchical Clustering: Basic Agglomerative Hierarchical Clustering Algorithm DBSCAN: Traditional Density Center-Based Approach, DBSCAN Algorithm, Strengths and Weaknesses. (Text Book- 2)

Text Books:

1. Data Mining concepts and Techniques, 3rd edition, Jiawei Han, Michel Kamber, Elsevier, 2011.
2. Introduction to Data Mining: Pang-Ning Tan & Michael Steinbach, Vipin Kumar, Pearson, 2012.

Reference Books:

1. Data Mining: Vikram Pudi and P. Radha Krishna, Oxford Publisher.
2. Data Mining Techniques, Arun K Pujari, 3rd edition, Universities Press, 2013.
3. (NPTEL course by Prof. Pabitra Mitra) http://onlinecourses.nptel.ac.in/noc17_mg24/preview
4. http://www.saedsayad.com/data_mining_map.htm