VAAGDEVI COLLEGE OF ENGINEERING
(Autonomous)
Billikunta, Warangal - 506 005, Telangana State (India)

M. TECH. (COMPUTER NETWORKS AND INFORMATION SECURITY)
COURSE STRUCTURE AND SYLLABUS

I Year I Semester

Code	Group	Subject	L	T/P/D	C
		Advanced Data Structures and Algorithms	3	0	3
		Web Technologies and Services	3	0	3
		Advanced Computer Networks	3	0	3
		Principles of Information Security	3	0	3
	Elective -I	Distributed Systems Ethical Hacking Information Retrieval Systems	3	0	3
	Elective -II	Embedded Systems Data Warehousing and Mining Network Programming	3	0	3
	Lab	Advanced Data Structures and Algorithms Lab	0	3	2
		Seminar	-	-	2
		Total	**18**	**3**	**22**

I Year II Semester

Code	Group	Subject	L	T/P/D	C
		Wireless Networks and Mobile Computing	3	0	3
		Applications of Network Security	3	0	3
		Information Security Management and Stand;	3	0	3
		Ad hoc and Sensor Networks	3	0	3
	Elective -III	Mobile Application Development using J2ME and Android Database Security Wireless Security	3	0	3
	Elective -IV	Semantic Web and Social Networks Network Management Systems Cloud Computing	3	0	3
	Lab	Information Security and Applications Lab	0	3	2
		Seminar	-	-	2
		Total	**18**	**3**	**22**

II Year I Semester

Code	Group	Subject	L	T/P/D	C
		Comprehensive Viva	-	-	2
		Project Seminar	0	3	2
		Project Work	-	-	18
		Total	**-**	**3**	**22**

II Year II Semester

Code	Group	Subject	L	T/P/D	C
		Project Work and Seminar	-	-	22
		Total	**-**	**-**	**22**

VAAGDEVI COLLEGE OF ENGINEERING
(Autonomous)

M. Tech - I Year - I Sem. (CN&IS)

ADVANCED DATA STRUCTURES AND ALGORITHMS

Objectives:

- The fundamental design, analysis, and implementation of basic data structures.
- Basic concepts in the specification and analysis of programs.
- Principles for good program design, especially the uses of data abstraction.
- Significance of algorithms in the computer field
- Various aspects of algorithm development
- Qualities of a good solution

UNIT I

Algorithms, Performance analysis- time complexity and space complexity, Asymptotic Notation-Big Oh, Omega and Theta notations, Complexity Analysis Examples.

Data structures-Linear and non linear data structures, ADT concept, Linear List ADT, Array representation, Linked representation, Vector representation, singly linked lists -insertion, deletion, search operations, doubly linked lists-insertion, deletion operations, circular lists. Representation of single, two dimensional arrays, Sparse matrices and their representation.

UNIT II

Stack and Queue ADTs, array and linked list representations, infix to postfix conversion using stack, implementation of recursion, Circular queue-insertion and deletion, Dequeue ADT, array and linked list representations, Priority queue ADT, implementation using Heaps, Insertion into a Max Heap, Deletion from a Max Heap, java.util package-ArrayList, Linked List, Vector classes, Stacks and Queues in java.util, Iterators in java.util.

UNIT III

Searching-Linear and binary search methods, Hashing-Hash functions, Collision Resolution methods-Open Addressing, Chaining, Hashing in java.util-HashMap, HashSet, Hashtable.

Sorting -Bubble sort, Insertion sort, Quick sort, Merge sort, Heap sort, Radix sort, comparison of sorting methods.

UNIT IV

Trees- Ordinary and Binary trees terminology, Properties of Binary trees, Binary tree ADT, representations, recursive and non recursive traversals, Java code for traversals, Threaded binary trees.

Graphs- Graphs terminology, Graph ADT, representations, graph traversals/search methods-dfs and bfs, Java code for graph traversals, Applications of Graphs-Minimum cost spanning tree using Kruskal's algorithm, Dijkstra's algorithm for Single Source Shortest Path Problem.

UNIT V

Search trees- Binary search tree-Binary search tree ADT, insertion, deletion and searching operations, Balanced search trees, AVL trees-Definition and examples only, Red Black trees - Definition and examples only, B-Trees-definition, insertion and searching operations, Trees in java.util- TreeSet, Tree Map Classes, Tries(examples only),Comparison of Search trees.

Text compression-Huffman coding and decoding, Pattern matching-KMP algorithm.

TEXT BOOKS:

1. Data structures, Algorithms and Applications in Java, S.Sahni, Universities Press.
2. Data structures and Algorithms in Java, Adam Drozdek, 3rd edition, Cengage Learning.
3. Data structures and Algorithm Analysis in Java, M.A.Weiss, 2nd edition, Addison-Wesley (Pearson Education).

REFERENCE BOOKS:

1. Java for Programmers, Deitel and Deitel, Pearson education.
2. Data structures and Algorithms in Java, R.Lafore, Pearson education.
3. Java: The Complete Reference, 8th editon, Herbert Schildt, TMH.
4. Data structures and Algorithms in Java, M.T.Goodrich, R.Tomassia, 3rd edition, Wiley India Edition.
5. Data structures and the Java Collection Frame work,W.J.Collins, Mc Graw Hill.
6. Classic Data structures in Java, T.Budd, Addison-Wesley (Pearson Education).
7. Data structures with Java, Ford and Topp, Pearson Education.
8. Data structures using Java, D.S.Malik and P.S.Nair, Cengage learning.
9. Data structures with Java, J.R.Hubbard and A.Huray, PHI Pvt. Ltd.
10. Data structures and Software Development in an Object-Oriented Domain, J.P.Tremblay and G.A.Cheston, Java edition, Pearson Education.

VAAGDEVI COLLEGE OF ENGINEERING
(Autonomous)

M. Tech - I Year - I Sem. (CN&IS)

WEB TECHNOLOGIES AND SERVICES

Learning Objective:

The student who has knowledge of programming with java should be able to develop web based solutions using multi-tier architecture. She / He should have good understanding of different technologies on client and server side components as Follows:

Client Side: HTML, CSS, Javascript, Ajax, JQuery and JSON Server
Side: Servlets, JSP
Database: MySQL with Hibernate and Connection Pooling Framework: Struts with validation framework, Internationalization (I18N)
SOA: Service Oriented Architecture, Web services fundamentals, Axis framework for WS

UNIT I

Client Side Technologies:

Overview of HTML - Common tags for text formatting, Lists, Tables, Images, Forms, Frames etc., XHTML Cascading Style sheets, linking to HTML Pages, Classes in CSS, General CSS statements for Text, Table, List and Page formatting

Introduction to JavaScripts, variables, arrays, methods and string manipulation, BOM/DOM (Browser/Document Object Model), accessing elements by ID, Objects in JavaScript Dynamic HTML with JavaScript and with CSS, form validation with JavaScript, Handling Timer Events, JQuery

UNIT II

Introduction to Java Servlets:

Introduction to Servlets: Lifecycle of a Servlet, Reading request and initialization parameters, Writing output to response, MIME types in response, Session T racking: Using Cookies and Sessions
Steps involved in Deploying an application
Database Access with JDBC and Connection Pooling
Introduction to XML, XML Parsing with DOM and SAX Parsers in Java
Ajax - Ajax programming with JSP/Servlets, creating XML Http Object for various browsers, Sending request, Processing response data and displaying it.
Introduction to Hibernate

UNIT III

Introduction to JSP:

JSP Application Development: Types of JSP Constructs (Directives, Declarations, Expressions, Code Snippets), Generating Dynamic Content, Exception Handling, Implicit JSP Objects, Conditional Processing, Sharing Data Between JSP pages, Sharing Session and Application Data, Using user defined classes with jsp:useBean tag, Accessing a Database from a JSP

UNIT IV

Introduction to Struts Framework:

Introduction to MVC architecture, Anatomy of a simple struts application, struts configuration file, Presentation layer with JSP, JSP bean, html and logic tag libraries, Struts Controller class, Using form data in Actions, Page Forwarding, validation frame work, Internationalization

UNIT V

Service Oriented Architecture and Web Services

Overview of Service Oriented Architecture - SOA concepts, Key Service Characteristics, Technical Benefits of a SOA

Introduction to Web Services- The definition of web services, basic operational model of web services, basic steps of implementing web services.

Core fundamentals of SOAP - SOAP Message Structure, SOAP encoding, SOAP message exchange models,
Describing Web Services -Web Services life cycle, anatomy of WSDL
Introduction to Axis- Installing axis web service framework, deploying a java web service on axis.
Web Services Interoperability **-** Creating java and .Net client applications for an Axis Web Service

(Note: The Reference Platform for the course will be open source products Apache Tomcat Application Server, MySQL database, Hibernate and Axis)

TEXT BOOKS:

1. Web Programming, building internet applications, Chris Bates 3rd edition, WILEY Dreamtech .
2. The complete Reference Java 7th Edition , Herbert Schildt., TMH.
3. Java Server Pages,Hans Bergsten, SPD, O'Reilly.
4. Professional Jakarta Struts - James Goodwill, Richard Hightower, Wrox Publishers.
5. Developing Java Web Services, R. Nagappan, R. Skoczylas, R.P. Sriganesh, Wiley India, rp -2008.
6. Understanding SOA with Web Services, Eric Newcomer and Greg Lomow, Pearson Edition – 2009
7. Java Web Service Architecture, James McGovern, Sameer Tyagi et al., Elsevier - 2009

REFERENCE BOOKS:

1. Programming the world wide web,4th edition,R.W.Sebesta,Pearson
2. Core SERVLETS ANDJAVASERVER PAGES VOLUME 1 CORE
3. TECHNOLOGIES , Marty Hall and Larry Brown Pearson
4. Internet and World Wide Web - How to program Dietel and Nieto PHI/Pearson.
5. Jakarta Struts Cookbook , Bill Siggelkow, S P D O'Reilly.
6. Professional Java Server Programming,S.Allamaraju & othersApress(dreamtech).
7. Java Server Programming ,Ivan Bayross and others,The X Team,SPD
8. Web Warrior Guide to Web Programmming-Bai/Ekedaw-Cengage Learning.
9. Beginning Web Programming-Jon Duckett ,WROX.

VAAGDEVI COLLEGE OF ENGINEERING
(Autonomous)

M. Tech - I Year - I Sem. (CN&IS)

ADVANCED COMPUTER NETWORKS

Objectives:

- The objective of this course is to build a solid foundation in computer networks concepts and design
- To understand computer network architectures, protocols, and interfaces.
- The OSI reference model and the Internet architecture network applications.
- The course will expose students to the concepts of traditional as well as modern day computer networks - wireless and mobile, multimedia-based.
- Students completing this course will understand the key concepts and practices employed in modern computer networking

Course description: This course will enable the student to refresh the fundamentals of Computer Networks in Unit I. Unit II describes the architecture, components, and operation of routers, and explains the principles of Routing and Routing protocols. Especially the Routing protocols need to be understood thoroughly with the help of any freely downloadable simulator tool. Through Unit III a student can learn the technologies and protocols needed to design and implement a converged switched network. This section explains how to configure a switch for basic functionality and how to implement Virtual LANs, VTP, and Inter-VLAN routing in a converged network. Students need to develop the necessary skills to implement a WLAN in a small-to-medium network. This course in Unit IV discusses the WAN technologies and network services required by converged applications in enterprise networks. Unit V makes the student to implement networking using Java programs.

Suggested Simulator tools: *NS-2/NS-3, OPNET, Packet Tracer, Boson, Wireshark.*

UNIT I: Review

Computer Networks and the Internet: History of Computer Networking and the Internet, Networking Devices, The Network edge, The Network core, Access Networks and Physical media, ISPs and Internet Backbones.

Networking Models: 5-layer TCP/IP Model, 7-Layer OSI Model, Internet Protocols and Addressing, Equal-Sized Packets Model: ATM.

UNIT II: Network Routing

Routing and its concepts: Structure of a Router, Basic Router Configuration, Building a Routing Table, Static Routing, Dynamic Routing - Distance Vector Routing Protocol (RIPv1, RIPv2, EIGRP), Link State Routing Protocols (OSPF).

UNIT III: LAN Switching

Switching and its concepts: Structure of a Switch, Basic Switch Configuration, Virtual LANs (VLANs), VLAN Trunking Protocol (VTP), Spanning Tree Protocol (STP), Inter-VLAN Routing.

UNIT IV: Wide Area Networks (WANs)

Introduction to WANs, Point-to-Point Protocol (PPP) concepts, Frame Relay concepts, Dynamic Host Configuration Protocol (DHCP), Network Address Translation (NAT), IPv6.

UNIT V: Network Programming using Java

TCP sockets, UDP sockets (datagram sockets), Server programs that can handle one connection at a time and multiple connections (using multithreaded server), Remote Method Invocation (Java RMI) - Basic RMI Process, Implementation details - Client-Server Application.

TEXT BOOKS:

1. Computer Networking: A Top-Down Approach Featuring the Internet, *James F. Kurose, Keith W.Ross,* Fifth Edition, Pearson Education, 2012.
2. Network Fundamentals, Mark Dye, Pearson Education.
3. Routing Protocols & Concepts, Rick Graziani, Pearson Education.
4. LAN Switching & Wireless, Wayne Lewis, Pearson Education.
5. Accessing the WAN, Bob Vachon, Pearson Education.
6. An Introduction to Network Programming with Java, Jan Graba, Springer, rp 2010.

REFERENCE BOOKS:

1. Computer Networks: A Systems approach, *Larry L. Peterson & Bruce S. Davie,* Fifth edition, Elsevier, rp2012.
2. Computer Networks: A Top-Down Approach, *Behrouz A. Forouzan, Firoz Mosharaf,* Tata McGraw Hill, 2012.
3. Java Network Programming,3rd edition, *E.R. Harold,* SPD, O'Reilly.(Unit V)
4. An Engineering Approach to Computer Networking, *S.Keshav,* Pearson Education, 1997.
5. Computer Networks: Principles, Technologies And Protocols For Network Design, *Natalia Olifer, Victor Olifer,* Wiley India, 2006.
6. Computer Networks, *Andrew S. Tanenbaum,* Fifth Edition, Prentice Hall.
7. Computer and Communication Networks, *Nader F. Mir,* Pearson Education, 2007
8. Data Communications and Networking, *Behrouz A. Forouzan,* Fourth Edition, Tata McGraw Hill, 2007.
9. Computer Networks, *Bhushan Trivedi,* Oxford University Press, 2011.
10. Fundamentals of Business Data Communications, *Jerry FitzGerald and Alan Dennis,* Tenth Edition, Wiley, 2009.
11. Internetworking with TCP/IP: Principles, Protocols and Architecture, Volume 1, *Douglas E. Comer,* 4th edition, PHI, 2005.
12. Next-Generation Internet: Architectures and Protocols, Byrav Ramamurthy et al, Cambridge, 2011.

VAAGDEVI COLLEGE OF ENGINEERING
(Autonomous)

M. Tech - I Year - I Sem. (CN&IS)

PRINCIPLES OF INFORMATION SECURITY

Objectives:

- Upon completion of this material, you should be able to define information security
- Recount the history of computer security and how it evolved into information security
- Define key terms and critical concepts of information security
- Enumerate the phases of the security systems development life cycle
- Describe the information security roles of professionals within an organization

UNIT - I

Information Security: Introduction, History of Information security, What is Security, CNSS Security Model, Components of Information System, Balancing Information Security and Access, Approaches to Information Security Implementation, The Security Systems Development Life Cycle.

UNIT – II

Cryptography: Concepts and Techniques, symmetric and asymmetric key cryptography, steganography, **Symmetric key Ciphers:** DES structure, DES Analysis, Security of DES, variants of DES, Block cipher modes of operation , AES structure, Analysis of AES , Key distribution **Asymmetric key Ciphers:** Principles of public key cryptosystems, RSA algorithm, Analysis of RSA, Diffie-Hellman Key exchange

UNIT – III

Message Authentication and Hash Functions: Authentication requirements and functions, MAC and Hash Funtions, **MAC Algorithms**: Secure Hash Algorithm, Whirlpool, HMAC, Digital signatures, X.509, Kerberos

UNIT – IV

Security at layers(Network, Transport, Application): IPSec, Secure Socket Layer(SSL), Transport Layer Security(TLS), Secure Electronic Transaction(SET), Pretty Good Privacy(PGP), S/MIME

UNIT – V

Inruders, Virus and Firewalls: Intruders, Intrusion detection, password management, Virus and related threats, Countermeasures, Firewall design principles, Types of firewalls

TEXT BOOKS:

1. Principles of Information Security : Michael E. Whitman, Herbert J. Mattord, CENGAGE Learning, 4th Edition.
2. Cryptography and Network Security : William Stallings, Pearson Education,4th Edition
3. Cryptography and Network Security : Forouzan Mukhopadhyay, Mc Graw Hill, 2nd Edition

REFERENCE BOOKS:

1. Cryptography and Network Security : C K Shyamala, N Harini, Dr T R Padmanabhan, Wiley India, 1st Edition.
2. Network Security and Cryptography: Bernard Menezes, CENGAGE Learning
3. Cryptography and Network Security : Atul Kahate, Mc Graw Hill, 2nd Edition
4. Principles of Computer Security: WM.Arthur Conklin, Greg White, TMH
5. Introduction to Network Security: Neal Krawetz, CENGAGE Learning
6. Handbook of Security of Networks, Yang Xiao, Frank H Li, Hui Chen, World Scientific, 2011.

VAAGDEVI COLLEGE OF ENGINEERING
(Autonomous)

M. Tech - I Year - I Sem. (CN&IS)

DISTRIBUTED SYSTEMS (ELECTIVE - I)

Objectives:

- To explain what a distributed system is, why you would design a system as a distributed system, and what the desired properties of such systems are;
- To list the principles underlying the functioning of distributed systems, describe the problems and challenges associated with these principles, and evaluate the effectiveness and shortcomings of their solutions;
- To recognize how the principles are applied in contemporary distributed systems, explain how they affect the software design, and be able to identify features and design decisions that may cause problems;
- To design a distributed system that fulfills requirements with regards to key distributed systems properties (such as scalability, transparency, etc.), be able to recognize when this is not possible, and explain why;
- To build distributed system software using basic OS mechanisms as well as higher-level middleware and languages.

UNIT I

Characterization of Distributed Systems- Introduction, Examples of Distributed systems, Resource sharing and web, challenges, System models- Introduction, Architectural and Fundamental models, Networking and Internetworking, Interprocess Communication.

Distributed objects and Remote Invocation-Introduction, Communication between distributed objects, RPC, Events and notifications, Case study-Java RMI.

UNIT II

Operating System Support- Introduction, OS layer, Protection, Processes and Threads, Communication and Invocation, Operating system architecture, Distributed File Systems-Introduction, File Service architecture, case study- SUN network file systems.

Name Services-Introduction, Name Services and the Domain Name System, Case study of the Global Name Service, Case study of the X.500 Directory Service.

UNIT III

Peer to Peer Systems-Introduction, Napster and its legacy, Peer to Peer middleware, Routing overlays, Overlay case studies-Pastry, Tapestry, Application case studies-Squirrel, OceanStore.

Time and Global States-Introduction, Clocks, events and Process states, Synchronizing physical clocks, logical time and logical clocks, global states, distributed debugging.

Coordination and Agreement - Introduction, Distributed mutual exclusion, Elections, Multicast communication, consensus and related problems.

UNIT IV

Transactions and Concurrency control - Introduction, Transactions, Nested Transactions, Locks, Optimistic concurrency control, Timestamp ordering, Comparison of methods for concurrency controls. Distributed Transactions - Introduction, Flat and Nested Distributed Transactions, Atomic commit protocols, Concurrency control in distributed transactions, Distributed deadlocks, Transaction recovery, Replication-Introduction, System model and group communication, Fault tolerant services, Transactions with replicated data.

UNIT V

Security - Introduction, Overview of Security techniques, Cryptographic algorithms, Digital signatures, Case studies-Kerberos, TLS, 802.11 WiFi.

Distributed shared memory, Design and Implementation issues, Sequential consistency and Ivy case study, Release consistency and Munin case study, other consistency models, CORBA case study- Introduction, CORBA RMI, CORBA Services.

TEXT BOOKS:

1. Distributed Systems Concepts and Design, G Coulouris, J Dollimore and T Kindberg, Fourth Edition, Pearson Education.
2. Distributed Systems, S.Ghosh, Chapman & Hall/CRC, Taylor & Francis Group, 2010.

REFERENCE BOOKS:

1. Distributed Computing, S.Mahajan and S.Shah, Oxford University Press.
2. Distributed Operating Systems Concepts and Design, Pradeep K.Sinha, PHI.
3. Advanced Concepts in Operating Systems, M Singhal, N G Shivarathri, Tata McGraw-Hill Edition.
4. Reliable Distributed Systems, K.P.Birman, Springer.
5. Distributed Systems - Principles and Paradigms, A.S. Tanenbaum and M.V. Steen, Pearson Education.
6. Distributed Operating Systems and Algorithm Analysis, R.Chow, T.Johnson, Pearson.
7. Distributed Operating Systems, A.S.Tanenbaum, Pearson education.
8. Distributed Computing, Principles, Algorithms and Systems, Ajay D. Kshemakalyani & Mukesh Singhal, Cambrigde, rp 2010

VAAGDEVI COLLEGE OF ENGINEERING
(Autonomous)

M. Tech - I Year - I Sem. (CN&IS)

ETHICAL HACKING (ELECTIVE-I)

Objectives:

- To learn the ethics and legality of hacking
- To learn about the hacking tools
- To learn the hacking of servers and OS

UNIT I

Introduction to Ethical Hacking, Ethics, and Legality

Ethical Hacking Terminology, Different Types of HackingTechnologies, DifferentPhases Involved in Ethical Hacking and Stages of Ethical Hacking: Passive and Active Reconnaissance, Scanning, Gaining Access, Maintaining Access, Covering Tracks, Hacktivism, Types of Hacker Classes, Skills Required to Become an Ethical Hacker, Vulnerability Research, Ways to Conduct Ethical Hacking, Creating a Security Evaluation Plan ,Types of Ethical Hacks, Testing Types, Ethical Hacking Report

Footprinting and Social Engineering

Footprinting, Information Gathering Methodology, Competitive Intelligence ,DNS Enumeration Whois and ARIN Lookups, Types of DNS Records, Traceroute, E-Mail Tracking ,Web Spiders , Social Engineering, Common Types Of Attacks, Insider Attacks, Identity Theft, Phishing Attacks, Online Scams, URL Obfuscation, Social-Engineering Countermeasures.

UNIT II

Scanning and Enumeration

Scanning, types of Scanning , CEH Scanning Methodology ,Ping Sweep Techniques, Nmap Command Switches, SYN, Stealth, XMAS, NULL, IDLE, and FIN Scans, TCP Communication Flag Types, War-Dialing Techniques, Banner Grabbing and OS Fingerprinting Techniques, Proxy Servers, Anonymizers, HTTP Tunneling Techniques, IP Spoofing Techniques , Enumeration, Null Sessions, SNMP Enumeration, Windows 2000 DNS Zone Transfer, Steps Involved in Performing Enumeration **System Hacking**

Understanding Password-Cracking Techniques, Understanding the LanManager Hash Cracking Windows 2000 Passwords, Redirecting the SMB Logon to the Attacker SMB Redirection, SMB Relay MITM Attacks and Countermeasures NetBIOS DoS Attacks, Password-Cracking Countermeasures, Understanding Different Types of Passwords Passive Online Attacks, Active Online Attacks, Offline Attacks Nonelectronic Attacks, Understanding Keyloggers and Other Spyware Technologies Understand Escalating Privileges, Executing Applications, Buffer Overflows, Understanding Rootkits Planting Rootkits on Windows 2000 and XP Machines, Rootkit Embedded TCP/IP Stack Rootkit Countermeasures, Understanding How to Hide Files, NTFS File Streaming NTFS Stream Countermeasures, Understanding Steganography Technologies, Understanding How to Cover Your Tracks and Erase Evidence, Disabling Auditing, Clearing the Event Log

UNIT III

Trojans, Backdoors, Viruses, and Worms

Trojans and Backdoors, Overt and Covert Channels, Types of Trojans, Reverse-Connecting Trojans, Netcat Trojan ,Indications of a Trojan Attack, Wrapping, Trojan Construction Kit and Trojan Makers , Countermeasure Techniques in Preventing Trojans, Trojan-Evading Techniques, System File Verification Subobjective to Trojan Countermeasures Viruses and Worms, Difference between a Virus and a Worm, Types of Viruses, Understand Antivirus Evasion Techniques, Understand Virus Detection Methods **Sniffers**

Protocols Susceptible to Sniffing, Active and Passive Sniffing, ARP Poisoning, Ethereal Capture and Display Filters, MAC Flooding, DNS Spoofing Techniques, Sniffing Countermeasures **Denial of Service and Session Hijacking**

Denial of Service, Types of DoS Attacks, DDoS Attacks, BOTs/BOTNETs, “Smurf” Attack, “SYN” Flooding, DoS/DDoS Countermeasures, Session Hijacking, Spoofing vs. Hijacking, Types of Session Hijacking, Sequence Prediction, Steps in Performing Session Hijacking, Prevention of Session Hijacking

UNIT IV

Hacking Web Servers, Web Application Vulnerabilities, and Web-Based Password Cracking Techniques

Hacking Web Servers, Types of Web Server Vulnerabilities, Attacks against Web Servers, IIS Unicode Exploits, Patch Management Techniques, Web Server Hardening Methods Web Application Vulnerabilities, Objectives of Web Application Hacking, Anatomy of an Attack, Web Application Threats, Google Hacking, Web Application Countermeasures Web-Based Password Cracking Techniques, Authentication Types, Password Cracker, Password Attacks: Classification ,Password- Cracking Countermeasures **SQL Injection and Buffer Overflows**

SQL Injection, Steps to Conduct SQL Injection, SQL Server Vulnerabilities, SQL Injection Countermeasures Buffer Overflows, Types of Buffer Overflows and Methods of Detection, Stack- Based Buffer Overflows, Buffer Overflow Mutation Techniques

UNIT V

Linux Hacking
Linux Basics, Compile a Linux Kernel, GCC Compilation Commands, Install Linux Kernel Modules, Linux Hardening Methods **Penetration Testing Methodologies**
Security Assessments, Penetration Testing Methodologies, Penetration Testing Steps, Pen-Test Legal Framework , Automated Penetration Testing Tools ,Pen-Test Deliverables

TEXT BOOKS:

1. CEH official Certfied Ethical Hacking Review Guide, Wiley India Edition
2. Certified Ethical Hacker: Michael Gregg, Pearson Education
3. Certified Ethical Hacker: Matt Walker, TMH.

REFERENCE BOOKS:

1. Computer Security, concepts, issues and implementation: Alfred Basta Wolf Halton, Cengage Learning
2. Hacking Exponsed Web 2.0, by Rich Annings, Himanshu Dwivedi, Zane Lackey, Tata Mcgraw hill Edition
3. Ethical Hacking & Network Defense, Michael T. Simpson, Cengage Learning
4. Hacking Exposed Windows, Joel Scambray, cissp, Stuart Mcclure, Cissp, Third Edition, Tata Mcgraw hill edition
5. Hacking Exposed Window server 2003, Joel Scambray Stuart Mcclure, T ata Mcgraw hill edition

VAAGDEVI COLLEGE OF ENGINEERING
(Autonomous)

M. Tech - I Year - I Sem. (CN&IS)

INFORMATION RETRIEVAL SYSTEMS (ELECTIVE-I)

Objectives:

On completion of this course you should have gained a good understanding of the foundation concepts of information retrieval techniques and be able to apply these concepts into practice. Specifically, you should be able to:

- To use different information retrieval techniques in various application areas
- To apply IR principles to locate relevant information large collections of data
- To analyze performance of retrieval systems when dealing with unmanaged data sources
- To implement retrieval systems for web search tasks.

UNIT I

Introduction: Definition, Objectives, Functional Overview, Relationship to DBMS, Digital libraries and Data Warehouses, **Information Retrieval System Capabilities -** Search, Browse, Miscellaneous.

UNIT II

Cataloging and Indexing: Objectives, Indexing Process, Automatic Indexing, Information Extraction, **Data Structures:** Introduction, Stemming Algorithms, Inverted file structures, N-gram data structure, PAT data structure, Signature file structure, Hypertext data structure - **Automatic Indexing:** Classes of automatic indexing, Statistical indexing, Natural language, Concept indexing, Hypertext linkages

UNIT III

Document and Term Clustering: Introduction, Thesaurus generation, Item clustering, Hierarchy of clusters - **User Search Techniques:** Search statements and binding, Similarity measures and ranking, Relevance feedback, Selective dissemination of information search, Weighted searches of Boolean systems, Searching the Internet and hypertext - **Information Visualization**: Introduction, Cognition and perception, Information visualization technologies.

UNIT IV

Text Search Algorithms: Introduction, Software text search algorithms, Hardware text search systems. **Information System Evaluation:** Introduction, Measures used in system evaluation, Measurement example - TrEC results.

UNIT V

Multimedia Information Retrieval - Models and Languages - Data Modeling, Query Languages, Indexing and Searching - **Libraries and Bibliographical Systems -** Online IR Systems, OPACs, Digital Libraries.

TEXT BOOKS:

1. Information Storage and Retrieval Systems: Theory and Implementation By Kowalski, Gerald, Mark T Maybury Kluwer Academic Press, 2000.
2. Modern Information Retrival By Ricardo Baeza-Yates, Pearson Education, 2007.
3. Information Retrieval: Algorithms and Heuristics By David A Grossman and Ophir Frieder, 2nd Edition, Springer International Edition, 2004.

REFERENCE BOOKS:

1. Information Retrieval Data Structures and Algorithms By William B Frakes, Ricardo Baeza- Yates, Pearson Education, 1992.
2. Information Storage & Retieval by Robert Korfhage - John Wiley & Sons.
3. Introduction to Information Retrieval by Christopher D. Manning and Prabhakar Raghavan, Cambridge University Press, 2008.

VAAGDEVI COLLEGE OF ENGINEERING
(Autonomous)

M. Tech - I Year - I Sem. (CN&IS)

EMBEDDED SYSTEMS (ELECTIVE-II)

Objectives:

- To explain various embedded system applications and design requirements.
- To construct embedded system hardware.
- To develop software programs to control embedded system.
- To generate product specification for embedded system.

UNIT I

Introduction to Embedded Systems: Embedded Systems, Processor Embedded into a System, Embedded Hardware Units and Devices in a System, Embedded Software, Complex System Design, Design Process in Embedded System, Formalization of System Design, Classification of Embedded Systems

UNIT II

8051 and Advanced Processor Architecture: 8051 Architecture, 8051 Micro controller Hardware, Input/output Ports and Circuits, External Memory, Counter and Timers, Serial data Input/output, Interrupts, Introduction to Advanced Architectures, Real World Interfacing, Processor and Memory organization - **Devices and Communication Buses for Devices Network:** Serial and parallel
Devices & ports, Wireless Devices, Timer and Counting Devices, Watchdog Timer, Real Time Clock, Networked Embedded Systems, Internet Enabled Systems, Wireless and Mobile System protocols

UNIT III

Embedded Programming Concepts: Software programming in Assembly language and High Level Language, Data types, Structures, Modifiers, Loops and Pointers, Macros and Functions, object oriented Programming, Embedded Programming in C++ & JAVA

UNIT IV

Real - Time Operating Systems: OS Services, Process and Memory Management, Real - Time Operating Systems, Basic Design Using an RTOS, Task Scheduling Models, Interrupt Latency, Response of Task as Performance Metrics - **RTOS Programming:** Basic functions and Types of RTOSES, RTOS VxWorks, Windows CE

UNIT V

Embedded Software Development Process and Tools: Introduction to Embedded Software Development Process and Tools, Host and Target Machines, Linking and Locating Software, Getting Embedded Software into the Target System, Issues in Hardware-Software Design and Co-Design - **Testing, Simulation and Debugging Techniques and Tools:** Testing on Host Machine, Simulators, Laboratory Tools

TEXT BOOK:

1. Embedded Systems, Raj Kamal, Second Edition TMH.

REFERENCE BOOKS:

1. Embedded/Real-Time Systems, Dr.K.V.K.K.Prasad, dreamTech press
2. The 8051 Microcontroller and Embedded Systems, Muhammad Ali Mazidi, Pearson.
3. The 8051 Microcontroller, Third Edition, Kenneth J.Ayala, Thomson.
4. An Embedded Software Primer, David E. Simon, Pearson Education.
5. Micro Controllers, Ajay V Deshmukhi, TMH.
6. Microcontrollers, Raj kamal, Pearson Education.
7. Introduction to Embedded Systems,Shibu K.V,TMH.

VAAGDEVI COLLEGE OF ENGINEERING
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M. Tech - I Year - I Sem. (CN&IS)

DATA WAREHOUSING AND MINING (ELECTIVE -II)

Objectives:

- Understand data mining principles and techniques: Introduce DM as a cutting edge business intelligence method and acquaint the students with the DM techniques for building competitive advantage through proactive analysis, predictive modeling, and identifying new trends and behaviors.
- Building basic terminology.
- Learn how to gather and analyze large sets of data to gain useful business understanding.
- Learn how to produce a quantitative analysis report/memo with the necessary information to make decisions.
- Describing and demonstrating basic data mining algorithms, methods, and tools
- Identifying business applications of data mining
- Develop and apply critical thinking, problem-solving, and decision-making skills.

UNIT I

Introduction: Fundamentals of data mining, Data Mining Functionalities, Classification of Data Mining systems, Data Mining Task Primitives, Integration of a Data Mining System with a Database or a Data Warehouse System, Issues in Data Mining.

Data Preprocessing: Need for Preprocessing the Data, Data Cleaning, Data Integration and Transformation, Data Reduction, Discretization and Concept Hierarchy Generation.

UNIT II

Data Warehouse and OLAP Technology for Data Mining: Data Warehouse, Multidimensional Data Model, Data Warehouse Architecture, Data Warehouse Implementation, Usage of Data Warehousing Online Analytical Processing and Mining

Data Cube Computation: Efficient Methods for simple Data Cube Computation (Full Cube, Iceberg Cube, Closed Cube and Shell Cube), Discovery Driven exploration of data cubes, Attribute-Oriented Induction for data characterization and its implementation

UNIT III

Mining Frequent Patterns, Associations and Correlations: Basic Concepts, The Apriori algorithm for finding frequent itemsets using candidate generation, Generating association rules from frequent itemsets, Mining frequent itemsets without candidate generation, Mining various kinds of Association Rules, Correlation Analysis

UNIT IV

Classification and Prediction: Description and comparison of classification and prediction, preparing data for Classification and Prediction, Classification by Decision Tree Induction, Bayesian Classification, Rule-Based Classification, Classification by Back propagation Prediction, linear and non-linear regression, evaluating accuracy of a Classifier or a Predictor

UNIT V

Cluster Analysis: Types of Data in Cluster Analysis, A Categorization of Major Clustering Methods, k-means and k-mediods methods, CLARANS, Agglomerative and divisive hierarchical clustering, chameleon dynamic modeling, clustering based on density distribution function, wavelet transformation based clustering, conceptual Clustering, Constraint-Based Cluster Analysis, Outlier Analysis.

TEXT BOOKS:

1. Data Mining - Concepts and Techniques - Jiawei Han, Micheline Kamber and Jian Pei, 3rd edition, Morgan Kaufmann Publishers, ELSEVIER.
2. Introduction to Data Mining - Pang-Ning Tan, Michael Steinbach and Vipin Kumar, Pearson education.

REFERENCE BOOKS:

1. Data Warehousing in the Real World - Sam Aanhory & Dennis Murray Pearson Edn Asia.
2. Insight into Data Mining, K.P.Soman, S.Diwakar, V.Ajay, PHI, 2008.
3. Data Warehousing Fundamentals - Paulraj Ponnaiah Wiley student Edition
4. The Data Warehouse Life cycle T ool kit - Ralph Kimball Wiley student edition
5. Building the Data Warehouse by William H Inmon, John Wiley & Sons Inc, 2005.
6. Data Mining Introductory and advanced topics -Margaret H Dunham, Pearson education
7. Data Mining Techniques - Arun K Pujari, 2nd edition, Universities Press.
8. Data Mining, V.Pudi and P.Radha Krishna, Oxford University Press.
9. Data Mining: Methods and Techniques, A.B.M Shawkat Ali and S.A.Wasimi, Cengage Learning.
10. Data Warehouse 2.0, The Architecture for the next generation of Data Warehousing, W.H.Inmon, D.Strauss, G.Neushloss, Elsevier, Distributed by SPD.

VAAGDEVI COLLEGE OF ENGINEERING
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M. Tech - I Year - I Sem. (CN&IS)

NETWORK PROGRAMMING (ELECTIVE -II)

Objectives:

- To understand to Linux utilities
- To understand file handling, signals
- To understand IPC, network programming in Java
- To understand processes to communicate with each other across a Computer Network.

UNIT - I

Linux Utilities- File handling utilities, Security by file permissions, Process utilities, Disk utilities, Networking utilities, Filters, Text processing utilities and Backup utilities.

Bourne again shell(bash) - Introduction, pipes and redirection, here documents, running a shell script, the shell as a programming language, shell meta characters, file name substitution, shell variables, command substitution, shell commands, the environment, quoting, test command, control structures, arithmetic in shell, shell script examples.

Review of C programming concepts-arrays, strings (library functions), pointers, function pointers, structures, unions, libraries in C.

UNIT - II

Files- File Concept, File types File System Structure, Inodes, File Attributes, file I/O in C using system calls, kernel support for files, file status information-stat family, file and record locking-lock and fcntl functions, file permissions-chmod, fchmod, file ownership-chown, lchown, fchown, links-soft links and hard links - symlink, link, unlink.

File and Directory management - Directory contents, Scanning Directories- Directory file APIs. Process- Process concept, Kernel support for process, process attributes, process control - process creation, replacing a process image, waiting for a process, process termination, zombie process, orphan process.

UNIT - III

Signals- Introduction to signals, Signal generation and handling, Kernel support for signals, Signal function, unreliable signals, reliable signals, kill, raise , alarm, pause, abort, sleep functions. Interprocess Communication - Introduction to IPC mechanisms, Pipes- creation, IPC between related processes using unnamed pipes, FIFOs-creation, IPC between unrelated processes using FIFOs(Named pipes), differences between unnamed and named pipes, popen and pclose library functions, Introduction to message queues, semaphores and shared memory.

Message Queues- Kernel support for messages, UNIX system V APIs for messages, client/server example.

Semaphores-Kernel support for semaphores, UNIX system V APIs for semaphores.

UNIT - IV

Shared Memory- Kernel support for shared memory, UNIX system V APIs for shared memory, client/server example.

Network IPC - Introduction to Unix Sockets, IPC over a network, Client-Server model ,Address formats(Unix domain and Internet domain), Socket system calls for Connection Oriented - Communication ,Socket system calls for Connectionless - Communication, Example-Client/Server Programs- Single Server-Client connection, Multiple simultaneous clients, Socket options - setsockopt , getsockopt , fcntl.

UNIT-V

Network Programming in Java-Network basics, TCP sockets, UDP sockets (datagram sockets), Server programs that can handle one connection at a time and multiple connections (using multithreaded server), Remote Method Invocation (Java RMI)-Basic RMI Process, Implementation details-Client-Server Application.

TEXT BOOKS:

1. Unix System Programming using C++, T.Chan, PHI. (Units II, III, IV)
2. Unix Concepts and Applications, 4th Edition, Sumitabha Das, TMH.(Unit I)
3. An Introduction to Network Programming with Java, Jan Graba,Springer, rp 2010. (Unit V)
4. Unix Network Programming ,W.R. Stevens, PHI.(Units II,III,IV)
5. Java Network Programming,3rd edition, E.R. Harold, SPD, O'Reilly.(Unit V)

REFERENCE BOOKS:

1. Linux System Programming, Robert Love, O'Reilly, SPD.
2. Advanced Programming in the UNIX environment, 2nd Edition, W.R.Stevens, Pearson Education.
3. UNIX for programmers and users, 3rd Edition, Graham Glass, King Ables, Pearson Education.
4. Beginning Linux Programming, 4th Edition, N.Matthew, R.Stones,Wrox, Wiley India Edition.
5. UNIX Network Programming The Sockets Networking API, Vol.-I, W.R.Stevens, Bill Fenner, A.M.Rudoff, Pearson Education.
6. UNIX Internals, U.Vahalia, Pearson Education.
7. UNIX shell Programming, S.G.Kochan and P.Wood, 3rd edition, Pearson Education.
8. C Programming Language, Kernighan and Ritchie, PHI

VAAGDEVI COLLEGE OF ENGINEERING
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M. Tech - I Year - I Sem. (CN&IS)

ADVANCED DATA STRUCTURES AND ALGORITHMS LAB

Objectives:

- The fundamental design, analysis, and implementation of basic data structures.
- Basic concepts in the specification and analysis of programs.
- Principles for good program design, especially the uses of data abstraction.

Sample Problems on Data structures:

1. Write Java programs that use both recursive and non-recursive functions for implementing the following searching methods:
   a) Linear search b) Binary search
2. Write Java programs to implement the following using arrays and linked lists a) List ADT
3. Write Java programs to implement the following using an array. a) Stack ADT b) Queue ADT
4. Write a Java program that reads an infix expression and converts the expression to postfix form. (Use stack ADT).
5. Write a Java program to implement circular queue ADT using an array.
6. Write a Java program that uses both a stack and a queue to test whether the given string is a palindrome or not.
7. Write Java programs to implement the following using a singly linked list. a) Stack ADT b) Queue ADT
8. Write Java programs to implement the deque (double ended queue) ADT using a) Array b) Singly linked list c) Doubly linked list.
9. Write a Java program to implement priority queue ADT.
10. Write a Java program to perform the following operations:
    a) Construct a binary search tree of elements.
    b) Search for a key element in the above binary search tree.
    c) Delete an element from the above binary search tree.
11. Write a Java program to implement all the functions of a dictionary (ADT) using Hashing.
12. Write a Java program to implement Dijkstra's algorithm for Single source shortest path problem.
13. Write Java programs that use recursive and non-recursive functions to traversethegiven binary tree in
    a) Preorder b) Inorder c) Postorder.
14. Write Java programs for the implementation of bfs and dfs for a given graph.
15. Write Java programs for implementing the following sorting methods:
    a) Bubble sort d) Merge sort g) Binary tree sort
    b) Insertion sort e) Heap sort
    c) Quick sort f) Radix sort
16. Write a Java program to perform the following operations: a) Insertion into a B-tree b) Searching in a B-tree
17. Write a Java program that implements Kruskal's algorithm to generate minimum cost spanning tree.
18. Write a Java program that implements KMP algorithm for pattern matching.

REFERENCE BOOKS:

1. Data Structures and Algorithms in java, 3rd edition, A.Drozdek, Cengage Learning.
2. Data Structures with Java, J.R.Hubbard, 2nd edition, Schaum's Outlines, TMH.
3. Data Structures and algorithms in Java, 2nd Edition, R.Lafore, Pearson Education.
4. Data Structures using Java, D.S.Malik and P.S. Nair, Cengage Learning.
5. Data structures, Algorithms and Applications in java, 2nd Edition, S.Sahani, Universities Press.
6. Design and Analysis of Algorithms, P.H.Dave and H.B.Dave, Pearson education.
7. Data Structures and java collections frame work, W.J.Collins, Mc Graw Hill.
8. Java: the complete reference, 7th editon, Herbert Schildt, TMH.
9. Java for Programmers, P.J.Deitel and H.M.Deitel, Pearson education / Java: How to Program P.J.Deitel and H.M.Deitel , 8th edition, PHI.
10. Java Programming, D.S.Malik,Cengage Learning.
11. A Practical Guide to Data Structures and Algorithms using Java, S.Goldman & K.Goldman, Chapman & Hall/CRC, Taylor & Francis Group.

(Note: Use packages like java.io, java.util, etc)

VAAGDEVI COLLEGE OF ENGINEERING
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M. Tech - I Year - I Sem. (CN&IS)

WIRELESS NETWORKS AND MOBILE COMPUTING

Objectives:

The main objective of this course is to provide the students with the competences required for understanding and using the communications component of an universal communications environment. Students will be provided, in particular, with the knowledge required to understand

- emerging communications networks,
- their computational demands,
- the classes of distributed services and applications enabled by these networks, and
- the computational means required to create the new networks and the new applications.

UNIT I

WIRELESS NETWORKS: Wireless Network, Wireless Network Architecture, Wireless Switching Technology, Wireless Communication problem, Wireless Network Reference Model, Wireless Networking Issues & Standards.

MOBILE COMPUTING: Mobile communication, Mobile computing, Mobile Computing Architecture, Mobile Devices, Mobile System Networks, Mobility Management

UNIT II

WIRELESS LAN: Infra red Vs radio transmission, Infrastructure and Ad-hoc Network, IEEE 802.11: System Architecture, Protocol Architecture, 802.11b, 802.11a, Newer Developments, HIPERLAN 1, HIPERLAN 2, Bluetooth : User Scenarios, Architecture.

UNIT III

GLOBAL SYSTEM FOR MOBILE COMMUNICATIONS (GSM): Mobile Services, System Architecture, Protocols, Localization & Calling, Handover, Security. **GPRS:** GPRS System Architecture, **UMTS**: UMTS System Architecture. **LTE**: Long Term Evolution

UNIT IV

MOBILE NETWORK LAYER: Mobile IP: Goals, Assumptions, Entities and Terminology, IP Packet Delivery, Agent Discovery, Registration, Tunneling and Encapsulation, Optimizations, Dynamic Host Configuration Protocol (DHCP)

UNIT V

MOBILE TRANSPORT LAYER: Traditional TCP, Indirect TCP, Snooping TCP, Mobile TCP, Fast retransmit/fast recovery, Transmission /time-out freezing, Selective retransmission, Transaction oriented TCP, TCP over 2.5G/3G Wireless Networks.

TEXT BOOKS:

1. Jochen Schiller, “Mobile Communications”, Pearson Education, Second Edition, 2008.
2. Dr. Sunilkumar, et al “Wireless and Mobile Networks: Concepts and Protocols”, Wiley India.
3. Raj Kamal, “Mobile Computing”, OXFORD UNIVERSITY PRESS.

REFERENCE BOOKS:

1. Asoke K Talukder, et al, “Mobile Computing”, Tata McGraw Hill, 2008.
2. Matthew S.Gast, “802.11 Wireless Networks”, SPD O'REILLY.
3. Ivan Stojmenovic, “Handbook of Wireless Networks and Mobile Computing”, Wiley, 2007.
4. Kumkum Garg, “Mobile Computing”, Pearson.
5. Handbook of Security of Networks, Yang Xiao, Frank H Li, Hui Chen, World Scientific, 2011.

VAAGDEVI COLLEGE OF ENGINEERING
(Autonomous)

M. Tech - I Year - I Sem. (CN&IS)

APPLICATIONS OF NETWORK SECURITY

Objectives:

- To understand the latest technologies related to network security
- To understand the IEEE 802.11 security
- To understand the GSM and UMTS security
- To understand IDS, IPS
- To understand Computer Forensics

UNIT – I

IEEE 802.11 Wireless LAN Security: Background, Authentication: Pre- WEP Authentication, Authentication in WEP, Authentication and key agreement in 802.11i, Confidentiality and Integrity: Data protection in WEP, Data protection in TKIP and CCMP

UNIT –II

Cell Phone Security: Preliminaries, GSM(2G) Security, Security in UMTS(3G)

UNIT – III

Non-Cryptographic Protocol Vulnerabilities: DoS and DdoS, Session Hijacking and Spoofing, Pharming Attacks, Wireless LAN Vulnerabilities **Software Vulnerabilities:** Phishing, Buffer Overflow, Format String Attacks, Cross-Site Scripting(XSS), SQL Injection **Access Control in the Operating System:** Preliminaries, Discretionary Access Control - Case Studies: Windows/ Unix, Mandatory Access Control, Role-Based Access Control, SELinux and Recent Trends

UNIT -I V

Intrusion Prevention and Detection: Introduction, Prevention versus Detection, Types of Intrusion Detection systems, DdoS Attack Prevention/Detection, Malware Defense
Web Services Security: Motivation, Technologies for Web Services: XML, SOAP, WSDL and UDDI, SSl, WS-Security, SAML, Ws-Trust, WS-Security Policy

UNIT – V

Computer and Network Forensics: Definition, Computer Forensics: History of Computer Forensics, Elements of Computer Forensics, Investigative Procedures, Analysis of Evidence, Network Forensics: Intrusion Analysis, Damage Assessment, Forensic Tools: Computer Forensic tools, Network Forensic Tools

TEXT BOOKS:

1. Network Security and Cryptography: Bernard Menezes, CENGAGE Learning
2. Computer Network Security: Joseph Migga Kizza, Springer link

REFERENCE BOOKS:

1. Cyber Security: Nina Godbole, Sunit Belapure, Wiley India.
2. Network Security Hacks: Andrew Lockhart, O'Reilly, SPD.
3. Cryptography and Network Security : Forouzan Mukhopadhyay, Mc Graw Hill, 2nd Edition
4. Principles of Computer Security: WM.Arthur Conklin, Greg White, TMH
5. Wireless Security-Models, Threats, and Solutions: Randall K.Nichols, Panos C.Lekkas, TMH
6. Computer Security: Dieter Gollman, 2nd Edition, Wiley India
7. Computer Evidence: Collection & Preservation, Christopher L.T.Brown, Firewall Media

VAAGDEVI COLLEGE OF ENGINEERING
(Autonomous)

M. Tech - I Year - I Sem. (CN&IS)

INFORMATION SECURITY MANAGEMENT AND STANDARDS

Objectives:

- Compile, analyze, and assess the applicability of best practices in addressing information security issues relevant to the cybersecurity community
- Evaluate the impact of business constraints and processes on the implementation of information security programs
- Integrate principles and techniques of risk analysis, project planning and change management in the development of information security strategies
- Demonstrate secondary research skills in the investigation and selection of best practice solutions to address information security challenges
- Demonstrate mastery of theory, concepts and skills in addressing specialized aspects of information security management

UNIT I

Information Security Management in Organizations: Security Policy, Standards, Guidelines and Procedures, Information Security Management System (ISMS), Organizational responsibility for Information Security Management, Information Security Awareness Scenario in Indian Organizations, Building Blocks of Information Security

UNIT II

Risk Management: Overview of Risk Management, Risk Identification, Risk Assessment, Risk Control, Quantitative and Qualitative Approaches, Introduction to OCTAVE and COBIT approach.

UNIT III

Finding Networking vulnerabilities, Firewalls - Processing modes, Categorization, Architectures, Selecting the right firewall, managing the firewalls. Intrusion Detection and Prevention Systems (IDS & IPS), Protecting Remote Connections - Virtual Private Networks for security

UNIT IV

Introduction to security audits, need for security audits, organizational roles, Auditor's roles, Types of security audits, Audit approaches, Technology based audits. Business Continuity and Disaster Recovery Planning.

UNIT V

Overview of ISO 17799/ISO 27001 Standards, System Security Engineering Capability Maturity Model (SSE-CMM). Legal, Ethical, and professional Issues in Information Security.

TEXT BOOKS:

1. Information Systems Security, *Nina Godbole,* Wiley India, 2009
2. Principles and Practices of Information Security. *Michael E. Whitman, Herbert J. Mattord,* Cengage Learning,

REFERENCES:

1. Microsoft Security Risk Management Guide
2. Risk Management Guide for Information Technology Systems http://csrc.nist.gov/publications/nistpubs/800-30/sp800-30.pdf
3. OCTAVE approach http://www.cert.org/octave/
4. COBIT http://www.isaca.org/
5. Guide to Firewalls and Policies (Unit 3) http://csrc.nist.gov/publications/nistpubs/800-41/sp800- 41.pdf
6. Firewalls and Network Security, Micheal E.Whitman, et al. Cengage Learning, 2008
7. Audit Trails (Unit 7) http://csrc.nist.gov/publications/nistpubs/800-12/800-12-html/chapter18.html
8. Information Security Management Handook, Harold F. Tipton, CRC Press, 2012
9. Information Security Policies and Procedures, 2nd Edition, Thomas R. Peltier, Auerbach, 2004

VAAGDEVI COLLEGE OF ENGINEERING
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M. Tech - I Year - I Sem. (CN&IS)

AD HOC AND SENSOR NETWORKS

Objectives:

- To understand the concepts of sensor networks
- To understand the MAC and transport protocols for adhoc networks
- To understand the security of sensor networks
- To understand the applications of adhoc and sensor networks

UNIT I

Ad Hoc Wireless Networks: Introduction, Issues in Ad hoc wireless networks, Ad hoc wireless Internet
MAC protocols for Ad hoc Wireless Networks Issues in Designing a MAC Protocol for Ad hoc Wireless Networks, Design Goals for a MAC Protocol for Ad hoc Wireless Networks, Classifications of the MAC Protocols, Other MAC Protocols.

UNIT II

Routing Protocols for Ad Hoc Wireless Networks Issues in Designing a Routing Protocol for Ad hoc Wireless Networks, Classifications of Routing Protocols
Transport Layer for Ad Hoc Wireless Networks Issues in Designing a Transport layer protocol for Ad hoc Wireless Networks, Design goals of a Transport layer protocol for Ad hoc Wireless Networks, Classification of Transport layer solutions, TCP over Ad hoc Wireless Networks, Other Transport layer protocols for Ad hoc Wireless Networks.

UNIT III

Security protocols for Ad hoc Wireless Networks Security in Ad hoc Wireless Networks, Network Security Requirements, Issues and Challenges in Security Provisioning, Network Security Attacks, Key Management, Secure Routing in Ad hoc Wireless Networks

UNIT IV

Basics of Wireless, Sensors and Applications: The Mica Mote, Sensing and Communication Range, Design Issues, Energy consumption, Clustering of Sensors, Applications **Data Retrieval in Sensor Networks:** Classification of WSNs, MAC layer, Routing layer, Transport layer, High-level application layer support, Adapting to the inherent dynamic nature of WSNs.

UNIT V

Sensor Network Hardware: Components of Sensor Mote,
Operating System in Sensors- TinyOS, LA-TinyOS, SOS, RETOS
Imperative Language: nesC, Dataflow style language: TinyGALS, Node-Level Simulators, ns-2 and its sensor network extension, TOSSIM

TEXT BOOKS:

1. Adhoc Wireless Networks - Architectures and Protocols, C.Siva Ram Murthy, B.S.Murthy, Pearson Education, 2004
2. Ad Hoc and Sensor Networks - Theory and Applications, *Carlos Corderio Dharma P.Aggarwal,* World Scientific Publications / Cambridge University Press, March 2006
3. Wireless Sensor Networks - Principles and Practice, Fei Hu, Xiaojun Cao, An Auerbach book, CRC Press, Taylor & Francis Group, 2010

REFERENCE BOOKS:

1. Wireless Sensor Networks: An Information Processing Approach, *Feng Zhao, Leonidas Guibas*, Elsevier Science imprint, Morgan Kauffman Publishers, 2005, rp2009
2. Wireless Ad hoc Mobile Wireless Networks - Principles, Protocols and Applications, Subir Kumar Sarkar, et al., Auerbach Publications, T aylor & Francis Group, 2008.
3. Ad hoc Networking, *Charles E.Perkins,* Pearson Education, 2001.
4. Wireless Ad hoc Networking, *Shih-Lin Wu, Yu-Chee Tseng,* Auerbach Publications, Taylor & Francis Group, 2007
5. Wireless Ad hoc and Sensor Networks - Protocols, Performance and Control, Jagannathan Sarangapani, CRC Press, Taylor & Francis Group, 2007, rp 2010.
6. Security in Ad hoc and Sensor Networks, Raheem Beyah, et al., World Scientific Publications / Cambridge University Press, , 2010
7. Ad hoc Wireless Networks - A communication-theoretic perspective, Ozan K.Tonguz, Gialuigi Ferrari, Wiley India, 2006, rp2009.
8. Wireless Sensor Networks - Signal processing and communications perspectives, Ananthram Swami, et al., Wiley India, 2007, rp2009.
9. Handbook on Sensor Networks - Yang Xiao, Hui Chen & Frank Haizhon Li, World Scientific, 2010.

VAAGDEVI COLLEGE OF ENGINEERING
(Autonomous)

M. Tech - I Year - I Sem. (CN&IS)

MOBILE APPLICATION DEVELOPMENT USING J2ME AND ANDROID (ELECTIVE - III)

Objectives:

- Design, implement and evaluate a User Interface for a mobile application.
- Create a small but realistic working mobile application using features such as data persistence and data communications.
- Categorize the challenges posed by developing mobile applications and be able to propose and evaluate and select appropriate solutions.

UNIT I

Introduction to Mobile Technology & J2ME Overview; A brief history of Mobile, The Mobile Ecosystem, Why Mobile?, Types of Mobile Applications, Mobile Information Architecture, Mobile Design, Mobile 2.0, Mobile Web development.

Java 2 Micro Edition and the World of Java, Inside J2ME, J2ME and Wireless Devices.

Small Computing Technology: Wireless Technology, Radio Data Networks, Microwave Technology, Mobile Radio Networks, Messaging, Personal Digital Assistants

UNIT II

J2ME Architecture, Development Environment and User Interface: J2ME Architecture, Small Computing Device Requirements, Run-Time Environment, MIDlet Programming, Java Language for J2mE, J2ME Software Development Kits, Hello World J2ME Style, Multiple MIDlets in a MIDlet Suite, J2ME Wireless Toolkit

J2ME Best Practices and Patterns: The Reality of Working in a J2ME World, Best Practices.

J2ME User Interfaces, Display Class, The Palm OS Emulator, Command Class, Item Class, Exception Handling

High-Level Display: Screens: Screen Class, Alert Class, Form Class, Item Class, List Class, Text Box Class, Ticker Class

Low-Level Display: Canvas: The Canvas, User Interactions, Graphics, Clipping Regions, Animation **UNIT III**

J2ME Data Management System & Networking: *Record Management System:* Record Storage, Writing and Reading Records, Record Enumeration, Sorting Records, Searching Records, Record Listener

JDBC Objects: The Concept of JDBC, JDBC Driver Types, JDBC Packages, Overview of the JDBC Process, Database Connection, statement Objects, Result set, Transaction Processing, Metadata, Data Types, Exceptions

JDBC and Embedded SQL: Model Programs, Tables, Indexing, Inserting Data into Tables, Selecting Data from a Table, Metadata, Updating Tables, Deleting Data form a Table, Joining Tables, Calculating Data, Grouping and Ordering Data, Sub queries, VIEWs.

Generic Connection Framework: The Connection, Hypertext Transfer Protocol, Communication, Management Using HTTP Commands, Session Management, Transmit as a Background Process

UNIT IV

Introduction to Android: What is Android isn't?, Android: An open platform for Mobile development, Native Android Applications, Android SDK features, Introducing the Development Framework, Development for Android, Developing for Mobile and Embedded Devices, Android Development Tools, Externalizing Resources, The Android Application Lifecycle, Android Activities.

UNIT V

Android development: Building User Interfaces, Intents and Broadcast Receivers, Using Internet Resources, Files, Saving State and Preferences, Databases and Content providers.

TEXT BOOKS:

1. J2ME: The Complete Reference, James Keogh, Tata Mc Graw Hill.
2. Programming for Mobile and Remote Computers, G.T.Thampi, dreamtech press.
3. Mobile Design and Development, Brian Fling, O'Reilly, SPD, rp2011.
4. Professional Android 4: Application Development, Reto Meier, Wiley India, rp2012.
5. Android: A Programmer's Guide, Jerome (J.F.) DiMarzio, TataMcGraw Hill, rp2011.

REFERENCE BOOKS:

1. Enterprise J2ME: Developing Mobile Java Applications - Michael Juntao Yuan, Pearson Education, 2004
2. Beginning Java ME Platform, Ray Rischpater, Apress, 2009
3. Beginning J2ME: From Novice to Professional, Third Edition, Sing Li, Jonathan B. Knudsen, Apress, 2005
4. Mobile Computing for Beginners, Raksha Shende, SPD, 2012.
5. Kicking Butt with MIDP and MSA: Creating Great Mobile Application, 1st edtion, J.Knudsen, Pearson Education.
6. Android: In Practice, Charlie Collins, Micheal Galpin, Matthias Kappler, dreamtech press, 2012.
7. Learning Android, Marko Gargenta, O'Reilly, SPD, 2011.
8. Beginning Web Development for Smart phones, B.M.Harwani, SPD, 2011.
9. Building Mobile Applications with Java, Joshua Marinacci, O'Reilly, SPD, 2012.
10. Android 3.0 Application Development Cookbook, Kyle Merrifield Mew, SPD, 2011.
11. Android Application Testing Guide, Diego Torres Milano, SPD, rp2012.

VAAGDEVI COLLEGE OF ENGINEERING
(Autonomous)

M. Tech - I Year - I Sem. (CN&IS)

DATABASE SECURITY (ELECTIVE - III)

Objectives:

- To learn the security of databases
- To learn the design techniques of database security
- To learn the secure software design

UNIT I

Introduction
Introduction to Databases Security Problems in Databases Security Controls Conclusions
Security Models -1
Introduction Access Matrix Model Take-Grant Model Acten Model PN Model Hartson and Hsiao's Model Fernandez's Model Bussolati and Martella's Model for Distributed databases

UNIT II

Security Models -2
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 conclusion **Security Mechanisms**
Introduction User Identification/Authentication Memory Protection Resource Protection Control Flow Mechanisms Isolation Security Functionalities in Some Operating Systems T rusted Computer System Evaluation Criteria

UNIT III

Security Software Design
Introduction A Methodological Approach to Security Software Design Secure Operating System Design Secure DBMS Design Security Packages Database Security Design

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 -1
Introduction A Model for the Protection of Frame Based Systems A Model for the Protection of Object- Oriented Systems SORION Model for the Protection of Object-Oriented Databases **Models For The Protection Of New Generation Database Systems -2** A Model for the Protection of New Generation Database Systems: the Orion Model Jajodia and Kogan's Model A Model for the Protection of Active Databases Conclusions

TEXT BOOKS:

1. Database Security and Auditing, Hassan A. Afyouni, India Edition, CENGAGE Learning, 2009.
2. Database Security, *Castano,* Second edition, Pearson Education.

REFERENCE BOOK:

1. Database security by alfred basta, melissa zgola, CENGAGE learning.

VAAGDEVI COLLEGE OF ENGINEERING
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M. Tech - I Year - I Sem. (CN&IS)

WIRELESS SECURITY (ELECTIVE - III)

Objectives:

- To learn Security Issues in Mobile Communication
- To learn Application Level Security in Cellular Networks, MANETs
- To learn Application Level Security in Ubiquitous networks
- To learn Security for mobile commerce applications

UNIT - I

Security Issues in Mobile Communication: Mobile Communication History, Security - Wired Vs Wireless, Security Issues in Wireless and Mobile Communications, Security Requirements in Wireless and Mobile Communications, Security for Mobile Applications, Advantages and Disadvantages of Application - level Security

UNIT – II

Security of Device, Network, and Server Levels: Mobile Devices Security Requirements, Mobile Wireless network level Security, Server Level Security, **Application Level Security in Wireless Networks:** Application of WLANs, Wireless Threats, Some Vulnerabilities and Attach Methods over WLANs, Security for 1g Wi-Fi Applications, Security for 2g Wi-Fi Applications, Recent Security Schemes for Wi-Fi Applications

UNIT – III

Application Level Security in Cellular Networks: Generations of Cellular Networks, Security Issues and attacks in cellular networks, GSM Security for applications, GPRS Security for applications, UMTS security for applications, 3G security for applications, Some of Security and authentication Solutions, **Application Level Security in MANETs:** MANETs, Some applications of MANETs, MANET Features, Security Challenges in MANETs, Security Attacks on MANETs, External Threats for MANET applications, Internal threats for MANET Applications, Some of the Security Solutions

UNIT – IV

Application Level Security in Ubiquitous networks: Ubiquitous Computing, Need for Novel Security Schemes for UC, Security Challenges for UC, Security Attacks on UC networks, Some of the security solutions for UC, **Application Level Security in Heterogeneous wireless networks:**
Introduction, Some of the Heterogeneous wireless network architectures, Heterogeneous network application in Disaster management, Security problems and attacks in heterogeneous wireless networks, Some security solutions for heterogeneous wireless networks

UNIT – V

Security for mobile commerce applications: M-Commerce Applications, M-Commerce Initiatives, Security Challenges in mobile e-commerce, Types of attacks on mobile e-commerce, A Secure M- commerce model based on wireless local area network, Some of M-Commerce Security Solutions

TEXT BOOKS:

1. Wireless & Mobile Network Security: Pallapa Venkataram, Satish Babu, TMH, 2010.
2. Fundamentals of Mobile and Pervasive Computing, Frank Adelstein, K.S.Gupta et al, TMH 2005.

REFERENCE BOOKS:

1. Wireless Security Models, Threats and Solutions, Randall k. Nichols, Panos C. Lekkas, TMH, 2006.
2. 802.11 Security, Bruce Potter & Bob Fleck, SPD O'REILLY 2005.
3. Guide to Wireless Network Security, Springer.
4. Hacking Exposed Wireless: Johnny Cache, 2nd Edition, Joshua Wright, Vincent Lu, Mc Graw Hill.

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M. Tech - I Year - I Sem. (CN&IS)

SEMANTIC WEB AND SOCIAL NETWORKS (ELECTIVE -IV)

Objectives:

- To learn Web Intelligence
- To learn Knowledge Representation for the Semantic Web
- To learn Ontology Engineering
- To learn Semantic Web Applications, Services and Technology
- To learn Social Network Analysis and semantic web

UNIT –I

Web Intelligence: Thinking and Intelligent Web Applications, The Information Age ,The World Wide Web, Limitations of Today's Web, The Next Generation Web, Machine Intelligence, Artificial Intelligence, Ontology, Inference engines, Software Agents, Berners-Lee www, Semantic Road Map, Logic on the semantic Web.

UNIT –II

Knowledge Representation for the Semantic Web: Ontologies and their role in the semantic web, Ontologies Languages for the Semantic Web -Resource Description Framework(RDF) / RDF Schema, Ontology Web Language(OWL), UML, XML/XML Schema.

UNIT-III

Ontology Engineering: Ontology Engineering, Constructing Ontology, Ontology Development Tools, Ontology Methods, Ontology Sharing and Merging, Ontology Libraries and Ontology Mapping, Logic, Rule and Inference Engines.

UNIT-IV

Semantic Web Applications, Services and Technology: Semantic Web applications and services, Semantic Search, e-learning, Semantic Bioinformatics, Knowledge Base ,XML Based Web Services, Creating an OWL-S Ontology for Web Services, Semantic Search Technology, Web Search Agents and Semantic Methods,

UNIT-V

Social Network Analysis and semantic web: What is social Networks analysis, development of the social networks analysis, Electronic Sources for Network Analysis - Electronic Discussion networks, Blogs and Online Communities, Web Based Networks. Building Semantic Web Applications with social network features.

TEXT BOOKS:

1. Thinking on the Web - Berners Lee, Godel and Turing, Wiley inter science, 2008.
2. Social Networks and the Semantic Web, Peter Mika, Springer, 2007.

REFERENCE BOOKS:

1. Semantic Web Technologies, Trends and Research in Ontology Based Systems, J.Davies, R.Studer, P.Warren, John Wiley & Sons.
2. Semantic Web and Semantic Web Services -Liyang Lu Chapman and Hall/CRC Publishers,(Taylor & Francis Group)
3. Information Sharing on the semantic Web - Heiner Stuckenschmidt; Frank Van Harmelen, Springer Publications.
4. Programming the Semantic Web, T.Segaran, C.Evans, J.Taylor, O'Reilly, SPD.

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M. Tech - I Year - I Sem. (CN&IS)

NETWORK MANAGEMENT SYSTEMS (ELECTIVE - IV)

Objectives:

- To learn about network management
- To understand SNMP
- To learn Network Management Tools and Systems
- To learn Performance Modeling and Estimation

UNIT I

Introduction to Network Management: Analogy of Telephone Network Management,
Communications protocols and Standards, Case Histories of Networking and Management, Challenges of Information Technology Managers, Network Management: Goals, Organization, and Functions, Network and System Management. Network Management System Platform, Current Status and future of Network Management.

UNIT II

SNMP v1 Network Management: Organization and Information Models : The History of SNMP Management The SNMP Mode, The Organization Model, System Overview, The Information Model. The SNMP Communication Model, Functional model.
SNMP Management: SNMP v2: Major Changes in SNMPv2, SNMPv2 System Architecture, SNMPv2 Structure of Management Information , The SNMPv2 Management Information Base, SNMPv2 Protocol, Compatibility with SNMP v1.

UNIT III

Network Management Tools and Systems : Network Management Tools, Network Statistics Measurement Systems, History of Enterprise Management, Network Management systems, Commercial network management Systems, System Management, and Enterprise Management Solutions.
Web-Based Management: NMS with Web Interface and Web-Based Management, Web Interface to SNMP Management, Embedded Web-Based Management, Desktop management Interface, Web- Based Enterprise Management. WBEM: Windows Management Instrumentation. Java management Extensions, Management of a Storage Area Network: Future Directions.

UNIT IV

Performance Modeling and Estimation: Overview of Probability and Stochastic Processes - Probability, Random Variables Stochastic Processes, Queuing Analysis - How Queues Behave—A Simple Example Why Queuing Analysis. Queuing Models, Single-Server Queues. Multi server Queues, Examples, Queues with Priorities, Networks of Queues, Other Queuing Models. Estimating Model Parameters
Modeling and Estimation of Self-Similar Traffic : Self-Similar Traffic - Self-Similarity, Self-Similar Data Traffic, Examples of Self-Similar Data Traffic, Performance Implications of Self-Similarity. Modeling and Estimation of Self-Similar Data Traffic.

UNIT V

Quality of Service in IP Networks : Exterior Routing Protocols and Multicast - Path-Vector Protocols: BGP and IDRP. Multicasting, Integrated and Differentiated Services - Integrated Services Architecture (ISA), Queuing Discipline, Random Early Detection. Differentiated Services, Protocols for QOS Support - Resource Reservation: RSVP. Multi protocol Label Switching, Real-Time Transport Protocol (RtP)

TEXT BOOKS:

1. Mani Subramanian, “Network Management, Principles and Practice”, Second edition, Pearson Education, 2010.
2. William Stallings, “High-Speed Networks and Internets: Performance and Quality of Service - Second edition”, Pearson Education, 2002.

REFERENCE BOOKS:

1. Benoit Claise and Ralf Wolter, “Network Management: Accounting and Performance Strategies”, Pearson Education, 2008.
2. J. Richard Burke, “Network Management - Concepts and Practice: A Hands-on Approach”, First edition, Pearson Education, rp2011.
3. Stephen B. Morris, “Network Management, MIBs and MPLS”, First edition, Pearson Education, 2003.
4. Farrel et al., “Network Management - know it all”, Morgan Kaufmann Publishers (an imprint of Elsevier), 2009.
5. Anurag Kumar, D.Manjunath and Joy Kuri, “Communication Networking: An Analytical Approach”, Elsevier, 2004.
6. Thomas G. Robertazzi, “Computer Networks and Systems - Queuing Theory and Performance Evaluation”, Third edition , Springer, rp2006.
7. Engineering Internet Qos, Sanjay Jha and Mahbub Hassan, Artech House, 2002
8. Gary N. Higginbottom, “Performance Evaluation of Communication Networks”, Artech House, 1998.
9. Brijendra Singh, “Network Security and Management”, Third edition, PHI 2012.

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M. Tech - I Year - I Sem. (CN&IS)

CLOUD COMPUTING (ELECTIVE-IV)

Objectives:

Prerequisite: Computer Networks and Operating Systems **Course Description:**
Cloud computing has evolved as a very important computing model, which enables information, software, and shared resources to be provisioned over the network as services in an on-demand manner. This course provides an insight into what is cloud computing and the various services cloud is capable.

UNIT I

Systems Modeling, Clustering and Virtualization Distributed System Models and Enabling Technologies, Computer Clusters for Scalable Parallel Computing, Virtual Machines and Virtualization of Clusters and Data centers.

UNIT II

Foundations Introduction to Cloud Computing, Migrating into a Cloud, Enriching the 'Integration as a Service' Paradigm for the Cloud Era, The Enterprise Cloud Computing Paradigm.

UNIT III

Infrastructure as a Service (IAAS) & Platform and Software as a Service (PAAS / SAAS) Virtual machines provisioning and Migration services, On the Management of Virtual machines for Cloud Infrastructures, Enhancing Cloud Computing Environments using a cluster as a Service, Secure Distributed Data Storage in Cloud Computing.
Aneka, Comet Cloud, T-Systems, Workflow Engine for Clouds, Understanding Scientific Applications for Cloud Environments.

UNIT IV

Monitoring, Management and Applications An Architecture for Federated Cloud Computing, SLA Management in Cloud Computing, Performance Prediction for HPC on Clouds, Best Practices in Architecting Cloud Applications in the AWS cloud, Building Content Delivery networks using Clouds, Resource Cloud Mashups.

UNIT V

Governance and Case Studies Organizational Readiness and Change management in the Cloud age, Data Security in the Cloud, Legal Issues in Cloud computing, Achieving Production Readiness for Cloud Services.

TEXT BOOKS:

1. Cloud Computing: Principles and Paradigms by Rajkumar Buyya, James Broberg and Andrzej M. Goscinski, Wiley, 2011.
2. Distributed and Cloud Computing, Kai Hwang, Geoffery C.Fox, Jack J.Dongarra, Elsevier, 2012.

REFERENCE BOOKS:

1. Cloud Computing : A Practical Approach, Anthony T.Velte, Toby J.Velte, Robert Elsenpeter, Tata McGraw Hill, rp2011.
2. Enterprise Cloud Computing, Gautam Shroff, Cambridge University Press, 2010.
3. Cloud Computing: Implementation, Management and Security, John W. Rittinghouse, James F.Ransome, CRC Press, rp2012.
4. Cloud Application Architectures: Building Applications and Infrastructure in the Cloud, George Reese, O'Reilly, SPD, rp2011.
5. Cloud Security and Privacy: An Enterprise Perspective on Risks and Compliance, Tim Mather, Subra Kumaraswamy, Shahed Latif, O'Reilly, SPD, rp2011.

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M. Tech - I Year - I Sem. (CN&IS)

INFORMATION SECURITY AND APPLICATIONS LAB

Objectives:

- The Network Security Lab tries to present several hands-on exercises to help reinforce the students knowledge and understanding of the various network security aspects.
- The lab exercises are divided into two parts A & B.
- Part A deals with the implementation of cryptographic algorithms.
- Part B deals with usage of various security attacks/defenses related tools and utilities.

PART - A

The following exercises are based on the cryptographic algorithms. They can be implemented using C, C++, Java, etc.

1. Write a C program that contains a string(char pointer) with a value 'Hello world'. The program should XOR each character in this string with 0 and displays the result.
2. Write a C program that contains a string(char pointer) with a value 'Hello world'. The program should AND or and XOR each character in this string with 127 and display the result.
3. Write a Java program to perform encryption and decryption using the following algorithms
    a. Ceaser cipher
    b. Substitution cipher
    c. Hill Cipher
4. Write a C program to implement the DES algorithm logic.
5. Write a JAVA program to implement the DES algorithm logic.
6. Write a Java program that contains functions, which accept a key and input text to be encrypted/decrypted. This program should use the key to encrypt/decrypt the input by using the triple Des algorithm. Make use of Java Cryptography package.
7. Write a C/JAVA program to implement the Blowfish algorithm logic.
8. Write a C/JAVA program to implement the Rijndael algorithm logic.
9. Write the RC4 logic in Java
10. Using Java cryptography, encrypt the text “Hello world” using Blowfish. Create your own key using Java keytool.
11. Implement DES-2 and DES-3 using Java cryptography package.
12. Write a Java program to implement RSA algorithm.
13. Implement the Diffie-Hellman Key Exchange mechanism using HTML and JavaScript. Consider the end user as one of the parties(Alice) and the JavaScript application as the other party(Bob)
14. Calculate the message digest of a text using the SHA-1 algorithm in JAVA.
15. Calculate the message digest of a text using the MD5 algorithm in JAVA.
16. Explore the Java classes related to digital certificates.
17. Create a digital certificate of your own by using the Java keytool.
18. Write a Java program to encrypt users passwords before they are stored in a database table, and to retrieve them whenever they are to be brought back for verification.
19. Key generation(public and private key pair) can be performed using Java. Write a program which can do this.
20. Write a program in java, which performs a digital signature on a given text.
21. Study phishing in more detail. Find out which popular bank sites have been phished and how.

PART -B

The following exercises have to be performed using various software tools/utilities mentioned

1. Passive Information Gathering
    a. IP Address and Domain Identification of log entries - DNS, RIR, etc tools
b. Information Gathering of a web site: WHOIS, ARIN, etc tools
    c. Banner Grabbing: Netcat, etc tools
2. Detecting Live Systems
    a. Port Scanning : Nmap,SuperScan
    b. Passive Fingerprinting: Xprobe2
    c. Active Fingerprinting: Xprobe2
3. Enumerating Systems
    a. SNMP Enumeration: SolarWinds IP Network Browser, www.solarwinds.com/downloads
    b. Enumerating Routing Protocols: Cain & Abel tool, www.oxid.it
4. Automated Attack and Penetration Tools
    a. Exploring N-Stalker, a Vulnerability Assessment Tool, www.nstalker.com
5. Defeating Malware
    a. Building Trojans, Rootkit Hunter: www.rootkit.nl/projects/rootkit hunter.html
    b. Finding malware
6. Securing Wireless Systems
    a. Scan WAPs: NetStumbler, www.netstumbler. com/downloads
    b. Capture Wireless T raffic: Wireshark, www.wireshark.org

TEXT BOOK:

1. Build Your Own Security Lab, Michael Gregg, Wiley India.