**IT-811: CRYPTOGRAPHY AND NETWORK SECURITY**

**Credits: 03**

**L-T-P:3-0-0**

**Unit I**

*Introduction:*

Introduction to Security attacks, services And mechanisms, Introduction to cryptology. Conventional Encryption model, classical encryption techniques-substitution ciphers & transposition ciphers, cryptanalysis, stereography, stream & block ciphers.

**Unit II:**

*Modern Block ciphers*:

Block Ciphers principles, Shandars (DES), Strength of DES, Differential & Linear Cryptanalysis of DES, Block cipher model of operation, triple DES, IDEA encryption & decryption, Strength of IDES, Confidentiality using conventional encryption, traffic confidentiality, key distribution, random number generation.

**Unit III**

*Principles of Public Key Cryptography:*

Principle of public key cryptography, prime and relative prime numbers, modular arithmetic, RSA algorithm, security of RSA key management.

Authentication recruitments, Authentications functions, and Message Authentication codes, Digital Signatures, authentication protocols Digital Signatures Standard (DSS), proof of digital signatures algorithm.

**Unit IV**

*Electronics mail security:*

Pretty good privacy (PGP), S/MIME IP security: IP security overview, architecture, Authentication header, encapsulating security payloads, combining security association, key management.

**Unit V**

*Web security:*

Security socket layer & transport layer security, secure electronic transaction (SET)

*System security:*

Intruders, viruses and related threads, firewall design principles.

**Text Books / References:**

1. William Stalling ― **Cryptography and networks security: Principles and Practice**, Prentice Hall, New jersey,

2. Johannes A Buchmann, ―**Introduction to cryptography**, Spiringer–verlag

3. Bruce Schiener, ―**Applied Cryptography**.

**IT-812: Software Testing**

**Credits: 03**

**L-T-P:3-0-0**

**Unit-I:**

*Introduction*

Faults, Errors, and Failures, Basics of software testing, Testing objectives, Principles of testing,

Requirements, behavior and correctness, Testing and debugging, Test metrics and measurements,

Verification, Validation and Testing, Types of testing, Software Quality and Reliability,

Software defect tracking.

**Unit-II:**

*White Box and Black Box Testing*

White box testing, static testing, static analysis tools, Structural testing: Unit/Code functional

testing, Code coverage testing, Code complexity testing, Black Box testing, Requirements based

testing, Boundary value analysis, Equivalence partitioning, state/graph based testing, Model

based testing and model checking, Differences between white box and Black box testing.

**Unit-III:**

*Integration, System, and Acceptance Testing*

Top down and Bottom up integration, Bi-directional integration, System integration, Scenario

Testing, Defect Bash, Functional versus Non-functional testing, Design/Architecture verification,

Deployment testing, Beta testing, Scalability testing, Reliability testing, Stress testing,

Acceptance testing: Acceptance criteria, test cases selection and execution.

**Unit-IV:**

*Test Selection & Minimization for Regression Testing*

Regression testing, Regression test process, Initial Smoke or Sanity test, Selection of regression

tests, Execution Trace, Dynamic Slicing, Test Minimization, Tools for regression testing, Ad hoc Testing: Pair testing, Exploratory testing, Iterative testing, Defect seeding.

**Unit-V:**

*Test Management and Automation*

Test Planning, Management, Execution and Reporting, Software Test Automation: Scope of

automation, Design & Architecture for automation, Generic requirements for test tool

framework, Test tool selection, Testing in Object Oriented Systems.

**Text Books/References:**

1. S. Desikan and G. Ramesh, “**Software Testing: Principles and Practices**”, Pearson

Education.

2. Aditya P. Mathur, “**Fundamentals of Software Testing**”, Pearson Education.

3. Naik and Tripathy, “**Software Testing and Quality Assurance**”, Wiley

4. K. K. Aggarwal and Yogesh Singh, “**Software Engineering**”, New Age International

Publication.

**IT-813: Robotics and Computer Vision**

**Credits: 03**

**L-T-P:3-0-0**

**Unit-I**

Definition, structure and application areas of Robotics; Introduction to the range of robots currently in use

**Unit-II**

Direct kinematics of the robot arm, link description and its connection; Frame assignment; Concept of actuator space, joint space and Cartesian space; Inverse kinematics, algebraic solution, geometric solution; Solvabilitly considerations and examples

**Unit-III**

Manipulator dynamics, basic equations, Newton-Euler dynamic formulation; Lagrange formulation of the manipulator dynamics; Simulation.

**Unit-IV**

Controller design, linear and non-linear control approaches, special considerations like coupling, time-variation and model uncertainty; Computed torque, variable structure and adaptive control

Techniques

**Unit-V**

Digital image fundamentals, digitization and 2-D parameters, types of operation; Basic tools: Convolution, Fourier transforms and statistical approaches**.**

**Unit-VI**

Image analysis and processing, basic enhancement and restoration techniques, unsharp masking, noise suppression, distortion suppression, segmentation, thresholding, edge finding, binary

mathematical morphology, grey-value mathematical morphology.

**Text Books/Reference**

1. Fu, K.S., Gonzalez, R.C. and Lee, C.S.G., “**Robotics: Control, Sensing, Vision and**

 **Intelligence**”, McGraw-Hill,1987

1. Pratt, W.K., “**Digital Image Processing**”, 2nd Ed., John Wiley & Sons, 1991
2. Klafter, R.D., Chmielewski, T.A. and Negin, M., “**Robotic Engineering An Integrated Approach**”, Prentice-Hall of India, 2007
3. Schilling, R. J., “**Fundamental of Robotics: Analysis and Control**”, Prentice-Hall of India.

2007

1. Sciavicco, L., “**Modeling and Control of Robot Manipulators**”, McGraw-Hill,2003

**IT-814: Natural Language Processing**

**Credits: 03**

**L-T-P:3-0-0**

**Unit-I**

Introduction to Natural Language Understanding: The study of Language, Applications of NLP,

Evaluating Language Understanding Systems, Different levels of Language Analysis,

Representations and Understanding, Organization of Natural language Understanding Systems,

Linguistic Background: An outline of English syntax.

**Unit-II**

Introduction to semantics and knowledge representation, Some applications like machine translation, database interface.

**Unit-III**

Grammars and Parsing: Grammars and sentence Structure, Top-Down and Bottom-Up Parsers,

Transition Network Grammars, Top- Down Chart Parsing. Feature Systems and Augmented

Grammars: Basic Feature system for English, Morphological Analysis and the Lexicon, Parsing with Features, Augmented Transition Networks.

**Unit-IV**

Grammars for Natural Language: Auxiliary Verbs and Verb Phrases, Movement Phenomenon in

Language, Handling questions in Context-Free Grammars. Human preferences in Parsing, Encoding uncertainty, Deterministic Parser.

**Unit-V**

Ambiguity Resolution: Statistical Methods, Probabilistic Language Processing, Estimating

Probabilities, Part-of-Speech tagging, Obtaining Lexical Probabilities, Probabilistic Context-Free Grammars, Best First Parsing. Semantics and Logical Form, Word senses and Ambiguity, Encoding Ambiguity in Logical Form.

**Text Books / References:**

1. AksharBharti, VineetChaitanya and Rajeev Sangal, **NLP: A Paninian Perspective**,

Prentice Hall, New Delhi

2. James Allen, **Natural Language Understanding**, Pearson Education

3. D. Jurafsky, J. H. Martin, **Speech and Language Processing**, Pearson Education

4. L.M. Ivansca, S. C. Shapiro, **Natural Language Processing and Language Representation**

5. T. Winograd, **Language as a Cognitive Process**, Addison-Wesley

**IT-815: Mobile Computing**

**Credits: 03**

**L-T-P:3-0-0**

**Unit – I**

Introduction, issues in mobile computing, overview of wireless telephony: cellular concept,

GSM: air-interface, channel structure, location management: HLR-VLR, hierarchical, handoffs, channel allocation in cellular systems, CDMA, GPRS.

**Unit – II**

Wireless Networking, Wireless LAN Overview: MAC issues, IEEE 802.11, Blue Tooth,

Wireless multiple access protocols, TCP over wireless, Wireless applications, data broadcasting,

Mobile IP, WAP: Architecture, protocol stack, application environment, applications.

**Unit – III**

Data management issues, data replication for mobile computers, adaptive clustering for mobile wireless networks, File system, Disconnected operations.

**Unit - IV**

Mobile Agents computing, security and fault tolerance, transaction processing in mobile computing environment.

**Unit – V**

Adhoc networks, localization, MAC issues, Routing protocols, global state routing (GSR),

Destination sequenced distance vector routing (DSDV), Dynamic source routing (DSR), Ad Hoc on demand distance vector routing (AODV), Temporary ordered routing algorithm (TORA), QoS in Ad Hoc Networks, applications.

**Text Books/References:**

1. J. Schiller, **Mobile Communications**, Addison Wesley.

2. Charles Perkins, **Mobile IP**, Addison Wesley.

3. Charles Perkins, **Ad hoc Networks**, Addison Wesley**.**

4. Upadhyaya, **Mobile Computing**, Springer

**IT-816: Real Time and Embedded Systems**

**Credits: 03**

**L-T-P:3-0-0**

**Unit-I**

Introduction to embedded systems: Classification, Characteristics and requirements, Applications; Challenges in embedded system design; Overview of Processors and Microcontrollers, Microprocessor vs. microcontroller, Host and Target Development environment, Cross Compilers, Moore’s Law; Relevant hardware technologies: Discrete logic, CPLDs, FPGAs, ASICs, PLDs, PALs; Software environments: HLL vs. Assembly Coding, DSP vs. General Purpose Computer vs. RISC

**Unit-II**

ARM Processor: Processor and memory organization, Addressing Modes, Instruction Set, Interrupt Processing; PIC: Architecture, Addressing Modes, Peripherals, Instruction Set; CPU bus configuration, ARM Bus, Memory Devices, Input/Output Devices, Component Interfacing

**Unit-III**

Fundamentals of embedded OS: Scheduling Policies, Resource Management.

Memory: Memory Organization, Virtual Memory and Memory Management Unit

Distributed embedded architecture- Hardware and software architecture, Network for embedded system- I2C, CAN Bus, Ethernet, Myrinet, Internet, Network based design; Security Issues in embedded system.

**Unit-IV**

Real Time System: Definition, Typical Real Time Applications: Digital Control, High Level Controls, Signal Processing etc., Release Times, Deadlines, and Timing Constraints, Hard Real Time Systems and Soft Real Time Systems, Temporal Parameters of Real Time Workload, Periodic Task Model, Precedence Constraints and Data Dependency. Common Approaches to Real Time Scheduling: Clock Driven Approach, Weighted Round Robin Approach, Priority Driven Approach, Dynamic Versus Static Systems, Optimality of Effective-Deadline-First (EDF) and Least-Slack-Time-First (LST) Algorithms, Rate Monotonic Algorithm, Offline Versus Online Scheduling, Scheduling Aperiodic and Sporadic jobs in Priority Driven and Clock Driven Systems.

**References/Books:**

1. “**Embedded System Design**” - Frank Vahid & Tony Givargis; John Wiley & sons, Inc.

2. “**Computers as Components: Principles of Embedded Computing System Design**”

 - Wayne Wolf; Morgan Kauffman publishers, 2001

3. “**Real – Time Systems and software**” - Alan C. Shaw; John Wiley & Sons Inc

4. “**Fundamentals of embedded Software**” - Daniel W. Lewis, Pearson

5. “**Real Time Systems**” - J. W. S. Liu, Pearson

6. “**Embedded Real-time System Programming**” - S. V. Iyer and P. Gupta, TMH

7. “**An Embedded System Primer**” - David E. Simon, Addison-Wesley Pub

8. “**Embedded System Design**” - Steve Heath, Butterworth-Heinemann Pub.

9.”**Embedded System Computer Architecture**” - Graham Wilson, Butterworth-Hei

**IT -817: IT in Forensic Science**

**Credits: 03**

**L-T-P:3-0-0**

**UNIT I**

*Overview of Biometrics*, Biometric Identification, Biometric Verification, Biometric Enrollment, Biometric System Security.

*Authentication and Biometrics*: Secure Authentication Protocols, Access Control Security Services, Matching Biometric Samples, Verification by humans.

*Common biometrics***:** Finger Print Recognition, Face Recognition, Speaker Recognition, Iris

Recognition, Hand Geometry, Signature Verification

**UNIT II**

*Introduction to Information Hiding***:** Technical Steganography, Linguistic Steganography,

Copy Right Enforcement, Wisdom from Cryptography

*Principles of Steganography***:** Framework for Secret Communication, Security of

Steganography System, Information Hiding in Noisy Data , Adaptive versus non-Adaptive Algorithms, Active and Malicious Attackers, Information hiding in Written Text.

**UNIT III**

*A Survey of Steganographic Techniques:*Substitution systems and Bit Plane Tools, Transform

Domain Techniques: - Spread Spectrum and Information hiding, Statistical Steganography,

Distortion Techniques, Cover Generation Techniques.

*Steganalysis:*Looking for Signatures: - Extracting hidden Information, Disabling Hidden Information.

**UNIT IV**

*Watermarking and Copyright Protection:*Basic Watermarking, Watermarking Applications,

Requirements and Algorithmic Design Issues, Evaluation and Benchmarking of Watermarking system.

*Transform Methods:*Fourier Transformation, Fast Fourier Transformation, Discrete Cosine Transformation, Mellin-Fourier Transformation, Wavelets, Split Images in Perceptual Bands. Applications of Transformation in Steganography.

**UNIT V**

Computer Forensics, Rules of evidence, Evidence dynamics, Evidence collection, Data recovery,

Preservation of digital evidence, surveillance tools for future warfare,

**Text Books/References:**

1. Katzendbisser, Petitcolas, " **Information Hiding Techniques for Steganography and Digital**

**Watermarking**", Artech House.

2. Peter Wayner, "**Disappearing Cryptography: Information Hiding, Steganography and**

**Watermarking 2/e**", Elsevier

3. Bolle, Connell et. al., "**Guide to Biometrics**", Springer

4. John Vecca, “**Computer Forensics: Crime scene Investigation**”, Firewall Media

5. Christopher L.T. Brown, “**Computer Evidence: Collection and Preservation**”, Firewall Media

**IT 818: GIS AND REMOTE SENSING**

**Credits: 03**

**L-T-P:3-0-0**

**Unit I**

Introduction : Maps – Definition – Types of Maps – Characteristics of Maps – Map Projections –

GIS – Definition – Components of GIS – Hardware, Software and Organizational Context – GIS

software; Data Input : Data Types – Spatial and Non- Spatial – Spatial Data – Points, Lines and

Polygons – Non-spatial data – Nominal, Ordinal, Interval and Ratio – Digitizer – Scanner –

Editing and Cleaning – Georeferencing.

**Unit II**

Remote Sensing : Data collection, Data types - EM spectrum, Radiation and Earth – Simulated and False-color Images - LUTs and Band Correlation these web sites Image enhancement. Remote sensing of the Earth's surface utilizing the electromagnetic spectrum. Techniques of photography, Multispectral Scanning, and Microwave Imagery from Airplane, Satellite, and manned-spacecraft platforms. Image interpretation, practical applications in earth science and use of remotely sensed data in geographic information systems.

**Unit III**

Data Structure and Analysis : Raster and Vector Data Structure – Raster data storage – Run length,

Chain and Block Coding – Vector Data Storage – Topology – Topological Models – ArcNode

Structure – Surface Data – DEM – Gridded DEM and TIN structure- Applications of DEM

**Unit IV**

Data Analysis and Data Quality : Reclassification – Measurement – Buffering – Overlaying – SQL for Queries – Neighbourhood and zonal operations – Data Quality – Components of data quality -Sources of errors in GIS – Meta data

**Unit V**

Data Output and GIS Applications : Output – Maps, Graphs, Charts, Plots, Reports – Printers –

Plotters – Fields of application – Natural Resource Management, Parcel based, AM/FM

applications examples – Case study: Urban growth studies using GIS

**Text Books/References:**

1. Peter A. Burrough and Rachael A. McDonnell, **Principles of Geographical**

 **Systems**, Oxford, University Press, 1988.

2. Anji Reddy Star J. and Estes. J., **GIS – An Introduction**, Prentice Hall, USA, 2002.

3. Robert Laurini and Derek Thompson, **Fundamentals of Spatial Information**

 **Systems**, Aca

**IT-819: Fuzzy logic and Neural Networks**

**Credits: 03**

**L-T-P:3-0-0**

**Unit – I:**

*Introduction to Neural Networks*

Introduction, Humans and Computers, Organization of the Brain, Biological Neuron, Biological and Artificial Neuron Models, Hodgkin-Huxley Neuron Model, Integrate-and-Fire Neuron Model,Spiking Neuron Model, Characteristics of ANN, McCulloch-Pitts Model, Historical Developments, Potential Applications of ANN.

**Unit- II:**

*Essentials of Artificial Neural Networks*

Artificial Neuron Model, Operations of Artificial Neuron, Types of Neuron Activation Function, ANN Architectures, Classification Taxonomy of ANN – Connectivity, Neural Dynamics (Activation and Synaptic), Learning Strategy (Supervised, Unsupervised, Reinforcement), Learning Rules, Types of Application

**Unit–III:**

*Single Layer Feed Forward Neural Networks*

Introduction, Perceptron Models: Discrete, Continuous and Multi-Category, Training Algorithms: Discrete and ContinuousPerceptron Networks, Perceptron Convergence theorem, Limitations of the Perceptron Model, Applications.

**Unit- IV:**

*Multilayer Feed forward Neural Networks*

Credit Assignment Problem, Generalized Delta Rule, Derivation of Backpropagation (BP) Training, Summary of Backpropagation Algorithm, Kolmogorov Theorem, Learning Difficulties and Improvements.

**Unit V:**

*Associative Memories*

Paradigms of Associative Memory, Pattern Mathematics, Hebbian Learning, General Concepts of Associative Memory (Associative Matrix, Association Rules, Hamming Distance, The Linear Associator, Matrix Memories, Content Addressable Memory), Bidirectional Associative Memory (BAM) Architecture, BAM Training Algorithms: Storage and Recall Algorithm, BAM Energy Function, Proof of BAM Stability Theorem

Architecture of Hopfield Network: Discrete and Continuousversions, Storage and Recall Algorithm, Stability Analysis, Capacity of the Hopfield Network

Summary and Discussion of Instance/Memory Based Learning Algorithms, Applications.

**Unit – VI:**

*Classical & Fuzzy Sets*

Introduction to classical sets - properties, Operations and relations; Fuzzy sets, Membership, Uncertainty, Operations, properties, fuzzy relations, cardinalities, membership functions.

*UNIT VII: Fuzzy Logic System Components*

Fuzzification, Membership value assignment, development of rule base and decision making system, Defuzzification to crisp sets, Defuzzification methods.

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**UNIT VIII:**

*Applications*

*Neural network applications:*Process identification, control, fault diagnosis and load forecasting.

*Fuzzy logic applications:*

Fuzzy logic control and Fuzzy classification.

***TEXT BOOK/ REFERENCES:***

1. **Neural Networks, Fuzzy logic, Genetic algorithms: synthesis and applications** - Rajasekharan and Rai – PHI Publication.

2. **Introduction to Neural Networks using MATLAB 6.0** -S.N.Sivanandam, S.Sumathi, S.N.Deepa, TMH, 2006

1. **Neural Networks** – James A Freeman and Davis Skapura, Pearson Education, 2002.

2. **Neural Networks** – Simon Hakins , Pearson Education

3. **Neural Engineering** -C.Eliasmith and CH.Anderson, PHI

4. **Neural Networks and Fuzzy Logic System** - Bart Kosko, PHI Publications.

**IT 820: Intrusion Detection System**

**Credits: 03**

**L-T-P:3-0-0**

**Unit I**

Intruder types, intrusion methods, processes and detection, message integrity and authentication, honey pots.

 General IDS model, data mining based IDS, Denning model, data mining framework for constructing features and models for intrusion detection systems.

**Unit II**

 Unsupervised anomaly detection, CV5 clustering, SVM, probabilistic and statistical modeling, general IDS model and taxonomy, evaluation of IDS, cost sensitive IDS.

NBAD, specification based and rate based DDOS, scans/probes, predicting attacks, network based anomaly detection, stealthy surveillance detection; Defending against DOS attacks in scout: signature-based solutions, snort rules.

**Unit III**

Host-based anomaly detection, taxonomy of security flaws in software, self-modeling system calls for intrusion detection with dynamic window size.

 Secure intrusion detection systems, network security, secure intrusion detection environment, secure policy manager, secure IDS sensor, alarm management, intrusion detection system signatures, sensor configuration, signature and intrusion detection configuration, IP blocking configuration, intrusion detection system architecture.

 **Text Books/References:**

1. Endorf, C., Schultz E. and Mellander J., “**Intrusion Detection and Prevention**,” McGraw-Hill. 2003

2. Bhatnagar, K., “**Cisco Security**”, Course Technology. 2002

3. Marchette, D. J., “**Computer Intrusion Detection and Network Monitoring: A Statistical**

 **Viewpoint**”, Springer. 2001

4. Rash, M., Orebaugh, A. and Clark, G., “**Intrusion Prevention and Active Response: Deploying Network and Host IPS**”, Syngress.2005

5. Cooper, M., Northcutt, S., Fearnow, M. and Frederick, K., “**Intrusion Signatures and Analysis**”, Sams. 2001

**IT 821:Internet Protocol**

**L-T-P:3-0-0**

**Credits :03**

**UNIT- 1**

IP Addressing: Decimal Notation-Classes- special addresses - A simple Internet-Unicast and Broadcast addresses - Applying for IP addresses-Private networks. Subnetting and supernetting: Subnetting- Masking-Examples of Subnetting – Variable length Subnetting- Supernetting. Internet protocol: Datagram-Fragmentation-Options- Checksum- IP design. ARP and RARP: ARP- ARP design, RARP, Internet control message protocol: Types of Messages- Message formats- Error reporting-Query- Checksum- ICMP design

**UNIT- II**

Internet group management protocols: Multicasting- IGMP-Encapsulation- Multicast Backbone- IGMP design. User datagram protocol: Process to process communication-User datagram – Checksum- UDP operation- uses of UDP – UDP design. Transmission control protocol: Process to Process communication -TCP Services – Segment -Options- Checksum-Flow control- Error Control- TCP Timers-Connection-State Transition Diagram-Congestion Control-TCP operation- TCP Design. Application layer and client-server model: Client-server Model-Concurrency-Processes BOOTP and DHCP: BOOTP-DHCP

**UNIT- III**

Domain name system: Name Space-Domain name Space-Distribution of Name space-DNS in the Internet-Resolution- DNS Messages- Types of Records-Compression-DDNS-Encapsulation. TELNET and RLOGIN: Concept-Network Virtual Terminal-NVT character set -Embedding-Options-Option Negotiation-Sub option Negotiation-Controlling Server-Out of Band signaling –Escape character-Mode of Operation-Examples- User Interface- Rlogin-Security Issue.File transfer protocol: Connections-Communication-Command Processing-File Transfer-User Interface-Anonymous FTP.

**UNIT- IV**

IPV4: Architecture, frame format, Security services, limitations, IPV6: Architecture, frame format, Security services, advantages over IPV4.

**UNIT- V**

Internet Security and Firewall Design: IPSEC, SSL, TLS.

**Text Books / Reference Books:**

1. **TCP/IP Tutorial and technical overview**, IBM international technical support organization Aug 2001.
2. Behrouz A. Forouzan, **TCP/IPs Protocol Suite,** (TMH edition)
3. D E Comer, D L Stevens, **Internetworking with TCP/IP** **(Vol-I, II, III)**, PHI-2005

**IT 822: Cloud Computing**

**L-T-P:3-0-0**

**Credits :03**

**UNIT- I**

Cloud Computing Basics ‐ Cloud Computing Overview, Applications, Intranets and the Cloud, First Movers in the Cloud.

Organization and Cloud Computing ‐ When You Can Use Cloud Computing, Benefits, Limitations,Security Concerns, Regulatory Issues.

Cloud Computing with the Titans – Google, EMC, NetApp, Microsoft, Amazon,

Salesforce.com, IBM,Partnerships

The Business Case for Going to the Cloud ‐ Cloud Computing Services, How Those Applications Help Your Business, Deleting Your Datacenter, Salesforce.com,

Thomson Reuters.

**UNIT ‐ II**

Hardware and Infrastructure – Clients, Security, Network, Services.Accessing the Cloud – Platforms, Web Applications, Web APIs, Web Browsers.Cloud Storage – Overview, Cloud Storage Providers

Standards – Application, Client, Infrastructure, Service.

**UNIT ‐ III**

Software as a Service – Overview, Driving Forces, Company Offerings, Industries

Software plus Services – Overview, Mobile Device Integration, Providers, Microsoft

Online.

Developing Applications – Google, Microsoft, Intuit QuickBase, Cast Iron Cloud,

Bungee Connect,Development, Troubleshooting, Application Management.

**Text Books/References:**

1. [BorkoHYPERLINK "http://www.google.co.in/search?tbo=p&tbm=bks&q=inauthor:%22Borko+Furht%22" HYPERLINK "http://www.google.co.in/search?tbo=p&tbm=bks&q=inauthor:%22Borko+Furht%22"Furht](http://www.google.co.in/search?tbo=p&tbm=bks&q=inauthor:%22Borko+Furht%22) *,“***Handbook of Cloud Computing**”, Springer, 01-Jan-2010
2. [Fred Van HYPERLINK "http://www.google.co.in/search?tbo=p&tbm=bks&q=inauthor:%22Fred+Van+Der+Molen%22"DerHYPERLINK "http://www.google.co.in/search?tbo=p&tbm=bks&q=inauthor:%22Fred+Van+Der+Molen%22" HYPERLINK "http://www.google.co.in/search?tbo=p&tbm=bks&q=inauthor:%22Fred+Van+Der+Molen%22"Molen](http://www.google.co.in/search?tbo=p&tbm=bks&q=inauthor:%22Fred+Van+Der+Molen%22) ,“ **Get Ready for Cloud Computing: A Comprehensive Guide to Virtualization and Cloud Computing**”, Van Haren Publishing, 13-Dec-2010

3. [Eric A. Marks](http://www.google.co.in/search?tbo=p&tbm=bks&q=inauthor:%22Eric+A.+Marks%22), [Bob Lozano](http://www.google.co.in/search?tbo=p&tbm=bks&q=inauthor:%22Bob+Lozano%22), “**Executive's Guide to Cloud Computing**”, John Wiley and

 Sons, 25-Mar-2010