JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR

Course Structure for Information Technology
B. Tech Course
(2013-14)

IV - II Semester

S.No	Course code	Subject	Theory	Tu	Lab	Credits
1.	13A05801 13A05802 13A05803	MOOC 1 1. Mobile Computing 2. Natural Language Processing 3. Parallel Algorithms	3	1	-	3
2.	13A05804 13A12801 13A12802	MOOC 2 1. Real Time Systems 2. Social Network Analysis 3. Information Storage And Management	3	1	-	3
3.	13A12803 13A05805 13A12804	MOOC 3 1. Bio-Metrics 2. High Performance Computing 3. Cyber Security	3	1	-	3
4.	13A12805	Technical Seminar	-	-	4	2
5.	13A12806	Project work	-	-	24	12
Total			**09**	**03**	**28**	**23**

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(13A05801) MOBILE COMPUTING
(MOOCS 1)

Course Objectives:

- Understand mobile ad hoc networks, design and implementation issues, and available solutions.
- Acquire knowledge of sensor networks and their characteristics.

Course Outcomes:

- Students able to use mobile computing more effectively
- Students gain understanding of the current topics in MANETs and WSNs, both from an industry and research point of views.
- Acquire skills to design and implement a basic mobile ad hoc or wireless sensor network via simulations.

UNIT-I:

Wireless LANS and PANS: Introduction, Fundamentals of WLANS, IEEE 802.11 Standards,
HIPERLAN Standard, Bluetooth, Home RF.

Wireless Internet:

Wireless Internet, Mobile IP, TCP in Wireless Domain, WAP, Optimizing Web over Wireless.

UNIT-II:

AD HOC Wireless Networks: Introduction, Issues in Ad Hoc Wireless Networks, AD Hoc Wireless Internet.

MAC Protocols for Ad Hoc Wireless Networks: Introduction, Issues in Designing a MAC protocol for Ad Hoc Wireless Networks, Design goals of a MAC Protocol for Ad Hoc Wireless Networks, Classifications of MAC Protocols, Contention - Based Protocols, Contention - Based Protocols with reservation Mechanisms, Contention – Based MAC Protocols with Scheduling Mechanisms, MAC Protocols that use Directional Antennas, Other MAC Protocols.

UNIT -III:

Routing Protocols: Introduction, Issues in Designing a Routing Protocol for Ad Hoc Wireless
Networks, Classification of Routing Protocols, Table –Driven Routing Protocols, On – Demand
Routing Protocols, Hybrid Routing Protocols, Routing Protocols with Efficient Flooding Mechanisms, Hierarchical Routing Protocols, Power – Aware Routing Protocols.

Transport Layer and Security Protocols: Introduction, 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 Protocol 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:

Quality of Service: Introduction, Issues and Challenges in Providing QoS in Ad Hoc Wireless
Networks, Classification of QoS Solutions, MAC Layer Solutions, Network Layer Solutions, QoS Frameworks for Ad Hoc Wireless Networks.

Energy Management: Introduction, Need for Energy Management in Ad Hoc Wireless Networks, Classification of Ad Hoc Wireless Networks, Battery Management Schemes, Transmission Power Management Schemes, System Power Management Schemes.

UNIT –V:

Wireless Sensor Networks: Introduction, Sensor Network Architecture, Data Dissemination, Data Gathering, MAC Protocols for Sensor Networks, Location Discovery, Quality of a Sensor Network, Evolving Standards, Other Issues.

TEXT BOOKS:

1. Ad Hoc Wireless Networks: Architectures and Protocols - C. Siva Ram Murthy and B.S.Manoj, PHI, 2004.
2. Wireless Ad- hoc and Sensor Networks: Protocols, Performance and Control - Jagannathan Sarangapani, CRC Press

REFERENCE BOOKS:

1. Ad hoc Mobile Wireless Networks – Subir Kumar sarkar, T G Basvaraju, C Puttamadappa, Auerbach Publications,2012.
2. Wireless Sensor Networks - C. S. Raghavendra, Krishna M. Sivalingam, 2004, Springer.
3. Ad- Hoc Mobile Wireless Networks: Protocols & Systems, C.K. Toh , Pearson Education.

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(13A05802) NATURAL LANGUAGE PROCESSING (MOOCS 1)

Objectives

- Understand and apply fundamental algorithms and techniques in the area of natural language processing (NLP).
- Understand approaches to syntax and semantics in NLP.
- Understand current methods for statistical approaches to machine translation.
- Understand language modeling.
- Understand machine learning techniques used in NLP.

Outcomes:

- Show sensitivity to linguistic phenomena and an ability to model them with formal grammars.
- Ability to design, implement and analyze NLP algorithms.

UNIT – I

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

UNIT-II:

Features and Augmented Grammars, Toward Efficient Parsing, Ambiguity Resolution

UNIT –III

Statistical Methods: Probabilistic Context-Free Grammars, Best-First Parsing.

UNIT-IV

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

UNIT-V

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

TEXT BOOK:

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

REFERENCE BOOKS:

1. Speech and Language Processing – Daniel Jurafsky, James H.Martin.
2. Foundations of Statistical Natural Language Processing – Christopher Manning, Hinrich Schutze, MIT Press.
3. Charniack, Eugene, Statistical Language Learning, MIT Press, 1993.
4. Jurafsky, Dan and Martin, James, Speech and Language Processing, 2nd Edition, Prentice Hall, 2013-2014
5. Manning, Christopher and Henrich, Schutze, Foundations of Statistical Natural Language Processing, MIT Press, 1999.

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(13A05803) PARALLEL ALGORITHMS
(MOOCS 1)

Course Objective:
The objective of this course is to make the students

- Familiar with the efficient parallel algorithms related to many areas of computer science:
  expression computation, sorting, graph-theoretic problems, etc.
- Familiar with the basic issues of implementing parallel algorithms.
- Familiar with the fundamentals of discrete probability theory;
- able to know the basic randomized algorithms and to analyze selected randomized algorithms;
- Familiar with the theory of Markov chains and their algorithmic applications; knowledgeable about selected randomized data structures;

Course Outcomes:
Students who complete the course will have demonstrated the ability to do the following:

- Argue the correctness of algorithms using inductive proofs and invariants.
- Analyze worst-case running times of algorithms using asymptotic analysis.
- Explain the different ways to analyze parallel and randomized algorithms.
- Compare between different randomized data structures. Pick an appropriate data structure for a design situation.

UNIT I
Sequential model, need of alternative model, parallel computational models such as PRAM, LMCC, Hypercube, Cube Connected Cycle, Butterfly, Perfect Shuffle Computers, Tree model, Pyramid model, Fully Connected model, PRAM-CREW, EREW models, simulation of one model from another one

UNIT II
Performance Measures of Parallel Algorithms, speed-up and efficiency of PA, Cost-optimality, An example of illustrate Cost- optimal algorithms- such as summation, Min/Max on various models

UNIT III
Parallel Sorting Networks, Parallel Merging Algorithms on CREW/EREW/MCC, Parallel Sorting Networks on CREW/EREW/MCC/, linear array
Parallel Searching Algorithm, Kth element, Kth element in X+Y on PRAM, Parallel Matrix, Transportation and Multiplication Algorithm on PRAM, MCC, Vector-Matrix Multiplication, Solution of Linear Equation, Root finding.

UNIT IV
Randomized Algorithms: Example, Randomized Quicksort and Mincut Algorithms, Moments and Deviations Markov and Chebyshev Inequalities; Chernoff Bounds, martingales, Markov Chains and Random walks

UNIT V
Randomized Data Structures, Randomized Search Trees, Game tree; Hashing, Random Graphs, Random Walks in graphs, Derandomization

Text Books :
1. Designing Efficient Algorithms for Parallel Computer, M.J. Quinn, McGrawHill.

2. Probability and Computing: Randomized algorithms and Probabilistic Analysis, Michael Mitzenmacher and Eli Upfal. Cambridge University Press, 2005

Reference Books :

1. The Design and Analysis of Parallel Algorithms, S.G.Akl, PHI, 1989.
2. Randomized Algorithms, Rajeev Motwani and Prabhakar Raghavan, Cambridge University Press.
3. Design and Analysis of Randomized Algorithms: Introduction to Design Paradigms. Juraj Hromkovic, Springer, 2005.
4. Introducti on to Parallel Algorithms and Architectures: Arrays, Trees, Hypercubes, F.T.Lei ghton, MK Publishers, San Mateo California, 1992

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(13A05804) REAL TIME SYSTEMS
(MOOCS 2)

Objectives:

- Acquire skills necessary to design and develop embedded applications by means of real-time operating systems
- Understand embedded real-time operating systems

Course Outcomes:

- Characterize real-time systems and describe their functions
- Analyze, design and implement a real-time system
- Apply formal methods to the analysis and design of real-time systems
- Apply formal methods for scheduling real-time systems
- Characterize and describe reliability and fault tolerance issues and approaches.

Unit-1

Typical Real time Applications: Digital control, High-level control, Signal processing, other Real-time Applications.

Hard versus Soft Real-Time Systems: Jobs and processors, Release time, dead lines and Timing constraints, Hard and soft timing constraints, Hard Real time systems, Soft Real-time Systems.

A Reference Model of Real Time Systems: Processors and resources, Temporal parameters of Real time workload, periodic task model, precedence constraints and data dependency, Functional parameter, Resource Parameters of Jobs and Parameters of Resources, Scheduling Hierarchy.

Commonly used Approaches to real time Scheduling: Clock-Driven Approach, Weighted Round-Robin Approach, Priority driven Approach, Dynamic vs Static Systems, Effective release time and deadlines, Optimality of the EDF and LST algorithms, Nonoptimality of the EDF and LST algorithms, Challenges in validating timing constraints in priority driven System, Off line vs On line scheduling, summary.

Unit-2

Clock-Driven Scheduling: Notations and Assumptions, static, Timer-Driven scheduler, General Structure of the Cyclic Scheduler, Improving the average response time of Aperiodic Jobs, Scheduling sporadic Jobs, Practical considerations and generalizations, Algorithm for generating Static Schedules, Pros and cons of Clock-driven scheduling, summary.

Unit-3

Priority-Driven Scheduling of periodic Tasks : Static Assumption, Fixed-priority vs Dynamic-priority Algorithms, Maximum Schedulable Utilization, Optimality of the RM and

DM Algorithms, A Schedulability test for Fixed-priority tasks with Short Response time, A Schedulability test for Fixed-priority tasks with arbitrary Response time, Sufficient Schedulability conditions for the RM and DM Algorithms, summary.

Unit-4

Scheduling Aperiodic and Sporadic Jobs in Priority Driven Systems: Assumptions and approaches, Diferrable servers, Sporadic Servers, Constant utilization, total bandwidth and weighted fair –Queueing servers, Slack stealing in Dead-line Driven System, Stack stealing in Fixed-priority systems, Scheduling of sporadic jobs, Real-time performance for jobs with soft timing constraints, A two-level scheme for Integrated scheduling.

Unit-5

Resources and Resource access control: Assumptions on Resources and their usage, Effects of Resource contention and resource access control, NonPreemptive critical section, Basic Priority inheritance protocol, Basic Priority ceiling protocol, Stack –based, Priority ceiling protocol, Use of priority ceiling protocol in Dynamic priority systems, pre-emption ceiling protocol, Controlling accesses to Multiple unit Resources, Controlling concurrent accesses to data objects.

Multiprocessor Scheduling, Resource access control, and Synchronization: Model of Multiprocessor and Distributed Systems, Task assignment, Multiprocessor Priority ceiling protocol, Elements of Scheduling Algorithms for End-to-End Periodic Tasks, Schedulability of Fixed-priority End-to-End periodic Tasks, End to End tasks in heterogeneous Systems, Predictability and validation of Dynamic Multiprocessor Systems, Summary

Text Book:

1) “Real-Time Systems” by Jane W.S Liu, Pearson Edition, 2006.

Reference Text Book:

1. Real-Time Systems: Scheduling, Analysis, and Verification, Cheng, A. M. K.: Wiley, 2002.
2. Z.: Scheduling in Real-Time Systems, by Cottet, F., Delacroix, J., Kaiser, C., Mammeri John Wiley & Sons, 2002.
3. Real-Time Systems, C. M., Shin, K. G. McGraw-Hill, Krishna 1997.

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(13A12801) SOCIAL NETWORK ANALYSIS
(MOOCS 2)

OBJECTIVES:

The student should be made to:

- Understand the concept of semantic web and related applications.
- Learn knowledge representation using ontology.
- Understand human behavior in social web and related communities.
- Learn visualization of social networks.

OUTCOMES:

Upon completion of the course, the student should be able to:

- Develop semantic web related applications.
- Represent knowledge using ontology.
- Predict human behavior in social web and related communities.
- Visualize social networks.

UNIT I INTRODUCTION

Introduction to Semantic Web: Limitations of current Web - Development of Semantic Web - Emergence of the Social Web - Social Network analysis: Development of Social Network Analysis -Key concepts and measures in network analysis - Electronic sources for network analysis: Electronic discussion networks, Blogs and online communities - Web-based networks - Applications of Social Network Analysis.

UNIT II MODELLING, AGGREGATING AND KNOWLEDGE REPRESENTATION

Ontology and their role in the Semantic Web: Ontology-based knowledge Representation – Ontology languages for the Semantic Web: Resource Description Framework - Web Ontology Language - Modeling and aggregating social network data: State-of-the-art in network data representation - Ontological representation of social individuals - Ontological representation of social relationships -Aggregating and reasoning with social network data - Advanced representations.

UNIT III EXTRACTION AND MINING COMMUNITIES IN WEB SOCIAL NETWORKS

Extracting evolution of Web Community from a Series of Web Archive - Detecting communities in social networks - Definition of community - Evaluating communities - Methods for community detection and mining - Applications of community mining algorithms - Tools for detecting communities social network infrastructures and communities - Decentralized online social networks - Multi- Relational characterization of dynamic social network communities.

UNIT IV PREDICTING HUMAN BEHAVIOUR AND PRIVACY ISSUES

Understanding and predicting human behavior for social communities - User data management - Inference and Distribution - Enabling new human experiences - Reality mining - Context – Awareness - Privacy in online social networks - Trust in online environment - Trust models based on subjective logic - Trust network analysis - Trust transitivity analysis -

Combining trust and reputation – Trust derivation based on trust comparisons - Attack spectrum and countermeasures.

UNIT V VISUALIZATION AND APPLICATIONS OF SOCIAL NETWORKS

Graph theory - Centrality - Clustering - Node-Edge Diagrams - Matrix representation – Visualizing online social networks, Visualizing social networks with matrix-based representations - Matrix and Node-Link Diagrams - Hybrid representations - Applications - Cover networks - Community welfare - Collaboration networks - Co-Citation networks.

TEXT BOOKS:

1. "Social Networks and the Semantic Web", Peter Mika, First Edition, Springer 2007.
2."Handbook of Social Network Technologies and Applications", Borko Furht ,1st Edition, Springer, 2010.

REFERENCES:

1. Guandong Xu ,Yanchun Zhang and Lin Li, "Web Mining and Social Networking – Techniques and applications", First Edition Springer, 2011.
2. Dion Goh and Schubert Foo, "Social information Retrieval Systems: Emerging Technologies and Applications for Searching the Web Effectively", IGI Global Snippet, 2008.
3. Max Chevalier, Christine Julien and Chantal Soulé-Dupuy, "Collaborative and Social Information Retrieval and Access: Techniques for Improved user Modelling", IGI Global Snippet, 2009.
4. John G. Breslin, Alexander Passant and Stefan Decker, "The Social Semantic Web", Springer, 2009.

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(13A12802) INFORMATION STORAGE AND MANAGEMENT (MOOCS 2)

Objectives:

After completing this course, students will be able to:

- Describe and effectively apply the fundamentals of information storage management.
- Analyze various storage management environments.
- Configure replication of information storage.
- Understand leading storage technologies that provide cost-effective IT solutions for medium to large scale businesses and data centers
- Study important storage technologies' features such as availability, replication, scalability and performance

Outcomes:

On completion of the course, students will be able to:

- Apply storage technologies
- Work in project teams to install, administer and upgrade popular storage solutions
- Identify and install current storage virtualization technologies
- Manage virtual servers and storage between remote locations
- Design, analyze and manage clusters of resources
- Utilize redundant array of independent disks (RAID) technologies effectively.

Unit-I

INTRODUCTION TO STORAGE TECHNOLOGY: Data proliferation and the varying value of data with time & usage, Sources of data and states of data creation, Data center requirements and evolution to accommodate storage needs, Overview of basic storage management skills and activities, The five pillars of technology, Overview of storage infrastructure components, Evolution of storage, Information Lifecycle Management concept, Data categorization within an enterprise, Storage and Regulations.

Unit-II

STORAGE SYSTEMS ARCHITECTURE: Intelligent disk subsystems overview, Contrast of integrated vs. modular arrays, Component architecture of intelligent disk subsystems, Disk physical structure components, properties, performance, and specifications, Logical partitioning of disks, RAID & parity algorithms, hot sparing, Physical vs. logical disk organization, protection, and back end management, Array caching properties and algorithms, Front end connectivity and queuing properties, Front end to host storage provisioning, mapping, and operation, Interaction of file systems with storage, Storage system connectivity protocols

Unit-III

INTRODUCTION TO NETWORKED STORAGE: JBOD, DAS, SAN, NAS, & CAS evolution, Direct Attached Storage (DAS) environments: elements, connectivity, & management, Storage Area Networks (SAN): elements & connectivity, Fiber Channel principles, standards, & network management principles, SAN management principles, Network Attached Storage (NAS): elements, connectivity options, connectivity protocols

(NFS, CIFS, ftp), & management principles, IP SAN elements, standards (iSCSI, FCIP, iFCP), connectivity principles, security, and management principles, Content Addressable Storage (CAS): elements, connectivity options, standards, and management principles, Hybrid Storage - solutions overview including technologies like virtualization & appliances.

Unit-IV

INTRODUCTIONS TO INFORMATION AVAILABILITY: Business Continuity and Disaster Recovery Basics, Local business continuity techniques, Remote business continuity techniques, Disaster Recovery principles & techniques

MANAGING & MONITORING: Management philosophies (holistic vs. system & component), Industry management standards (SNMP, SMI-S, CIM), Standard framework applications, Key management metrics (thresholds, availability, capacity, security, performance), Metric analysis methodologies & trend analysis, Reactive and pro-active management best practices, Provisioning & configuration change planning, Problem reporting, prioritization, and handling techniques, Management tools overview

Unit-V

SECURING STORAGE AND STORAGE VIRTUALIZATION: Define storage security. , List the critical security attributes for information systems, describe the elements of a shared storage model and security extensions, Define storage security domains, List and analyze the common threats in each domain, Identify different virtualization technologies, describe block-level and file level virtualization technologies and processes.

REFERENCES

1. Marc Farley Osborne, "Building Storage Networks", Tata Mac Graw Hill, 2001
2. Robert Spalding and Robert Spalding, "Storage Networks: The Complete Reference", Tata McGraw Hill, 2003
3. Meeta Gupta, "Storage Area Network Fundamentals", Pearson Education Ltd., 2002
4. Gerald J Kowalski and Mark T Maybury," Information Storage Retreival Systems theory & Implementation", BS Publications, 2000
5. Thejendra BS, "Disaster Recovery & Business continuity", Shroff Publishers & Distributors, 2006

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(13A12803) BIO-METRICS
(MOOCS 3)

Objectives:

To equip students with a good knowledge of:

- the design and working of a generic biometric system;
- the features used to represent and match individual biometric traits;
- the performance metrics used to evaluate a biometric system;
- the socio-legal implications of biometrics.

Outcomes:

- Be able to assess the performance of a biometric matcher.
- Ability to use different biometrics systems effectively.
- Ability to suggest the biometrics system depending on organizations requirements.

UNIT I

BIOMETRIC FUNDAMENTALS AND STANDARDS: Definition, Biometrics versus traditional techniques, Characteristics, Key biometric processes: Verification - Identification - Biometric matching, Performance measures in biometric systems, Assessing the Privacy risks of biometrics - Designing privacy sympathetic biometric systems, Different biometric standards, Application properties.

UNIT II

PHYSIOLOGICAL BIOMETRICS: Facial scan, Ear scan, Retina scan, Iris scan, Finger scan, Automated fingerprint identification system, Palm print, Hand vascular geometry analysis, DNA, Dental.

UNIT III

BEHAVIOURAL BIOMETRICS: Signature scan, Keystroke scan, Voice scan, Gait recognition, Gesture recognition, Video face, mapping the body technology.

UNIT IV

USER INTERFACES: Biometric interfaces: Human machine interface - BHMI structure, Human side interface: Iris image interface - Hand geometry and fingerprint sensor, Machine side interface: Parallel port - Serial port - Network topologies, Case study: Palm Scanner interface.

UNIT V

BIOMETRIC APPLICATIONS: Categorizing biometric applications, Application areas: Criminal and citizen identification – Surveillance - PC/network access - E-commerce and retail/ATM, Costs to deploy, Issues in deployment, Biometrics in medicine, cancellable biometrics.

References:

1. Anil K Jain, Patrick Flynn and Arun A Ross, “Handbook of Biometrics”, Springer, USA, 2010.
2. John R Vacca, “Biometric Technologies and Verification Systems”, Elsevier, USA, 2007.
3. Samir Nanavati, Michael Thieme and Raj Nanavati, “Biometrics – Identity Verification in a Networked World”, John Wiley & Sons, New Delhi, 2003.

4. Paul Reid, “Biometrics for Network Security”, Pearson Education, New Delhi, 2004.
5. Ruud M. Bolle et al, “Guide to Biometrics”, Springer, USA, 2003.
6. David D Zhang, “Automated Biometrics: Technologies and Systems”, Kluwer Academic Publishers, New Delhi, 2000.

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(13A05805) HIGH PERFORMANCE COMPUTING
(MOOCS 3)

Objectives:

This course deals with two interrelated issues in high-performance computing:

- Fundamental concepts and techniques in parallel computation structuring and design, including parallelization methodologies and paradigms, parallel programming models, their implementation, and related cost models;
- Architectures of high-performance computing systems, including shared memory multiprocessors, distributed memory multi computers, clusters, and others.

Course Outcomes:

At the end of the module, a student will have an understanding of

- Ability to measure, analyze, and assess the performance of HPC applications and their supporting hardware.
- Ability to design the parallel algorithms.

UNIT I:

Introduction to Parallel Computing:
Motivating parallelism, Scope of Parallel Computing.
Parallel Programming Platforms:
Implicit Parallelism: Trends in Microprocessor Architectures, Limitations of Memory System Performance, Dichotomy of Parallel Computing Platforms, Physical Organization of Parallel Platforms, Communication costs in Parallel Machines, Routing Mechanisms for Interconnection Networks, Impact of Process –Processor Mapping and Mapping Techniques.

UNIT II:
Principles of Parallel Algorithm Resign:
Preliminaries, Decomposition Techniques, Characteristics of tasks and Interactions, Mapping Techniques for Load Balancing, Methods for containing Interaction Overheads, Parallel Algorithm Models.
Basic Communication Operators:
One-to-All Broadcast and All-to-One Reduction, All-to-All Broadcast and Reduction, All-Reduce and Prefix-Sum Operations, Scatter and Gather, All-to-All Personalized Communication, Circular Shift, Improving the speed of Some Communication Operations.

UNIT III:
Programming Using Message-Passing Paradigm:
Principles of Message-Passing, The Building Blocks: Send and Receive Operations, MPI: The Message Passing Interface, Topologies and Embedding, Overlapping Communication with computation, Collective Communication and Computation Operations, Groups and

Communications.

Programming Shared Address Space Platforms:

Thread Basics, Why Threads?, The POSIX Thread, Thread Basics: Creation and Termination, Synchronization Primitives in Pthreads, Collecting Thread and Synchronization Attributes, Thread Cancellation, Tips for designing Asynchronous Programs, OpenMP: a Standard for Directive based parallel programming.

UNIT IV:

Dense Matrix Algorithms:

Matrix-Vector Multiplication, Matrix-Matrix Multiplication, Solving a System for Linear Equations.

Sorting:

Issues in Sorting on Parallel Computers, Sorting Networks, Bubble Sort and its Variants, Quick Sort, Bucket and Sample Sort, Other Sorting Algorithms.

UNIT V:

Graph Algorithms:

Definitions and Representation, Minimum Spanning Tree: Prim's Algorithm, Single Source Shortest path: Dijkstra's Algorithm, All-Pair Shortest Paths, Transitive Closure, Connected components, Algorithms for Space Graphs.

Search Algorithms For Discrete Optimization Problems:

Definitions and Examples, Sequential Search Algorithms, Search Overhead Factor, Parallel Depth-First Search, Parallel Best-First Search, Speedup Anomalies in Parallel Search Algorithms.

TEXT BOOKS:

1."Introduction to Parallel Computing" by Ananth Grama, Anshul Guptha, George Karypis and Vipin Kumar. Pearson, 2nd Edition.

REFFRENCE BOOKS:

1. "Parallel Programming- Techniques and applications using networked workstations and parallel computers" by Barry Wilkinson, Michael Allen , Pearson Education, 2nd Edition 2007.

2."Multi Core Programming – Increasing Performance through Software Multi-threading" by Shameem Akhter and Jason Roberts, Intel Press 2006.

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(13A12804) CYBER SECURITY
(MOOCS 3)

Objectives:

- Appraise the current structure of cyber security roles across the DoD enterprise, including the roles and responsibilities of the relevant organizations.
- Evaluate the trends and patterns that will determine the future state of cyber security

Out comes:

- Analyze threats and risks within context of the cyber security architecture
- Appraise cyber security incidents to apply appropriate response
- Evaluate decision making outcomes of cyber security scenarios

Unit -I

INTRODUCTION: Introduction and Overview of Cyber Crime, Nature and Scope of Cyber Crime, Types of Cyber Crime: Social Engineering, Categories of Cyber Crime, Property Cyber Crime.

Unit -II

CYBER CRIME ISSUES: Unauthorized Access to Computers, Computer Intrusions, White collar Crimes, Viruses and Malicious Code, Internet Hacking and Cracking, Virus Attacks, Pornography, Software Piracy, Intellectual Property, Mail Bombs, Exploitation ,Stalking and Obscenity in Internet, Digital laws and legislation, Law Enforcement Roles and Responses.

Unit -III

INVESTIGATION: Introduction to Cyber Crime Investigation, Investigation Tools, eDiscovery, Digital Evidence Collection, Evidence Preservation, E-Mail Investigation, E-Mail Tracking, IP Tracking, E-Mail Recovery, Hands on Case Studies. Encryption and Decryption Methods, Search and Seizure of Computers, Recovering Deleted Evidences, Password Cracking.

Unit -IV

DIGITAL FORENSICS: Introduction to Digital Forensics, Forensic Software and Hardware, Analysis and Advanced Tools, Forensic Technology and Practices, Forensic Ballistics and Photography, Face, Iris and Fingerprint Recognition, Audio Video Analysis, Windows System Forensics, Linux System Forensics, Network Forensics.

Unit -V

LAWS AND ACTS: Laws and Ethics, Digital Evidence Controls, Evidence Handling Procedures, Basics of Indian Evidence ACT IPC and CrPC , Electronic Communication Privacy ACT, Legal Policies.

REFERENCES:

1. Nelson Phillips and Enfinger Steuart, "Computer Forensics and Investigations", Cengage Learning, New Delhi, 2009.
2. Kevin Mandia, Chris Prosise, Matt Pepe, "Incident Response and Computer Forensics ", Tata McGraw -Hill, New Delhi, 2006.
3. Robert M Slade," Software Forensics", Tata McGraw - Hill, New Delhi, 2005.
4. Bernadette H Schell, Clemens Martin, "Cybercrime", ABC – CLIO Inc, California, 2004.
5."Understanding Forensics in IT ", NIIT Ltd, 2005.