Fifth Semester Syllabus

MOBILE COMPUTING (DCS-501)
Discipline core (DC): Credit 4(3-0-2)

Objective: The ubiquity of wireless communication technologies and the proliferation of portable computing devices have made possible a mobile computing era in which users, on the move, can seamlessly access network services and resources, from anywhere and at anytime. This course provides an introduction to the fundamentals of mobile computing. A background in computer networks and wireless communication is required.

COURSE OUTLINE:

1. Introduction

Evolution of wireless networks, wireline and wireless data networks, advantages of mobile computing, networks, middleware and gateways, application, services and security, Evolution of mobile communication system, paging system

2. Mobile Computing Architecture

3-tier architecture, design considerations for mobile computing, mobile computing through internet, FDMA, TDMA, CDMA, SDMA

3. Cellular Networks

GSM principles and architecture, GPRS architecture, EDGE, 2G cellular network,
2.5 G wireless network, HSCSD,UMTS, 3G, CDMA Technologies

4. System design fundamentals

Frequency reuse, channel alignment strategies, handoff strategies, interference and system capacity, improving converge and capacity in cellular system, parameters for mobile multipath channel, small scale fading

5. Wireless System and Standards

Difference between wireless and wired telephone network, ISDN, development of wireless network, Bluetooth, RFID, IEEE 802.11.a/b/g/n, Mobile IP, IPV6, JAVA Card, Features of WIMAX,CDMA digital cellular standard

6. Wireless Application Protocol (WAP)

WAP, MMS, GPRS Applications

7. Operating Systems for Mobile Devices

Design constraints in applications for handheld devices, palm and symbian OS features and architecture, introduction to J2ME technology, Android OS

RECOMMENDED BOOKS

1. Mobile Computing: Technology, Applications and Service Creation by Asoke K. Talukdar and Roopa R. Yavagal, Tata McGraw Hill Education Pvt Ltd , New Delhi

2. Handbook of Wireless Networks and Mobile Computing by Stojmenovic, Wiley India Pvt Ltd. Daryaganj, New Delhi

3. Wireless Communication: Principles and Practice by Theodok S. Rappaport, Pearson Education Asia, 2nd Edition.

Data Warehouse and Mining (DCS-502)
Discipline core (DC): Credit 3(3-0-0)

Objective: Data Mining and Warehousing enables middle and top managers to analyze data and explore relationships among the data items which helps them to take right decisions in right time. After going through this course, students can understand the concepts, functions and various techniques of data mining and warehousing and appreciate them through various case studies.

COURSE OUTLINE:

Introduction to Data Mining

- What is data mining? Data mining background
- Inductive learning, statistics, machine learning
- Difference between data mining and machine learning, data mining models, verification model, discovery model
- Data mining problems/issues

Introduction to Data Warehousing

- Concept and benefits of data warehousing, type of data, characteristics of a data warehouse, processes in data warehousing
- Data warehousing and OLTP systems
- The data warehouse architecture, problems with data warehousing, criteria for a data warehouse
- Data marks

Data Mining Functions

- Classification
- Associations
- Sequential/temporal patterns
- Clustering/segmentation

Data Mining Techniques

- Cluster analysis
- Induction, decision trees, rule induction
- Neural networks
- On-line analytical processing, OLAP (Online Analytical Processing) examples
- Comparison of OLAP and OLTP (Online Transaction Processing)
- Data visualization

- Case Studies on Data Mining Applications and recent trends in data mining

Cyber Security and cyber law (DCS-503)
Open Elective (OC): Credit 4(3-0-2)

Objectives:

1. To create a secure cyber ecosystem in the country, generate adequate trust and confidence in IT system and transactions in cyberspace and thereby enhance adoption of IT in all sectors of the economy.
2. To enable effective prevention, investigation and prosecution of cybercrime and enhancement of law enforcement capabilities through appropriate legislative intervention.
3. To enable Protection of information while in process, handling, storage & transit so as to safeguard privacy of citizen's data and reducing economic losses due to cybercrime or data theft.

Contents

UNIT 1

Introduction to Information Systems, Types of Information Systems; Introduction to information security, Need for Information security, Threats to Information Systems, Information Assurance; Cyber Security, and Security Risk Analysis.

UNIT 2

Application security (Database, E-Mail and Internet), Data Security Consideration-Backups; Security Threats – Viruses, Worms, Trojan Horse, Bombs, Trapdoors, Spoofs, E-mail Viruses, Macro Viruses, Malicious Software; Threats to E-Commerce- Electronic Payment System, e-Cash, Credit/Debit Cards.

UNIT 3

Introduction to Cryptography, Basic terms of Cryptography; Plaintext, Cipher text, Key; Concepts of Cryptography: Transposition, Substitution, Rotation Cipher, Symmetric Key & Asymmetric key; Data Encryption System (DES), Advanced Encryption System (AES) and RSA algorithm.

UNIT 4

Developing Secure Information System, Application Development Security, Security Architecture & Design; Security Issues in Hardware, Data Storage & Downloadable Devices, Physical Security of IT Assets, access control and CCTV.

UNIT 5

IT Act, Copyright Act, Patent Law, IPR, Cyber Laws in India; IT Act 2000 Provisions, Intellectual Property Law: Copyright Law, Software License, Semiconductor Law.

RECOMMENDED BOOKS

1. Introduction to Information Security and Cyber Law; by SURYA P. TRIPATHI, R. Geol, P.K Shukla.

E-COMMERCE (DCS-503)
Open Elective (OC): Credit 3(3-0-0)

Objectives:

1. Define what is E-commerce
2. Discuss the applications of E-commerce
3. Discuss the types of E-commerce
4. Describe the life cycle of implementation of E-commerce
5. Differentiate between E-commerce and other forms of commerce
6. List the modes of payments involved in E-commerce

COURSE OUTLINE:

UNIT 1

Introduction to E-Commerce: The Scope of Electronic Commerce, Definition of Electronic Commerce, Electronic E-commerce and the Trade Cycle, Electronic Markets, Electronic Data Interchange, Internet Commerce, E-Commerce in Perspective.

Business Strategy in an Electronic Age: Supply Chains, Porter's Value Chain Model, Inter Organizational Value Chains, Competitive Strategy, Porter's Model, First Mover Advantage Sustainable Competitive Advantage, Competitive Advantage using E-Commerce, Business Strategy, Introduction to Business Strategy, Strategic Implications of IT, Technology, Business Environment, Business Capability, Exiting Business Strategy, Strategy Formulation & Implementation Planning, E-Commerce Implementation, E-Commerce Evaluation.

UNIT 2

Business-to-Business Electronic Commerce: Characteristics of B2B EC, Models of B2B Ec, Procurement Management Using the Buyer's Internal Marketplace, Just in Time Delivery, Other B2B Models, Auctions and Services from Traditional to Internet Based EDI, Integration with Back-end Information System, The Role of Software Agents for B2B EC, Electronic marketing in B2B, Solutions of B2B EC, Managerial Issues, Electronic Data Interchange (EDI), EDI: The Nuts and Bolts, EDI & Business.

UNIT 3

Internet and Extranet: Automotive Network Exchange, The Largest Extranet, Architecture of the Internet, Intranet and Extranet, Intranet software, Applications of Intranets, Intranet Application Case Studies, Considerations in Intranet Deployment, The Extranets, The structures of Extranets, Extranet products & services, Applications of Extranets, Business Models of Extranet Applications, Managerial Issues.

Electronic Payment Systems: Is SET a failure, Electronic Payments & Protocols, Security Schemes in Electronic payment systems, Electronic Credit card system on the Internet, Electronic Fund transfer and Debit cards on the Internet, Stored - value Cards and E- Cash, Electronic Check Systems, Prospect of Electronic Payment Systems, Managerial Issues.

UNIT 4

Public Policy: From Legal Issues to Privacy : EC- Related Legal Incidents, Legal Incidents, Ethical & Other Public Policy Issues, Protecting Privacy, Protecting Intellectual Property, Free speech, Internet Indecency & Censorship, Taxation & Encryption Policies, Other Legal Issues: Contracts, Gambling & More, Consumer & Seller Protection In EC.

UNIT 5

Infrastructure for EC: It takes more than Technology, A Network Of Networks, Internet Protocols, Web- Based client/ Server, Internet Security, selling on the web, Chatting on the Web, Multimedia delivery, Analyzing Web Visits, Managerial Issues.

Reference/Text Book:

1. David Whiteley, " E-Commerce", Tata McGraw Hill, 2000.
Eframi Turban, Jae Lee, David King, K. Michale Chung, "Electronic Commerce", Pearson Education, 2000.

Graph Theory (DCS-503)
Open Elective (OC): Credit 3(3-0-0)

Objective: The **objective** of the course is to Explain basic concepts in combinatorial **graph theory** Define how **graphs** serve as models for many standard problems discuss the concept of **graph**, tree, Euler **graph**, cut set and Combinatory.

COURSE OUTLINE:

UNIT 1

Introduction: Graphs, Sub graphs, some basic properties, various example of graphs & their sub graphs, walks, path& circuits, connected graphs, disconnected graphs and component, euler graphs, various operation on graphs, Hamiltonian paths and circuits, the traveling sales man problem.

UNIT 2

Trees: Trees and fundamental circuits, distance diameters, radius and pendent vertices, rooted and binary trees, on counting trees, spanning trees, fundamental circuits, finding all spanning trees of a graph and a weighted graph, algorithms of primes, Kruskal and Dijkstra Algorithms.

UNIT 3

Graph and Networks: Cuts sets and cut vertices, some properties, all cut sets in a graph, fundamental circuits and cut sets , connectivity and separability, network flows .Planer graphs, combinatorial and geometric dual: Kuratowski graphs, detection of planarity, geometric dual, Discussion on criterion of planarity, thickness and crossings.

UNIT 4

Graph Representation: Vector space of a graph and vectors, basis vector, cut set vector, circuit vector, circuit and cut set subspaces, Matrix representation of graph – Basic concepts; Incidence matrix, Circuit matrix, Path matrix, Cut-set matrix and Adjacency matrix.
Coloring, covering and partitioning of a graph, chromatic number, chromatic partitioning, chromatic polynomials, matching, covering, four color problem
Discussion of Graph theoretic algorithm wherever required.

RECOMMENDED BOOKS

1. Deo, N, Graph theory with applications to Engineering and Computer Science, PHI
2. Gary Chartrand and Ping Zhang, Introduction to Graph Theory, TMH
3. Robin J. Wilson, Introduction to Graph Theory, Pearson Education
4. Harary, F, Graph Theory, Narosa
5. Bondy and Murthy: Graph theory and application. Addison Wesley.

6. V. Balakrishnan, Schaum's Outline of Graph Theory, TMH

CRYPTOGRAPHY AND NETWORK SECURITY (DCS-504)
Discipline Electives (DE): Credit 3(3-0-0)

Objective: This course has been designed by keeping in view the basic computer users and information system managers. The concepts needed to read through the ripe in the market place and understanding risks and how to deal with them. It is hoped that the student will have a wider perspective on security in general and better understanding of how to reduce and manage the security

COURSE OUTLINE:

1. Introduction

Need for securing a network; attacks from within and external, introduction to cyber crime, cyber law-Indian Perspective (IT Act 2000), cyber ethics, ethical hacking. What is hacking, attacker, phreaker etc.

2. Securing Data over Internet

Introduction to basic encryption and decryption, concept of symmetric and asymmetric key cryptography, Cipher technique PPTP/L2TP, overview of DES, RSA and PGP. Introduction to Hashing: MD5, SSL, SSH, HTTPS, Digital Signatures.

3. Virus, Worms and Trojans

Definitions, preventive measures – access central, checksum verification, process neutering, virus scanners, neuristic scanners, application level virus scanners, deploying virus protection.

4. Computer Network Attacks:

Active Attacks, Passive Attacks, Stealing Passwords, Social Engineering, Bugs and Backdoors, Authentication Failures, Protocol Failures, Information Leakage, Denial-of-Service Attacks, Botnets, Phishing Attacks

5. Firewalls

Definition and types of firewalls, defining access control policies, address translation, firewall logging, firewall deployment

6. Intrusion Detection System (IDS)

Introduction; IDS limitations – teardrop attacks, counter measures; Host based IDS set up

7 Virtual Private Network (VPN)

Basics, setting of VPN, VPN diagram, configuration of required objects, exchanging keys, modifying security policy

RECOMMENDED BOOKS

1. Cryptography and Network Security by Forouzon, Tata Mc Graw Hill Education Pvt Ltd, New Delhi

2. Cryptography and Network Security by Atul Kahate, Tata Mc Graw Hill Education Pvt Ltd, New Delhi

Computer Graphics (DCS-505)
Discipline core (DC): Credit 3(3-0-0)

Objective:

1. To get the Knowledge about the basics concepts of multimedia and its applications.
2. To get the knowledge of its relevance with internet and its future aspects

COURSE OUTLINE:

Unit 1

Line generation: Points lines, Planes, Pixels and Frame buffers, vector and character generation. Graphics Primitives: Display devices, Primitive devices, Display File Structure, Display control text.

Unit 2

Polygon: Polygon Representation, Entering polygons, Filling polygons. Segments: Segments table, creating deleting and renaming segments, visibility, image transformations.

Unit 3

Transformations: Matrices transformation, transformation routines, displays procedure. Windowing and Clipping: Viewing transformation and clipping, generalize clipping, multiple windowing.

Unit 4

Three Dimension: 3-D geometry primitives, transformations, projection clipping. Interaction: Hardware input devices handling algorithms, Event handling echoing, Interactive techniques.

Unit 5

Hidden Line and Surface: Back face removal algorithms, hidden line methods. Rendering and Illumination: Introduction to curve generation, Bezier, Hermite and B-spline algorithms and their comparisons

RECOMMENDED BOOKS

1. Rogers, "Procedural Elements of Computer Graphics", McGraw Hill
2. Asthana, Sinha, "Computer Graphics", Addison Wesley Newman and Sproul, "Principle
of Interactive Computer Graphics", McGraw Hill
3. Steven Harrington, "Computer Graphics", A Programming Approach, 2nd Edition 4. Rogar and Adams, "Mathematical Elements of Computer Graphics", McGraw Hill.

Cloud Computing (DCS-506)
Discipline core (DC): Credit 3(3-0-0)

Objective: This course offers a good understanding of cloud computing concepts and challenges faced in implementation of cloud computing.

COURSE OUTLINE:

1.Introduction

Evolution of Cloud Computing, Cloud Computing Overview, Characteristics, Applications, Benefits, Challenges.

2. Service and Deployment Models

- Cloud Computing Service Models: Infrastructure as a Service, Platform as a Service, Software as a Service;
- Cloud Computing Deployment Models: Private Cloud; Public Cloud, Community Cloud, Hybrid Cloud, Major Cloud Service providers.

3. **Service Level Agreement (SLA) Management**
   Overview of SLA, Types of SLA, SLA Life Cycle, SLA Management Process.
4. **Virtualization Concepts**
   Overview of Virtualization, Types of Virtualization, Benefits of Virtualization, Hypervisors.
5. **Cloud Security**
   Infrastructure Security, Data Security & Privacy Issues, Legal Issues in Cloud Computing.
6. **Cloud Storage**
   Overview; Storage as a Service, Benefits and Challenges, Storage Area Networks (SANs).
7. **Scheduling in Cloud**
   Overview of Scheduling problem, Different types of scheduling, Scheduling for independent and dependent tasks, Static vs. Dynamic scheduling.

RECOMMENDED BOOKS

1. Rajkumar Buyya, James Broberg, Andrzej Goscinski (Editors): Cloud Computing: Principles and Paradigms, Wiley, 2011

2. Kumar Saurabh, Cloud Computing, Wiley, 2012.

3. Barrie Sosinsky: Cloud Computing Bible, Wiley, 2011.