I SEMESTER

MAT-511 COMPUTATIONAL METHODS AND STOCHASTIC PROCESSES

Probability and distribution, Stochastic processes and Queuing theory, Optimization Techniques. Numerical solutions to BVP’s by finite difference and finite element methods. Solution of parabolic, elliptic, hyperbolic PDEs: Linear Algebra, Eigen values, Eigen vectors, Matrix computation and SVD.

References:

CSE-521 DISTRIBUTED COMPUTING SYSTEMS


References:
5. Relevant research paper from the journals.
CSE-523 NUMBER THEORY & CRYPTOGRAPHY


References:

7. Relevant research paper from the journals.

CSE-503 ADVANCED COMPUTER NETWORKS

Traffic Engineering (TE) and TE with MPLS, Transport protocols and congestion control, Quality of Service (QoS) with MPLS technology, Network recovery and restoration with MPLS technology, Voice over IP (VOIP): VOIP protocols: overview of H323 and SIP (Session Initiation Protocol), Overview of VOIP call flows, IVR calls, Advanced Routing and switching: Review of networking devices, routing and switching, VLAN, VTP, STP, Distance Vector Routing: RIP, algorithm, routing table format, routing update format, Link State Routing: OSPF, algorithm, routing table format, routing update format

References:

8. RFCs and Internet Drafts, available from Internet Engineering Task Force.
9. Articles in various journals and conference proceedings.
11. Relevant research papers from the journals.

CSE-525 SECURITY ARCHITECTURE-DESIGN & ANALYSIS

[3 1 0 4]


References:

4. Relevant research papers from the journals.
HSS-501 RESEARCH METHODOLOGIES AND TECHNICAL COMMUNICATION.


References:
1. Dr.Ranjit Kumar, “Research Methodology: A Step-by-Step Guide for Beginners”, SAGE,2005

CSE- 531 INFORMATION SYSTEMS LAB I

Experiments/mini project based on the syllabus specified in Advanced Computer Networks, Cryptography and Security Architecture.
II SEMESTER

CSE-501 ADVANCED CONCEPTS IN DATA BASE MANAGEMENT SYSTEMS


References:
5. Relevant research papers from the journals

CSE-524 NETWORK SECURITY

References:

5. Relevant research papers from the journals

CSE-532 INFORMATION SYSTEMS LAB-II

[0 0 6 2]

Experiments/mini project based on the syllabus specified in Elective I and Elective III.

CSE-514 SEMINAR

[0 0 3 1]

Each student has to present a seminar individually, on any technical topic related to the subject, but not covered in the syllabus. The time duration for presentation is 45 minutes and 15 minutes is devoted for question and answer session. Slides have to be prepared for the presentation. A seminar report has to be submitted one week before the day of the presentation.

PROGRAM ELECTIVES

CSE 505 OBJECT ORIENTED SYSTEM DEVELOPMENT

[3 1 0 4]

Introduction to information systems, Object Basics: encapsulation, Association and Aggregation, Inheritance, Dynamic and static type systems, Polymorphism, Dynamic Binding. Software development Methodologies, Requirements: Business perspective, Developer perspective. Introduction to OOAD with UML 2.0: structure diagrams, behavior diagrams, extension mechanisms Analyzing the problem: static and dynamic analysis, Designing the system architecture: priorities, system design, concurrency, security, Choosing technologies, typical front end configurations, back-end configurations. Designing subsystems: mapping the analysis class model into the design class model, handling persistence with a relational database, designing user interfaces, using patterns, frameworks and libraries, handling multiple activities. Reusable design
patterns: patterns template, common design patterns. Specifying the interfaces of classes. Testing: automating tests, testing strategies, test driven development using JUnit.

References:
5. Relevant research papers from the journals

CSE-540 ADVANCED DATA STRUCTURES AND ALGORITHMS
[3 1 0 4]

Amortized Analysis - Aggregate analysis, The accounting method, The potential method,

References:
3. Relevant research papers from the journals.

CSE-542 DATA MINING AND BUSINESS ANALYTICS
[3 1 0 4]

Introduction to Business Intelligence, Basics of Data Integration,Introduction to Multi-Dimensional Data Modeling, Basics of Enterprise Reporting, Data Mining functionalities Major issues in Data Mining, Applications and Trends in Data Mining, Association Rules Mining, Algorithms for discovering frequent itemsets, Mining various kinds of association rules, classification and Prediction, Clustering Analysis, Interactive Visual Data Analysis Sensing and Analyzing Univariate Data, Sensing and Analyzing Time Series Data
References:

1. Jiawei Han and Micheline Kamber, Data Mining: Concepts and Techniques, Second Edition, Elsevier
5. Fundamentals of Business Analytics by R.N Prasad, Seema Acharya
6. Business Intelligence by David Loshin
7. Business intelligence for the enterprise by Mike Biere
8. Business intelligence roadmap by Larissa Terpeluk Moss, Shaku Atre
9. An introduction to Building the Data Warehouse – IBM
10. Business Intelligence For Dummies – Swain Scheps
11. Successful Business Intelligence: Secrets to making Killer BI Applications by Cindi Howson
12. Information dashboard design by Stephen Few

CSE-546 SECURE E-COMMERCE


References:
CSE-562 WEB SERVICES


References:

4. XML: How to Program, by Deitel, Deitel, Nieto, Lin and Sadhu, Prentice Hall. (new edition is still not out)
6. Essential XML Quick Reference: A Programmer's Reference to XML, XPath, XSLT, XML Schema,
7. SOAP, and More by Aaron Skonnard, Martin Gudgin (Paperback)

References:

2. Ashutosh Saxena, “Public Key Infrastructure- Concepts, Design and Deployment”, TMH.
4. Relevant research papers from the journals

Introduction to databases - Concept of database, Components of the database, Distributed databases - Challenges, Operating system support, Distributed file systems, Fault tolerance and Failure Recovery, Distributed Shared Memory. Database Security - Need for database security, SQL injection, Database security evolution, Multilevel Security in databases, Architectural Components and Security, Secure connectivity to the database, Role based access Control, Security based on Object oriented Encapsulation, Reliability and Integrity, Sensitive Data, DB

References:

6. Relevant research papers from the journals

CSE-570 INTRUSION DETECTION SYSTEMS

References:

3. Relevant research papers from the journals.

CSE-572 MOBILE AND WIRELESS SECURITY


References:

4. Relevant research papers from the journals.
CSE-574 LEGAL ISSUES IN INFORMATION SECURITY

The Information Technology Act, 2000 (No. 21 OF 2000). The Reserve Bank Of India Act, 1934. The first schedule, Amendments to the Indian Penal Code (45 Of 1860). Amendments to the Indian Evidence Act, 1872, Amendments to the Bankers' Books Evidence act ’ 891 (18 of 1891) Amendment to the Reserve Bank of India Act, 1934 (2 of 1934) A Methodology for Developing Trusted Information Systems, A national information infrastructure model for information warfare defense. Intellectual Property, Understand how copyrights, patents, trademarks, and other forms of IP differ, Understand why semiconductor chips aren’t protectable by patents or copyrights, Licenses, fighting against macro threats, defensive strategies for governments and industry groups, measures for ensuring data protection and citizen privacy against the threat of crime and terrorism; the European response EU Tackles Cybercrime Background, other related issues, U.S. military response to cyber warfare and USA’s view on world cyber security issues, law enforcement: being behind the technology curve and how to change that.

References:

2. The Information Technology 2000 (No. 21 OF 2000)-Bare Act
5. Lech J. Andrew M. Colarik, “Cyber Warfare and Cyber Terrorism”.
6. Relevant research papers from the journals

CSE-576 INFORMATION SECURITY MANAGEMENT


References:

2. Chris McNab “Network Security Assessment “, O’Reilly, 2004
4. Relevant research papers from the journals

CSE-578 CYBER SECURITY STANDARDS AND BEST PRACTICES


References:

3. www.Bell-labs.com/user/krauscher/nric
4. Relevant research papers

CSE-580 BIOMETRIC SECURITY

Biometrics Fundaments: Introduction, Benefits of biometrics over traditional authentication systems, Benefits of biometrics in identification systems, Selecting a biometric for a system,
Applications, Key biometric terms and processes, Verification versus Identification, Logical versus physical access, How biometric matching works, Accuracy in biometric systems.


Behavioral Biometric Technologies: Handprint Biometrics, DNA Biometrics, Signature and handwriting technology, Technical description, classification, Keyboard /keystroke dynamics, Voice Scan- data acquisition, feature extraction, characteristics, strengths and weaknesses, Deployment.

Multi biometrics: Multi biometrics and multi factor biometrics, Two-factor authentication with passwords, tickets and tokens.

Categorizing Biometric Applications, Executive decision, Case studies on Physiological, Behavioral and multifactor biometrics in identification systems.

References:

7. Relevant research papers from the journals

CSE-582 AGENT SYSTEMS AND SECURITY

An introduction to Software Agents What is a software agent? Why software agents? Intelligent agents, Agents and environments, Good behavior and concept of rationality, The nature of environments, The structure of agents. Goal based agents Problem-solving agents, Example problems, searching for solutions, Uniformed Search Strategies, Avoiding repeated states, searching with partial information. Learning Forms of learning, Inductive learning, learning decision trees, Ensemble learning. Agents in use How will we use agents?, Health, E-mail, Finance, Information, Banks, Retail, Media, Agents in IT, Government. Security in mobile agent system Problems and approaches Mobile agent security, attacks and countermeasures of software system security, security issue in a mobile agent system, New formal model, extended elementary object system (EEOS), Translating the EEOS model to colored petri net model, Simulation and analysis of the extended elementary object system model of a secure mobile agent system, An introduction to multiagent system, intelligent agents, deductive reasoning agents, practical reasoning agents, reactive and hybrid agents. Introduction, security threats; agent to platform, agent to agent, platform to agent, other to agent platform. Security requirements; Confidentiality, Integrity, Accountability, availability. Anonymity; Countermeasures, protecting the agent platform, protecting agents. Mobile agent applications and security scenarios; E-
commerce, Network management, Personal digital assistants  Multiagent systems  Multiagent system issues and challenges, Multiagent planning, Multiagent system applications

References:

5. Relevant Research papers from the journals.

OPEN ELECTIVE

CSE-536 MULTICORE PROGRAM OPTIMIZATION

[3 0 0 3]

Introduction to parallel computers; Instruction Level Parallelism (ILP); Multiprocessors and thread level parallelism; Shared Memory Multiprocessors; Cache coherence problems; Snoopy protocols: invalidate vs. update; Memory consistency models; Hyper threading technology architecture, multi-core architecture; Multi-threading on single core versus multi-core platforms; Amdahl’s law; Power consumption; Synchronization; Introduction to Basic optimization; Hot Spot, Faster Algorithms, Data Dependency, Branching, Memory, Loops, Slow Operations; Introduction to Performance Tools (Intel Software Tools); Introduction to Multi-core Optimization; ILP vs TLP, Data vs Task Parallelism, Threading and Parallel programming constructs, Threading APIs, Multi Threading with OpenMP, Threading Goals and Issues; Multithreaded and Parallel Applications Case studies; Some applications in Integer Programming, Digital Signal Processing(Video Codec)

References:

2. Shameem Akhter, Jason Roberts. Multi-Core Programming: Increasing Performance through Software Multi-threading
5. Relevant papers from Intel, IEEE and other journals
7. www.llnl.gov/computing/tutorials/openMP/

References:

6. Relevant research papers from the journals

III/IV SEMESTER

CSE-699 DISSEMINATION/THESIS/PROJECT [ - - - 40]

The duration of this major project is one year. Students are required to undertake innovative and research oriented projects, which not only reflect their knowledge gained in the previous two semesters but also reflects additional knowledge gained from their own effort. They must show the phase wise development of their project submitting the appropriate documents at the end of each phase.