

B.E COMPUTER ENGINEERING FOURTH YEAR SEM VIII

SUB: SYSTEM SECURITY

- 1. Introduction:** Security, Attacks, Computer criminals, Method of Defense
- 2. Cryptography:** Basic Cryptography: Classical Cryptosystems, Public Key Cryptography, Cryptographic checksum, Key Management: Key Exchange, Key generation, cryptographic Key infrastructure, Storing and revoking keys, Hash Algorithm, Digital Signature, Cipher Techniques: problems, Stream and block ciphers: AES, DES, RC4
- 3. Program Security:** Secure programs, Non-malicious program errors, Viruses and other malicious code, Targeted malicious code, controls against program threats
- 4. Operating System Security:** Protected Objects and methods of protection, Memory address protection, Control of access to general objects, File protection mechanism, Authentication: Authentication basics, Password, Challenge-Response, biometrics.
- 5. Database Security:** Security requirements, Reliability and integrity, sensitive data, interface, multilevel database, Proposals for multilevel security
- 6. Security In Networks:** Threats in networks, Network security control, Firewalls, Intrusion detection systems, Secure E-mail, Networks and cryptography, Example protocols: PEM, SSL, IPsec
- 7. Administrating Security:** Security planning, Risk Analysis, Organizational security policies, Physical Security
- 8. Legal, Privacy and Ethical Issues in Computer Security:** Protecting programs and data, information and law, rights of employees and employers, Software failures, Computer Crime, Privacy, Ethical issues in computer society, case studies of ethics

Books:

TEXT BOOKS:

1. Stallings, "Cryptography and Network Security: Principles and Practice"
2. C.P. Pfleeger and S.L.Pfleeger, " Security in Computing", Pearson Education
3. Matt Bishop, "Computer Security: Art and Science", Pearson Education

References:

1. Kaufman, Perlman, Speciner, "Network Security"
2. Eric Malwald, "Network Security: A Beginner's Guide", TMH
3. Bruce Schneier, "Applied Cryptography", John Wiley
4. Macro Pistoia , " Java network security", Pearson Education
5. Whitman, Mattord, "Principles of Information security", Thomson

TERM WORK

Term work should consist of at least 10 practical experiments and two assignments covering the topics of the syllabus.

Oral Examination

An oral examination is to be conducted based on the above syllabus.

B.E Computer Engineering
Fourth Year SEM VIII
DISTRIBUTED COMPUTING

1. **Introduction to Distributed system:** Goals, Hardware concepts, Software concepts, and Client-Server Model. Examples of distributed systems.
2. **Communication:** Layered protocols, Remote procedures call, Remote object invocation, Message-oriented Communication, Stream-Oriented communication
3. **Processes:** Threads, clients, servers, code migration, software agent
4. **Naming:** Naming entities, locating mobile entities, removing un-referenced entities.
5. **Synchronization:** Clock synchronization, Logical clocks, Global state, Election Algorithms, Mutual Exclusion, Distributed transactions
6. **Consistency and replication:** Introduction, Data centric consistency models, Client centric consistency models, distribution protocols, Consistency protocols.
7. **Fault Tolerance:** Introduction, process resilience, Reliable client server communication, Reliable group communication, Distributed commit, Recovery.
8. **Security:** Introduction, Secure channels, Access control, Security management.
9. **Distributed File system:** Sun network file system, CODA files system.
10. **Case study:** CORBA, Distributed COM, Globe, Comparison of CORBA, DCOM and Globe.

BOOKS:

Text Books:

1. A.Taunenbaum, "Distributed systems: Principles and Paradigms"
2. G.Coulouris, J.Dollimore, and T.Kindberg, "Distributed Systems: Concepts and Design", Pearson Education

References

1. M.Singhal, N.Shivaratri, "Advanced Concepts in Operating Systems", TMH

TERM WORK

Term work should consist of at least 10 practical experiments and two assignments covering the topics of the syllabus.

ORAL EXAMINATION

An oral examination is to be conducted based on the above syllabus.

**B.E COMPUTER ENGINEERING
FOURTH YEAR SEMESTER VII
MULTIMEDIA SYSTEMS**

Syllabus

1. **Multimedia Systems Introduction:** Multimedia application, Multimedia system architecture, Evolving Technologies for multimedia systems, defining objects for multimedia systems, Multimedia data interface standards.
2. **Compression and Decompression:** Types of Compression, Binary image compression schemes, Color, Gray scale, Still video image compression, Video image compression, Audio compression, Fractal compression, Data and File Format Standards: Rich Text Format, TIFF, RIFF, MIDI, JPEG, AVI, MPEG
3. **Multimedia Input/Output Technologies:** Key Technologies issues, Pen input, Video and Image display system, Printout Technology, Image Scanners, Digital Voice and Audio, Full motion video
4. **Storage and Retrieval Technologies:** Magnetic media technology, Optical media, Hierarchical storage management, Cache management for storage system, Image and Video databases: Indexing and Retrieval
5. **Architectural and Telecommunications Considerations:** Specialized computational processors, Memory systems, Multimedia board solutions, LAN/WAN connectivity, Multimedia transport across ATM networks, Multimedia across wireless, Distributed object models
6. **Multimedia Networking:** Multimedia networking applications, streaming stored audio and video, RTP, Scheduling and policing mechanisms, Integrates Services, RSVP
7. **Multimedia Application Design:** Multimedia Application Classes, Types of multimedia systems, Virtual reality design, Components of multimedia systems, organizing multimedia databases, application workflow design issues, Distributed application design issues, Applications like Interactive, Television, Video Conferencing, Video-on-demand, Educational Applications and authoring, Industrial Applications, Multimedia Archives and digital libraries.
8. **Multimedia Authoring and User Interface:** Multimedia Authoring systems, Hyper media application design considerations, User interface design, information access, Object display/playback issues
9. **Hyper Media Messaging:** Mobile Messaging, Hyper media message components, Hypermedia linking and embedding, Creating Hypermedia messages, integrated multimedia message standards, Integrated document management, the World-wide web, Open hypermedia systems, Content based navigation.
10. **Distributed Multimedia systems:** Components of Distributed multimedia systems, Distributed Client server operations, Multimedia object servers, Multi server network topologies, Distributed multimedia database, managing distributed objects.
11. **Multimedia System Design:** Methodology and considerations, Multimedia systems design examples

Books:

1. Prabhat.K.Andheigh, Kiran Thakrar, “Multimedia Systems Design”, PHI John F
2. Koegel Buford, “Multimedia Systems”, Pearson Education

References:

1. Free Halshall, “Multimedia Communications”, Pearson Education
2. R.Steimnetz, K.Nahrstedt, “Multimedia Computing, Communications and Applications”, Pearson Education.
3. K.R Rao, D.Milovanovic, “Multimedia Communication Systems: Techniques, Standards and Networks”
4. Subrahmanian, “Multimedia Database Systems”, M.Kaufman
5. J.D. Gibson, “Multimedia Communications: Directions and Innovations”, Academic Press, Hardcourt India
6. J.F Kurose, K.W Ross, “Computer Networking”, Pearson Education

TERMWORK

Term work should consist of at least 10 practical experiments and two assignments covering the topics of the syllabus.

ORAL EXAMINATION

An oral examination is to be conducted based on the above syllabus.

B.E Computer Engineering**Fourth Year SEM VIII****Subject: Elective-II, Robotics****Detailed Syllabus:**

Robotic Manipulation: Automation and Robots, Classification, Application, Specification, Notations

Direct Kinematics: Dot and Cross products, coordinate Frames, Rotations, Homogenous, co-ordinates, Link coordination arm equation, (Five-axis robot, Four-axis robot, Six-axis robot)

Inverse Kinematics: General properties of solutions tool configuration five axis robots, three-four axis, six axis robot (Inverse Kinematics)
Workspace analysis and trajectory planning work envelop and examples, workspace fixtures, Pick and place operations, continuous path motion, Interpolated motion, Straight-line motion

Robot Vision: Image representation, Template matching, Polyhedral objects, Shape analysis, segmentation (Thresholding, region labeling, Shrink operators, Swell operators, Euler numbers, Perspective transformation, Structured Illumination, Camera Calibration)

Task Planning: Task Level programming, Uncertainty, Configuration, Space, Gross motion, Planning, Gasp planning, Fine-motion Planning, Simulation of planer motion, Source and goal scenes, Task planner simulation.

Moments and Inertia.

Principles of NC and CNC machines

Books:

Text Books: Robert Shilling, fundamentals of robotics-analysis and control, Prentice hall of India

Fu, Gonzales and Lee, Robotics, McGraw Hill

J.J, Craig, Introduction to Robotics, Pearson Education

Additional Reading:

Staughard, Robotics and AI, Prentice Hall of India

Grover, Wiess, Nagel, Oderey, "Industrial Robotics", McGraw Hill

Walfram, Stdder, Robotics and Mechatronics

Niku, Introduction to Robotics, Pearson Education

Klafter, Chmielewski, Negin, Robot Engineering, Prentice Hall of India

Mittal, Nagrath, Robotics and control, Tata McGraw Hill publications

TERM WORK:

Term work should consist of at least 10 practicals and assignments covering the topics of the syllabus

A term work shall be conducted with a weightage of 10 marks

Oral Examination:

An oral examination is to be conducted based on the above syllabus

B.E Computer Engineering

Fourth Year SEM VIII

Subject: Computer Vision (ELECTIVE-II)

Detailed Syllabus:

Recognition Methodology: Conditioning, Labeling, Grouping, Extracting, Matching.

Edge detection, Gradient based operators, Morphological operators, spatial operators for

edge detection. Thinning, Region growing, region shrinking, Labeling of connected components.

Binary Machine Vision: Thresholding, Segmentation, Connected component labeling, Hierarchical segmentation, spatial clustering, Split & merge, Rule-based segmentation, Motion based segmentation.

Area Extraction: Concepts, Data structures, Edge, Line-linking, Hough transform, Line fitting, Curve fitting (Least square fitting)

Region Analysis: Region Properties, External points, spatial moments, mixed spatial, gray-level moments, Boundary analysis: Signature properties, Shape numbers.

Facet Model Recognition: Labeling Lines, Understanding line drawings, Classification of shapes by labeling of edges, Recognition of shapes, Consistent labeling problem, Back-tracking, Perspective Projective geometry, Inverse perspective Projection, Photogrammetry- from 2D to 3D, Image matching: Intensity matching of ID signals, Matching of 2D image, Hierarchical image matching.

Object Models and Matching: 2D representation, Global vs. Local features.

General Frame Works for Matching: Distance relational approach, ordered structural matching, View class matching, Models database organization.

General Frame Works: Distance-relational approach, Ordered-structural matching, View class matching, Models database organization.

Knowledge Based Vision: Knowledge representation, Control strategies, Information integration.

BOOKS:

TEXT BOOKS:

1. David A.Forsyth, Jean Ponce, "Computer Vision: A Modern Approach"
2. R.Jain, R.Kasturi and B.G Schunk, "Machine Vision", McGraw Hill.

References:

1. Milan Sonka, Vaclav Hlavac, Roger Boyle, "Image Processing, Analysis, and Machine Vision", Thomson Learning
2. Robert Haralick and Linda Shapiro, "Computer and Robot Vision", Vol I,II, Addison Wesley, 1993

TERM WORK:

Term work should consist of at least 10 practical experiments and two assignments covering the topics of the syllabus.

ORAL EXAMINATION

An oral examination is to be conducted based on the above syllabus.

B.E Computer Engineering

Fourth Year SEM VIII

Subject: Computer Vision (ELECTIVE-II)

Detailed Syllabus:

Recognition Methodology: Conditioning, Labeling, Grouping, Extracting, Matching. Edge detection, Gradient based operators, Morphological operators, spatial operators for edge detection. Thinning, Region growing, region shrinking, Labeling of connected components.

Binary Machine Vision: Thresholding, Segmentation, Connected component labeling, Hierarchical segmentation, spatial clustering, Split & merge, Rule-based segmentation, Motion based segmentation.

Area Extraction: Concepts, Data structures, Edge, Line-linking, Hough transform, Line fitting, Curve fitting (Least square fitting)

Region Analysis: Region Properties, External points, spatial moments, mixed spatial, gray-level moments, Boundary analysis: Signature properties, Shape numbers.

Facet Model Recognition: Labeling Lines, Understanding line drawings, Classification of shapes by labeling of edges, Recognition of shapes, Consistent labeling problem, Back-tracking, Perspective Projective geometry, Inverse perspective Projection, Photogrammetry- from 2D to 3D, Image matching: Intensity matching of ID signals, Matching of 2D image, Hierarchical image matching.

Object Models and Matching: 2D representation, Global vs. Local features.

General Frame Works for Matching: Distance relational approach, ordered structural matching, View class matching, Models database organization.

General Frame Works: Distance-relational approach, Ordered-structural matching, View class matching, Models database organization.

Knowledge Based Vision: Knowledge representation, Control strategies, Information integration.

BOOKS:

TEXT BOOKS:

3. David A.Forsyth, Jean Ponce, “Computer Vision: A Modern Approach”
4. R.Jain, R.Kasturi and B.G Schunk, “Machine Vision”, McGraw Hill.

References:

3. Milan Sonka, Vaclav Hlavac, Roger Boyle, “Image Processing, Analysis, and Machine Vision”, Thomson Learning
4. Robert Haralick and Linda Shapiro, “Computer and Robot Vision”, Vol I,II, Addison Wesley, 1993

TERM WORK:

Term work should consist of at least 10 practical experiments and two assignments covering the topics of the syllabus.

ORAL EXAMINATION

An oral examination is to be conducted based on the above syllabus.

**B.E COMPUTER ENGINEERING
FOURTH YEAR SEM VIII**

Subject: Data Warehousing and Mining (ELECTIVE-II)

Detailed Syllabus:

Data Warehousing:

Overview and concepts: Need for data warehousing, basic elements of data warehousing, Trends in data warehousing

Planning and requirements: Project planning and management, collecting the requirements

Architecture and Infrastructure: Architectural components, Infrastructure and metadata.

Data Design and Data Representation: Principles of dimensional modeling, Dimensional modeling advanced topics, data extraction, transformation and loading, data quality

Information Access and Delivery: Matching information to classes of users, OLAP in data warehouse, Data Warehousing and the web.

Implementation and Maintenance: Physical design process, data warehouse deployment, growth and maintenance.

Data Mining:

Introduction: Basics of data mining, related concepts, Data mining techniques.

Data Mining Algorithms: Classification, Clustering, Association rules

Knowledge Discovery: KDD Process

Web Mining: Web Content Mining, Web Structure Mining, Web Usage Mining

Advanced Topics: Spatial mining, Temporal Mining

Visualization: Data generalization and summarization-based characterization, Analytical characterization: analysis of attribute relevance, Mining class comparisons: Discriminating between different classes, mining descriptive statistical measures in large databases.

Data Mining Primitives, Languages and System Architectures: Data mining primitives, Query language, Designing GUI based on a data mining query language, Architectures of data mining systems

Application and Trends in Data mining: Applications, systems products and research prototypes, Additional Themes in data mining, Trends in data mining

BOOKS:

TEXT BOOKS:

1. Paulraj Ponnian, "Data Warehousing Fundamentals", John Wiley
2. M.H Dunham, "Data Mining Introductory and Advanced Topics", Pearson Education
3. Han, Kamber, "Data Mining Concepts and Techniques", Morgan Kaufmann

References:

1. Ralph Kimbal, "The Data Warehouse Lifecycle toolkit", John Wiley

2. M.Berry and G.Linoff, "Mastering Data Mining", John Wiley
3. W.H. Inmon, "Building the Data Warehouses", Wiley Dreamtech
4. R.Kimpall, "The Data Warehouse Toolkit", John Wiley
5. E.G.Mallach, "Decision Support and Data Warehouse Systems", TMH

TERM WORK:

Term work should consist of at least 10 practical experiments and two assignments covering the topics of the syllabus

Oral Examination:

An Oral Examination is to be conducted based on the above syllabus.