

Mumbai University

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B.E. SEMESTER VIII

Scheme of Instructions					Scheme of Evaluation					
Subjects	Lect/	Pract/	Tuto/	Hours	Paper		T/W	Pract	Oral	Total
	Week	Week	Week		Marks					
1	Data Warehousing and Mining*	4	2	-	3	100	25	-	25	150
2	Multimedia Systems*	4	2	-	3	100	25	-	25	150
3	Project Management	4	2	-	3	100	25	-	25	150
4	Elective-II	4	2	-	3	100	25	-	25	150
5	Project-B	-	-	6	-	-	50	-	50	100
		16	8	6	-	400	150	-	150	700

Elective-II	
1	Robotics*
2	Computer Vision*
3	Geographical Information System
4	Neural Networks and Fuzzy Systems*
5	Software Testing*
6	Information Security

* Common with CE

B.E. INFORMATION TECHNOLOGY
FOURTH YEAR SEMESTER VIII

SUBJECT: DATA WAREHOUSING AND MINING

Lectures: 4 Hrs per week
Practical: 2 Hrs per week

Theory: 100 Marks
Term work: 25 Marks
Oral Exam: 25 Marks

Objectives of the course: The data warehousing part of module aims to give students a good overview of the ideas and techniques which are behind recent development in the data warehousing and online analytical processing (OLAP) fields, in terms of data models, query language, conceptual design methodologies, and storage techniques. Data mining part of the model aims to motivate, define and characterize data mining as process; to motivate, define and characterize data mining applications.

Pre-requisites: DBMS

DETAILED SYLLABUS

Data Warehousing:

1. Overview And Concepts: Need for data warehousing, Basic elements of data warehousing, Trends in data warehousing.
2. Planning And Requirements: Project planning and management, Collecting the requirements.
3. Architecture And Infrastructure: Architectural components, Infrastructure and metadata.
4. Data Design And Data Representation: Principles of dimensional modeling, Dimensional modeling advanced topics, data extraction, transformation and loading, data quality.
5. Information Access And Delivery: Matching information to classes of users, OLAP in data warehouse, Data warehousing and the web.
6. Implementation And Maintenance: Physical design process, data warehouse deployment, growth and maintenance.

Data Mining:

1. Introduction: Basics of data mining, related concepts, Data mining techniques.
2. Data Mining Algorithms: Classification, Clustering, Association rules.
3. Knowledge Discovery : KDD Process
4. Web Mining: Web Content Mining, Web Structure Mining, Web Usage mining.
5. Advanced Topics: Spatial mining, Temporal mining.
6. Visualisation : 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
7. 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
8. 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 Kimball, "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

1. 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. INFORMATION TECHNOLOGY
FOURTH YEAR SEMESTER VIII

SUBJECT: MULTIMEDIA SYSTEMS

Lectures: 4 Hrs per week
Practical: 2 Hrs per week

Theory: 100 Marks
Term work: 25 Marks
Oral: 25 marks

Objectives of the course: This course teaches students to collect, and intelligently integrate multiple media on computers. Students learn the issues involved in capturing, compressing, processing, manipulating, searching, indexing, storing, and retrieving various kinds of continuous media in the text section.

Pre-requisites: Operating Systems, Computer Networks

DETAILED 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, Integrated 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

<p>topologies, Distributed multimedia database, Managing distributed objects</p> <p>11. Multimedia System Design: Methodology and considerations, Multimedia systems design examples.</p>
<p>Books</p>
<p>Text Books:</p>
<ol style="list-style-type: none"> 1. Prabhat K. Andheigh, Kiran Thakrar, "Multimedia Systems Design", PHI John F, 2. Koegel Buford, "Multimedia Systems", Pearson Education.
<p>References :</p>
<ol style="list-style-type: none"> 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
<p>TERM WORK</p>
<ol style="list-style-type: none"> 2. Term work should consist of at least 10 practical experiments and two assignments covering the topics of the syllabus.
<p>ORAL EXAMINATION</p>
<p>An oral examination is to be conducted based on the above syllabus.</p>

B.E. INFORMATION TECHNOLOGY
FOURTH YEAR SEMISTER VIII

SUBJECT: PROJECT MANAGEMENT

Lectures: 4 Hrs per week
Practical: 2 Hrs per week

Theory: 100 Marks
Term Work: 25 Marks
Oral: 25 Marks

Objectives: This course will help to identify key areas of concern and uses of measurement for project management, define indicators based upon what a project manager would want to know, use measurement to support decision making, understand where measurement is used from the perspective of a generic management process

Pre-requisite: Software Engineering

DETAILED SYLLABUS

1. Project Management: Introduction, Need, Goals, Evolution, Project environments, Systems, Organizations, and System methodologies.
2. Systems Development Cycle: Early stages: Life cycle, Development cycle, Constraints in systems development, Phase A: Conception, Project proposals, Project contracting; Middle and Later stages: Phase B: definition, Phase c: Execution, Implementation stage, Phase D: Operation, System development in Industrial and service Organization, System development in large Government programs.
3. Systems and Procedures: Planning fundamentals: Planning steps, Project master plan, Scope and work definition, Project organization structure and responsibilities, Project management system, Scheduling, Planning and scheduling charts;
4. Network scheduling and PDM: Logic diagram and network, Critical path, Scheduling and time based networks, Management schedule reserve, PDM networks, PERT, CPM, Resource allocation, GERT;
5. Cost estimating and budgeting: Cost estimating, Cost escalation, Cost estimating and system development cycle, Cost estimating process, Elements of budgets and estimates, Project cost accounting and MIS, Budgeting using cost accounts, Cost schedules and forecasts;
6. Risk Management: Basic concepts, Identification, Assessment, Response planning, management;
7. Project Control: Control process, Control emphasis, Information monitoring, Internal and external project control, Traditional cost control, Cost accounting systems for project control, Performance analysis, Performance index monitoring, Variance limits, Controlling changes, Contract administration, Control problems;
8. Project Management Information System: Functions of PMIS, Computer based tools, Computer -based PMIS, Representative Computer -based PMIS, Web based Project management, Applying computer based PMS, Project evaluation, Project reporting, Project
9. Software Quality: Introduction, Importance, ISO 9126, Software quality measures, External standards, Techniques to enhance software quality
10. Termination: Terminating the project, termination responsibilities, Closing and contracts, Project extension.
11. Organization Behavior: Project Organization structure and integration: Organization structure, Formal organization structure, Organization design by differentiation and integration, Requirements of project organizations, Integration of subunits in projects,

liaison roles, Task forces, and Teams, Project expeditors and co-coordinators, Matrix organization, Informal organization, Concurrent engineering, Quality function deployment; Project roles, Responsibility and Authority, Managing participation, Team work and conflict.

BOOKS

Text Books:

1. J. M. Nicholas, "Project Management for Business and Technology", PHI
2. B. Hughes, M. Cotterell, "Software Project Management", TMH

References:

1. R. K. Wysocki, R. Beck Jr., D.B. Crane, "Effective Project Management", John Wiley
2. J. Phillips, "IT Project Management", TMH
3. P. Jalote, "Software Project Management in Practice", Pearson Education

TERM WORK

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

ORAL EXAMINATION

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

B.E. INFORMATION TECHNOLOGY
FOURTH YEAR SEMESTER VIII

SUBJECT: ROBOTICS
(ELECTIVE-II)

Lectures: 4 Hrs per week
Practical: 2 Hrs per week

Theory: 100 Marks
Term Work: 25 Marks
Oral: 25 Marks

Objective: The goal of the course is to familiarize the students with the concepts and techniques in robot manipulator control, enough to evaluate, chose, and incorporate robots in engineering systems.

Pre-requisite: Exposure to linear algebra and matrix operations. Exposure to programming in a high level language

DETAILED SYLLABUS

1. Robotic Manipulation: Automation and Robots, Classification, Application, Specification, Notations.
2. Direct Kinematics: Dot and cross products, Co-ordinate frames, Rotations, Homogeneous, Co-ordinates, Link co-ordination arm equation, (Five-axis robot, Four axis robot, Six axis robot).
3. Inverse Kinematics: General properties of solutions tool configuration Five axis robots, Three-Four axis, Six axis robot (Inverse kinematics).
4. Workspace analysis and trajectory planning work envelop and examples, workspace fixtures, Pick and place operations, Continuous path motion, Interpolated motion, Straight-line motion.
5. Robot Vision: Image representation, Template matching, Polyhedral objects, Shane analysis, Segmentation (Thresholding, region labeling, Shrink operators, Swell operators, Euler numbers, Perspective transformation, Structured Illumination, Camera calibration).
6. Task Planning: Task level programming, Uncertainty, Configuration, Space, Gross motion, Planning, Grasp planning, Fine-motion Planning, Simulation of Planer motion, Source and goal scenes, Task planner simulation.
7. Moments of Inertia.
8. Principles of NC and CNC Machines.

BOOKS

Text Books:

1. Robert Shilling, "Fundamentals of Robotics-Analysis and control", PHI.
2. Fu, Gonzales and Lee, "Robotics", McGraw Hill
3. J.J, Craig, "Introduction to Robotics", Pearson Education

References:

1. Staughard, "Robotics and AI", PHI.
2. Grover, Wiess, Nagel, Oderey, "Industrial Robotics", McGraw Hill
3. Walfram Stdder, "Robotics and Mecatronics", TMH.
4. Niku, "Introduction to Robotics", Pearson Education
5. Klafter, Chmielewski, Negin, "Robot Engineering", PHI
6. Mittal, Nagrath, "Robotics and Control", TMH

TERM WORK
4. 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. INFORMATION TECHNOLOGY
FOURTH YEAR SEMESTER VIII

SUBJECT: COMPUTER VISION
(ELECTIVE-II)

Lectures: 4 Hrs per week
Practical: 2 Hrs per week

Theory: 100 Marks
Term Work: 25 Marks
Oral: 25 Marks

Objective: To introduce the student to computer vision algorithms, methods and concepts which will enable the student to implement computer vision systems with emphasis on applications and problem solving

Pre-requisite: Introduction to Image Processing.

DETAILED SYLLABUS

9. 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.
10. Binary Machine Vision: Thresholding, Segmentation, Connected component labeling, Hierarchical segmentation, Spatial clustering, Split & merge, Rule-based Segmentation, Motion-based segmentation.
11. Area Extraction: Concepts, Data-structures, Edge, Line-Linking, Hough transform, Line fitting, Curve fitting (Least-square fitting).
12. Region Analysis: Region properties, External points, Spatial moments, Mixed spatial gray-level moments, Boundary analysis: Signature properties, Shape numbers.
13. 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.
14. Object Models And Matching: 2D representation, Global vs. Local features.
15. General Frame Works For Matching: Distance relational approach, Ordered-structural matching, View class matching, Models database organization.
16. General Frame Works: Distance -relational approach, Ordered -Structural matching, View class matching, Models database organization.
17. 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
5. 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. INFORMATION TECHNOLOGY
FOURTH YEAR SEMISTER VIII

SUBJECT: GEOGRAPHICAL INFORMATION SYSTEM
(ELECTIVE-II)

Lectures: 4 Hrs per week
Practical: 2 Hrs per week

Theory: 100 Marks
Term work: 25 Marks
Oral Exam: 25 Marks

Objectives: This course is designed to provide an introduction to and an understanding of the basic concepts, procedures and applications of the exciting and rapidly expanding field of Geographical Information Systems.

Pre-requisites: Image processing, Computer programming concepts

DETAILED SYLLABUS

1. Introduction To GIS: Introduction, Definition of GIS, Evolution of GIS, Component of GIS.
2. Maps And GIS: Map scale, Classes of map, Mapping process, Coordinate systems, Map projection, Spatial framework for mapping locations, Topographic mapping, Attribute data for Thematic mapping
3. Digital Representation Of Geographic Data: Technical issues to digital representation of data, Database and Database management System, Raster geographic data representation, Vector geographic data representation, Object oriented geographic data representation, Relationship between Data representation and Data analysis.
4. Data Quality And Standards: Concepts and definition of data quality, Component of geographic data, Data quality assessment, Spatial data error management, Geographic data standards, Geographic data standards and GIS development.
5. GIS Data Processing, Analysis And Visualization: Raster based GIS data processing, Vector based GIS data processing, Human computer interaction and GIS, Visualization of geographic information, Principles of Cartographic design in GIS, Generation of information product.
6. Data Modeling: Digital Terrain Modeling, Approaches to digital terrain data modeling, Acquisition of digital terrain data, Data processing, Analysis and visualization, Spatial modeling, Descriptive statistics, Spatial autocorrelation, Quadrat counts and Nearest- Neighbor analysis, Trend surface analysis, Gravity models.
7. GIS Project Design And Management: Software engineering as applied to GIS, GIS project planning, System analysis and study of user requirement, Geographic database design methodology, GIS application software design methodology, System implementation, System maintenance and support.
8. GIS Issues And Future Of GIS: Issues of implementing GIS, Trend of GIS development, GIS applications and GIS users.

BOOKS

Text Books:

1. C.P. Lo, Albert K.W. Yeung, "Concepts and Techniques of Geographic Information Systems", PHI
2. Kang-Tsung Chang, "Introduction to Geographic Information Systems", TMH

References:

1. Ian Heywood, Sarah Cornelius, Steve Carver, "An Introduction to Geographical Information System", Person Education
2. Peter A Burrough, R. A. McDonnell, "Principles of Geographical Information System", Oxford Press

TERM WORK

6. 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. INFORMATION TECHNOLOGY
FOURTH YEAR SEMESTER VIII

SUBJECT: NEURAL NETWORKS & FUZZY SYSTEMS
(ELECTIVE-II)

Lectures: 4 Hrs per week
Practical: 2 Hrs per week

Theory: 100 Marks
Term Work: 25 Marks
Oral: 25 Marks

Objective: This course covers basic concepts of artificial neural networks, fuzzy logic systems and their applications. Its focus will be on the introduction of basic theory, algorithm formulation and ways to apply these techniques to solve real world problems.

Pre-requisite: Knowledge of calculus, and basic probability and statistics are required. Background in the following subjects desirable: numerical analysis (including optimization). Programming skills in one of the following would be desirable: Matlab, MathCad, C, Java, C++

DETAILED SYLLABUS

1. Introduction: Biological neurons, McCulloch and Pitts models of neuron, Types of activation function, Network architectures, Knowledge representation. Learning process: Error-correction learning, Supervised learning, Unsupervised learning, Learning Rules.
2. Single Layer Perceptron: Perceptron convergence theorem, Method of steepest descent - least mean square algorithms.
3. Multilayer Perceptron: Derivation of the back-propagation algorithm, Learning Factors.
4. Radial Basis and Recurrent Neural Networks: RBF network structure, theorem and the reparability of patterns, RBF learning strategies, K-means and LMS algorithms, comparison of RBF and MLP networks, Hopfield networks: energy function, spurious states, error performance .
5. Simulated Annealing: The Boltzmann machine, Boltzmann learning rule, Bidirectional Associative Memory.
6. Fuzzy logic: Fuzzy sets, Properties, Operations on fuzzy sets, Fuzzy relations, Operations on fuzzy relations, The extension principle, Fuzzy measures, Membership functions, Fuzzification and defuzzification methods, Fuzzy controllers.

BOOKS

Text Books:

1. Simon Haykin, "Neural Network a - Comprehensive Foundation", Pearson Education
2. Zurada J.M., "Introduction to Artificial Neural Systems, Jaico publishers
3. Thimothy J. Ross, "Fuzzy Logic with Engineering Applications", McGraw Hill
4. Ahmad Ibrahim, "Introduction to Applied Fuzzy Electronics", PHI

References:

1. Yegnanarayana B., "Artificial Neural Networks", PHI
2. Driankov D., Hellendoorn H. & Reinfrank M., "An Introduction to Fuzzy Control", Norosa Publishing House
3. Berkan R.C., and Trubatch S.L., "Fuzzy Systems Design Principles", IEEE Press

TERM WORK

7. 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. INFORMATION TECHNOLOGY
FOURTH YEAR SEMESTER VIII

SUBJECT: SOFTWARE TESTING
(ELECTIVE-II)

Lectures: 4 Hrs per week
Practical: 2 Hrs per week

Theory: 100 Marks
Term work: 25 Marks
Oral: 25 marks

Objectives To improve your understanding of software testing - its purpose and nature - and raise your awareness of issues and constraints around testing. To provide a professional qualification widely recognized by employers, customers and peers. To learn standard terminology. Discover good sources of information. To provide a complete picture of the test activities and processes from requirements review to system implementation.

Pre-requisites: Software Engineering, OOAD

DETAILED SYLLABUS

1. Introduction: Defect, Defect Vs failures, Process problems and defect rates, The business perspective for testing
2. Building a Software Testing Strategy: Computer system strategic risk, Economics of testing, Common computer problems, Economics of SDLC testing, Testing- an organizational issue, Establishing a testing policy, Structured approach to testing, Test strategy, Testing methodology
3. Establishing a Software Testing Methodology: Introduction, Verification and validation, Functional and structural testing, Workbench concept, Considerations in developing testing methodologies
4. Determining Software Testing Techniques: Testing techniques/tool selection process, Selecting techniques/tools, Structural system testing techniques, Functional system testing techniques, Unit testing techniques, Functional testing and analysis
5. Selecting and Installing Software Testing Tools: Testing tools-Hammers of testing, Selecting and using the test tools, Appointing managers for testing tools
6. Software Testing Process: Cost of computer testing, Life cycle testing concept, Verification and validation in the software development process, Software testing process, Workbench skills
7. Software Testing Process: Access Project Management Development Estimate and Status, Test Plan, Requirements Phase Testing, Design Phase Testing, Program Phase Testing, Execute Test and Record Results, Acceptance Test, Report Test Result, Testing Software Installation, Test Software Change, Evaluate Test Effectiveness
8. Testing Specialized Systems and Applications: Client/Server systems, RAD, System documentation, Web based systems, Off-the-self software, Multi platform environment, Security, Data Warehouse
9. Building Test Document: Uses, Types, Responsibility, Storage, Test plan documentation, Test analysis report documentation

Books

Text Books:

3. W.E. Perry, "Effective Methods for Software Testing", John Wiley.
4. Kaner C., Nguyen H., Falk J., "Testing Computer Software", John Wiley.

References :

1. Boris Beizer, "Software Testing Techniques", Dreamtech
2. Louise Tamres, "Introducing Software Testing", Pearson Education.

TERM WORK

8. 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. INFORMATION TECHNOLOGY
FOURTH YEAR SEMISTER VIII

SUBJECT: INFORMATION SECURITY
(ELECTIVE-II)

Lectures: 4 Hrs per week
Practical: 2 Hrs per week

Theory: 100 Marks
Term work: 25 Marks
Oral: 25 Marks

Objectives of the course: Learn about the threats in computer security. Understand what puts you at a risk and how to control it. Controlling a risk is not eliminating the risk but to bring it to a tolerable level.

Pre-requisites: Computer Networks, Operating system.

DETAILED SYLLABUS

1. Introduction: Security, Attacks, Computer criminals, Method of defense
2. Program Security: Secure programs, Non-malicious program errors, Viruses and other malicious code, Targeted malicious code, Controls against program threats
3. 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.
4. Database Security: Security requirements, Reliability and integrity, Sensitive data, Interface, Multilevel database, Proposals for multilevel security
5. Security in Networks: Threats in networks, Network security control, Firewalls, Intrusion detection systems, Secure e-mail, Networks and cryptography, Example protocols: PEM, SSL, IPsec
6. Administrating Security: Security planning, Risk analysis, Organizational security policies, Physical security.
7. 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. C. P. Pfleeger, and S. L. Pfleeger, "Security in Computing", Pearson Education.
2. Matt Bishop, "Computer Security: Art and Science", Pearson Education.

References :

1. Stallings, "Cryptography And Network Security: Principles and practice"
2. Kaufman, Perlman, Speciner, "Network Security"
3. Eric Maiwald, "Network Security : A Beginner's Guide", TMH
4. Macro Pistoia, "Java Network Security ", Pearson Education
5. Whitman, Mattord, "Principles of information security", Thomson

TERM WORK

9. 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. INFORMATION TECHNOLOGY
FOURTH YEAR SEMISTER VIII

SUBJECT: PROJECT-B

Tutorial: 6 Hrs per week

Term Work: 50 Marks

Oral: 50 Marks

GUIDELINES

1. Project-B exam be conducted by two examiners appointed by university. Students have to give demonstration and seminar on the project-B for the term work marks. All the students of the class must attend all the seminars. Seminars should be conducted continuously for couple of days.
2. Project -B should contain:
 - Introduction and motivation, Problem statement, Requirement analysis, Project design, Implementation details, Technologies used, Test cases, Project time line, Task distribution, References, and Appendix consisting of users manual, technical reference manual.
 - CD containing: Project documentation, Implementation code, Required utilities, Software's and Manuals.
 - Every student must prepare well formatted, printed and hard bound report.
3. Internal guide has to interact at least once in fortnight and maintain the progress and attendance report during the term.
4. Make sure that external project guides are BE graduates.
5. Convener should make sure that external examiners are appointed from the list as per appropriate technical area.