## B.E. COMPUTER ENGINEERING

### B.E. SEMESTER VIII

| Scheme of Instructions | | | | | Scheme of Evaluation | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Subjects | | Lect/ | Prac/ | Tuto/ | Paper | | T/W | Prac/ | Oral | Total |
| | | Week | Week | Week | Hours | Marks | | | | |
| 1 | System Security | 4 | 2 | --- | 3 | 100 | 25 | ---- | 25 | 150 |
| 2 | Distributed Computing | 4 | 2 | --- | 3 | 100 | 25 | ---- | 25 | 150 |
| 3 | Multimedia System | 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 |

| | |
|---|---|
| 1 | Robotics |
| 2 | Computer vision |
| 3 | Parallel Processing |
| 4 | Data Warehousing and Mining |
| 5 | Neural Networks and Fuzzy Systems |
| 6 | Software Testing |

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

## *SUBJECT : SYSTEM SECURITY*

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|---|---|
| **Lect : 4 Hrs per week** | **Theory : 100 Marks** |
| **Prac : 2 Hrs per week** | **Term work : 25 Marks** |
| | **Oral : 25 Marks** |

**Objective 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 Systems.**

## *DETAILED SYLLABUS*

1. **Introduction: Security, Attacks, Computer Criminals, Method of defense**
2. **Cryptography: Basic Cryptography: Classical Cryptography, Public key, Key generation, Cryptography key infrastructure, storing and revoking keys, Hash Algorithm ,Digital stricture, 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-mails, Network and cryptography, Examples 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 in computer society, Case studies of ethic**

## *Books*

**Text Books:**


1. **Stallings, "Cryptography and Network Security: Principle 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"**<br>2. **Eric Maiwald, "Network Security: A Begineer's Guide", TMH**<br>3. **Bruce Schneier, "Applied Cryptography", John Wiley.**<br>4. **Macro Pistoia, "Java Network Security", Pearson Education**<br>5. **Whitman, Mattord, " Principles of information security", Thomson** |
| ***TERM WORK*** |
| **11. Term work should consist of at least 10 Practicals experiments and two assignments covering the topics of syllabus.** |
| ***ORAL EXAMINATIONS*** |
| **An oral examination is to be conducted on the above syllabus.** |

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

**SUBJECT: DISTRIBUTED COMPUTING**

| | |
|---|---|
| **Lectures: 4 Hrs per week** | **Theory:100 Marks** |
| **Practical: 2 Hrs per week** | **Term Work:25 Marks** |
| | **Oral:25 Marks** |

**Objective: This course aims to build concepts regarding the fundamental principles of distributed systems. The design issues and distributed operating system concepts are covered.**

**Pre-requisites: Operating Systems & Computer Networks.**

**DETAILED SYLLABUS**

1. **Introduction to Distributed Systems: Goals, Hardware concepts, Software concepts, & 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 & Replication: Introduction, Data centric consistency models, Client centric consistency models, Distributed 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 file system.**
10. **Case Study: CORBA, Distributed COM, Globe, Comparison of CORBA, DCOM, & Globe.**

**BOOKS**

**Text Books:**

1. **A. Taunebaum,"Distributed Systems: Principles & Paradigms"**
2. **G. Coulouris, J. Dollimore, & T. Kindberg, "Distributed Systems: Concepts & Design", Pearson Education.**

**References:**

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

**TERM WORK**

**12.Term Work should consist of at least 10 practical experiments and 2 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**

## SUBJECT: MULTIMEDIA SYSTEMS

| | |
|---|---|
| **Lectures: 4 Hrs per week**<br>**Practical: 2 Hrs per week** | **Theory:100 Marks**<br>**Term Work:25 Marks**<br>**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

11. **Multimedia systems introduction: Multimedia applications, multimedia systems architecture, evolving technologies for multimedia systems, defining objects for multimedia systems, multimedia data interface standards**
12. **Compression and Decompression: Types of compressions, 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.**
13. **Multimedia I/O technologies: Key technologies issues, pen input, video and image display system, printout technology, image scanner, digital voice and audio, full motion video.**
14. **Storage and retrieval technologies: Magnetic media technology, optical media, hierarchical storage management, cache management for storage systems, image and video databases: indexing and retrieval**
15. **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**
16. **Multimedia networking: Multimedia networking applications, streaming stored audio and video, RTP, scheduling and policing mechanisms, integrated services, RSVP**
17. **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**
18. **Multimedia authoring and user interface: Multimedia authoring systems, hypermedia application design considerations, user interface design, information access, object display or playback issues.**
19. **Hyper Media Messaging: Mobile messaging, hyper media message components, hyper media linking and embedding, creating hyper media messages, integrated multimedia message standards, integrated document management, The World Wide Web, open hyper media systems, content based navigation.**

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| 20. Distributed multimedia system: Components of distributed multimedia systems, distributed client server operation multimedia object server, multi-server network topologies, distributed multimedia database, managing distributed objects<br>21. Multimedia system design: Methodology and consideration, multimedia system design examples |
| **BOOKS** |
| **Text Books:** |
| 3. Prabhat K. Andheigh, Kiran Thakrar, 'Multimedia systems design', PHI, John F.<br>4. Koegel Buford, 'Multimedia Systems', PEA. |
| **References:** |
| 2. Free Halshal, 'Multimedia Communications', PEA.<br>3. R. Steimnetz, K. Nahrstedt, 'Multimedia Computing, Communications and Applications', PEA<br>4. K. R. Rao, D. Milovanovic, 'Multimedia Communications Systems: Techniques, Standards and Networks"<br>5. Surbrahmanian, 'Multimedia Database Systems', M. Kaufman<br>6. J. D. Gibson, 'Multimedia Communications: Directions and Innovations', Academic Press, Hardcourt India<br>7. J. F. Kurose, K. W. Ross, 'Computer Networking', PEA. |
| **TERM WORK** |
| Term Work should consist of at least 10 practical experiments and 2 assignments covering the topics of the syllabus study of advanced embedded systems. |
| **ORAL EXAMINATION** |
| An oral examination is to be conducted based on the above syllabus |

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

**SUBJECT : Robotics (Elective –II)**

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|---|---|
| **Lectures : 4 Hrs Per Week**<br>**Practicals: 3 Hrs Per Week** | **Theory Papers (3 Hours): 100**<br>**Term Work : 25**<br>**Oral: 25** |

**Rationale:This Course Familarizes students with the concepts & techniques in robot manipulator control, enough to evalute, choose,and incorporate robot in engineering systems.**

**DETAILED SYLLABUS**

**Robotic Manipulation**

**Automation and Robots,Classification,Application,Spcification,Notations**

**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)**

**Inverse kinematics**

**General Properties of Solutions Tool Configration,five-axis Robot,Three-Four -axis ,Six-axis Robot(Inverse kinematics)**

**Workspace analysis and trajectory planning work envelope & examples,workspace fixtures,pick & place operations,Continious Path Motion,Interpolated Motion,Straight line Motion**

**Robot Vision**

**Image Reprsentation,Templet Matching,poly Hedral Objects,Shane Analysis,Segmentation(Thresholding,Region Labeling,Shirnk Operators,Swell Operators,Euler numbers,Prespective Transformation,Structured illumanation,camara calibiration)**

**Task Planning**

**Task Level Programming,Uncertanity,Configuration,Space,Gross Motion,Planning,Grasp Planning,Fine Motion Planning,Simulation of planer motion,source and goal scenes,Task Planner Simulation**

**Moments of Inertia**

**Principle of NC and CNC Machines**

**BOOKS**

**Text Books:**

**1.Robert Shilling ,Funadamentals Of Robotics –Analysis And Control,Prentice Hall of India**

**2.Fu ,Gonzales and Lee , Robotics, McGraw Hill**
**3.J.J.Craig , Introduction To robotics , Pearson Education**

**Additonal Reading**


**1. Staughard ,Robotica And A.I ,Prentice Hall of India**

**2. Grover,Wiess ,Nagel , Oderey , "Industrial Robotics", McGraw Hill 3.Walfarm Stdder.Robotics and Mechatronics,**

**4. Niku ,Introduction To Robotics, Pearson Education**

**5. Klafter , Chmielewski,Negin , Robot Engineering , Prentice Hall of India**

**6.Mittal ,Nagrath,Robotics and Control , Tata McGraw Hill Publications**


**TERM WORK:**

**1.Term Work should consist of atleast 10 practicals and assignments covering the topic of the syllabus .**

**2. A term work test sall be conduted with a weightage of 10 marks**

**ORAL EXAMINATION**

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

| B.E. COMPUTER ENGINEERING<br>FOURTH YEAR SEMISTER VIII | |
|---|---|
| SUBJECT : Computer Vision (Elective –II) | |
| Lectures : 4 Hrs Per Week<br>Practicals: 2 Hrs Per Week | Theory Papers (3 Hours): 100<br>Term Work : 25<br>Oral: 25 |

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

**Pre-requisite: Introduction to image processing.**

**Detailed Syllabus**

1. **Recognition methodology : Conditioning labeling, grouping, extracting, matching. Edge detection, gradient based operations, morphological operations, spatial operators for edge detection .**
2. **Binary Machine Vision: thresholding, segmentation, connected component labeling , hierarchical segmentation , spatial clustering , split and merge , rule based segmentation motion based segmentation.**
3. **Area Extraction : Concepts data structure , edge , line linking , Hough transform , line fitting , curve fitting,.**
4. **Region Analysis: Region properties , External points . Spatial moments , mixed spatial moments , gray level moments , boundary analysis : signature properties , shape numbers.**
5. **Facet model recognition : labeling lines , understanding line drawing classification shapes by labeling of edges , recognition of shapes consisting labeling problem , back tracking , inverse perceptive projecting , photogrammetry image matching : intensity matching of 1D signals , matching 2D images, hierarchical image matching .**
6. **Object Models and Matching : 2D representation global Vs local features .**
7. **General frame work for matching: distance relational approach , ordered structure matching , view class matching , model database organization .**
8. **General Frame work: : distance relational approach , ordered structure matching , view class matching , model database organization .**
9. **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. Rober Haralick and Linda Shapiro, "Computer and Robot Vision", Vol I, II, Addison-Wesley, 1993.**

## Term Work

**14. 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**

**Subject:Parallel Processing (Elective-II)**

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|---|---|
| **Lectures:4 hrs Per Week**<br>**Practical: 2 hrs Per Week** | **Theory:100 Marks**<br>**Term Work: 25 Marks**<br>**Oral: 25 Marks** |

**Objectives:Upon completion of this course students will be able to undersatnd and employ the fundamental concepts and mechanisms which forms the basis of the design of the parallel computation models and algorithms, recognize the problems and limitations to parallel systems,as well as possible solutions.**

**Prerequisite:Computer Architecture,Data Structures.**

**DETAILED SYLLABUS**

1. **Introduction: Parallel processing architectures: Parallelism in sequential machines,Abstrct model of parallel computer,Multi processor architecture,Pipelining,Array Processors.**
2. **Prgrammability Issues: An overview,Operating system support,types of operating systems,Parallel programming models,Software tools.**
3. **Data Dependancy Analysis: Types of dependencies:Loop and array dependencies,Loop dependence analysis,Solving diophantine equations,Program transformations.**
4. **Shared Memory Programming: general model of Sheared Memory Programmming, Process model under UNIX.**
5. **Algorithms For Parallel machines: Speedup,Coplexity and cost,Histogram composition,Parallel reduction,Quadrature problem,matrx multiplication,parallel sorting algorithms,Solving linear systems,Probabilistic algorithms.**
6. **Message Passing Programming:introduction,Model,Interface,circuit satisfability,introducing collective,Benchmarking parallel performance.**
7. **Parallel Programming Languages: Fortran90,nCUBE C,Occum,C-Linda.**
8. **Debugging Parallel Programs:Debugging techiniques, Debugging message passing parallel pragrams, Debugging Sheared Memory Parallel Programs.**
9. **Memory and I/O subsystems:Hierachical memory structure,Virtul memeory system, Memory allocation and management, Cache allocation and management, Cache memory and managemenInput output subsystems.**
10. **Other parallel Paradigms: Data flow computing, systolic architectures,functional and logic paradigms,distributed shared memeory.**
11. **Performance of Parallel Processors:Speedup and efficency,Amdahl's Law,Gustafson-Barsis law,Karf-Flatt metric,Isoefficency metric.**

| BOOKS |
|---|
| **Text Books:** |
| **1. hawang Kai and Briggs F. A."*Computer Architecture and Parallel Pracessing*"**<br>**2. Jorden H. F. and Alaghaband G.,"*Fundamentals of Parallel Pracessing*"**<br>**3. M.J. Quinn"*Parallel Programming*",TMH** |
| **References:** |
| **1. Shshikumar M.," *Introduction to Parallel Processing*",PHI**<br>**2. Wilson G.V."*Prctical parallel Programming*",PHI.**<br>**3. D. E. Culler,J.P.Singh, A.Gupta,"*Parallel Computer Architecture*",Morgan Kaufman** |
| **TERM WORK** |
| **Term work should consist iof at least10 practical experiments and two assignments covering the topics of the syllabus.** |
| **ORAL EXAMINATION** |
| **An oral examination is toi be conducted based on the above syllabus.** |

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

**SUBJECT : DATA WAREHOUSING AND MINING**

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|---|---|
| **Lectures : 4 Hrs Per Week**<br>**Practicals: 2 Hrs Per Week** | **Theory Papers (3 Hours): 100**<br>**Term Work : 25**<br>***Oral: 25*** |

**Objectives Of the course :**

**The Data Warehousing part of module aims to give students a good overview of the ideas and techniquies which are behind recent development in the dataweresing and online Analyatical 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 as**

**Prerequisities: DBMS**

**DETAILED SYLLABUS**

**DATA WAREHOUSING:**

1. **Overview And Concepts:Need For DATA WAREHOUSING,Basic Elements Of Data werehousing,Trends in DATA WAREHOUSING**
2. **Planning And Requirments:Project Planning And Management,Collecting The Requirments.**
3. **Architecture and Infrastructure:Architectural Components, Infrastructure And Metadata.**
4. **Data Design And Data Representation:Principles of Dimensional Modelling,Dimensional Modelling Advanced topics,data extraction,transformation and loading,data quality.**
5. **Information Access and Delivery:Matching Information to Classes of users,OLAP in data Werehouse,Data Werehousing And the Web.**
6. **Implimentation And Maintenance:Physical Design Process,Data Werehouse Deployment,Growth And Maintenance.**

**DATA MINING:**

1. **Introduction : Basics of Data Mining,Related Concepts,Data Mining Techniques.**
2. **Data Mining Algorithms:Classification,Clustring,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. **Visulisation: Data Generalization and Summarization-based Characterization,Analyatical Characterization:Analysis of Attribute Relevance,Mining claa comparisions:Discriminating Between Different classes,Mining Descriptive Statistical Measures in Large Databases**
7. **Data Mining Primitives,Languages,And System Architecture: Data Mining Primitives,Query Language,Desining GUI Based On Data Mining Query Language,Architecture of data Mining Systems**
8. **Application and Trends in Data Mining :Application ,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.**<br>2. **M.h.Dunham,"*Data Mining Introductory And Advanced Topics*",Pearson Education.**<br>3. **Han,Kamber,"*Data Mining Concepts And Techniques* " ,Morgan Kaufmann** |
| **Referances:** |
| 1. **Ralph Kimball,"*The Data Warehouse LifeCycle Tool Kit*",John Wiley.**<br>2. **M Berry And G.Linoff ,"*Mastering Data Mining*", John Wiley**<br>3. **W.H.Inmon,"*Building The Data Warehouse*",Wiley Dreamtech.**<br>4. **R.Kimpall,"*The Data Warehouse Tool Kit*", John Wiley**<br>5. **E.G.Mallach,"*Decision Support And Data Warehouse Systems*",TMH.** |
| **TERM WORK** |
| **Term work should consist of atleast 10 practical experiments and 2 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 VIII**

**Subject : Neural Networks & Fuzzy Systems (Elective – II)**

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|---|---|
| **Lect : 4 Hrs per week** | **Theory : 100 Marks** |
| **Prac : 2 Hrs per week** | **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 the basic theory, algorithm formulation and ways to apply these techniques to solve real world problems.**

**Pre-requisite: Knowledge of calculus, basic probability and statistics are required. Background of following subjects desirable : numerical analysis (including optimization). Programming skill 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 architecture, Knowledge representation, Learning Process: Error-correction learning, Supervised learning, Unsupervised learning, Learning rules.**
2. **Single layer Perception: Perceptron converges theorem, Method of steepest Descent – least mean square algorithm.**
3. **Multi layer Perceptron: Derivation of the Back-propagation algorithm, Learning factors.**
4. **Radial Basis and Recurrent Neural Networks: RBF networks structure, theorem and the reparability of patterns, RBF Learning Strategies, K-means and LMS Algorithms, Comparison of RBF and MLP Networks, Hope Field Networks, Energy Functions, Spurious States, Error performance.**
5. **Simulated Annealing: The Boltzmann Machine, Boldzmann Learning rule, Bi-directional associative memory.**
6. **Fuzzy Logic : Fuzzy sets, properties, Operations on Fuzzy sets, Fuzzy relations, Operation some Fuzzy Relations, The Extension Principle, Fuzzy measures, Membership Functions, Fuzzification and deFuzzification methods, Fuzzy Controllers.**

## *Books*


1. **Simin Haykin, "Neural Network a – Comprehensive Foundation", Pearson Education**
2. **Zurda 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 Network", PHI**
2. **Drinkov D., Helloendoorn H. and Reinfrank M., " Fuzzy Systems Desings Principle", IEEE Press.**

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| ***TERM WORK*** |
| **11. Term work should consist of at least 10 Practicals experiments and two assignments covering the topics of syllabus.** |
| ***ORAL EXAMINATIONS*** |
| **An oral examination is to be conducted on the above syllabus.** |

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

## *SUBJECT : PROJECT - B*

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|---|---|
| **Tutorial: 6 Hrs per week** | **Term work : 50 Marks**<br><br>**Oral : 50 Marks** |

### *GUIDELINES*

1. **project-B exam be conducted by two examiners appointed by university. Student have to give demonstration and seminar no the Project-B for them work marks. All the students of the class must attend all the seminars. Seminar 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 user Manuals.**
   - **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 the fortnight and maintain the progress and attendance report during the term.**
4. **Make sure the internal project guide are BE graduates.**
5. **Convener should make sure that external examiner are appointed from the list as per appropriate technical area**