B.E. COMPUTER ENGINEERING

B.E. SEMESTER VII

Scheme of Instructions					Scheme of Evaluation					
Subjects		Lect/	Prac/	Tuto/	Paper		T/W	Prac /	Oral	Total
		Week	Week	Week	Hours	Marks				
1	Advanced Microprocessors	4	2	---	3	100	25	----	25	150
2	Intelligent System	4	2	---	3	100	25	----	25	150
3	Digital Signal Processing	4	2	---	3	100	25	----	25	150
4	Software Engineering	4	2	---	3	100	25	----	25	150
5	Elective – I	4	2	---	3	100	25	----	25	150
6	Project – A	-	-	2	--	-	25	----	25	50
		20	10	2	--	500	150	---	150	800

Elective – I	
1	Image processing
2	Pattern Reorganization
3	Mobile Computing
4	Embedded Systems
5	Computer simulation and Modeling
6	Advanced Computing Networks

B.E.COMPUTER ENGINEERING
FOURTH YEAR SEMESTER VII

SUBJECT: ADVANCED MICROPROCESSORS

LECTURES: 4 HRS PER WEEK **PRACTICAL: 2HRS PER WEEK**	**THEORY: 100 MARKS** **TERM WORK:25 MARKS** **ORAL: 25 MARKS**

Objective: To study microprocessors basics and the fundamental principles of architectrure related to advanced microprocessors

Prerequisites: Microprocessors

DETAILED SYLLABUS

1. Overview of new generation of modern microprocessors

2. Advanced Intel Microprocessors: Protected mode operation of X86 Intel family; study of Pentium: superscalar architecture and pipelining, register set andspecial instructions, memory management, cache organization, bus operation, branch prediction logic.

3.Study of pentium family of processors: Pentium, Pentium II, Pentium III, Pentium 4, Pentium V: architectural features,comparative study.

4. **Advanced RISC microprocessors:** Overview of RISC development and current systems, Alpha AXP architecture, Alpha AXP implementations and applications.

5. Study of sun Sparc family:SPARC architecture, the super SPARC, SPARC implementations.

6.Standard for bus architectureand ports: EISA,VESA, PCI, SCSI, PCMCIA cards and slots ,ATA , ATAPI, LTP, USB,AGP,RAID

7.System Architectures for desktop and server-based systems: study of memory subsystems and I/O subsystems. Integration issues

BOOKS

Text books:

1.DanielTabak, 'Advanced Microprocessors',McGraw-Hill
2.BarryB.Brey, The Intel Microprocessors, Architecture,Programming and interfacing
3.Tom Shanley, Pentium Processor System Architecture, Addison Wesley Press

References:

1. Ray and Bhurchandi, 'Advanced MicroprocessorsandPeripherals', TMH
2. James Antonakos, 'The Pentium Microprocessor',Pearson Education
3. Badri Ram,'Advanced Microprocessors andInterfacing', TMH Publication
4. Intel Manuals

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. COMPUTER ENGINEERING
FOURTH YEAR SEMESTER VII

SUBJECT: INTELLIGENT SYSTEMS

Lectures:4 hrs Per Week **Practical: 2 hrs Per Week**	**Theory:100 Marks** **Term Work: 25 Marks** **Oral: 25 Marks**

Objectives: To understand and apply principles, methodologies and techniques in design and implementation of intelligent system.

Prerequisite: Data Structures, Programming Languages and Algorithms

DETAILED SYLLABUS

1. **Artificial Intelligence:** An overview, Intelligent System: Evolution of the Concept
2. **Intelligent Agents:** How Agent Should act, Structure Of Intelligents, Enviroments
3. **Problem Solving:** Solving Problems by Searching, Informed Search Methods. Game Playing.
4. **Knowledge And Reasoning:** A knowledge based agent, The wumpus world enviroment, Representation, Reasoning, Logic, Proportional Logic, First order logic: Syntax and Semantics, Extention and Notational variation, Using First order logic.
5. **Building a Knowledge Base:** Properties of good and bad Knowledge Base, Knowledge Engineering, General ontology.
6. **Interfacing First Order Logic:** Interface rules involving quantifiers, an example proof, forward and backward chaining, Completeness.
7. **Acting Logically:** Planning, Practical Planning; Practical Planners, Hierachical decomposition, Conditional Planning.
8. **Uncertain Knowledge And Reasoning:** Uncertainty, Representing knowledge in an uncertain domain, the semantics of belief networks, interface in belief networks.
9. **Learning: Learning from observations:** General model of learning agents, inductive Learning, Learning decision trees, Learning in neural and belief networks: Introduction to neural networks, Perceptrons, Multilayer feed forward network, Application of AAN, Reinforcement Learning: Passive Learning in a known enviroment, Generlization in Reinforcement Learning, Genetic Algorithms
10. **Agents That Communicate:** Communication As Action, Types of communication agents, A formal grammar for a subset of English,
11. **Expert System:** Introduction to Expert System, represting and using domain knowledge, Expert System shells, explanation, knowledge acquisition.
12. **Applications:** Natural language Prossceing, Perception, Robotics.

BOOKS

Text Books:

1. Stuart russell and Peter Norvig,"*Artificial intelligence: A modern Approach*"
2. George F. Luger," *Artificial intelligence: Structurs And Strategies for Complex Problem Solving*", Pearson Education

References:

1. Nils J. Nillson," *Artificial intelligence: A new Synthsis*"Harcourt Asia
2. Elaine Rich and Kevin Knight," *Artificial intelligence*", TMH
3. Patrick Winston," *Artificial intelligence*", Pearson Education
4. Ivan Bracto,"*Prolog Programming for Artificial Intelligence*", Pearson Education
5. Ephraim Turban Joy E Aronson,"Decision Support Systems and intelligent System"
6. Ed.m.Sasikumar and Others" *Artificial intelligence: Theory And Practical*" Proceeding of the International Conference KBCS-2002,Vikas Publishing House

TERM WORK

Term work should consist of at least10 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: DIGITAL SIGNAL PROCESSING

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

Objective: Digital Signal Processing continues to play an increasingly important role in the fields that range literally from A(astronomy) to Z(zeugmatography, or magnetic resonance imaging) and encompass applications such as Compact Disc player, Speech Recognition, echo cancellations in communication systems, image enhancement, geophysical exploration, & noninvasive medical imaging. This course aims to build concepts regarding the fundamental principles & applications of Signals, System Transforms & Filters.

Pre-requisites: Nil

DETAILED SYLLABUS

1. **Discrete Time Signals & Systems:** Discrete-Time signals, Discrete-Time systems, Analysis of Discrete-Time systems described by differential equations, Implementation of Discrete-Time systems, Correlation of Discrete-Time systems.
2. **Z-Transform:** Definition & properties of Z-Transform, rational Z-Transforms, Inverse Z-Transforms, one-sided Z-Transforms, Analysis of LTI systems in Z-domain.
3. **Frequency Analysis of Signals & Systems:** Frequency Analysis: Continuous time signals & Discrete-time signals, Properties of the Fourier transform for Discrete-time signals, F frequency domain characteristics of LTI systems, LTI system as a frequency selective filter, Inverse systems & deconvolution.
4. **Discrete Fourier Transform:** Frequency domain sampling, Properties of DFT, Linear filtering method based on DFT, Frequency analysis of signals using DFT, FFT algorithm, Applications of FFT, Goertzel algorithm, Quantisation effects in the computation of DFT.
5. **Implementation of Discrete Time Systems:** Structure of FIR systems, Structure of IIR systems, quantization of filter coefficients, round of effects in digital filters.
6. **Design of Digital Filters:** Design of FIR filters, Design of IIR filters from analog filters, frequency transformations, Design of Digital Filters based on least-squares method digital filters from analogue filters, Properties of FIR digital filters, Design of FIR filters using windows, Comparison of IIR & FIR filters, & Linear phase filters.
7. **Introduction to DSP co-processors:** TMS 320C40/50, Analog Devices.
8. **Applications:** Image processing, Control, Speech, Audio, Telecommunication.
9.

BOOKS

Text Books:

1. J. G. Proakis, 'Introduction to Digital Signal Processing, PHI
2. Oppenheim and Schafer, 'Discrete-Time Signal Processing

References:
1. S. K. Mitra, 'Digital Signal Processing', TMH 2. T. J. Cavicchi, 'Digital Signal Processing', John Wiley 3. L. C. Ludeman, 'Fundamentals of DSP, John Wiley 4. E. C. Ifeachor, B. W. Jervis, 'DSP', PEA 5. S. Sallivahanan 'DSP', TMH 6. Ashok Ambardar, 'Analog and Digital Signal Processing', Thompson Learning
TERM WORK
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: SOFTWARE ENGINEERING

Lectures: 4 hrs per week **Practical: 2 hrs. per week**	**Theory: 100 Marks** **Term Work: 25 Marks** **Oral: 25 Marks**

Objective: Apply various software Engineering principles and methodologies while dealing with the various phases of software development.

Prerequisites: Programming Concepts

DETAILED SYLLABUS

1. Product : Evolving role of software,software characteristics,software applications,software myths.

2. Process: Software Process,Process models,Linear sequential model,prototyping model,RAD model,Evolutionary software models,component based development,Formal methods model,Fourth generation techniques,Process technology,Product,Process.

3. Project Management: Management spectrum,People,Product,process,Project,w^5HH

4. Software Process & Project Matrics: Measures-Metrics-indicators, Metrics in the process & project domains, Software measurment, Metrics for software quality, Integrating Metrics within the software engineering process, Statistical qyality control, Metrics for small organisation, Establishing a software metrics program.

5. Software Project Planning: Objectives, Software scope, Resources, Software project estimation, Decomposition techniques, Empirical estimation models, Make/buy decision, Automated estimation tools.

6. Risk Analysis & management: Reactive versus proactive risk stategies, Software risks, risk identification, risk projection, risk refinement, risk mitigation-monitoring-management, safety risks & hazards, RMMM plan.

7. Project Scheduling & Tracking: Basic concepts, relationship between people and efforts, defining a task set for the software project, selecting software engineering task, refinement of major task, defining a task network, scheduling, earned value network, erro tracking, project planning

8. Software Quality Assuarance: Quality concepts, quality movements, software quality assurance, software reviews, formal technical reviews, formal approaches to SQA, statistical software quality assurance, software reliability, mistake-proofing for software, ISO 9000 quality standards and SQA plans

9. Software Configuration Management: Introduction, SCM process, identification of objects in the software configuration, version control, change control, configuration audit, status reporting, SCM standards

10. System Engineering: Computer-based system engineering, hierarchy, business-process engineering, product engineering, requirement engineering, system modeling

11. Analysis Concepts & Principles: Requirement analysis, requirement elicitation for software, analysis principles, software prototyping, specifications

12. Analysis Modeling: Introduction, elements of analysis model, data modeling, functional modeling and information flow, behavioural modeling, mechanics of structured analysis, data dictionary, other classical analysis methods

13. Design Concepts & Principles: Software design and software engineering, design process, design principles, design concepts, effective modular design, design heuristics for effective modularity, design model, design documentation
14. Architectural Design: Software architecture, data design, architectural styles, analysing alternative architectural design, mapping requirement into a software architecture, transform mapping, transaction mapping, refining architectural design
15. User Interface Design: The golden rules, user interface design, task analysis and modeling, interface design activities, implementation rules, design evaluation
16. Component-Level Design: Structured Programming, Comparision of design notation
17. Software Testing Techniques: Software testing fundamentals, Test case design, White-Box testing, basis path testing, control structure testing, black-box testing, testing for specialized environments, architectures and applications.
18. Software Testing Strategies: Strategic approach to software testing, strategic issues, unit testing, integration testing, validation testing, system testing, art of debugging
19. Technical metrics for software: Software quality, framework for technical software metrics, metrics for the analysis model, metrics for the design model, metrics for source code, metrics for testing, metrics for maintenance.
BOOKS
Text Books:
1. Roger Pressman, “Software Engineering”, McGraw Hill, Fifth Edition.
2. James Peter, “Software Engineering An Engineering Approach”, John Wiley
3. Lan Sommerville, “Software Engineering”, Pearson Education
References:
1. W.S. Jawadekar, “Software Engineering”, TMH.
2. Pankaj Jalote, “An Integrated Approach to Software Engineering”,Narosa
3. R. Mall, “Fundamentals of Software Engineering”, PHI
4. A. Behferooz & F.J.Hudson, “Software Engineering Fundamentals”, Oxford Universitry press
5. S.L. Pfleeger, “Software Engineering theory & practice”,Pearson Education.
TERM WORK
Term work should consist of at least 10 practical experiments and 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: IMAGE PROCESSING (ELECTIVE-I)	
LECTURES: 4 HRS PER WEEK **PRACTICAL: 2HRS PER WEEK**	**THEORY: 100 MARKS** **TERM WORK:25 MARKS** **ORAL: 25 MARKS**
Objective: Digital Image Processing is a rapidly evolving field with growing applications in science and engineering.Image processing holds the possibility of developing the ultimate machine that could perform the visual funcionts of all living beings.There is an abundance of image processing applications that can serve mankind with the available and anticipated technology in the near future.	
Prerequisites: Digital Signal Processing & ComputerGraphics	
DETAILED SYLLABUS	
1. Digital Image Processing Systems:Introduction, Structure of human eye,Image formation in the human eye,Brightness adaption and discrimination ,Image sensing and acquisition,Storage, Processing,communication,display. Imagesampling and quantization, basic relationship between pixels.	
2.Image Transforms (Implementation): Introduction to Fourier Transform, DFT and 2D DFT, properties of 2D DFT, FFT, IFFT,Walsh Transform, Hadamard Transform, Discrete CosineTransform, Slant Transform,OptimumTransform:Karhunen-Loeve (Hotelling) Transform	
3. Image Enhancement in Spatial Domain: Gray-Level Transformation, Histogram Processing, Arithmetic and Logic Operation, Spatial filtering: Introduction, smoothing and sharpening filters.	
4. Image Enhancement in the frequency domain: Frequency-domain filters: smoothing and sharpening filters, homomorphic filtering	
5. Wavelets and multiresolution processing: Image pyramids, subbandcoding, Haar Transform, Series expansion, scaling functions, Wavelet functions, Discrete Wavelet Transform in 1D, Fast Wavelet Transform, Wavelet Transform 2D	
6. Image Data Compression: Fundamentals, redundancies: coding, inter-pixel, psycho-visual, fidelity criteria,image compression models, error-free compression, lossy compression, image compression standards: binary image and continuous-tone still image compression standards, video compression standards.	
7.Morphological image processing: Introduction, dilation, erosion, opening, closing, hit-or-miss transformation, morphological algorithm operations on binary images, morphological algorithm operations on gray-scale images.	
8. Image segmentation: Detections of discontinuities, edge-linking and boundary detection, thresholding, region-based segmentation	
9. Image representation and description: Representation schemes, boundary descriptors, regional descriptors.	

BOOKS

1.R. C.Gonsales R.E.Woods, "Digital Image Processing",Second edition, Pearson Education

2. Anil K.jain, 'Fundamentals of Image Processing', PHI

References:

5. William Pratt,'Digital Image Processing', John Wiley
6. Milan Sonka,Vaclav Hlavac, Roger Boyle,' Image Processing, Analysis and Machine Vision', Thompson Learning
7. N. Ahmed and K. R. Rao, 'Orthogonal Transforms for Digital Signal Processing', Springer
8. B.Chanda ,D. Datta, Mujumdar, 'Digital Image Processing and Analysis', PHI

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. COMPUTER ENGINEERING
FOURTH YEAR SEMESTER VII

SUBJECT:MOBILE COMPUTING
(ELECTIVE-I)

Lectures:4 hrs Per Week **Practical: 2 hrs Per Week**	**Theory: 100 Marks** **Term Work: 25 Marks** **Oral: 25 Marks**

Objectives: Recent developments in portable devices and high bandwidth ubiquitous wireless network has made mobile computing a reality. Indeed, it is widely predicted that within the next few years' access to internet services will be primarily from wireless devices, with desktop browsing the exception. Such success of wireless data services. This course will help in understanding fundamental concepts. Current development in mobile communication systems and wireless computer networks.

Prerequisite: Computer Networks.

DETAILED SYLLABUS

13. **Introduction:** Applications, A short History of wireless Communication
14. **Wireless transmission:** Frequency for radio transmission, Signals Antennas, Signal propagation, Multiplexing, modulation, Spread spectrum, Cellular Systems.
15. **Medium Access Control:** Motivation for a specialized MAC: Hidden and exposed terminals. Near and far terminals; SDMA, FDMA, TDMA, Fixed TDM, Classical Aloha, Slotted Aloha, Carrier sense multiple access, Demand assigned multiple access with collision avoidance, Polling, Inhibit sense multiple access, CDMA :Spread Aloha multiple access.
16. **Telecommunication Systems:** GSM: Mobile services, System architecture, Radio interface, Protocols, Localization and Calling Handover, Security, New data services, DECT, System architecture, Protocol architecture, TETRA,UMTS and IMT-2000: UMTS Basic architecture, ULTRA FDD mode, ULTRA TDD mode
17. **Satellite Systems:** History Applications, Basics: GEO, LEO, MEO; Routing, Localization, Handover, Examples.
18. **Broadcast Systems:** Overview, Cyclic Repetitions of data, Digital audio Broadcasting: Multimedia object transfer protocol; Digital Video broadcasting
19. **Wireless LAN** Infrared vs. radio transmission, Infrastructures and ad hoc Networks, IEEE 802.11: System Architecture, Protocol architecture, Physical layer, Medium Access control layer, MAC management, future development, HIPERLAN: Protocol architecture, Physical layer, Channel access control sub layer, Information bases and networking; Bluetooth: User scenarios, Physical layer, MAC layer, Networking, Security, Link management.
20. **Wireless ATM:** Motivation for WATM, Wireless ATM working group, WATM services, Reference model: Example configurations Generic reference model; Functions: Wireless mobile terminal side, mobility supporting network side, Radio Access layer: Requirements BRAN; Handover reference model, Handover requirements, types of Handover, Handover scenarios, Backward Handover,

Forward Handover; Location Management: Requirements for Location Management, Procedure and entities: Addressing, Mobile quality of service, Access point control protocol.

21. **Mobile Network Layer:** mobile IP: Goals, Assumptions and requirements, Entities and terminology, IP packet delivery, Agent advertisement and discovery, Registration tunneling and Encapsulation, Optimization Reverse tunneling,Ivp6, Dynamic host configuration protocol, Ad hoc networks: Routing, Destination sequence distance vector, dynamic source routing, Hierarchical Algorithm, Alternative metrics.
22. **Mobile Transport Layer:** Traditional TCP: Congestion control, Slow start, Fast retransmit/ fast recovery, Implications on mobility; Indirect TCP, Snooping TCP, Mobile TCP, Fast retransmit/ Fast recovery, transmission/time-out freezing, selective retransmission, transaction oriented TCP.
23. **Support For Mobility:** File Systems Consistency, Examples: World Wide Web, Hypertext Transfer Protocol Hypertext Markup language, Some approaches that might help wireless access, System architecture; Wireless application protocol: Architecture, Wireless datagram protocol, Wireless transport layer security, Wireless transaction protocol, Wireless session protocol, Wireless application environment, Wireless markup language, WML script, Wireless telephony application, Examples Stacks with WAP, mobile Databases, Mobile agents

BOOKS

Text Books:

7. Jochen Schiller,"*Mobile communication*", Addison wisely, Pearson Education
2. William Stallings," *Wireless Communication and Network*"

References:

1. Rappaart.," *Wireless Communications Principles and Practices*".
2. YI Bing Lin," *Wireless and Mobile Network Architecture*", John Wiley.
3. P.Nicopolitidis,"*Wireless Networks*", John Wiley
4. K. Pahlavan, P.Krishnamurthy,"*Principles of Wireless Networks*"
5. M. Richharia,"*Mobile Satellite Communication: Principles and Trends*", Pearson Education

TERM WORK

Term work should consist of at least10 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: EMBEDDED SYSTEMS
(ELECTIVE-I)

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

Objective: Embedded system tools & products are evolving rapidly. This course deals with various approaches to building embedded systems. It introduces unified view of hardware & software. The aim of this course is to make the students aware of the various appliocations of embedded systems.

Pre-requisites: Microprocessors & C Programming

DETAILED SYLLABUS

10. **An overview of embedded systems:** Introduction to embedded systems, Categories & requirements of embedded systems, challenges & issues related to embedded software development, Hardware/Software co-design, Introduction to IC technology, Introduction to design technology.
11. **Embedded Software development:** Concepts of concurrency, processes, threads, mutual exclusion & inter-process communication, models & languages for embedded software, Synchronous approach to embedded system design, Scheduling paradigms, Scheduling algorithms, Introduction to RTOS, Basic design using RTOS.
12. **Embedded C Language:** Real time methods, Mixing C & Assembly Standard I/O functions, Preprocessor directives, Study of C compilers & IDE, Programming **the target device.**
13. **Hardware for Embedded System:** Various interface standards, Various methods of interfacing, ParallelI/o interface, Blind counting synchronisation & Gadfly busy waiting, Parallel port interfacing with switches, keypads & display units, Memory & high speed interfacing, Interfacing of data acquisition system, Interfacing of controllers, Serial communication interface, Implementation of above concepts using C language.
14. **Study of ATMEL RISC Processor:** Architecture, Memory, Reset & interrupt, functions, parallel I/O ports, Timers/Counters, Serial communication, Analog interfaces, Implementations of above concepts using C language, Implementation of above concepts using C language.
15. **Case studies & Applications of embedded systems:** Applications to: Communication, Networking, Database, Process Control, Case Studies of: Digital Camera, Network Router, RTLinux.

BOOKS

Text Books:

3. Raj Kernal, ”Embedded Systems”,TMH.
4. David E. Simson, “An Embedded Software Primer”, Pearson Education.
5. Muhammad Ali Mazidi & Janice Gillispie Mazidi, “The 8051 Microcontroller & Embedded Systems”, Pearson Education.

References:

7. Frank Vahid, Tony Givargis, "Embedded System Design: A Unified Hardware/Software introduction", John Wiley.
8. Craig Hollabaugh, "Embedded Linux", pearson Education.
9. Daniel Lewis, "Fundamentals of Embedded Software", Pearson Education.
10. Barnett, Cox, O'Cull, "Embedded C Programming & the atmel AVR", Thompson Learning.
11. Myke Predko, "Programming & Customizing the 8051 Microcontroller", TMH.

TERM WORK

8.Term Work should consist of at least 10 practical experiments and 2 assignments covering the topics of the syllabus

- Four experiments on micro controller based systems.
- Four experiments using cross C compiler & Linux.
- Two experiments using developments tools like logic analyzer, emulator, & simulator
- Two experiments on case 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 VII

SUB: Computer Simulation And Modeling (Elective-I)

Lectures: 4 Hrs per week Practical: 2 Hrs per week	Theory:100 Marks Term Work: 25 Marks Oral Exam: 25 Marks

Objective: In the last few decades digital computer simulation has developed from infancy to a full-fledged discipline. The filed of modeling and simulation is as diverse as of man. The application of Simulation continues to expand, both in terms of extent to which simulation is used and the range of application. This course gives a comprehensive and state of art treatment of all the important aspects of a simulation study, including Modeling .simulation software, model verification , input modeling.

Pre-Requisite: Probability and Statistics

DETAILED SYLLABUS

1.Introduction to Simulation: System and System environment, Components of system, Type of system ,type of models ,Steps in simulation study,
Advantage & disadvantage

2. Simulation of Queuing systems ,Other examples of simulation.

3. General Principles: Concept of discrete event simulation, List processing,

4. Simulation Software: History of simulation Software , Desirable software features, General-Purpose simulation packages, Object oriented simulation ,Tends in simulation software.

5. Statistical Models in Simulation: Useful statistical model, Discrete distribution, Continuous distribution, Poisson Process, Empirical distribution.

6. Queuing Models: Characteristic of Queuing systems, Queuing notations, Long run measures of performance of Queuing systems, Queuing notations, behavior of infinite population markovian Models, Steady state behavior infinite population model ,Network of Queues.

7. Random Number Generation: Properties of random numbers, Generation of pseudo random numbers, Techniques for generating random numbers, Tests for random numbers.

8. Random Variety Generation: Inverse transform technique,Convolution method, Acceptance rejection techniques

9.Input modeling:Data Collection, identifying the Distribution of data, Parameter estimation , Goodness of fit tests, selection input model without data, Multivariate and Time series input modles.

10. Verification and Validation of Simulation Modle: Model building, verification, and Validation, Verification of simulation models, Calibration and Validation of modles.

11. OUTPUT ANALYSIS FOR A SINGLE MODEL: types of simulations with respect to out put analysis, stochastic nature of out put date, measure of performance and their estimation, output analysis of terminating simulators, output analysis for steady state simulation.

12. COMPARISON AND EVALUATION OF ALTERNATIVE SYSTEM DESIGN: comparison of two system designs, comparison of several system design, Meta modeling, optimization via simulation.

13.CASE STUDIES: simulation of manufacturing system, simulating of pert network

BOOK

TEXT BOOKS:

1. jerry banks, john Carson, Barry nelson, David Nicola "discrete event system simulation"
2. Averill law, w. David kiloton, "simulation modeling and analysis:," McGraw-Hill

REFERENCES:

1. gaffer Gordon, "system simulation", PHI
2. Bernard Ziegler, Herbert praehofer, tag goon Kim, "theory of modeling and simulation", academic press
3. nursing doe, "system simulayion with digital computer", PHI
4. Donald W. body, "system analysis and modeling", academic press Harcourt India
5. w David kiloton, Randall shadows, Deborah shadows, "simulation with arena", McGraw-HILL.

TERM WORK

9. Term work should consist of at lest 10 practicval 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 : Advaced Computer Network (Elective I)

Lectures:4 hrs Per Week **Practical: 2 hrs Per Week**	**Theory:100 Marks** **Term Work: 25 Marks** **Oral: 25 Marks**

Obectives: In first part ,advanced Technologies like high speed devices etc. are to be considred . second part network programming is to be studied. Not just SOCKETS but also protocols ,drivers ,simulation programming. In third part we should study network design ,protocols design ,and analysis considering deterministic and non-deterministic approach.We expect natural thinking from stdutents .For example he should able to consider different costraint and assume suitable data and solved problem .

Prerequisitie:COMPUTER NETWORKS

DETAILED SYLLABUS

1. **Data Communications** :Business drivers and networking directions :data communication past and future
2. **Understanding the standereds and their marker:**creating standerds :players and process,current forums, standard protocols ,layer reference model :the OSIRM ,standard computer architures
3. **Introduction to transmission technologies:** Hardware selection in the design process
4. **Optical networking:** SONET/SDH standards ,dense wave length division multiplexing(DWDM),Performance and design consideration
5. **Physical layer protocol and access technologies :**physical layer protocols and interfaces ,accessing the networks ,copper access technologies ,cable access ,fiber access technologies.air access technologies,
6. **Common Protocols And Interfaes In The Lan Environment :** Data Link Layers protocols ,LLC and MAC sub layer protocol ,Ethernet ,token ring ,token bus and FDDI , Bridge protocols ,switching in the LAN envirnoment.
7. **Frame Relay:**FR specifications and design ,VoFR :performane and design condiserations ,advantages and disadvantages of FR .
8. **Common WAN Protocol:**ATM :Many faces of ATM ,ATM protocol operation (ATM cell and transmission) ,ATM networking basis ,theory of operations, B-ISDN protocol reference model, PHY layer, ATM layer (protocol model), ATM layer and cell (definition), traffic descriptors and parameters, traffic and congestion control defined, AAL protocol model, traffic contract and QoS, user plane overview, control plane AAL, management layer, sub-DS3, ATM, ATM public services
9. **Common Protocols And Interfaces In the Upper Layers(TCP/ IP):** Background (Routing Protocols),TCP/IP suite,Network layer(Internetwork layer),Addresssing and routing design.
10. **Mature Packet Switched Protocol:** ITU Recommondation X.25,User Connectivity,Theory Of Operation,Network layer function X.25,User

internetworking protocol,Switched multimegabit data service(SMDS),SMDS and IEEE 802.6,Subscriber interface and Access protocol,Addressing and traffic control,

11. **Requirement Defination:**User requirementsTraffic sizing,traffic charactristics,protocols,time and delay considerations,connectivity,Availability,Reliability and Maintainability,Service aspects,Budgets constraints.
12. **Traffic Engineering And Capacity Planning:**Background (Throughtput calculations),Traffic engineering basics(Traffic characteristics),Traditional traffic engineering, queued data and packet switched trffic modeling,designing for the peaks, delay or latency, availability and reliability, Network performance Modeling, Creating the traffic Matrix, Capacity planning and Network vision, Design Tool, Categoris of tools, Classes of Design Tool, Components of design projects, types of design projects .
13. **Technology Comparisons:** Circuits- message-pocket and cell swithing methods, Packet Swithching Service aspects, Generic Packet Switching Network Characteristics, private Vs Public Networking, Public network service selections, Busness aspects of packet-frame and cell swithching services, high speed LAN Protocol comparisons, Application performance needs.
14. **Access N/W Design :** N/W Design Layers, Access Layer design, Access N/W capacity, N/W Topology and H/W, Completing the access N/W Design
15. **Backbone N/W Design:** Backbone requirements, N/W Capacities, Topologies, Topologies Strategis, Tunning the N/W.

BOOKS

Text Books:

8. Derren L. Spohn,"*Data N/W Design*",THM.
2. D. Bertsekas, R. Gallager "*Data N/W's*", PHI

References:

6. W.R. Stevens, "Unix N/W programming", Vol.1, Pearson Education
7. J. Warland, P. Varaiya," *High Performance Communication N/W*",Morgan Kaufmann.
8. Y. Zheng, S. Akhtar, "N/W for computer Scientists and Engineers", Oxford
9. A. S. Tanenbaum, "Computer N/W"
10. Peterson and Davie"Computer N/W", Harcourt Asia
11. James D. McCabe, "Practical Computer Analysis And Design",

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 VII	
SUBJECT: PROJECT-A	
Tutorial: 2 Hrs per week	**Term Work:25 Marks** **Oral:25 Marks**

GUIDELINES

16. Project-A exam be conducted by two examiners appointed by university. Students have to give seminar on the project-A 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.
17. Project-A should preferably contain abstract, existing system, problem definition, scope, proposed system, its design, introduction to programming tools, hardware & softeare platforms requirements etc.
18. Out of the total projects 35 percent may be allowed as to be industry projects. 65 percent projects must be in-house. Head of dept & senior staff in the department will take decision regarding projects.
19. Every student must prepare hand written synopsis in the normal journal format.
20. Internal guide has to interact at least once in fortnight and maintain the progress and attendance report during both the terms.
21. Two research projects may be allowed only for outstanding students with research aptitude.
22. In case of industry projects, visit by internal guide will be preferred. Industry projects will attract demos either at site or in college.
23. Make sure that external project guides are B.E. graduates..
24. Number of students for a project should be preferrably 2-4. Only one student should be avoided and upto 6 may be allowed only for exceptional and complex projects.

B.E. COMPUTER ENGINEERING FOURTH YEAR SEMESTER VII	
SUBJECT: PATTERN RECOGNITION (ELECTIVE-I)	
Lectures: 4 hrs per week Practical: 2 hrs. per week	**Theory: 100 Marks Term Work: 25 Marks Oral: 25 Marks**
Objective: This course teaches the fundamentals of techniques for classifying multidimensional data to be utilized for problem-solving in a wide variety of applications, such as engineering system design, manufacturing, technical and medical diagnostics, image processing, economics, psychology.	
Prerequisites: Linear algebra, probability and statistics	
DETAILED SYLLABUS	
1. Introduction: Machine perception, pattern recognition system, design cycles, learning, and adaptation.	
2. Bayesian Decision Theory: Bayesian Decision Theory: Continuous features, minimum-error rate classification, classifiers, discriminant functions and decision surfaces, normal density, discriminant functions for normal density, Baye's decision theory: discrete features	
3. Maximum-Likelihood and Bayesian Parameter Estimation: Maximum likelihood estimation, Bayesian estimation, Bayesian parameter estimation, Gaussian case and general theory, Problems of dimensionality, Hidden Markov Model	
4. Nonparametric techniques: Density estimation, Parzen windows, k_n nearest neighbour estimation, nearest neighbour rule, matrics and nearest-neighbour classification.	
5. Linear Discriminant Functions: Linear discriminant functions and decision surfaces, generalized linear discriminant functions, 2-category linearly separable case, minimizing the perception criterion function, relaxation procedure, non-separable behaviour, mimimum square error procedure, Ho-Kashyap procedures, multicategory generalizations	
6. Nonmetric Methods: Decision tree, CART, ID3, C4.5, grammatical methods, grammatical interfaces	
7. Algorithm Independent Machine Learning: Lack of inherent superiority of any classifier, bias and variance, resampling for estimating statics, resampling for classifier design, estimating and comparing classifier, combining classifiers	
8. Unsupervised Learning and Clustering: Mixture densities and identifiability, maximum-likelihood estimation, application to normal mixture, unsupervised Bayesian learning, data description and clustering criterion functions for clustering, hierarchical clustering.	
9. Applications of Pattern Recognition	

BOOKS
Text Books:
1. Duda Hart and Stock, 'Pattern Classification', John Wiley and sons
2. Gose, Johnsonbaug and Jost, 'Pattern Recognition and Image Analysis', PHI
TERM WORK
Term work should consist of at least 10 practical experiments and assignments covering the topics of the syllabus
ORAL EXAMINATION
An oral examination is to be conducted based on the above syllabus.