SYLLABUS PRESCRIBED FOR
BACHELOR OF ENGINEERING
COMPUTER SCIENCE & ENGINEERING
SEMESTER PATTERN (C. G. S.)

SEVENTH SEMESTER

7KS01 DIGITAL SIGNAL PROCESSING

Unit I: Discrete ï Time Signals and Systems: Introduction to DSP, Advantages, basic elements of DSP system, sampling theorem, A/D, D/A conversion, quantization. Elementary discrete-time sequences. Discrete-time systems: description, representation, classification (linear, time-invariant, static, casual, stable) (08Hrs)

Unit II: Analysis of DTLTI systems: The convolution sum, properties of convolution, Analysis of causal LTI systems, stability of LTI systems, step response of LTI systems, difference equation, recursive & non recursive discrete time systems, solution of difference equations, Impulse response of LTI recursive system. Correlation of discrete time signals. (08Hrs)

Unit III: z- Transform and Analysis of LTI Systems: Definition of z-Transform, properties, rational z-Transforms, evaluation of the inverse z- Transforms, analysis of linear time invariant systems in z-domain, transient and steady-state responses, causality, stability, pole-zero cancellation, the Schur-Cohn stability test. (08Hrs)

Unit IV: Fourier Transforms, the DFT and FFT: Definition & properties of Fourier transform, relation with z-transform. Finite duration sequences and the discrete Fourier transform(DFT), properties, circular convolution, Fast algorithms for the computation of DFT: radix-2 and radix-4 FFT algorithms (08 Hrs)

Unit V: Design of Digital Filters: Classification of filters: LP, HP, BP, FIR and IIR filters, filter specifications. Design of FIR filters using Windows and by Frequency sampling methods. Design of IIR filters from Analog filters using approximation of derivatives, Impulse invariant transformation, Bilinear transformation and Matched z-Transformation, Commonly used Analog filters and IIR Filter design example. (08Hrs)

Unit VI: Realization of Discrete-Time systems: Structures for realization of Discrete-Time systems, realization of FIR systems: Direct Form, Cascade Form, Frequency sampling and Lattice structures. Realization of IIR filters: Direct Form, Signal flow graph and Transposed structures, Cascade form, Lattice and Lattice ladder. Realization for IIR systems. (08Hrs)

TEXT BOOK :

J G Prokis and D G Manolokis, ñDigital Signal Processing: Principles Algorithms and applications (Pearson Education)

REFERENCE BOOKS:

1. S K Mitra: ñDigital Signal Processing: A Computer-Based Approachò (McGraw Hill)
2. E C Ifeacthor and B W Jervis ñDigital Signal Processing A Practical Approachò (Pearson)
3. A V Oppenheim, R W Schafer with J R Buck ñDiscrete Time Signal Processingò(PHI)
4. P Ramesh Babu: ñ Digital Signal Processingò Scitech Publications.

7KS02/7KE02 COMPUTER NETWORKS

UNIT I: Introduction: Brief history of computer networks & Internet, Layered architecture, Internet protocol stack, Network entities & layers, Application layer: Principles of protocols, HTTP, FTP, SMTP and DNS protocols. (08Hrs)

UNIT II: Transport layer: services & principles, multiplexing & demultiplexing applications, UDP, principles of reliable data transfer, TCP details, principles of congestion control, TCP congestion control. (08Hrs)

UNIT III: Network layer: network service model, routing principles, hierarchical routing, Internet Protocol (IP) & ICMP details, routing in the Internet, router internals, IPV6. 08Hrs

UNIT IV: Link layer: Introduction, services, multiple access protocol, LAN addresses & ARP, CSMA / CD, PPP details. (08 Hrs)

UNIT V: Network security: Basic issues, principles of cryptography, authentication and authentication protocol, version, integrity: digital signatures, message digests, hash function algorithm, key distribution & certification, secure e- mail, E-Commerce: SSL & SET, IP Sec details. (08 Hrs)

UNIT VI: Firewalls: Packet filtering and Application gateway, Network Management: Basic principles, infrastructure for network management, The Internet Network ï management framework: SMI, MIB, SNMP details, security and administration, ASN.1 (08 Hrs)

TEXT BOOK:

James F. Kurose & K W Ross: Computer Networking, Pearson Education (LPE)

Reference Books:

1. Douglas E. Comer: Computer Network & Internet, Addison Wesley.
2. Andrew S. Tanenbaum: Computer Networks, PHI (5E)
3. Leon Garcia & Widjaja: Communication Networks, TMH
4. William Stallings: Data & Computer Communication, Pearson Education.

7KS03 DESIGN AND ANALYSIS OF ALGORITHMS

Unit I : Iterative Algorithm Design Issue: Introduction, Use of Loops, Efficiency of Algorithms, Estimating & Specifying Execution Times, Order Notations, Algorithm Strategies, Design using Recursion.

Unit II: Divide And Conquer: Introduction, Multiplication Algorithm and its analysis, Introduction to Triangulation, Covex Hulls, Drawbacks of D & C & Timing Analysis.

Unit III: Greedy Methods: Introduction, Knapsack Problem, Job sequencing with deadlines, Minimum Spanning Trees, Primôs Algorithms, Kruskalôs Algorithm, Dijkstras Shortest Path Algorithm.

Unit IV: Dynamic Programming: Introduction, Multistage Graphs, Traveling Salesman, Matrix multiplication, Longest Common Sub-Sequences, Optimal Polygon Triangulation, Single Source Shortest Paths.

Unit V: Backtracking: Combinational Search, Search & Traversal, Backtracking Strategy, Backtracking Framework, and Some typical State Spaces.

Unit VI: Efficiency of Algorithm: Polynomial Time & Non Polynomial Time Algorithms, Worst and Average case Behavior, Time Analysis of Algorithm, Efficiency of Recursion, Complexity, Examples of Complexity Calculation for Various Sorting algorithms. Time-Space Trade off and Time-Space Trade off in algorithm research.

TEXT BOOK:

Dave and Dave: ñDesign and Analysis of Algorithmsò Pearson Education

REFERENCE BOOKS:

1. Aho,Hopcroft & Ullman ñThe Design & Analysis of Computer Algorithmsò, Addison-Wesley
2. G. Brassard, P.Bratley: ñFundamentals of Algorithmicsò , PHI
3. Horowitz & Sahani: ñ Fundamental Algorithmsò , Galgotia.
4. Cormen, T.H, Lierson & Rivest: ñ Introduction to Algorithmsò, Mc Graw-Hill

7KS04 OBJECT ORIENTED ANALYSIS AND DESIGN

UNIT-I: Modeling Concept: Introduction, Object orientation, OO Development, OO themes, Modeling as a design technique, Class Modeling. Abstraction, The three models, Object and class concepts, Link and association concepts, Generalization & Inheritance, Navigation of class models. (08Hrs)

UNIT II: Advanced object and class concepts, Association Ends, N-ary association, Aggregation, Abstract classes, Multiple inheritance, Metadata, Reification, Constraints, Derived data, Packages, State Modeling: Events, States, Transitions and Conditions, State diagrams, State diagram behavior. (08Hrs)

UNIT III: Nested state diagram, Signal Generalization, Nested states, Concurrency, Relation of class and state models, Use case model, Sequence models, Activity models, Use case relationships, Procedural sequence model, Special constructs for activity models. (08 Hrs)

Unit IV: Development stages, Development life cycle, Devising a system concepts, Elaborating a concepts, Preparing a problem statements, Overview of analysis, Domain class models, Domain state model, Domain Interaction model. (08 Hrs)

Unit V: Application Analysis. Overview of System Design, Estimating Performance, Making a reuse plan, Breaking a system into subsystems, Identifying Concurrency, Allocation of subsystems, Management of data storage, Handling global resources, Choosing a software control strategy, Handling boundary conditions, Setting trade-off priorities, Architecture of the ATM system. (08 Hrs)

Unit VI: Overview of class design, Realizing the use cases, Designing algorithm, Recursing Downwards, Refactoring, Design Optimization, Reification of behavior, Adjustment of Inheritance, Organizing a class design, ATM examples (08 Hrs)

TEXT BOOK :

Blaha , Rumbaugh:òObject Oriented Modeling and Design with UMLò (2/e) Pearson Education.

REFERENCE BOOKS:

1. Dathan, Ramnath: ñObject Oriented Analysis, Design & Implementation,òOUP.
2. McRobb & Farmer: ñObject Oriented System Analysis & Designò Mc Graw Hill.
3. Booch, Rumbaugh & Jacobson: ñ The UML User guideò Pearson Education.

4. Whitten & Bentley: ñSystem Analysis & Design Methodsò Tata McGraw Hill.
5. Booch: ñObject Oriented Analysis & Design with Applicationsò, Pearson Education.

7KS05 PROFESSIONAL ELECTIVE - I
(I) COMPUTER GRAPHICS

Unit I : An overview of Computer Graphics and Graphics System: video display devices, Raster-Scan systems, Random-Scan systems, Graphics monitors and workstations, input devices, hard copy devices, Graphics software. (08 Hrs)

Unit II : Output primitives : Point and Lines, Line drawing algorithms,loading the frame buffer, line function, circle and ellipse generating algorithms, curves, parallel curves algorithms, Pixel addressing, filled-area primitives , functions, Cell array, character generation. (08 Hrs)

Unit III: Attributes of output primitives : Line and curve attributes,color and grayscale levels, area fill attributes. Character attributes, bundled attributes, antialiasing. (08 Hrs)

Unit IV: 2-D geometric transformations : basic transformations, matrix representations, composite transformations, other transformations, transformations between coordinate systems, affine transformations, transformation functions, Raster methods for transformations. Two- Dimensional viewing : viewing coordinates, Window-to viewport coordinate transformation, viewing functions, clipping : point, line, polygon, curve, text, exterior. (08Hrs)

Unit V: Structures and hierarchical modeling : concepts, editing structures, basic modeling concepts, hierarchical modeling, GUI and interactive input methods : the user dialogue, input of graphical data, functions, initial values for input device parameters, interactive picture - construction techniques, virtual reality environments. (08Hrs)

Unit VI: Three dimensional concepts : display methods, graphics, Bezier curves and surfaces, B-spline curves and surfaces,Beta-splines, three dimensional geometric and modeling transformations : translation, rotation, scaling, three dimensional viewing : viewing pipeline, viewing coordinates, projections. (08Hrs)

TEXT BOOK:

D. Hearn, M.P.Baker : Computer Graphics, Second Edition, Pearson Education.

REFERENCES:

1. F.S.Hill: Computer Graphics Using Open GL, II edition, Pearson Education.
2. W.M.Newman & R.F.Sproul: Principles of Interactive Computer Graphics, 2/e, McGraw Hill.
3. F.S.Hill : Computer Graphics, McMillan.
4. D.Hearn & M.P.Baker : Computer Graphics, Prentice Hall.
5. Hamington : Computer Graphics, McGraw Hill.

7KS05 PROFESSIONAL ELECTIVE - I
(II) MULTIMEDIA TECHNOLOGIES

Unit I : Multimedia Authoring and Data Representations: Introduction, Components of Multimedia, Hypermedia and Multimedia, Overview of Multimedia Software Tools, Multimedia Authoring and Tools: Multimedia Authoring, VRML. Graphics and Image Data Representations: Graphics/Image Data Types, 1-Bit Images, 8-Bit Gray-Level, Images,Image Data Types, Popular File, Formats, GIF, JPEG, PNG,TIFF, EXIF, Graphics Animation Files, PS and PDF, Windows WMF, Windows BMP, Macintosh PAINT and PICT, X Windows PPM. (08Hrs)

Unit II: Color in Image and Video: Color Science, Color Models in Images, and Color Models in Video. Fundamental Concepts in Video: Types of Video Signals,Component Video, Composite Video, S-Video, Analog Video,NTSC Video, PAL Video, SECAM Video, Digital Video, Chroma Sub sampling CCIR Standards for Digital Video, High Definition TV. (08Hrs)

Unit III: Basics of Digital Audio: Digitization of Sound, Digitization, Nyquist Theorem, Signal-to-Noise Ratio (SNR), Signal-to-Quantization-Noise Ratio (SQNR), MIDI: Musical Instrument Digital Interface, Hardware Aspects of MIDI, Structure of MIDI Messages, General MIDI, MIDI-to-WAV Conversion, Quantization and Transmission of Audio, Coding of Audio,Pulse Code Modulation, Differential Coding of Audio, Lossless Predictive Coding, DPCM, DM, ADPCM. (08Hrs)

Unit IV: Multimedia Data Compression: Lossless Compression Algorithms: Basics of Information Theory, Run-Length Coding, Variable-Length Coding (VLC), Dictionary-BasedCoding, Arithmetic Coding, Lossless Image Compression. The JPEG Standard. (08Hrs)

Unit V: Basic Video Compression Techniques: Introduction, Video Compression Based on Motion Compensation, Search for Motion Vectors, H.261, Intra-Frame (I-Frame) Coding, Inter-

Frame (P-Frame) Predictive Coding, Quantization in H.261, H.261 Encoder and Decoder, H.261 Video Bitstream Syntax, MPEG-1, Motion Compensation in MPEG-1 , Major Differences from H.261 (08Hrs)

Unit VI: Basic Audio Compression Techniques: ADPCM, Vocoders, Phase Insensitivity, Channel Vocoder, Formant Vocoder, Linear Predictive Coding, CELP. MPEG Audio Compression: Psychoacoustics, Equal-Loudness Relations, Frequency Masking, Temporal Masking, MPEG Audio, MPEG Layers, MPEG Audio Strategy, MPEG Audio Compression Algorithm, MPEG-2 AAC (Advanced Audio Coding). (08Hrs)

TEXT BOOK:

Ze-Nian, Li, Mark S. Drew ñFundamentals of Multimediaò (Pearson Education)

REFERENCE BOOKS:

1. Rajan Parekh ñPrinciples of Multimediaò (Tata McGraw-Hill)
2. S.J.Gibbs & D.C.Tsichritzis ñMultimedia Programmingò, Addison Wesley 1995
3. P.W.Agnew & A.S.Kellerman ñDistributed Multimediaò, Addison-Wesley 1996
4. C.A.Poynton, ñA Technical Introduction to Digital Videoò Wiley1996
5. F.Fluckiger, ñUnderstanding Networked Multimediaò, Prentice- Hall 1995

7KS05 PROFESSIONAL ELECTIVE - I
(III) WEB ENGINEERING

UNIT I: Introduction to the Web: History of web, Protocol governing the web, Web architecture, Major issues in Web solution development, Web servers, Web browsers, Internet Standards, TCP/IP protocol suites, IP Address, MIME, Cyber laws. Hypertext Transfer Protocol (HTTP): Introduction, web server and client, Resources, URL and its Anatomy, Message Format, Examples, Persistent and non persistent Connections, Web caching, Proxy. (08Hrs)

Unit II: Hypertext Markup language (HTML): History of HTML, HTML basics, Elements, attributes and tags of HTML, Basic Tags, Advanced Tags, Frames, Images, Meta Tag, Planning of web page, Model amd Structue of web site, Desiging web pages, Multimedia content. Cascading Style Sheet (CSS): Introduction, advantages, Adding CSS, Browser compatibilty, CSS and page layout, Selectors, Grouping, Type Selectors. (08Hrs)

Unit III: Extensible Markup Language (XML): Common Usage, Role of XML, Prolog, Body, Elements, Attribuyes, Validation, Displying XML, Namespaces. XML DTD, Introduction to DTD, Purpose of DTD, DTD in XML document, element type declaration, Attribute declaration, Entity declaration, DTD validation. 08 Hrs

Unit IV: W3C XML Schema: Introduction, limitation of DTD, strengths of schema, schema structure, schema element, element declaration, schema validation, Built in data types, declaring simple elements. (08Hrs)

Unit V: Java Script: Introduction, variables, literals, operators, control structure, conditional statements, Arrays, Functions, Parameter Passing, Function Pointer, Inner/Nested Functions, Objects. (08Hrs)

Unit VI: Common Gateway Interface (CGI): Internat programming paradigm, Server side programming, Language for CGI, Applications, Server environment, Environment variables, CGI building blocks, CGI scripting using C, shell script, writing CGI progarm, CGI security, Alternatives and enhancement in CGI. (08 Hrs)

TEXT BOOK:

Roy Uttam K: Web Technologies, Oxford University Press, 2010.

REFERENCES:

1. Dr. Raja Subramanian: Creating Web Sites in Engineering, University Science Press.
2. Mohler J.L. & Duff J.M.: Desiginig Interactive Web Sites, CENGAGE Learning.
3. Joel Sklar: Text Book of Web Design, CENGAGE Learning.
4. Meenakshi G.M.: Web Graphics, Scitech Publications(India) Pvt. Ltd.

7KS05 PROFESSIONAL ELECTIVE - I
(IV) HUMAN COMPUTER INTERFACE

UNIT I: Human factors of interactive software: Goals of system engineering & User-interface design, motivation for human factors, accommodation of human diversity, High level theories, Object-Action interface model, Recognition of the diversity, Eight golden rules of interface design, Preventing errors, Guidelines for data display and data entry, Balance of automation and human control. (08 Hrs)

UNIT II: Managing design process, Organizational design to support usability, the three pillars of design , Development methodologies, ethnographic observation, Participatory Design,

Scenario Development, Social impact statement for early design review, legal issues, Software tools: specification methods, Interface-Building tools, Evaluation and Critiquing tools. (08 Hrs)

UNIT III: Direct manipulation and virtual environments, example of direct manipulation system, Explan ations of direct manipulation, OAI model, Visual thinking and icons, direct manipulation programming, home automation, Remote Direct manipulation, Virtual environments. (08 Hrs)

UNIT IV: lnteraction devices: Keyboards and function keys, Pointing devices, Speech recognition , digitization and generation, Image and Video Displays, Printers. Response time and Display rate: Theoretical foundations, Expectations and attitudes, User Productivity, Variability. (08 Hrs)

UNIT V: Multiple window strategies, Individual windows design, Multiple window design, Coordination by tightly coupled windows, Image browsing and tightly coupled windows, Personal role management and elastic windows. Computer supported cooperative work: Goals of cooperation , Asynchronous interaction, Synchronous distributed and face-to-face, Applying CSCW to education. (08 Hrs)

UNIT VI: lnformation search and visualization, Database Query and phrase search in textual documents, multimedia documents searches, Information visualization, advanced filtering. Hypermedia and the World Wide Web, Genres and goals and designers, Users and their tasks, Object action interface model for web site design. (08 Hrs)

TEXT BOOK:

Ben Shneiderman:òDesigning the User Interfaceò, Pearson Education.

REFERENCE BOOKS:

1. R. Beale, A.J. Dix, J. E. Finlay, G. D. Abowd ñHuman-Computer Interactionò,Prentice-Hall.
2. Joann Hackos, Janice Redish, ñUser and Task Analysis for Interface Designò,Wiley.
3. Jeff Raskin, ñThe Humane Interfaceò, Pearson Education.
4. Jesse James Garrett, ôThe Elements of User Experienceò, New Riders.

7KS06 DIGITAL SIGNAL PROCESSING - LAB.:

Minimum Eight experiments/programming assignments must be completed based on the respective syllabus uniformly covering each of the units.

7KS07 DESIGN & ANALYSIS OF ALGORITHMS - LAB.:

Minimum Eight experiments/programming assignments must be completed based on the respective syllabus uniformly covering each of the units.

7KS08 OBJECT ORIENTED ANALYSIS & DESIGN - LAB.:

Minimum Eight experiments/programming assignments must be completed based on the respective syllabus uniformly covering each of the units along with one mini project.

7KS09 PROJECT AND SEMINAR

Seminar should be preferably based on the proposed project to be completed in final year. The seminar should be conducted in seventh semester and evaluated. Each candidate shall submit a seminar report, deliver the seminar and face the viva-voce. The distribution of internal 50 marks shall be as follows.

1. Seminar report preparation and submission :- 10 marks
2. Seminar delivery/ presentation:- 20 marks
3. Seminar viva-voce:- 10 marks
4. Attendance in all seminar sessions:- 10 marks

SEMESTER : EIGHT

8KS01 ARTIFICIAL INTELLIGENCE

Unit I : Introduction: Definition of AI, AI Techniques, Tic-Tac-Toe, Pattern Recognition, Level of the model, Critical for Success, Problems and Problem Specifications, Defining the Problems, Production Systems, Control Strategies, Futuristic Search, Problem Characteristics, Decomposition of Problems, Solution steps, Predictability, Absolute & Relative Solutions.

Unit II: Basic Problem Solving methods: Reasoning, Problem trees and graphs, Knowledge Representation, Matching indexing with variables, Heuristic Functions, Weak Methods, Problem reduction, Constraints Satisfaction, Means-ends analysis, Analysis of Search Algorithms.

Unit III: Games Playing, Minimax Search Procedure, adding alpha beta cutoffs, additional refinements, waiting for quiescence, Secondary Search, Using Book moves limitations.

Unit IV : Knowledge Representation using Predicate Logic: Representing simple facts in logic, augmenting the representation, resolution, conversion to clause form, Resolution in Propositional Logic and Predicate Logic, Unification Algorithms, Question Answering and Natural Deduction.

Unit V : Structural representation of knowledge: Some common known structures, choosing the level of representation, finding the right structure as needed, declarative representation, semantic nets, Conceptual Dependency, Frames, Scripts, Semantic- Semantic, Spectrum and procedural representation.

Unit VI : Natural Language Understanding: Concepts of Understanding, Keyword matching, Syntactic and Semantic analysis, Understanding single and multiple sentences, Using Four, Cover structures, Schemes and Scripts in Understanding, Dialogue Understanding.

TEXT BOOK:

Elaine Rich & Knight: ñArtificial Intelligenceò, McGraw Hill.

REFERENCE BOOKS:

1. Nils Nilson: ñ Principles of Artificial Intelligenceò.(Addison-Wesley)

2. R. J. Winston: ñ Artificial Intelligenceò.(Wiley)

3. Patterwson ñIntroduction to Artificial Intelligence and Expert Systemsò (PHI).

4. Rolston ñPrinciples of Artificial Intelligence and Expert Systemsò, McGraw Hill.

8KS02/8KE02 EMBEDDED SYSTEMS

Unit-I Introduction to Embedded System: Embedded Systems Vs General Computing Systems. History, classification, major application areas and purpose of Embedded Systems. Components of Embedded system: General Purpose and Domain Specific Processors, Memories for embedded systems.

Unit-II Components of Embedded system: Sensors & Actuators, Communication Interface, Embedded Firmware and other components. Characteristics of Embedded System, Quality Attributes of Embedded System. Embedded Systems Examples: Washing machine. Automotive application.

Unit-III Introduction to 8051Microcontroller: 8051 Architecture, 8051 Memory Organization, Registers, Oscillator Unit, Ports, 8051 Interrupt System, Timer units, the Serial Port, 8051 Power Saving Modes.

Unit-IV: Programming the 8051 Microcontroller: Addressing modes. 8051 Instruction Set: Data transfer instructions, Arithmetic instructions, Logical instructions, Boolean instructions, and Program Control Transfer instructions. Assembly Language based Embedded Firmware development.

Unit-V : Programming in Embedded C: Review of various constructs in C. Constant declarations, óvolatileô type qualifier, Delay generation and Infinite loops in Embedded C. Coding Interrupt Service Routines, Recursive and Re-entrant Functions, Dynamic memory allocation.

Unit-VI : VxWorks Real Time Operating System (RTOS): Characteristics, Real Time Kernel, Hard/Soft Real time. VxWorks Task Creation, Management and Task Scheduling, Kernel Services, Inter Task Communication, VxWorks Task Synchronization and Mutual Exclusion, Interrupt Handling, Watchdog for task Execution monitoring, Timing and Reference in VxWorks.

TEXTBOOK:

Shibu K V ñIntroduction to Embedded Systemsò McGraw-Hill.

REFERENCES:

1. Rajkamal , ñEmbedded Systems, Architecture, Programming & Designò TMH.
2. Tammy Noergaard ñEmbedded Systems Architectureò Elsevier Newness Publication.
3. Vahid and Givargis ñEmbedded System Designò John Wiley & Sons P Ltd.
4. Peter Marwedel ñEmbedded Systems Designò Springer, Netherland.

8KS03/8KE03 SOFTWARE ENGINEERING

Unit I : Evolving role of Software. Software crises & myths. Software engineering. Software process & process models: Linear sequential, prototyping, RAD, Evolutionary Product & Process. Project management concepts: People, Product, Process, Project. W5HH principles, critical practice. (08 Hrs)

Unit II: Measures, Metrics & Indicators. Metrics in process & project domains-software measurement, Metrics for software quality, small organization. Software projects Planning: Scope, resources, estimation, decomposition technique, Tools. Software risks : identification, risk projection, refinement & RMMM plan. (08 Hrs)

Unit III: Project Scheduling: Concepts. Peoples Efforts. Task set, Task network. Scheduling. EV analysis, Project Plan. Software quality concepts. SQ Assurance, Software reviews, technical reviews, software reliability, ISO 900 L, SQA Plan. SCM process. Version control. SCM standard. (08 Hrs)

Unit IV: System engineering: Hierarchy, Business Process & Product engineering: Overviews. Requirement engineering, System modeling. Requirement analysis. Analysis principles. Software prototyping. Specification. Design Process. Design Principles & Concepts. Effective modular design. Design model & documentation. (08 Hrs)

Unit V: Software architecture, Data Design, Architectural styles, Requirement mapping. Transform & Transaction mappings. User-interface design : Golden Rule. UTD, Task analysis & modeling, ID activities, Tools, design evaluation. Component level design : Structure programming, Comparison of design notation. (08 Hrs)

Unit VI: Software testing fundamentals; test case design, Whitebox testing. Basis path, control structure-, Blackbox-Testing, & for specialized environments. Strategic approach to S/W testing. Unit testing, integration testing, validation testing, system testing. Debugging. Technical metrics for software. (08 Hrs)

TEXTBOOK:

Pressman Roger. S: Software Engineering, A Practitioner's Approach, TMH.

REFERENCE BOOKS :

1. Somerville: Software Engineering (Addison-Wesley) (5/e)
2. Fairly R: Software Engineering (McGraw Hill)
3. Davis A: Principles of Software Development (McGraw Hill)
4. Shooman, M.L: Software Engineering (McGraw-Hill)

8KS04 PROFESSIONAL ELECTIVE - II
(I) DISRIBUTED COMPUTING

UNIT-I: Basic distributed system: Introduction, Distributed computing models, Software concepts, Issues in designing distributed system, Client Server model, Case studies. (08 Hrs)

UNIT II: Inter process Communication: Message passing Group Communication, Remote Communication: Introduction, Remote procedural call basics, RPC Implementation, RPC Communication, Other RPC Issues, Remote method, Invocation basics, RMI Implementation. (08 Hrs)

UNIT III: Synchronization: Introduction, Clock Synchronization, Logical clocks, Global state, Mutual Exclusion, Election algorithms, Deadlock in Distributed systems. (08 Hrs)

UNIT IV: Distributed system management: Introduction Research management, Task assignment approach, Load balancing

approach, Load sharing g approach, Process management in a distributed environment, Process migration, Threads, Fault tolerance. (08 Hrs)

UNIT V: Distributed shared memory: Introduction, Basic concepts of DSM, Hardware DSM, Design Issues in DSM, Issues in implementing DSM systems, Heterogeneous and other DSM systems. (08 Hrs)

UNIT VI: Distributed File System: Introduction to DFS, File models, DFS design, Semantics of file sharing, DFS Implementation, File catching in DFS, Replication in DFS. (08 Hrs)

TEXT BOOK :

Sunita Mahajan & Seema Shah: "Distributed Computing" Oxford University Press

REFERENCE BOOKS:

1. Tanenbaum: "Distributed Operating Systems" Pearson Education.
2. Sinha: "Distributed Operating Systems Concepts & Design" PHI.
3. Tanenbaum & Van Steen: "Distributed Systems Principles & Paradigms" PHI, Second Edition.
4. Crichlow: "Distributed Systems- Computing Over Networks" PHI.

8KS04 PROFESSIONAL ELECTIVE - II
(II) MOBILE COMPUTING

Unit I : Introduction: Applications, History of wireless communication, A simplified reference model, Wireless Transmissions: Frequencies for Radio Transmissions, Signals, Antennas, Signal Propagations, Multiplexing, Modulation, Spread Spectrum, Cellular System. (08 Hrs)

Unit II: Medium Access Control: Motivations for a specialized MAC, SDMA, FDMA, TDMA.CDMA, Comparison of S/T/F/CDMA, Telecommunications System: GSM, DECT, TETRA, UMTS and IMT-2000. (08 Hrs)

Unit III: Satellite Systems: History, Applications, Basics, Routing, Localizations, Handover, Examples, Broadcast Systems: Cyclical Repetition of Data, Digital Audio Broadcasting, Digital video Broadcasting, Convergence of Broadcasting and mobile communications. (08 Hrs)

Unit IV: Wirelesses LAN: Infra Red Vs Radio Transmission, Infrastructure and Ad-hoc Network, IEEE 802.11, HIPERLAN, Bluetooth. (08 Hrs)

Unit V: Mobile Network Layer: Mobile IP, Dynamic Host Configuration Protocol, Mobile Ad-hoc Networks, Mobile Transport Layer:

Traditional TCP, Classical TCP improvements, TCP over 2.5/3G Wireless Networks. (08 Hrs)

Unit VI: Support for Mobility: File Systems, World Wide Web, Wireless Application Protocol (version 1.X) Arhitecture, i-mode, SyncML, WAP2.0. (08 Hrs)

TEXT BOOK :

ochen Schiller: ñMobile Communicationò Pearson Education, Second Edition.

REFERENCE BOOKS:

1. Mazliza Othman: ñ Principles of Mobile Computing and Communicationsò, Auerbach.
2. Agrawal and Zeng: ñIntroduction to Wireless and Mobile Systemsò Cengage Learning.
3. Upena Dalal: ñ Wireless Communicationò Oxford University Press.
4. Raj Kamal: ñMobile Computingò Oxford University Press.

8KS04 PROFESSIONAL ELECTIVE - II
(III) SOFT COMPUTING

UNIT-I: Fundamental of Neural Network: Basic concepts of Neural Network, Human Brain, Model of artificial neurons, Neural Network architecture, Characteristics of Neural Network, Learning methods, Taxonomy of Neural Network architecture, Early Neural Network architecture. (08 Hrs)

UNIT II: Architecture of a Backpropagation Network, The Perceptron Model, The solution, Single Layer Artificial Neural Network, Model for Multiayer Perceptron, Back propagation learning, Input Layer, Hidden Layer and Output Layer Computation, Calculation of error, Training of Neural Network, Method of Seepest Descent,Effect of Learning rate, Adding a momentum Term, Backpropogation Algorithm. (08Hrs)

UNIT-III: Fuzzy Set Theory: Fuzzy verses Crisp, Crisp sets, Operations and Properties of Crisp Sets, Partition and Covering, Fuzzy sets, Membership Function, Basic Fuzzy Set Operation, Properties of Fuzzy Sets, Crisp Relations, Cartesian product, other relations, Operations on Relations, Fuzzy Relations, Fuzzy Cartesian Product, Operations on Fuzzy Relations. (08Hrs)

UNIT IV: Fuzzy Systems: Crisp logic, Laws of Propositional logic, Inference in Propositional logic, Predicate logic, Interpretations of Predicate Logic Formula, Inference in Predicate Logic, Fuzzy logic, Fuzzy Quantifiers and Inference, Fuzzy rule based system, Defuzzification methods, applications. (08 Hrs)

UNIT V: Fundamental of Genetic Algorithm: Genetic Algorithms, Basic Concepts, Creation of offspring, Working Principle, Encoding, Binary, Octal, Hexadecimal, Permutation, Value, Tree, Fitness function, Reproduction. (08 Hrs)

UNIT VI: Genetic Modeling: Inheritance Operators, Cross over, Inversion & Deletion, Mutation Operator, Bit wise operator, Bit wise operator used in GA, Generational cycle, Convergence of genetic algorithm, Application, Multilevel Optimization, Real life problem, Differences and similarities between GA and other traditional methods, Advances in GA. (08 Hrs)

TEXT BOOK:

S. Rajesekaran, G. A. Vijayalakshmi Pai: ñNeural Network, Fuzzy logic, and Genetic algorithms Synthesis and Applicationsò PHI.

REFERENCE BOOKS:

1. S. Haykin: ñ Neural Networksò Pearson Education.
2. Jang,Sun and Mezutani: ñ Neuro Fuzzy and Soft Computingò .McGraw-Hill
3. J.Yen, R. Langari: ñ Fuzzy Logic: Intelligence, Control & Information ñ. Pearson Education.
4. N.P.Pahey: ñArtificial Intelligence and Intelligent Systemsò, Oxford University Press.

8KS04 PROFESSIONAL ELECTIVE - II
(IV) NETWORK SECURITY

Unit I: Introduction: Security Trends, The OSI Security Architecture, Security Attacks, Security Services, Security Mechanisms, A Model for Internetwork Security, Internet Standards and the Internet Society. Symmetric Encryption and Message Confidentiality: Symmetric Encryption Principles, Symmetric Block Encryption Algorithms, Stream Ciphers and RC4, Cipher Block Modes of Operation, Location of Encryption Devices, Key Distribution. (08 Hrs)

Unit II: Public-Key Cryptography and Message Authentication: Approaches to Message Authentication, Secure Hash Functions and HMAC, Public Key Cryptography Principles, Public Key Cryptography Algorithms, Digital Signatures, Key Management. (08 Hrs)

Unit III: Authentication Applications: Kerberos, X.509 Authentication Service, Public-Key Infrastructure, Electronic Mail Security: Pretty Good Privacy (PGP), S/MIME, (08 hrs)

Unit IV: IP Security: IP Security Overview, IP Security Architecture, Authentication Header, Encapsulating Security Payload, Combining Security Associations, Key Management, Web Security: Web Security Considerations, Secure Socket Layer (SSL) and Transport Layer Security (TLS), Secure Electronic Transaction (SET). (08 Hrs)

Unit V: Network Management Security: Basic Concepts of SNMP, SNMPv1 Community Facility, SNMPv3, Intruders**:** Intruders, Intrusion Detection, Password Management. (08 Hrs)

Unit VI: Malicious Software: Viruses and Related Threats, Virus Countermeasures, Distributed Denial of Service Attacks, Firewalls: Firewall Design Principles, Trusted Systems, Common Criteria for Information Technology Security Evaluation. (08 Hrs)

TEXT BOOK:

William Stallings: ñNetwork Security Essentials Applications and Standardsò Pearson Education, Third Edition.

REFERENCE BOOKS:

1. Atul Kahate: ñCryptography and Network Securityò Mc Graw Hill.
2. Forouzan and Mukhopahyay: ñòCryptography and Network Securityò Mc Graw Hill.
3. Matt Bishop: ñ Computer Security: Art & Scienceò Pearson Education.
4. Brijendra Singh: ñ Network Security & Managementò PHI.

8KS05 ARTIFICIAL INTELLIGENCE - LAB.

Minimum Eight experiments/programming assignments must be completed based on the respective syllabus uniformly covering each of the units.

8KS06 EMBEDDED SYSTEMS - LAB.

Minimum Eight experiments/programming assignments must be completed based on the respective syllabus uniformly covering each of the units.

8KS07 PROJECT & SEMINAR

The project shall be internally evaluated (for 75 Internal Marks) in three phases based on the progress of the project work. Each phase shall be internally evaluated for 25 marks as follows:

Phase I: - Problem Definition and Design

Phase II: - Problem Implementation and Testing

Phase III: - Project Demonstration & Report submission.

The external evaluation of the project shall be based on demonstration of the project and viva-voce

*****

SYLLABUS PRESCRIBED FOR
BACHELOR OF ENGINEERING
COMPUTER ENGINEERING
SEMESTER PATTERN (C. G. S.)

SEVENTH SEMESTER

7KE01 SIGNALS AND SYSTEMS

Unit I : Continuous time and discrete time signals, transformation of the independent variable, exponential and sinusoidal signals, unit impulse and unit step functions, operations on signals like folding, time-shifting, amplitude scaling and time-scaling, mixing of signals and modulation. (08Hrs)

Unit-II: Continuous time and discrete time systems, basic system properties, discrete time LTI systems, Continuous time LTI systems, Properties of linear time invariant systems, Causal LTI systems described by differential and difference equations, Singularity functions. (08 Hrs)

Unit III: Fourier Series representation of periodic signals: Response of LTI systems to complex exponentials, Fourier representation of continuous time periodic signals, convergence of the Fourier series, Properties of continuous time Fourier series, Fourier series representation of discrete ï time periodic signals, properties of discrete time Fourier series, Fourier series and LTI systems, filtering. (08 Hrs)

Unit IV: Continuous ï Time Fourier Transform: Development of the Fourier transform representation of an aperiodic signal, the Fourier transform for periodic signals, properties of the continuous time Fourier transform, the convolution property, multiplication property, Linear constant coefficient differential equations. (08 Hrs)

Unit V: Sampling: Representation of continuous time signals by its samples, reconstruction of a signal from its samples, aliasing, discrete time processing of continuous time signals, sampling of discrete time signals. (08 Hrs)

Unit VI : Z- Transform: Z- transform, the region of convergence for the z-transform, Inverse z- transform, properties of Z transform, analysis and characterization of LTI systems using z transforms, System function algebra and block diagram representations, the unilateral z ï transform. (08 Hrs)

TEXT-BOOK :

Oppenheim, Willsky, Nawab ó Signals and Systemsô, Pearson Education.