

SOFTWARE ENGINEERING

Section A

Introduction- Need for software engineering, issue in the design of large software, software life cycle models, overview of software development process.

Software Requirement Analysis and Specification- Requirements Engineering, Crucial process step, State of the practice, problem analysis, Data dictionaries, Entity relationship diagram, approaches to problem analysis, Structured requirements definition, structured analysis & design technique, Software prototyping, Software requirements specification, Nature of the SRS, characteristics of a good SRS. Organization of the SRS, Specifying behavioral requirements, finite state machines, decision tables & tree, PDL

Section B

Software Metrics: What and why: Definition, areas of applications, problems during implementation, size metrics, The basic information Flow Model, the more sophisticated information Flow Model, Metrics analysis: using statistics for Assessment, Flow problems with metric data, The common of pool of data. A pattern for successful applications.

Software Project Planning: Cost estimation: Models, Static, single variable model, Static multivariable model, The constructive cost model: Basic model, International model, Detailed COCOMO Model, The Putnam resource allocation model: The trade off- -of-time versus cost, development sub cycle, software risk management: what is Risk, typical software risks, Risk management Activities, Risk identification, Risk projection, Risk management activity.

Section C

Software testing techniques: Software testing fundamental testing objectives, testing principles, testability, test case design, White box testing, flow graph notation, cyclomatic complexity, driving test cases, graph metrics, black box testing, graph base testing methods, equalization partitioning, comparison testing, orthogonal Array testing, Testing for real time system.

Software Testing Strategies: Strategic approach to software testing, verification and validation, unit testing, unit test procedures, integration testing, top down integration, bottom up integration, regression testing, smoke testing, validation testing, alpha testing and beta testing, system testing, recovery testing, security testing, stress testing, performance testing.

Section D

Software maintenance: What is software maintenance; categories of maintenance, problem during maintenance, potential solution to maintenance problems, the maintenance process: program understanding, generating particular maintenance proposal, ripple effect, modified program testing, maintenance models: Quick fix model, iterative enhancement model, reuse oriented model, Boehm's model estimation of maintenance cost, Beladay and Lehman model, Boehm model, Configuration management activities, software version, Change control process.

Software Quality Assurance: Quality concepts, Quality, Quality control, Quality assurance, cost of quality, SQA Activities, Cost impact of defects, defect amplication and removal, Review meeting, reporting and record keeping, statistical software quality assurance, software reliability, measure of reliability and availability.

Books:

1. Software Engineering- A practitioner's Approach, RogerS. Pressmen
2. Software Engineering-K.K. Aggarwal&Yogesh

MANAGEMENT FOR IT PROFESSIONALS

Section A

Meaning, Nature and scope of management, The Emergence of Management thought, Japanese management vs. U.S. Management; the Management process – Planning, Organizing, Directing and controlling.

Planning – The Process, Premises; Types of Plans; The Process and Techniques of Decision Making. Decision Making: Bounded rationality, alternatives and their evaluation.

Section B

Organizing – Meaning and Principles of Organization; Organizational Structure; Work Division, Departmentation; Organization charts, span of control, levels of management; delegation of authority, decentralization; line & staff relationship. Concepts of authority, responsibility, power delegation, organizational culture, and climate.

Section C

Motivation – Definition, content and process theories.

Communication – Definition, process and barriers to communication.

Leadership – Meaning, theories and styles.

Control – Control process, Areas of control.

Section D

Organization theory – Group dynamics; Group processes, group cohesiveness, stress management; Nature and potential sources of stress.

BOOKS :

1. Joseph L., Massie; Essentials of Management Prentice Hall of India.
2. Boone, Louis E. and David L. Kurtz; Principles of Management, Random Books.
3. McFarland, vide balton E., Management; Principles and practices; McMillan Co.
4. Dressler, Grey; Management Fundamentals; Modern Principles and practices”. Reston Publishing.
5. Newman, Summer and Warren; The process of Management; Prentice Hall of India.
6. Peter Drucker; The practice of Management, Harpar & Bros.
7. L.M. Parsad; Principles and Practice of Management; Sultan Chand & Sons.

DATABASE MANAGEMENT SYSTEM

Section A

Overview of DBMS, Components of DBMS: (users, language, structure, data-dictionary, data manager, DBA, etc.). File processing versus Data Management, File Oriented approach versus Database Oriented approach. SPARC 3-level architecture. A brief overview of three traditional models (hierarchical mode, network model and relational model).

Section B

Properties of relational model {Codd's 12 rules (integrity rules (concept of keys))}, Relational algebra (select, project, cross product, joins (theta-join, equi-join, natural-join, outer join)), Tuple relational calculus, Domain relational calculus, Entity-Relationship model as a tool for conceptual design entities, attributes and relationships, ER-Diagram, Converting ER-Model into relational schema.

Section C

Functional Dependencies, Multi-valued Dependencies, Normalization (up to 5th level), Structured Query language (with special reference of SQL of Oracle): (INSERT, DELETE, UPDATE, VIEW definitions and use of Temporary tables, Nested Queries, Integrity constraints: Not null, unique, check, primary key, foreign key references), File Organization (Sequential file, index sequential files, direct files, Hashing, B-trees, index files).

Section D

Query processing (Introduction, steps in Query processing, General Processing Strategies, Query Optimisation), Recovery and security, Introduction to Object-Oriented Database, C/S Database, Knowledge Based Database and Distributed Database Management System.

BOOKS:

1. C.J. Date, " An introduction to data base System", 7th ed. Addison Wesley, 2000.
2. Abraham Silberschatz, Henry F. Korth, S. Sudershan, Database System Concepts, rd edition, The McGraw Hill Companies, Inc., 1997.
3. Naveen prakash,"Introduction to Database management ", Tata McGraw Hill Publishing Company Ltd., New Delhi, 1991.
4. Bipin C desai, an introduction to database management system.

COMPUTER NETWORKS

Section A

Introduction: Layered Network Architecture; ISO-OSI Model;

Data Communication Techniques: Pulse Code Modulation (PCM); Differential Pulse Code Modulation (DPCM), Delta Modulation (DM), Data Modems, Multiplexing Techniques – Frequency – Division, Statistical time – Division Multiplexing, Multiplexing Hierarchies, Transmission Media – Wires, Cables, Radio Links, Satellite Links, Fibre-optic Links, Error Detection: Parity Check Codes, Cyclic Redundancy Codes.

Section B

Data Link Protocols: Stop and Wait protocols: Noise free and Noisy Channels, Performance and Efficiency; Sliding Window protocols: Go Back and Selective Repeat ARQs, performance and Efficiency; Verification of Protocols using Finite State Machine; HDLC Data Link Protocol; Integrated Services Digital network; Interfaces, Devices; Channel Structure; Asynchronous Transfer Mode (ATM); ATM Cells, Header and Cell Formats, Layers in ATM, Class 1,2,3,4 Traffic.

Local Area Networks (LANs): IEEE 802.3, 802.4 and 802.5 Protocols; performance of Ethernet and Token ring Protocols; FDDI protocol; Distributed Queue Dual Bus (DQDB) protocol.

Section C

Network Layer protocols: Design Issues: Virtual Circuits and Datagrams; Routing Algorithms; Optimality principle, Shortest path routing – Dijkstra, Bellman-Ford and Floyd-Warshall Algorithms, Flooding and Broadcasting, Distance Vector Routing, Link Stat Routing, Flow Based Routing, Multicasting Routing; Flow and Congestion Control; General Principles, Window Flow Control, Packet Discarding, Isarithmic Control, Traffic Shaping, Choke packets, RSVP; Dead Locks and their Avoidance; Network Layer in ATM; Interworking: Bridges, Routers and Gateways; Internet Architecture and Addressing.

Transport Layer Protocols: Design Issues: Quality of Services, Primitives; Connection Management: Addressing, Connection Establishment and Releases, Use of Timers, Flow Control and Bufferings, Multiplexing, Crash Recovery; Elements of TCP/IP Protocol: User Datagram protocol (UDP/TCP Layering, Segment Format, Checks Sum, Timeout, Connection Management, Finite State Machine.

Section D

Session Layer protocol: Dialog Management; Synchronization; OSI Session primitives; Connection Establishment.

Presentation and Application Layer protocols: Presentation Concepts; SNMP-abstract Syntax notation.1 (ASN. 1), Structure of Management, Management Information Base; Cryptography: substitution and Transposition Ciphers; Data Encryption Standards (DES), DES Chaining, Breaking DAS, Public Key Cryptography, Authentication Protocols; Electronic Mail; World Wide Web.

Books:

1. A. S. Tanenbaum, “Computer Networks”, Second Ed., Prentice Hall, India.
2. J. F. Hayes, “Modelling and analysis of Computer Communication Networks”, Plenum Press (Reprinted in India by Khana Publishers).
3. D. Bertsekas and R. Gallager, “Data Networks”, Second Ed., Prentice Hall, India.
4. D.E.Comer, “Internetworking with TCP/Ip”, Vol. 1, Prentice Hall, India.
5. G. E. Keiser, “Local Area Networks”, McGraw Hill, International Edition.
6. W. Stalling, “Data & Computer Communication”, Maxwell Macmillan International Edition.

VISUAL PROGRAMMING

Section A

VB environment, Properties, Methods, use of object browser, Basic Programming convention in VB, Menu and tool bars and programming fundamentals, flow control statements, dialog control, MS Common Control, MDI, Control Array.

Section B

VB Design elements, concept of classes in VB procedures and function in VB, file handling, Shell Programming, OLE, ActiveX in VB, win 32 API in VB and API viewer.

Section C

SQL query processing and Data base basics, Data Control and Data bound control, DAO and ADO, creating reports in VB, Data aware classes, ActiveX environment, packaging and development in VB.

Section D

Advance VB (Developing Add in VB) CDO and MAPI Programming, Advance ADO Techniques, VB Script, and ASP in VB, VB and Internet Programming.

Books:

1. Brian Siler and Jeff spots: Using Visual basic 6 by PHI.
2. Professional Visual basic 6 Database Programming by WDOX publishers.
3. O'Reilly: Developing Visual Basic Add – ins by Romen pub.
4. Win 32 API Programming with Visual basic by Romen pub. O' Reilly.
5. Visual basic Shell Programming by Hamilton pub. O' Reilly.
6. Visual basic Oracle 8 Programmer's reference by Tretsch pub. O' Reilly

MICROPROCESSOR, MICRO COMPUTERS AND INTERFACES

Section A

Microprocessor: Microprocessor Instruction Set and Computer language; from Large Computers to Single Chip Micro controllers. Microprocessor Architecture and its operations.

Memory: Input and Output (I/O) Devices; Example of a Microcomputer System; Review: Logic Devices for Interfacing. The 8085 MPU; Example of an 8085 Based Microcomputer; Memory Interfacing; Interfacing the 8155 Memory Segment; Testing and Troubleshooting Memory Interfacing Circuits; How Does an 8085 – based Signal-Board Microcomputer Work? Basic Interfacing Concepts; Interfacing Output Display; Interfacing Input Devices; Memory-Mapped I/O; Testing and Troubleshooting I/O Interfacing Circuits.

Section B

The 8085 programming Model; Instruction Classification; Instruction and Data Format; How to Write, Assemble and Execute a Simple program; Overview of the 8085 Instruction Set. Data Transfer (Copy) Operations; Arithmetic Operations; Logic Operations; Branch Operations; Writing Assembly Language programs; Debugging a program; some puzzling questions and Their Answers.

Programming Techniques: Looping, Counting and Indexing; Additional Data Transfer and 16-bit Arithmetic Instructions; Arithmetic Operations Related to Memory; Logic Operations; Rotate; Logic Operations; Compare; Dynamic Debugging.

Counters and time Delays; Illustrative program; Hexadecimal Counter; Illustrative program: Zero-to-Nine (Modulo Ten) Counter; Illustrative Program; Generating Pulse Waveforms; Debugging Counter and Time-Delay Programs.

Stack; Subroutine; Restart, Conditional Call, and Return Instructions; Advanced Subroutine Concepts.

Section C

The 8085 Interrupt; 8085 Vectored Interrupts; Restart as Software Instructions; Additional I/O Concepts and processes.

Digital-to-Analog (D/A) Converters; Analog-to-Digital (A/D) Converters.

8155 I/O and timer; 8279 Keyboard/Display Interface: Basic Concepts in programmable Devices; The 8155: Multipurpose programmable Device; The 8279 programmable Keyboard/ Display Interface.

Section D

The 8255 A Programmable Peripheral Interface; Illustration: Interfacing Keyboard and Seven-Segment Display; Illustration Bi-directional Data Transfer Between Two Microcomputers. The 8254 (8253) programmable Interval Timer; The 8259 A programmable Interrupt Controller; Direct Access (DMA) and the 8237 DMA Controller. Basic Concepts in Serial I/O; Software-Controlled Asynchronous Serial I/O; The 8085-Serial I/O

Lines; SOD and SID; Hardware-Controlled Serial I/O using Programmable Chips.

Study of Architecture of Pentium family processor – Processor, registers, mmu, instruction set, on chip cache, interfaces. (Only Brief Discussion)

Books:

1. Ramesh S. Gaonkar, “ Microprocessor Architecture, programming, and Application with 8085”, 4th edition, Penram International Publishing (India), 2000.
2. Aditya P. Mathur, “ Introduction to Microprocessors”, 3rd edition, Tata McGraw Hill Publishing House, New Delhi, 1989.
3. Y. Rajasra, Advance Microprocessor, New Age International Publishers, New Delhi.

MICROPROCESSOR & COMPUTER NETWORK LABORATORY

Section A

Computer Networks:

1. Construct a network of 2 or 3 system.
2. Simple communication between the systems in exchanging a binary word.
3. Encryption and decryption on the ASCII character set being transmitted.
4. Experimentation with standard set of protocols (Tanebaum).
5. Experimentation with protocol kit.
6. Experimentation with modulation.
7. Asure cables, connections, crimping.
8. JDM
9. Bridges, Routers, Hubs etc.

Note: - Record to be maintained in the laboratory record book for evaluation.

Section B

Microprocessor Laboratory:

This laboratory will based on microprocessor 8085 kits with following interfaces:

1. Keyboard & Display.
2. Analog to Digital conversion using DAC.
3. Analog to Digital conversing using Dual slope ADC.
4. Elevator simulator.
5. Logic controller.
6. Stepper motor.
7. DC motor.
8. General purpose PCB with connector.
9. Crystal Oscillator.

5th Semester

VOCATIONAL TRAINING

Instructions for paper Setter / Candidates

This training will be related to Industrial Projects to be undertaken under the guidance of Faculty preferably at Industry / Software Park / Incubation Centre or related areas. This may also be undertaken with in the Institute. This training will be undertaken during vacation. Student is supposed to submit the project report at the end of the training.

Evaluation will be based on Project Report, presentation and comprehensive Viva-voce examination related to the project.