CSE - 302 F   **Principles of Software Engineering**

L T P   Class Work : 50 Marks
3 1 -   Exam : 100 Marks
                                                                          Total : 150 Marks
                                                                Duration of Exam : 3 Hrs.

NOTE: For setting up the question paper, question no 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt 5 questions out of 9 questions.

Section-A

Introduction: The process, software products, emergence of software engineering, evolving role of software, software life cycle models, Software Characteristics, Applications, Software crisis.
Software project management: Project management concepts, software process and project metrics Project planning, project size estimation metrics, project estimation Techniques, empirical estimation techniques, COCOMO- A Heuristic estimation techniques, staffing level estimation, team structures, staffing, risk analysis and management, project scheduling and tracking.

Section-B

Requirements Analysis and specification requirements engineering, system modeling and simulation Analysis principles modeling, partitioning Software, prototyping: , Prototyping methods and tools; Specification principles, Representation, the software requirements specification and reviews Analysis Modeling: Data Modeling, Functional modeling and information flow: Data flow diagrams, Behavioral Modeling; The mechanics of structured analysis: Creating entity/ relationship diagram, data flow model, control flow model, the control and process specification; The data dictionary; Other classical analysis methods.
System Design: Design concepts and principles: the design process: Design and software quality, design principles; Design concepts: Abstraction, refinement, modularity, software architecture, control hierarchy, structural partitioning, data structure, software procedure, information hiding; Effective modular design: Functional independence, Cohesion, Coupling; Design Heuristics for effective modularity; The design model; Design documentation.

Section-C

Architectural Design: Software architecture, Data Design: Data modeling, data structures, databases and the data warehouse, Analyzing alternative Architectural Designs ,architectural complexity; Mapping requirements into a software architecture; Transform flow, Transaction flow; Transform mapping: Refining the architectural design.
Testing and maintenance: Software Testing Techniques, software testing fundamentals: objectives, principles, testability; Test case design, white box testing, basis path testing: Control structure testing: Black box testing, testing for specialized environments ,architectures and applications. Software Testing Strategies: Verification and validation, Unit testing, Integration testing,; Validation testing, alpha and beta testing; System testing: Recovery testing, security testing, stress testing, performance testing; The art of debugging, the debugging process debugging approaches. Software re-engineering , reverse engineering ,restructuring, forward engineering.

Section-D

Software Reliability and Quality Assurance :Quality concepts, Software quality assurance , SQA activities; Software
reviews: cost impact of software defects, defect amplification and removal; formal technical
reviews: The review meeting, review reporting and record keeping, review guidelines; Formal
approaches to SQA; Statistical software quality assurance; software reliability: Measures of
reliability and availability ,The ISO 9000 Quality standards: The ISO approach to quality assurance
systems, The ISO 9001 standard, Software Configuration Management.
Computer Aided software Engineering: CASE, building blocks, integrated case environments and
architecture, repository.

Text Book:
1. Software Engineering – A Practitioner‟s Approach, Roger S. Pressman, 1996, MGH.

Reference Books:
1. Fundamentals of software Engineering, Rajib Mall, PHI
2. Software Engineering by Ian sommerville, Pearson Edu, 5 edition, 1999, AW,
3. Software Engineering – David Gustafson, 2002, T.M.H
4. Software Engineering Fundamentals Oxford University, Ali Behforooz and Frederick J. Hudson 1995 JW&S, An Integrated Approach to software engineering by Pankaj jalote , 1991 Narosa,

CSE - 304 F   **Intelligent System**

L T P   Class Work : 50 Marks
3 1 -   Exam : 100 Marks
                                                                            Total : 150 Marks
                                                                  Duration of Exam : 3 Hrs.

NOTE: For setting up the question paper, question no 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt 5 questions out of 9 questions.

Section-A

Foundational issues in intelligent systems: Foundation and history of AI, Ai problems and techniques – AI programming languages, introduction to LISP and PROLOG- problem spaces and searches, blind search strategies, Breadth first- Depth first- heuristic search techniques Hill climbing: best first- A * algorithm AO* algorithm-game tree, Min max algorithms, game playing-alpha beta pruning.

Section-B

Knowledge representation issues, predicate logic- logic programming, semantic nets- frames and inheritance, constraint propagation, representing knowledge using rules, rules based deduction systems.
Reasoning under uncertainty, review of probability, Baye" s probabilistic interferences and Dempster shafer theory, Heuristic methods,.

Section-C

Symbolic reasoning under uncertainty, Statistical reasoning, Fuzzy reasoning, Temporal reasoning, Non monotonic reasoning.
Planning, planning in situational calculus, representation for planning, partial order planning algorithm.

Section-D

Learning from examples, discovery as learning, I earning by analogy, explanation based learning, neural nets, genetic algorithms.
Principles of Natural language processing, rule based systems architecture, Expert systems, knowledge acquisition concepts, AI application to robotics, and current trends in intelligent systems.

Text Book:
Artificial Intelligence: A Modern Approach,. Russell & Norvig. 1995, Prentice Hall.

Reference Books:
- Artificial Intelligence, Elain Rich and Kevin Knight, 1991, TMH.
- Artificial Intelligence-A modern approach, Staurt Russel and peter norvig, 1998, PHI.
- Artificial intelligence, Patrick Henry Winston:, 1992, Addition Wesley 3 Ed.,

CSE - 306 F   **Analysis and Design of Algorithms**

L T P   Class Work : 50 Marks
3 1 -   Exam : 100 Marks
                                                            Total : 150 Marks
                                                            Duration of Exam : 3 Hrs.

NOTE: For setting up the question paper, question no 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt 5 questions out of 9 questions.

Section-A

Brief Review of Graphs, Sets and disjoint sets, union, sorting and searching algorithms and their analysis in terms of space and time complexity.
Divide and Conquer: General method, binary search, merge sort, qick sort, selection sort, Strassen‟ s matrix multiplication algorithms and analysis of algorithms for these problems.

Section-B

Greedy Method: General method, knapsack problem, job sequencing with dead lines, minimum spanning trees, single souce paths and analysis of these problems.
Dynamic Programming: General method, optimal binary search trees, O/I knapsack, the traveling salesperson problem.

Section-C

Unit-5: Back Tracking: General method, 8 queen‟ s problem, graph colouring, Hamiltonian cycles, analysis of these problems.
Unit-6: Branch and Bound: Method, O/I knapsack and traveling salesperson problem, efficiency considerations. Techniques for algebraic problems, some lower bounds on parallel computations.

Section-D

Unit-7: NP Hard and NP Complete Problems: Basic concepts, Cook‟ s theorem, NP hard graph and NP scheduling problems some simplified NP hard problems.

Text Books:
1. Fundamental of Computer algorithms, Ellis Horowitz and Sartaj Sahni, 1978, Galgotia Publ.,
2. Introduction To Algorithms, Thomas H Cormen, Charles E Leiserson And Ronald L Rivest: 1990, TMH.

Reference Books:
1. The Design and Analysis of Computer Algorithm, Aho A.V. Hopcroft J.E., 1974, Addison Wesley.
2. Algorithms-The Construction, Proof and Analysis of Programs, Berlion, P.Bizard, P., 1986. Johan Wiley & Sons,
3. Writing Efficient Programs, Bentley, J.L., PHI

4. Introduction to Design and Analysis of Algorithm, Goodman, S.E. & Hedetnieni, 1997, MGH.
5. Introduction to Computers Science- An algorithms approach , Jean Paul Trembley, Richard B.Bunt, 2002, T.M.H.
6. Fundamentals of Algorithms: The Art of Computer Programming Voll, Knuth, D.E.: 1985, Naresh Publ.

IT - 305 F   **Computer Networks**

L T P   Class Work : 50 Marks
3 1 -   Exam : 100 Marks
                                                                                   Total : 150 Marks
                                                                          Duration of Exam : 3 Hrs.

NOTE: For setting up the question paper, question no 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt 5 questions out of 9 questions.

Section-A

OSI Reference Model and Network Architecture: Introduction to Computer Networks, Example networks ARPANET,
Internet, Private Networks, Network Topologies: Bus-, Star-, Ring-, Hybrid -, Tree -, Complete -, Irregular –Topology; Types of Networks : Local Area Networks, Metropolitan Area Networks, Wide Area Networks; Layering architecture of networks, OSI model, Functions of each layer, Services and Protocols of each layer.

Section-B

TCP/IP: Introduction, History of TCP/IP, Layers of TCP/IP, Protocols, Internet Protocol, Transmission Control Protocol , User Datagram Protocol, IP Addressing, IP address classes, Subnet Addressing, Internet Control Protocols, ARP, RARP, ICMP, Application Layer, Domain Name System, Email – SMTP, POP,IMAP; FTP, NNTP, HTTP, Overview of IP version 6.

Section-C

Local Area Networks: Introduction to LANs, Features of LANs, Components of LANs, Usage of LANs, LAN Standards, IEEE 802 standards, Channel Access Methods, Aloha, CSMA, CSMA/CD, Token Passing, Ethernet, Layer 2 & 3 switching, Fast Ethernet and Gigabit Ethernet, Token Ring, LAN interconnecting devices: Hubs, Switches, Bridges, Routers, Gateways.
Wide Area Networks: Introduction of WANs, Routing, Congestion Control, WAN Technologies, Distributed Queue Dual Bus (DQDB).

Section-D

Synchronous Digital Hierarchy (SDH)/ Synchronous Optical Network (SONET), Asynchronous Transfer Mode (ATM), Frame Relay.,Wireless Links.
Introduction to Network Management: Remote Monitoring Techniques: Polling, Traps, Performance Management, Class of Service, Quality of Service, Security management, Firewalls, VLANs, Proxy Servers, Introduction to Network Operating Systems: Client-Server infrastructure, Windows NT/2000.

Text Book:

1. Computer Networks (3rd edition), Tanenbaum Andrew S., International edition, 1996.

Reference Books:
1. Data Communications, Computer Networks and Open Systems (4th edition), Halsall Fred, 2000, Addison Wesley, Low Price Edition.
2. Business Data Communications, Fitzgerald Jerry,.
3. Computer Networks – A System Approach, Larry L.
4. Peterson & Bruce S. Davie, 2 Edition Computer Networking – ED Tittel , 2002, T.M.H.

IT - 303 F   **Systems Programming & System Administration**

L T P   Class Work : 50 Marks

3 1 -   Exam : 100 Marks

                                                          Total : 150 Marks

                                        Duration of Exam : 3 Hrs.

NOTE: For setting up the question paper, question no 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt 5 questions out of 9 questions.

Section-A

Evolution of Components Systems Programming, Assemblers, Loaders, Linkers, Macros, Compilers. software tools, Text editors, Interpreters and program generators, Debug Monitors, Programming environment.
Compiler: Brief overview of compilation process, Incremental compiler, Assembler: Problem statement, single phase and two phase assembler, symbol table; Loader schemes, compile and go Loader, general loader schemes, absolute loader, Subroutine linkage, Reallocating loader, Direct linkage Loader, Binders, Linking loader, overlays.

Section-B

Macro language and macro-processor, macro instructions, features of macro facility, macro instruction arguments, conditional macro expansion, macro calls with macro instruction defining macros.
Theoretical Concept of Unix Operating System: Basic features of operating system; File structure: CPU scheduling; Memory management: swapping, demand paging; file system: block and fragments, inodes, directory structure; User to user communication.

Section-C

Getting Started with Unix: User names and groups, logging in; Format of Unix commands; Changing your password; Characters with special meaning; Unix documentation; Files and directories; Current directory, looking at the directory contents, absolute and relative pathnames, some Unix directories and files; Looking at the file contents; File permissions; basic operation on files; changing permission modes; Standard files, standard output; Standard input, standard error; filters and pipelines; Processes; finding out about processes; Stopping background process; Unix editor vi. Test Manipulation: Inspecting files; File statistics; Searching for patterns; Comparing files; Operating on files; Printing files; Rearranging files; Sorting files; Splitting files; Translating characters; AWK utility.

Section-D

Shell Programming: Programming in the Borne and C-Shell; Wild cards; Simple shell programs; Shell variables; Shell programming constructs; interactive shell scripts; Advanced features.
System Administration: Definition of system administration; Booting the system; Maintaining user accounts; File systems and special files; Backups and restoration; Role and functions of a system manager. Overview of the linux. operating system

Text Books:
1. Systems Programming by Donovan, TMH.
2. The unix programming environment by Brain Kernighen & Rob Pike, 1984, PHI & Rob Pike.
3. Design of the Unix operating system by Maurich Bach, 1986, PHI.
4. Introduction to UNIX and LINUX by John Muster, 2003, TMH.

Reference Book:
1. Advanced Unix programmer" s Guide by Stephen Prato, BPB
2. Unix- Concept and applications by Sumitabha Das, 2002, T.M.H

EE - 310 F   **Digital Systems Design**

L T P   Class Work : 50 Marks

3 1 0   Exam : 100 Marks

                                                         Total : 150 Marks

                                      Duration of Exam : 3 Hrs.

NOTE: For setting up the question paper, question no 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt 5 questions out of 9 questions.

Section-A

Introduction: Introduction to Computer-aided design tools for digital systems. Hardware description languages; introduction to VHDL, data objects, classes and data types, Operators, Overloading, logical operators.Types of delays Entity and Architecture declaration. Introduction to behavioural, dataflow and structural models.

Section-B

Vhdl Statements: Assignment statements, sequential statements and process, conditional statements, case statement Array and loops, resolution functions, Packages and Libraries, concurrent statements.
Subprograms: Application of Functions and Procedures, Structural Modelling, component declaration, structural layout and generics.

Section-C

Combinational Circuit Design: VHDL Models and Simulation of combinational circuits such as Multiplexers, Demultiplexers, encoders, decoders, code converters, comparators, implementation of Boolean functions etc.
Sequential Circuits Design :VHDL Models and Simulation of Sequential Circuits Shift Registers, Counters etc.

Section-D

Design Of Microcomputer : Basic components of a computer, specifications, architecture of a simple microcomputer system, implementation of a simple microcomputer system using VHDL
Design With Cplds And Fpgas :Progr ammable logic devices : ROM, PLAs, PALs, GAL, PEEL, CPLDs and FPGA. Design implementation using CPLDs and FPGAs.

Reference Books:

1. IEEE Standard VHDL Language Reference Manual (1993).
2. Digital Design and Modelling with VHDL and Synthesis : KC Chang; IEEE Computer Society Press.
3. "A VHDL Primmer" : Bhasker; Prentice Hall 1995.
4. "Digital System Design using VHDL" : Charles. H.Roth ; PWS (1998).
5. VHDL-Analysis & Modelling of Digital Systems" : Navabi Z; McGraw Hill.
6. VHDL-IV Edition :Perry; TMH (2002)
7. "Introduction to Digital Systems" : Ercegovac. Lang & Moreno; John Wiley (1999).
8. Fundamentals of Digital Logic with VHDL Design : Brown and Vranesic; TMH (2000)
9. Modern Digital Electronics- III Edition: R.P Jain; TMH (2003).

CSE - 308 F **Intelligent Systems Lab.**

L T P   Class Work : 25 Marks
- - 2   Exam : 25 Marks
                                                                        Total : 50 Marks
                                                              Duration of Exam : 3 Hrs.

1. Study of PROLOG. Write the following programs using PROLOG.

2. Write a program to solve 8 queens problem.

3. Solve any problem using depth first search.

4. Solve any problem using best first search.

5. Solve 8-puzzle problem using best first search

6. Solve Robot (traversal) problem using means End Analysis.

7. Solve traveling salesman problem.

Note : At least 5 to 10 more exercises to be given by the teacher concerned.

EE - 330 F   **Digital System Design Lab.**

L T P   Class Work : 25 Marks
0 0 2   Exam : 25 Marks
                                                            Total : 50 Marks
                                                 Duration of Exam : 3 Hrs.

List Of Experiments:

1. Design all gates using VHDL.
2. Write VHDL programs for the following circuits, check the wave forms and the hardware generated
      a. half adder
      b. full adder
3. Write VHDL programs for the following circuits, check the wave forms and the hardware generated
      a. multiplexer
      b. demultiplexer
4. Write VHDL programs for the following circuits, check the wave forms and the hardware generated
      a. decoder
      b. encoder

5. Write a VHDL program for a comparator and check the wave forms and the hardware generated

6. Write a VHDL program for a code converter and check the wave forms and the hardware generated

7. Write a VHDL program for a FLIP-FLOP and check the wave forms and the hardware generated

8. Write a VHDL program for a counter and check the wave forms and the hardware generated

9. Write VHDL programs for the following circuits, check the wave forms and the hardware generated
      a. register
      b. shift register

10. Implement any three (given above) on FPGA/CPLD kit

Note :
Ten experiments are to be performed out of which at least seven experiments should be performed from above list. Remaining three experiments may either be performed from the above list or designed & set by the concerned institution as per the scope of the syllabus.

CSE - 310 F   **Computer Network Lab.**

L T P   Class Work : 25 Marks
- - 3   Exam : 25 Marks
                                                                   Total : 50 Marks
                                                          Duration of Exam : 3 Hrs.

This course provides students with hands on training regarding the design, troubleshooting, modeling and evaluation of computer networks. In this course, students are going to experiment in a real test-bed networking environment, and learn about network design and troubleshooting topics and tools such as: network addressing, Address Resolution Protocol (ARP), basic troubleshooting tools (e.g. ping, ICMP), IP routing (e,g, RIP), route discovery (e.g. traceroute), TCP and UDP, IP fragmentation and many others. Student will also be introduced to the network modeling and simulation, and they will have the opportunity to build some simple networking models using the tool and perform simulations that will help them evaluate their design approaches and expected network performance.

L T P   Class Work : 25 Marks
- - 3   Exam : 25 Marks
                                                           Total : 50 Marks
                                       Duration of Exam : 3 Hrs.

Study of Visual Basic 6.0.NET and Visual C++ 6.0.NET.

1. Study Windows API" s. Find out their relationship with MFC classes. Appreciate how they are helpful in finding complexities of windows programming.
2. Get familiar with essential classes in a typical (Document- view architecture) VC++ Program and their relationship with each other.
3. Create an SDI application in VC++ that adds a popup menu to your application which uses File drop down menu attached with the menu bar as the pop-up menu. The pop-up menu should be displayed on the right click of the mouse.
4. Create an SDI application in VC++ using which the user can draw atmost 20 rectangles in the client area. All the rectangles that are drawn should remain visible on the screen even if the window is refreshed. Rectangle should be drawn on the second click of the left mouse button out of the two consecutive clicks. If the user tries to draw more than 20 rectangles, a message should get displayed in the client area that " No more rectangles can be drawn"
5. Create an application in VC++ that shows how menu items can be grayed, disabled and appended at run time.
6. Write a program in VC++ to implement serialization of inbuilt and user defined objects.
7. Write a program in VC++ to create archive class object from CFile class that reads and stores a simple structure (record).
8. Make an Active X control in VC++ derived from a standard control.
9. Write a program in VB to implement a simple calculator.
10. Create a simple database in MS Access Database /Oracle and a simple database application in VB that shows database connectivity through DAO and ADO.
11. Write a simple program that displays an appropriate message when the illegal operation is performed using error handling technique in VB.
12. Write a program in VB to create a notepad.
13. Create a DLL in VB.

Bright students may do the following exercises:

14. Write a program in VC++ to implement a simple calculator.
15. Write a program in VC++ to create a static link library and a dynamic link library.
16. Create a simple database in MS Access Database and a simple database application in VC++ that shows database connectivity through ADO model.
17. Make an Active X control of your own using VB.
18. With the help of VB, create an object of excel application and implement any action on it.