

ET 572 Digital Systems

Theory: 100

Sessional: 50

Time: 3 hours

Number representation

Signed magnitude, One's and two's complement numbers.

Binary Arithmetic

Addition, subtraction, multiplication and division. Fixed and floating point arithmetic.

Boolean Algebra and switching circuits

Boolean algebra, Boolean expressions, logic functions, SOP and POS, function minimization - Carnaugh map and algorithms. Logic gates. Design and analysis of combinational circuits, address generation, code converters, parity generator. Sequential circuits. Flip-flops, counters, registers, decoders, encoders, multiplexers.

Logic families

TTL, CMOS and ECL. RAM, ROM, E-PROM, EEPROM, PAL, PLD and PGA. Schmitt trigger and timing circuits.

Current trends in digital design

ASIC, FPGA and CPLD.

Books / References:

- M. Morris Mano — Digital Design. Prentice Hall of India
- P. Malvino and D. K. Leach— Digital Principles and Applications. Tata-McGraw-Hill.
- M. Morris Mano — Digital Logic and Computer Design. Prentice Hall of India.

CS 573 Formal Language and Automata Theory

Theory: 100 marks

Sessional: 50 marks

Time: 3 hours

Alphabets, languages and grammars.

Finite automata: regular expressions and regular languages.

Context free languages: pushdown automata, DCFLs, LL(K), LALR grammars.

Context Sensitive Languages: Linear Bounded Automata.

Turing Machines: Recursively enumerable languages, operation on formal languages and their properties.

Decision query on languages.

Undecided problems.

Books / References:

1. Introduction to Automata Theory, Languages & Computation – J. E. Hopcroft and J. D. Ullman, Published by Narosa.
2. Introduction to Languages and The Theory of Computation – J. C. Martin, McGraw Hill International Edition.

CS 574 System Programming

Theory: 100 marks

Sessional: 50 marks

Time: 3 hours

Overview : Definition and classification of system software.

Assemblers : Assembly language, Assembly process, Assembler data structures, Assembler macros and macroprocessors.

Linkers and loaders : Basic concepts, Static and Dynamic linking, shared libraries, loaders, overlays. Case study of UNIX linking system, Windows DLL, OLE, ActiveX.

Debugger : Types, features, case study : sdb/dbx.

Editors : Types, Structure, case study of vi, sed and wordstar.

Unix Utilities: Make, RCS, sed, grep, awk, etc.

Compiler Principles.

Books:

1. Dhandhere, System programming and operating systems, Tata McGraw Hill.
2. System Software, Beck,
3. Sumitabha Das, Unix System V.4 Concepts and Applications, TMH.
4. Linux Manuals.
5. Windows Manuals.

CS 575 Software Engineering
Theory: 100 marks
Sessional: 50 marks
Time: 3 hours

Introduction

Life cycle models

Function oriented software design

Structured analysis and structured design.

Object Oriented Design

User interface design, GUI design primitives, Window management system and the X-
Windows system.

Coding and Testing

Coding standard and unit testing.

Software requirements, analysis and specification

Informal and formal specification.

Project management

Estimation, scheduling, risk management and configuration management.

Software reliability and quality assurance

Reliability metrics and growth modeling, ISO-9000, SEI and CMM.

Software maintenance and CASE tools.

Text Books / References:

1. An Integrated Approach to Software Engineering by Jalote. Narosa Publishing
House
2. Software Engineering by R. S. Pressman, McGraw Hill
3. Software Engineering by R. Mall, PHI.

CS 576 Principles of Programming Languages

Theory: 100 marks

Sessional: 50 marks

Time: 3 hours

Introduction to various programming paradigms and their implementation issues.

Imperative Programming

Block structure, scoping rules, parameter passing etc. in languages like C, PASCAL and FORTRAN.

Objective Oriented Programming

Abstraction, hiding, objects, classes, inheritance etc. in languages like C⁺⁺ and Modular JAVA.

Functional Programming

Functions, Recursion, types, polymorphism, storage allocation in languages like LISP, ML Scheme.

Logic Programming

Horn clauses, SLD resolution etc. in languages like PROLOG.

Introduction to Concurrent Programming

Expressing parallelism, communication, synchronization etc. in languages like Ada, CSP and Linda.

Introduction to mathematical foundations and semantics of programming languages.

Books / References:

1. Programming Languages – Concepts and Constructs, Ravi Sethi.
2. Programming Languages – Design and Implementation, T. W. Pratt.
3. The Study of Programming Languages by Stansifer.

HU 501 Economics and Principles of Management

Theory: 100 + 50

Sessional: 50 + 25

Time: 3 hours

Part A. Economics

1. Economics: Meaning, nature and scope;
2. Consumer behaviour and demand analysis: Alternate theories on consumer behavior.
3. Producer behaviour: Production function. Production analysis and input demand. Cost Analysis. Estimation of cost functions. Managerial uses of cost functions.
4. Price and output determination: Price concepts; Pricing under different objectives; Profit and break even analysis, Differential pricing; Alternative market models; Market structure and Government intervention.
5. Investment analysis: time value of money. Cash flows and measures of investment worth; investment analysis.
6. Money, Why money matters, value of money- Quantity theory of Money; index numbers. Interest rate determination.
7. The financial system- The Central bank, Stock Exchange and the market for securities, Money market instruments.
8. International trade- theories of international trade. The world Trading Environment- Multilateralism and Bilateralism.
9. Emerging Economic and Business environment

Books:

1. Samuelson and Nordhaus: Economics. Irwin McGraw Hill
2. Gupta, G.S, Managerial Economics
3. H. Davis Managerial Economics
4. Sengupta, A.K and Agarwala M.K. Money Market Operations in India: Skylark Publications, New Delhi

Part B. Principles of Management

1. Management- concepts, status and functions. Role of management. Management skills. Effective versus successful managerial activities. Motivation- early and contemporary theories on motivation- implication of managers and applications.
2. Group behaviour and group dynamics: foundations of group behaviour, Defining and classifying groups; stages of group development; group interaction; External conditions; Group member resources; Group structure; Group processes; tasks and decision making.
3. Leadership- Leadership theories. Recent approach to leadership and contemporary issues in leadership.

4. Organaisational dynamics- Organaisational change and stress management. Human factors in induatry- fatigue and symptoms. Fatigue control.
5. Human resource policies and practices- Selection practices, Training and development programmes; Performance Evaluation; Union- Management interface; Managing diversity in organizations.
6. Investment analysis: Time value of money. Cash flows and measures of investment worth; Investment analyis.
7. Projects and Project evaluation. Economic and financial evaluation of projects. Economic and social cost benefit analysis.

Books

1. Essentials of Management- J.L. Marcis
2. Organaisational behaviour. Concepts, Controversies and Applications- Stephen P. Robbins
3. Gupta, G.S, Managerial Economics