

**L: 3**

**ET 572 Digital Systems**

**T: 1**

**Theory: 100 marks**

**P: 3**

**Sessional: 50 marks**

**Practical: 50 marks**

**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.

**L: 3**

**CS 573 Formal Language and Automata Theory**

**T: 1**

**Theory: 100 marks**

**P: 0**

**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.

**L: 3**

**CS 574 System Programming**

**T: 1**

**Theory: 100 marks**

**P: 3**

**Sessional: 50 marks**

**Practical: 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.

**L: 3**

**CS 575 Software Engineering**

**T: 1**

*Theory: 100 marks*

**P: 3**

**Sessional: 50 marks**

**Practical: 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.



**L: 3**

**CS 576 Principles of Programming Languages**

**T: 1**

**Theory: 100 marks**

**P: 3**

**Sessional: 50 marks**

**Practical: 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<sup>++</sup> 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.

**L: 3**

**HU 501 Economics and Principles of Management**

**T: 1**

**Theory: 100+50 marks**

**P: 0**

**Sessional: 50 +25 marks**

**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 analysis.
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. Organisational behaviour. Concepts, Controversies and Applications- Stephen P. Robbins
3. Gupta, G.S, Managerial Economics