COMPUTER SCIENCE
PAPER –I

Introduction to Computer Science and Programming:

1. Termination and correctness.
2. Algorithms to programs: Specification.
3. Stepwise refinement.
4. Problem solving using pascal.
5. Introduction to system software.
6. Operating systems.
7. Compilers and multi-user environments.
8. Interactive versus recessive style.
9. Problem solving using scheme.
10. Programming in Pascal using advanced features.
11. Operating systems and system software.

Data Structures:

1. Introduction to programming methodologies and design of algorithms.
2. Survey of basic structures like arrays, stacks and queues.
3. Linked list structures.
4. Garbage collection and compaction.
5. Tree traversals.
6. Sorting techniques.

Numerical and Scientific Computing :

1. Review of matrices and linear system.
2. Eigen values and singular value decompositions and linear systems sensitivity.
3. Review of convergence of iterative methods.
4. Newton's method.
5. Software design principles and practice use.

Computer Architecture:

1. Information representation and binary arithmetic.
2. Basic combinational and sequential circuit design.
3. QTR representation.
4. Subsystems of a computer.
5. Instructions and their formats.
6. Assembly programming.

PAPER –II

Program Languages:

1. Notions of syntax and semantics of programming languages.
2. Data operating and central constructs.
3. Runtime structure and operating environment.
4. Special Purpose languages for string.
5. List; of array manipulation.

Introduction to Logic for Computer science;

1. Syntax of propositional formulas.
2. Truth and the semantics of propositional logic.
3. Validity of inconsistency.
4. Deduction systems for propositional logic.

5. First order logic.
6. Proof theory for FOL.
7. Introduction to model theory.
8. Completeness and compactness theorems.
9. Herbrand models.
10. Applications of resolution to automatic theorem proving and Logic programming.

Super Computing for Engineering Applications :

1. Programming for vector processors.
2. Mapping loops.
3. Data storage and access strategies.
4. Process communication.
5. Broadcasting
6. Load balancing.
7. Application of above ideas in solving matrix operation.
8. Optimization.
9. Monte-carlo simulation.

Digital Hardware Design:

1. Asynchronics and pulse mode circuit design and implementation.
2. Hardware description language and synthesis.
3. Microprogramme control design.
4. Testing of digital system.

Introduction to Microprocessors :

1. Introduction to digital hardware design.
2. Organization and programming of a microprocessor.
3. Interfacing memory.
4. Programmed and interrupt based I/O interfacing.
5. Support chips like DICA controller.
6. Interrupt controller.
7. Microprocessor applications.

File Structures and Information system Design:

1. Data processing concepts.
2. Auxiliary storage media.
3. Blocking.
4. Buffering and other issues on data transfer.
5. External sorting techniques.

Database Management Systems :

1. Introduction to database concept.
2. Difference between a file system and a database system.
3. Introduction to distributed databases.
4. Concurrency control.
5. Basis recovery.

Software Engineering :

1. Techniques of structured programming.
2. Top-down design and development
3. Information liding.
4. Strength, coupling and complexity measures.
5. Organisation and management of large software design projects.
6. Chief Programmes terms.
7. Program libraries.
8. Documentation, testing, validation.