DEPARTMENT OF INFORMATION TECHNOLOGY

NIT
NATIONAL INSTITUTE OF TECHNOLOGY
HAZRATBAL, SRINAGAR 190006

Syllabus for Entrance Examination for Ph.D. Admission

Note:
- **5 questions from each sub-section of Section A.**
- **3 questions from each sub-section of Section B.**
- **15 questions from Section C.**

Section A

Section A1: Software Engineering
Information gathering, requirement and feasibility analysis, data flow diagrams, process specifications, input/output design, process life cycle, planning and managing the project, design, coding, testing, implementation, maintenance.

Section A2: Programming and Data Structures
Programming in C. Recursion. Arrays, stacks, queues, linked lists, trees, binary search trees, binary heaps, graphs.

Section A3: Computer Networks
Concept of layering. LAN technologies (Ethernet). Flow and error control techniques, switching. IPv4/IPv6, routers and routing algorithms (distance vector, link state).

Section A4: Databases
ER-model. Relational model: relational algebra, tuple calculus, SQL. Integrity constraints, normal forms. File organization, indexing (e.g., B and B+ trees). Transactions and concurrency control.

Section A5: Computer Organization and Architecture
Machine instructions and addressing modes. ALU, data-path and control unit. Instruction pipelining. Memory hierarchy: cache, main memory and secondary storage

Section A6: Operating System
Processes, threads, inter-process communication, concurrency and synchronization. Deadlock. CPU scheduling. Memory management and virtual memory. File systems.

Section B

Section B1: Artificial Intelligence
Knowledge representation and reasoning, Neural Networks, Expert Systems

Section B2: Wireless and Mobile Communication
Cellular Wireless Networks, Wireless Access Techniques, Wireless Systems and Standards, Mobile communication, Mobile and Wireless Security

Section B3: Cloud Computing
Virtualization, Cloud Services, Cloud Security, Cloud Storage, Cloud Computing Standards

Section B4: Big Data
Big Data Management, Hadoop, Map Reduce, Big Data Analytics, Data Modelling, Data Measure Techniques.

Section B5: Computer Graphics and Image Processing
Transformations, 2D and 3D representation, Curves and Surfaces, Detection Methods, Computer Animation, Digital Image Formation, Image Enhancement, Image Restoration, Image Segmentation.

Section C

Section C1: General Aptitude.
Section C2: Engineering Mathematics.
Discrete Mathematics, Linear Algebra, Calculus, Probability, Graph Theory