Swami Ramanand Tirth Marathwada University

Syllabus for Ph. D. Entrance
Faculty of Computer Science and
Engineering/Information Technology

SECTION –A   **Common to all faculties**

SECTION –B

The syllabus for section B based on undergraduate syllabus BE(CSE)

 Engineering Mathematics

Discrete Mathematics: Sets, Relations, Functions, Groups, Lattice, Boolean algebra, Induction, Recurrence relations, Combinatorics, Permutations, Combinations, Counting, Summation.

Elementary Graph Theory: Basic properties, Connectivity, Covering and matching, Planarity

Mathematical Logic: Prepositional logic, First order logic, Probability, Random variables and expectation, Conditional probability, Independent random variables, Distributions (Uniform, Normal Exponential, Poisson, Binomial)

Ref: Discrete mathematics and its applications with combinatorics and graph theory, Kenneth H. Rosen, 6th Edition, McGraw-Hill Publication.

Data Structure and Algorithms

Introduction to data structures, Linear data structures, Stack, Queue, Linked lists, Non linear data structures, Trees, Graphs, Indexing and searching.

Computation complexity and asymptotic notions Divide and conquer paradigm, Dynamic programming, Greedy Algorithms, Randomized Algorithms, Geometric algorithms ,Branch and bound solution
Approximation algorithms, NP-Completeness, Polynomial time, NP completeness reducibility, NP completeness proofs

Ref:1) Data Structures using C and C++, Y. Langsam, M.J. Augenstein, A.M. Tenenbaum, Second Edition, PHI India, ISBN-81-203-1177-4

2) Introduction to data structures with applications, J.P. Tremblay and .P. G. Sorenson , Second Edition, McGraw Hill ISBN 0-07-065157-4

3) Fundamentals of Computer Algorithms " E. Horowitz, S. Sahni, S Rajasekaran, Third Edition, Galgotia Publications, ISBN 8175152575,9788175152571

Data Base Management System

Relational Databases, Relational Model, Relational Algebra & Calculus, Tree Structured Indexing , Scheme Refinement & Normal forms, Parallel & Distributed Database

Ref: Database Management System, Gehrke & Remakrishna, McGrawHill Publication, ISBN 0-07-0462239-0

Operating System

Introduction to the system software, Computer system overview, Operating system overview, Process & inter process communication, Concurrency, Mutual exclusion , Dead lock, Memory management, Scheduling, I/O Management, File management

Ref : Operating Systems : Internals & Design principles , Willam Stallings, Pearson Education, ISBN 81-317-0304-5

Computer Architecture

Computer evolution and performance, Cache memory, Internal memory, External memory, Input, Output, OS support, CPU: Computer arithmetic, Instruction sets, CPU structures and function , Reduced instruction set computer, ILP and super scalar processor, Parallel processing.

Ref: Computer Organization and Architecture Designing for Performance, William Stallings, Pearson Education, sixth Edition.

Computer Network

Network Goals, Classification, Architecture, Physical layer, Data link layer, Network Routing, Flow and congestion control, Internet protocol, TCP, ATM, Quality of service, Network Management, SNMP, ASN, Multicast-IGMP, Mobile IP, Application layer, Network security

Ref: Computer Network,: Andrew S. Tanenbaum, Prentic Hall India, ISBN- 81-203-2175-8

Software Engineering

The product and the process, Managing software projects, Conventional methods for software engineering : System engineering, Object oriented software engineering.

Ref : Software Engineering A practitioner approach, Roger S. Pressman, 5th edition, McGraw-Hill publications

Theory of Computation & Compiler Design

Regular language and finite automata, Context free languages and push down automata, Turing machine, Lexical analysis, Parsing, Syntax directed translation, Run time environment , Code generation, Code optimization.

Ref: 1) Introduction to Automata and Theory of Computation, Hopcroft, Motwani, Ulman, 3rd Edition, Addison Wesley publication

2) Compilers Principles, Techniques, and Tools, Aho, Sethi, Ullman, Pearson Education. ISBN 81-7808-046-X

The syllabus for Paper I Section C is based on PG level syllabus of ME(CSE)

1) Data Structure and Algorithms

Algorithm Design and Analysis Techniques, Advanced Data Structure, Complexity Classes, Approximation Algorithms

Ref: Introduction to Algorithms, T.H. Cormen, C.E Leiserson, R.L. Rivest, PHI India, 1990

2) Data Base Management and Data Mining

Relational Databases, Parallel Databases, Distributed Databases, Object Oriented Databases, Data mining Introduction, Data warehouse and OLAP, Data Pre- processing, Data Mining Primitives and Language, Concept Description characterization & Comparison, Association Rule, Classification & Prediction, Cluster Analysis

Ref: 1) Database System Concepts, Silberschatz A., Korth H.F, & Sudarshan S., Tata McGraw Hill, 2003 ISBN 0-07-044756-X, 0-07-12413-X

2) Data Mining Concepts and Techinques, Jaiwei Han, Micheline Kamber, Morgan Kauffmann publishers, 2000, 1-55860-489-8

3) Advance computer Networks

Computer Network and Intranet, Application Layer, Transport Layer, Network Layer and Routing, Link layer and Local Area Network, Multimedia Networking, Security in computer Network, Network Management

Ref:1) J. F Kurose, K.W. Ross, " Computer Networking – A Top Down Approach Featuring the Internet " , Pearson Education

3) Douglas Ecomer, " Internetworking with TCP/IP Volume 1 : Principles Protocols, and Architecture ", 5th edition PHI

4) Operating System and Design

Introduction to Operating System, Interprocess Communication Patterns, Virtual Memory, I/O Devices, File System Organization, Security

Ref: 1) Operating System - A design oriented approach, Charles Crowely, Tata McGraw-Hill Edition, New Delhi, 1998.

2) Operating System - Internals and Design principles, Stallings W, 4th Edition, PHI   2002

5) Advanced Computer Architecture

Fundamentals of Computer Design, Instruction Level Parallelism, Memory Hierarchy Design, Microprocessors of Thread level Parallelism

Ref : 1) Computer Architecture – A Quantitative Approach , Hennessy J.L., D. Patterson, Morgan Koffman, Third edition, 2003