



INTRODUCTION TO PARALLEL PROGRAMMING IN OPENMP AND MPI

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IIT Delhi

TYPE OF COURSE : Rerun | Elective | UG/PG

COURSE DURATION : 8 Weeks (24 Jan' 22 - 18 Mar' 22)

EXAM DATE : 27 Mar 2022

PRE-REQUISITES : Students enrolling for this course should be comfortable with programming in C.

INTENDED AUDIENCE : Computer Science and non-Computer Science Students with interest in parallel programming for HPC applications.

INDUSTRIES APPLICABLE TO : IBM, Intel, Amazon, Google, Microsoft, Cray.

COURSE OUTLINE :

This course focuses on the shared memory programming paradigm. It covers concepts & programming principles involved in developing scalable parallel applications. Assignments focus on writing scalable programs for multi-core architectures using OpenMP and C. This is an introductory course in shared memory parallel programming suitable for computer science as well as non-computer science students working on parallel/HPC applications and interested in parallel programming.

ABOUT INSTRUCTOR :

Prof. Yogish Sabharwal is a researcher at IBM Research and serves as an adjunct faculty at IIT Delhi. At IBM, he manages the high performance computing group, that ensures that real-world applications are able to extract the best performance out of HPC systems. He has 70+ papers including 3 best paper awards, 2 best paper nominations and a Gordon Bell finalist. His work has won several competitions organized in the HPC community.

COURSE PLAN :

Week 1: Single Processor Architecture and Basic OpenMP constructs & functions

Week 2: More OpenMP constructs & functions

Week 3: Basic Linear Algebra using OpenMP and OpenMP tasks

Week 4: Critical Sections, locks and Matrix Factorization using OpenMP

Week 5: Distributed Memory programming and Message Passing Interface (MPI)

Week 6: MPI Collectives and Interconnection architectures

Week 7: Some applications on distributed memory architectures

Week 8: Applications to Graph Algorithms