



# Jahangirnagar University

## Institute of Information Technology

### Course outline

**Course Code:****ICT-4105****Course Title:****Parallel and Distributed System****Credit Hours:****3.0 hours****Course Level:****4<sup>th</sup> Year 1<sup>st</sup> Sem.****Course Teacher****Md. Biplob Hosen**

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**Course objective:**

The objective of this course is to:

- Provide an understanding of the principles of parallel and distributed system along with their applications in real world.
- Understand their architecture both in software and hardware platform.
- Learn challenges that the system faces while implementation.
- Learn security and failure handling and finally the importance of consistency and synchronization in distributed system.

**Course Learning Outcomes (CLOs):**

On completion of the course students will be able:

- CLO1- To distinguish the features of parallel and distributed system.
- CLO2- To demonstrate knowledge of the core architectural aspects of distributed systems, detail learning of the main underlying components of distributed systems.
- CLO3- To understand and apply the knowledge of the parallel algorithms.
- CLO4- To demonstrate and apply important methods in distributed systems to support scalability and fault tolerance.
- Distributed Systems: Principles and Paradigms, 2<sup>nd</sup> Edition by Andrew S. Tanenbaum & Maarten van Steen, Publisher: Pearson Prentice Hall.

**Textbook:****Reference Books:**

- Distributed Systems: Concepts and Design, 3<sup>rd</sup> Edition by George Coulouris, Jean Dollimore & Tim Kindberg, Publisher: Addison-Wesley.

**Lesson Plan:**

<u>CLO</u>	<u>Contents</u>
CLO-1	Introduction: Why use parallel and distributed systems? Why not use them? Speedup and Amdahl's Law.
CLO-2	Hardware and Software architectures: multiprocessors (shared memory), networks of workstations (distributed memory), clusters, threads and shared memory, processes and message passing, distributed shared memory (DSM), distributed shared data (DSD).
CLO-2	Distributed Systems: System Architecture, Communication, Mid-session Recess, Replication & Consistency, Distributed Shared

	Memory, Synchronization & Coordination, Middleware, Fault Tolerance, Security, Naming, Distributed File Systems.
CLO-3	Parallel Algorithms: Concurrency and synchronization, Data and work partitioning, Common parallelization strategies, Granularity, Load balancing, Examples: parallel search, parallel sorting, etc.
CLO-3, CLO-4	Shared-Memory Programming: Threads, Pthreads, Locks and semaphores. Distributed-Memory Programming: Message Passing, MPI, PVM, Other Parallel Programming Systems: Trademarks: Distributed shared memory.
CLO-2, CLO-4	System Configurations: Aurora: Scoped behavior and abstract data types, Enterprise: Process templates, Protocols for DSM systems, Impact of network protocols (TCP/IP, UDP/IP, bulk-data transfer, etc.), System area networks (SAN) (e.g., Myrinet).