

Parallel and Distributed Computing				
Credit Hours:	2	Course Code:	COSC----	Prerequisites: Operating System
Course Learning Outcomes (CLOs):				
At the end of the course, the students will be able to:			Domain	BT Level*
1. Learn about parallel and distributed computers.			C	1
2. Write portable programs for parallel or distributed architectures using Message-Passing Interface (MPI) library			C	1
3. Analyze complex problems with shared memory programming with OpenMP.			C	2
* BT= Bloom’s Taxonomy, C=Cognitive Domain, P=Psychomotor Domain, A=Affective Domain				
#	SDG	Relevant CLOs		
1	SDG 4: Quality Education	CLO 1: Learn about parallel and distributed computers.		
Course Contents:				
Asynchronous/synchronous computation/communication, concurrency control, fault tolerance, GPU architecture and programming, heterogeneity, interconnection topologies, load balancing, memory consistency model, memory hierarchies, Message passing interface (MPI), MIMD/SIMD, multithreaded programming, parallel algorithms & architectures, parallel I/O, performance analysis and tuning, power, programming models (data parallel, task parallel, process-centric, shared/distributed memory), scalability and performance studies, scheduling, storage systems, synchronization, and tools (Cuda, Swift, Globus, Condor, Amazon AWS, OpenStack, Cilk, gdb, threads, MPICH, OpenMP, Hadoop, FUSE).				
Teaching Methodology:				
Lectures, Written Assignments, Practical labs, Semester Project, Presentations.				
Course Assessment:				
Mid Term Exams, Final Term Exams, Assignments, Quizzes, Project, Presentations, Practical Exam				
Reference Material:				