CS406: Grid and Cluster Computing	L	T	P	Operating Systems
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Course Objective: The course will provide an insight for achieving cost efficient high performance system and how to deal with design and architecture of grid and cluster computing.

S. No.	Course Outcomes (CO)
CO1	Describe the fundamental concepts, hardware technologies, and software architectures used in cluster computing.
CO2	Implement and analyze standard MPI variants, derived data types, and communicators for parallel programming.
CO3	Demonstrate skills in resource management, distributed task scheduling, and system administration using tools like Condor, Maui, and PBS.
CO4	Set up and deploy grid computing environments, apply programming models, and ensure grid security.
CO5	Use performance evaluation tools and apply data management techniques to case studies such as molecular modeling and brain activity analysis.

S. No	Contents	Contact Hours
UNIT 1	Cluster Computing Introduction to concepts in Cluster based distributed computing Hardware technologies for cluster computing and software for cluster computing, and different Software Architecture for Cluster Computing.	**6**
UNIT 2	Programming; Programming Models and Paradigms, features and performance of standard MPI variants, Derived data types, communicators.	**8**
UNIT 3	Resource management and scheduling Managing, cluster resources: single system images, system level middleware, distributed task scheduling, monitoring and administering system resources Parallel I/O and Parallel Virtual File System. Scheduling: Condor, Maui Scheduler, Portable Batch System (PBS).	**8**
UNIT 4	Grid Computing: Grids and Grid Technologies, Programming models and Parallelization Techniques, Grid Security Infrastructure, Setting up Grid, deployment of Grid software and tools, and application execution.	**10**
UNIT 5	Standard application development tools and paradigms Performance evaluation tools, HINT, netperf, netpipe, ttcp, Iperf.message	**8**
UNIT 6	Data Management Application Case Study: Molecular Modeling for Drug Design and Brain Activity Analysis, Resource management and scheduling.	**6**
	Total	**48**