

Course code: Course Title	Course Structure			Pre-Requisite
SE409: Grid and Cluster Computing	L	T	P	Operating Systems, Data Structures and Algorithms
	3	1	0	

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	Understand the fundamental concepts of hardware, and software architectures used in cluster computing.
CO2	Apply different programming models and paradigms for efficient parallel computing.
CO3	Illustrate resource management and scheduling techniques, and parallel file systems to optimize computing performance in distributed environments.
CO4	Demonstrate grid computing models, security infrastructure, and deployment techniques for set up and execution of grid-based applications.
CO5	Examine standard tools and paradigms for performance measurement.

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).	7
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.	9
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.	4
	TOTAL	42

REFERENCES

S.No.	Name of Books/Authors/Publishers	Year of Publication / Reprint

1	C. S. R. Prabhu, “Grid and Cluster Computing”, PHI.	2008
2	B. Jacob, M. Brown, K. Fukul, N. Trivedi, “Introduction to grid computing”, IBM.	2005
3	Barry Wilkinson, “Grid Computing: Techniques and Applications”, CRC Press, 1 st Edition.	2009
4	Rajkumar Buyya, “High Performance Cluster Computing: Architectures and Systems”, Volume I, Pearson Education.	2008
5	D. Janakiram, “Grid Computing”, McGraw Hill Education.	2005