

Subject Name: High Performance Computing

Subject Code: CE 802-2 / IT 802-2

Teaching Scheme (Credits and Hours)

Teaching scheme				Total Credit	Evaluation Scheme					Total
L	T	P	Total		Theory		Mid Sem Exam	CIA	Pract.	
Hrs	Hrs	Hrs	Hrs		Hrs	Marks	Marks	Marks	Marks	Marks
03	00	02	05	4	3	70	30	20	30	150

LEARNING OBJECTIVES:

The objective of this course is

- To Study various computing technology architecture.
- To know Emerging trends in computing technology.
- To highlight the advantage of deploying computing technology.

OUTLINE OF THE COURSE:

Sr. No	Title of the Unit	Minimum Hours
1	Cluster Computing and its Architecture	10
2	Cluster Setup and Administration	5
3	Introduction to Grid and its Evolution	6
4	Introduction to Cloud Computing	8
5	Nature of Cloud	11
6	Cloud Elements	5

Total hours (Theory): 45

Total hours (Practical): 30

Total hours: 75

DETAILED SYLLABUS:

Sr. No	Topic	Lecture Hours	Weight age (%)
1	Cluster Computing and its Architecture: <ul style="list-style-type: none">• Ease of Computing• Scalable Parallel Computer Architecture• Towards Low Cost Parallel Computing & Motivation• Windows opportunity• A Cluster Computer And Its Architecture• Cluster Classification• Commodity Components for Clusters• Network Services/Communication SW• Cluster Middleware and Single Systems Image• Resource management & Scheduling (RMS)	10	20
2	Cluster Setup and Administration: <ul style="list-style-type: none">• Introduction• Setting up the cluster• Security• System Monitoring• System Tuning	5	14
3	Introduction to Grid and its Evolution: <ul style="list-style-type: none">• Introduction to Grid and its Evolution:• Beginning of the Grid• Building blocks of Grid• Grid Application and Grid Middleware• Evolution of the Grid: First, Second & Third Generation	6	14
4	Introduction to Cloud Computing: <ul style="list-style-type: none">• Defining Clouds• Cloud Providers• Consuming Cloud Services• Cloud Models – Iaas, Paas, SaaS• Inside the cloud• Administering cloud services• Technical interface• Cloud resources	8	18
5	Nature of Cloud: <ul style="list-style-type: none">• Tradition Data Center• Cost of Cloud Data Center• Scaling computer systems• Cloud work load• Managing data on clouds• Public, private and hybrid clouds	11	22

6	Cloud Elements: <ul style="list-style-type: none"> • Infrastructure as a service • Platform as a service • Software as a service 	5	12
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INSTRUCTIONAL METHOD AND PEDAGOGY

- At the start of course, the course delivery pattern, prerequisite of the subject will be discussed.
- Lectures will be conducted with the aid of multi-media projector, black board, OHP etc.
- Attendance is compulsory in lecture and laboratory which carries 10 marks in overall evaluation.
- One internal exam will be conducted as a part of internal theory evaluation.
- Assignments based on the course content will be given to the students for each unit and will be evaluated at regular interval evaluation.
- Surprise tests/Quizzes/Seminar/tutorial will be conducted having a share of five marks in the overall internal evaluation.
- The course includes a laboratory, where students have an opportunity to build an appreciation for the concepts being taught in lectures.
- Experiments shall be performed in the laboratory related to course contents.

STUDENTS LEARNING OUTCOMES:

On successful completion of the course, the student will:

- On successful completion of the course, the student will be having the basic knowledge of computing technology.
- Student will be able to understand architecture of computing technology.
- Student will be able to know cloud computing service models.
- Know about emerging trends in computing technology.
- Student will be able to know big data and hadoop architecture.

TEXT BOOKS:

1. High Performance Cluster Computing, Volume 1, Architecture and Systems, Rajkumar Buyya, Pearson Education.
2. Berman, Fox and Hey, Grid Computing – Making the Global Infrastructure a Reality, Wiley India.
3. Hurwitz, Bllor, Kaufman, Halper, Cloud Computing for Dummies, Wiley India.

REFERENCE BOOKS:

1. Ronald Krutz, Cloud Security, Wiley India.
2. Cloud Computing, A Practical Approach, Anthony Velte, Toby Velte, Robert Elsenpeter, McGrawHill.

LIST OF PRACTICALS:

Sr. No	Name of Experiment
1	To study the basic commands of linux.
2	To establish Beowulf Cluster using MPI(Message Passing Interface) Library.
3	Installation and configuration of Alchemi Grid.
4	Running a sample application on Alchemi Grid and analysing it.
5	To study a Grid Simulation Toolkit.
6	To run two sample programs using GridSim Toolkit.
7	To study a Cloud Simulation Toolkit.
8	To setup Cloud.