COURSE HANDOUT
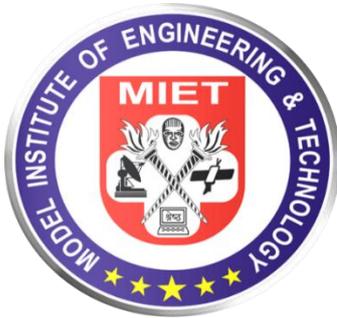
Cloud Computing (MCSE21A)

MTech-2ST SEMESTER

ACADEMIC YEAR (2023-24)

Harashleen Kour

Assistant professor

Department of Computer Science

Department of CSE

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KotBhalwal, Jammu - 181122

www.mietjmu.in

Course Code	Course Name	Course Type	L	T	P	C	Marks		
							Sessional	Final Exam	Total
MCSE22A	Cloud Computing	Elective	5	3	2	0	50	100	150

Course Outcomes

At the end of the course the student will be able to	
CO22A.1	Install and configure various Cloud computing environments like Hadoop/AWS etc.
CO22A.2	Understand deployment of service and its usage over cloud by implementing Para-Virtualization using VM Ware's Workstation/ Oracle's Virtual Box and Guest O.S
CO22A.3	Implement Concurrent computing techniques to manage cloud resources efficiently.

Detailed Syllabus
Section-A

Unit 1: Distributed Systems: Virtualization, Web Service-Oriented Computing, Utility-Oriented Computing, Building Cloud Computing Environments, Application Development, Infrastructure and System Development.

(06 hrs)

Unit 2: Principles of Parallel and Distributed Computing: Eras of Computing, Parallel vs. Distributed Computing, Elements of Parallel Computing, Parallel Processing, Hardware Architectures for Parallel Processing, Approaches to Parallel Programming, Levels of Parallelism, Laws of Caution, Elements of Distributed Computing, General Concepts and Definitions, Components of a Distributed System, Architectural Styles for Distributed Computing, Models for Inter-Process Communication, Technologies for Distributed Computing, Remote Procedure Call, Distributed Object Frameworks, Service Oriented Computing.

(08 hrs)

Unit 3: Introduction to Virtualization: Characteristics of Virtualized Environments, Taxonomy of Virtualization Techniques, Execution Virtualization, Other Types of Virtualization, Virtualization and Cloud Computing, Pros and Cons of Virtualization, Case Studies: Xen(Paravirtualization), VMware(Full Virtualization), Microsoft(Hyper-V) .

(06 hrs)

Section-B

Unit 4: Cloud Computing Architecture: Cloud Definition, Cloud Reference Model, Architecture, Infrastructure / Hardware as a Service, Platform as a Service, Software as a Service, Types of Clouds(Public, Private, Hybrid and Community), Economics of the Cloud, Open Challenges, Cloud Interoperability and Standards, Scalability and Fault Tolerance, Security, Trust, and Privacy, Organizational Aspects. **(08 hrs)**

Unit 5: Concurrent Computing and High-Throughput Computing: Thread Programming, Introducing Parallelism for Single Machine Computation, Programming Applications with Threads, Threads, Thread

APIs, Techniques for Parallel Computation with Threads, Domain Decomposition: Matrix Multiplication, Functional Decomposition: Sine, Cosine, and Tangent, Task Programming, Task Computing, Characterizing a Task, Computing Categories, Frameworks for Task Computing, Task-based Application Models, Embarrassingly Parallel Applications, Parameter Sweep Applications, MPI Applications, Workflow Applications with Task Dependencies, Task Programming Model, Developing Applications with the Task Model, Developing Parameter Sweep Application, Managing Workflows. **(08 hrs)**

Text Books

S.No	Name of the Books	Name of the Author	Publisher Name	Edition (Pub.Yr.)
1	Mastering Cloud Computing	Rajkumar Buyya , Christian Vecchiola, S Thamarai Selvi	McGraw Hill	2006

Reference Books

S.No	Name of the Books	Name of the Author	Publisher Name	Edition (Pub.Yr.)
2	Programming Amazon EC2	Jurg Van Vliet and Flavia Paganelli	O'Rielly	2009
3	Cloud Computing Bible	Barrie Sosinsky	Wiley	2011

(8 Hours)

COURSE PLAN	
Unit-I Distributed System	
S.No	**Topics**	**Recommended Books**

S.No	Topics	Recommended Books
1	Distributed System	Book 1, ch 1
2	Virtualization	Book 1, ch 1
3	Web Service-Oriented Computing	https://www.geeksforgeeks.org/service-oriented-architecture/
4	Utility-Oriented Computing	Book 1, ch 1
5	Building Cloud Computing Environments	Book 1, ch 1
6	Application Development	Book 1, ch 1
7	Infrastructure and System Development	Book 1, ch 1
	Unit-II **Principles of Parallel and Distributed Computing**	
8	Eras of Computing	Book 1, ch 2
9	Parallel vs. Distributed Computing	Book 1, ch 2
10	Elements of Parallel Computing	Book 1, ch 2
11	Parallel Processing, Hardware Architectures for Parallel Processing	Book 1, ch 2
12	Approaches to Parallel Programming	Book 1, ch 2

13	Levels of Parallelism	Book 1, ch 2
14	Laws of Caution	Book 1, ch 2
15	Elements of Distributed Computing	Book 1, ch 2
16	Components of a Distributed System	Book 1, ch 2
17	Architectural Styles for Distributed Computing	Book 1, ch 2
18	Models for Inter-Process Communication	Book 1, ch 2
19	Technologies for Distributed Computing	Book 1, ch 2
20	Remote Procedure Call	Book 1, ch 2
21	Distributed Object Frameworks	Book 1, ch 2
22	Service Oriented Computing	Book 1, ch 2

Unit-III Introduction to Virtualization		
16	Characteristics of Virtualized Environments	Book 1, ch 3
17	Taxonomy of Virtualization Techniques	Book 1, ch 3
18	Execution Virtualization	Book 1, ch 3
19	Virtualization and Cloud Computing	Book 1, ch 3
20	Case Studies: Xen (Paravirtualization),	Book 1, ch 3
21	VMware (Full Virtualization),	Book 1, ch 3
22	Microsoft (Hyper-V)	Book 1, ch 3

Unit-IV Cloud Computing Architecture		
22	Cloud Definition	Book 1, Ch.4
23	Cloud Reference Model	Book 1, Ch.4
24	Infrastructure / Hardware as a Service, Platform as a Service, Software as a Service	Book 1, Ch.4
25	Types of Clouds (Public, Private, Hybrid and Community)	Book 1, Ch.4
26	Economics of the Cloud, Open Challenges	Book 1, Ch.4

Unit-V Concurrent Computing and High-Throughput Computing		
29	Thread Programming	Book 1, Ch.6
30	Introducing Parallelism for Single Machine Computation	Book 1, Ch.6
31	Programming Applications with Threads	Book 1, Ch.6
32	Threads, Thread APIs	Book 1, Ch.6
33	Techniques for Parallel Computation with Threads	Book 1, Ch.6
34	Domain Decomposition	Book 1, Ch.6
35	Task Programming, Task Computing, Characterizing a Task	Book 1, Ch.6
36	Computing Categories, Frameworks for Task Computing	Book 1, Ch.7
37	Task-based Application Models	Book 1, Ch.6
38	Embarrassingly Parallel Applications	Book 1, Ch.7
39	Parameter Sweep Applications	Book 1, Ch.6
40	MPI Applications	Book 1, Ch.6
41	Workflow Applications with Task Dependencies	Book 1, Ch.7
42	Task Programming Model	Book 1, Ch.7
43	Developing Applications with the Task Model	Book 1, Ch.7
44	Developing Parameter Sweep Application	Book 1, Ch.7
45	Managing Workflows	Book 1, Ch.7

ADDITIONAL WEB RESOURCES

1.	**Coursera course: introduction to cloud** https://www.coursera.org/learn/ introduction-to-cloud
2.	**Coursera course: specializations aws-fundamentals** https://www.coursera.org/specializations/aws-fundamentals

GRADING AND ASSESSMENT

- **Sessional Test**: 20 marks

- **Assignment**: 10 marks

- **Attendance**: 10 marks

- **Final Examination**: 100 marks

COURSE POLICIES

- **Attendance**: Minimum 75% attendance is mandatory to appear in the final examination of the course.

- **Academic Integrity**: MIET's academic integrity policies apply. Plagiarism will not be tolerated.

- **Late Submissions**: Assignments and projects must be submitted by the specified timelines.

FACULTY INFORMATION

- **Office Hours**

  Monday (12:05 PM - 12:55 PM)
  Friday (12:05 PM - 12:55 PM)

- **Contact Information**
  harashleen.cse@mietjammu.in

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