Bachelor of Computer Engineering
Bachelor of Electronics, Communication and Information Engineering
Institute of Engineering
Enterprise Computing (Elective Course)

Lecture: 3   **Year: IV**

Tutorial: 1   **Part: I**

Practical: 1.5

Course Objectives:

This course covers the brief computing background for enterprise computing and especially focuses on the out-sourcing of computing to the cloud. This course provides an in-depth overview of cloud computing concepts, core services, security, and architecture.

Course Contents:

1.	**Enterprise Computing: A Retrospective**	**(4 Hours)**
1.1.	Introduction	
1.2.	Mainframe Architecture	
1.3.	Client-Server Architecture	
1.4.	3-Tier Architectures with TP Monitors	
2.	**Evolution of Computing**	**(4 Hours)**
2.1.	Internet Technology and Web-Enabled Applications	
2.2.	Web Application Servers	
2.3.	Overview of Computing Paradigm: Grid Computing, Cluster Computing, Distributed Computing, Utility Computing, Cloud Computing	
2.4.	Internet of Services	
2.5.	Adopting Cloud Computing in Business	
3.	**Enterprise Architecture: Role and Evolution**	**(4 Hours)**
3.1.	Enterprise Data, Processes and Components	
3.2.	Enterprise Architecture Evolution and Frameworks	
3.3.	Monolithic, Application Integration, SOA and Microservices	
3.4.	Enterprise Technical Architecture	
3.5.	Data Center Infrastructure: Coping with Complexity	
4.	**Cloud Concepts**	**(6 Hours)**
4.1.	Cloud Computing (NIST Model), Properties, Characteristics, Benefits	
4.2.	Cloud Types; Private, Public and Hybrid Cloud.	
4.3.	Service Models: IaaS, PaaS, SaaS.	
4.4.	Role of Virtualization in Enabling the Cloud.	
4.5.	Application Availability, Performance, Security and Disaster	
5.	**Cloud Architecture & Framework**	**(5 Hours)**
5.1.	Cloud Global Infrastructure	
5.2.	Deploying And Operating in the Cloud	
5.3.	Well-Architected Framework Design Principles	

5.4.	Software as a Service, SaaS Architectures, Dev 2.0 in the Cloud for Enterprises	
5.5.	Infrastructure as a Service	
5.6.	Platform as a Service	

6.	**Computing and Storage Services**	**(6 Hours)**
6.1.	Compute Services – Virtual Server, Cloud Containers, Cloud Server Less Service, Auto Scaling	
6.2.	Storage Services – Object Storage, File Storage, and Block Storage, Archive Storage	
6.3.	Databases – SQL, NoSQL and Graph Database and Database Migration	

7.	**Networking & Security**	**(6 Hours)**
7.1.	Networking and Content Delivery – Cloud Network, CDN, DNS Services, Cloud Load Balancing.	
7.2.	Cloud Security and Compliance Concepts	
7.3.	Shared Responsibility Model	
7.4.	Cloud Watch, Cloud Formation, Cloud Logs, Personal Health Dashboard.	
7.5.	Cloud Messaging and Notification Service	

8.	**Cloud Computing Economics**	**(3 Hours)**
8.1.	Introduction	
8.2.	Economics of Private Clouds	
8.3.	Software Productivity in the Cloud	
8.4.	Economies of Scale: Public Vs. Private Clouds	

9.	**Enterprise Analytics and Search**	**(3 Hours)**
9.1.	Enterprise Knowledge: Goals and Approaches	
9.2.	Business Intelligence	
9.3.	Text And Data Mining	
9.4.	Text And Database Search	

10.	**Enterprise Cloud Computing Ecosystem and Roadmap**	**(4 Hours)**
10.1.	Public Cloud Providers	
10.2.	Cloud Management Platforms and Tools	
10.3.	Tools for Building Private Clouds	
10.4.	Future of Enterprise Cloud Computing	

Practical

There will be lab exercises to provide students with hands on experiences on using online cloud computing platform to enhance the concept in following topics

1. Introduction to Cloud Computing.
2. Implementing Virtualization and dynamic hosting on Linux instances & server launching.
3. Explain block storage and types.
4. Auto Scaling and Load Balancing
5. Storage Services
6. Virtual Private Cloud, NAT, VPC Peering
7. Identification Access Management (IAM)
8. Implementation of Database (SQL and NoSQL)
9. Implementation of Content Delivery Network (CDN)

10. Elastic Beanstalk (PaaS)
11. Cloud Formation (IaaC)
12. Monitoring, Log Management, Account Management.
13. Case Study: PaaS(Facebook, Google App Engine)
14. Case Study: Amazon Web Services, Azure, Google cloud

At the end of this course, students need to submit a project by developing a prototype using one of the cloud computing platforms and encouraged to appear for global certification in the cloud computing platform.

References:

1. Gautam Shroff, Enterprise Cloud Computing - Technology, Architecture, Applications, University Press, 2010
2. Toby Velte, Anthony Velte, Robert Elsenpeter, "Cloud Computing, A Practical Approach" McGraw-Hill, 2009
3. John Rittinghouse, James Ransome, Cloud Computing: Implementation, Management, and Security, 2009
4. Thomas Erl, Zaigham Mahmood and Ricardo Puttini, "Cloud Computing Concepts, Technology & Architecture", PRENTICE HALL, 2013
5. Ben Piper, David Clinton, "AWS Certified Cloud Practitioner Study Guide", Sybex,2019

Evaluation Scheme:

The questions will cover all the chapters of the syllabus. The evaluation scheme will be as indicated in the table below:

Chapters	Hours	Marks Distribution*
1	4	7
2	4	7
3	4	7
4	6	11
5	5	9
6	6	11
7	6	11
8	3	5
9	3	5
10	4	7
Total	45	80

*There may be minor deviation in marks distribution