Woldia University

Institute of Technology

School of Computing

Department of Software Engineering

Course Title	Fundamentals of Cloud Computing
ECTS	ECTS:5(2hr lecture, 3hr laboratory)
Course Code	SEng3072
Category	Major
Year	III
Semester	II
Prerequisite	None
Instructor	Name: Abebaw S. Office: GB-G+1-office no 25 Email: sete3abebaw4@gmail.com
Objectives	**By the end of this course, students will be able to:** • Understanding the key dimensions of the challenge of Cloud Computing and Services. • Articulate the main concepts, key technologies, strengths and limitations of cloud computing. • Identify the architecture, infrastructure and delivery models of cloud computing. • Understand various performance criteria to evaluate the quality of the cloud architecture and advanced Technologies. • Explain the core issues of cloud computing such as security, privacy and interoperability
Descriptions	Cloud Computing has transformed the IT industry by opening the possibility for infinite or at least highly elastic scalability in the delivery of enterprise applications and software as a service (SaaS). Amazon Elastic Cloud, Microsoft 's Azure, Google App Engine, and many other Cloud offerings give mature software vendors and new start-ups the option to deploy their applications to systems of infinite computational power with practically no initial capital investment and with modest operating costs proportional to the actual use. The course examines the most important APIs used in the Amazon and Microsoft Cloud, including the techniques for building, deploying, and maintaining machine images and applications. Students will learn how to use Cloud as the infrastructure for existing and new services. Open source implementations of highly available clustering computational environments, as well as RESTful Web services, to build very powerful and efficient applications will be also covered. Student's also learn how to deal with not trivial issues in the Cloud, such as load balancing, caching, distributed transactions, and identity and authorization management. In the process students will also become very familiar with Linux operating system.

Chapters	Title

1	**Evolution of Cloud Computing**
	• System Models for Distributed and Cloud Computing
	• NIST Cloud Computing Reference Architecture -IaaS
	• On-demand provisioning
	• Elasticity in cloud
	  • Examples of (IaaS, PaaS, and SaaS) providers
	• Public, Private and Hybrid clouds.
	  • General Benefits and Architecture,
	  • Business drivers
	  • Main players in the field,
	  • Overview of Security Issues
	  • XaaS Cloud Based Service Offerings

2	**Basics of Virtualization**

	• Types of Virtualization
	  • Implementation Levels of Virtualization
	  • Virtualization Structures
	• Tools and Mechanisms
	  • Virtualization of CPU, Memory, I/O Devices
	  • Desktop virtualization
	  • Server Virtualization.

3	**Architectural Design of Compute and Storage Clouds**
	• Layered Cloud Architecture Development Design Challenges • Inter Cloud Resource Management • Resource Provisioning and Platform Deployment • Global Exchange of Cloud Resources
4	**Parallel and Distributed Programming-Paradigms**

	• MapReduce, Twister and Iterative MapReduce
	  • Hadoop, Library from Apache
	• Mapping Applications
	• Programming Support
	  • Google App Engine, Amazon AWS
	  • Cloud Software Environments - Eucalyptus, Open nebula, OpenStack.

5	**Security Overview**

	• **Cloud Security-Challenges**
	  • Software-as-a-Service Security
	• **Security Governance**
	  • Risk Management
	  • Security Monitoring
	  • Security Architecture
	• **Design**
	  • Data Security
	  • Application Security
	  • Virtual Machine Security

Assessment type	Weight (%)
Quiz 1	5
Individual Assignment	15
Mid exam	20
Lab Exam	20
Final Exam	40
Total	100

REFERENCE BOOKS

1. Distributed and Cloud Computing, From Parallel Processing to the Internet of Things by Kai Hwang, Geoffrey C Fox, Jack G Dongarra, Morgan Kaufmann Publishers, 2012.
2. Cloud Computing: Implementation, Management, and Security by John W.Rittinghouse and James F.Ransome: CRC Press 2010
3. Cloud Computing, A Practical Approach by Toby Velte, Anthony Velte, Robert Elsenpeter: TMH, 2013
4. Cloud Application Architectures: Building Applications and Infrastructure in the Cloud: Transactional Systems for EC2 and Beyond (Theory in Practice (O'Reilly)) by George Reese: O'Reilly
5. James E. Smith, Ravi Nair, Virtual Machines: Versatile Platforms for Systems and Processes,Elsevier/Morgan Kaufmann, 2005.
6. Katarina Stanoevska-Slabeva, Thomas Wozniak, Santi Ristol, —Grid and Cloud Computing A Business Perspective on Technology and Applications‖

Approved by		**Date**	**Signature**
Instructor	Abebaw S.	10/21/2024	_____
HOD	Zeleke C.	_____	_____
QAC	Demeke G.	_____	_____