EE4221: CLOUD COMPUTING SYSTEMS

Effective Term
Semester A 2022/23

Part I Course Overview

Course Title
Cloud Computing Systems

Subject Code
EE - Electrical Engineering
Course Number
4221

Academic Unit
Electrical Engineering (EE)

College/School
College of Engineering (EG)

Course Duration
One Semester

Credit Units
3

Level
B1, B2, B3, B4 - Bachelor's Degree

Medium of Instruction
English

Medium of Assessment
English

Prerequisites
EE3206 Java Programming and Applications and EE3009 Data Communications and Networking

Precursors
Nil

Equivalent Courses
Nil

Exclusive Courses
Nil

Part II Course Details

Abstract

The course aims to provide students with the essential knowledge and practical skills in cloud administration and architecting. Amazon Web Services (AWS) is a major cloud computing platform provider in the world. This course is

integrated with the curriculum of AWS Academy Cloud Foundations (ACF) to deliver industry-recognized content that covers a wide range of fundamental concepts and considerations from business to technology.

Course Intended Learning Outcomes (CILOs)

	CILOs	Weighting (if app.)	DEC-A1	DEC-A2	DEC-A3
1	Explain the cloud computing characteristics, key benefits, and underlying principles.		x	x	
2	Identify the performance and security issues in the cloud and use appropriate AWS tools to design well-architected solutions.		x	x	
3	Describe distributed and parallel computing models and implement cloud applications to process data efficiently.		x	x	

A1: Attitude
Develop an attitude of discovery/innovation/creativity, as demonstrated by students possessing a strong sense of curiosity, asking questions actively, challenging assumptions or engaging in inquiry together with teachers.

A2: Ability
Develop the ability/skill needed to discover/innovate/create, as demonstrated by students possessing critical thinking skills to assess ideas, acquiring research skills, synthesizing knowledge across disciplines or applying academic knowledge to real-life problems.

A3: Accomplishments
Demonstrate accomplishment of discovery/innovation/creativity through producing /constructing creative works/new artefacts, effective solutions to real-life problems or new processes.

Teaching and Learning Activities (TLAs)

	TLAs	Brief Description	CILO No.	Hours/week (if applicable)
1	Lecture	Learning in lectures will be supported by practical exercises	1, 2, 3	3 hrs/wk

Assessment Tasks / Activities (ATs)

	ATs	CILO No.	Weighting (%)	Remarks (e.g. Parameter for GenAI use)
1	Tests (min.: 2)	1, 2, 3	30	
2	#Assignments (min.: 3)	1, 2, 3	20	

Continuous Assessment (%)

50

Examination (%)

50

Examination Duration (Hours)

2

Additional Information for ATs

Remark:
To pass the course, students are required to achieve at least 30% in coursework and 30% in the examination.

\# may include homework, tutorial exercise, project/mini-project, presentation

Assessment Rubrics (AR)

Assessment Task
Examination

Criterion
Achievements in CILOs

Excellent (A+, A, A-)
High

Good (B+, B, B-)
Significant

Fair (C+, C, C-)
Moderate

Marginal (D)
Basic

Failure (F)
Not even reaching marginal levels

Assessment Task
Coursework

Criterion
Achievements in CILOs

Excellent (A+, A, A-)
High

Good (B+, B, B-)
Significant

Fair (C+, C, C-)
Moderate

Marginal (D)
Basic

Failure (F)
Not even reaching marginal levels

Part III Other Information

Keyword Syllabus

Cloud computing characteristics; virtualization and container technologies; cloud deployment models; cloud service models – SaaS, PaaS, and IaaS; cloud pricing model; cloud economics and challenges; key elements of classic data centers; shared responsibility model; authentication vs authorization; cloud storage models; RAID levels; data consistency models;

data replication and fault tolerance; high availability system and architecture; availability vs reliability; horizontal scaling vs vertical scaling; load balancing algorithms; business continuity and disaster recovery strategies; Java distributed programming; MapReduce and Hadoop

Introduction to AWS:
AWS Global Infrastructure, Region and Availability Zone, Edge Location, Elastic Compute Cloud (EC2), Lambda, Simple Storage Service (S3), Elastic Block Store (EBS), Elastic File System (EFS), Glacier, Relational Database Service (RDS), DynamoDB, Identity & Access Management (IAM), Virtual Private Cloud (VPC) Networking, Security Groups, Network ACL, Internet Gateway, NAT Gateway, Route 53, CloudFront, Elastic Load Balancing (ELB), Auto Scaling Group, Cloud Watch

Reading List

Compulsory Readings

	Title
1	AWS Documentation - https://docs.aws.amazon.com/index.html

Additional Readings

	Title
1	AWS Certified Solutions Architect Official Study Guide (Sybex, 1st edition, 2017)
2	Cloud Infrastructure and Services Participant Guide Volume 1 & 2 (EMC Education Services, Oct 2011)
3	T. Petrocelli: Data Protection and Information Lifecycle Management (Prentice Hall, 2006, ISBN 0131927574)