



Course Specification

— (Bachelor)

Course Title: Cloud Architecture

Course Code: IT 476

Program: B.Sc. Information Technology

Department: Information Technology

College: College of Computer and Information Sciences

Institution: Majmaah University

Version: V2023

Last Revision Date: 04 November 2023



Table of Contents

A. General information about the course:	3
B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods	4
C. Course Content	5
D. Students Assessment Activities	8
E. Learning Resources and Facilities	8
F. Assessment of Course Quality	9
G. Specification Approval	9



A. General information about the course:

1. Course Identification

1. Credit hours: 3(2,2,0)

2. Course type

A. University College Department Track Others

B. Required Elective

3. Level/year at which this course is offered: (Level 8)

4. Course general Description:

This course 'Cloud Architecting' covers the fundamentals of building IT infrastructure on AWS. The course is designed to teach students solutions for cloud architects and how to optimize their use of the AWS Cloud by understanding AWS services and how they fit into cloud-based solutions. Although architectural solutions can differ depending on the industry, type of application, and size of the business, this course emphasizes best practices for the AWS Cloud that apply to all of them. It also recommends various design patterns to help you think through the process of architecting optimal IT solutions on AWS. Finally, this course provides opportunities for students to build a variety of infrastructures through a guided, hands-on approach

5. Pre-requirements for this course (if any): IT 479- cloud computing foundations

6. Co-requisites for this course (if any):

7. Course Main Objective(s):

students should be able to

1. Make architectural decisions based on cloud architectural principles and best practices
2. Use cloud services to make their infrastructure scalable, reliable, and highly available
3. Use cloud managed services to enable greater flexibility and resiliency in an infrastructure
4. Indicate how to increase the performance efficiency and reduce costs of infrastructures built on AWS
5. Use the cloud Well-Architected Framework to improve architectures that use cloud/AWS solutions.

2. Teaching mode (mark all that apply)





No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	60	100%
2	E-learning		
3	Hybrid <ul style="list-style-type: none"> Traditional classroom E-learning 		
4	Distance learning		

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	Lectures	30
2.	Laboratory/Studio	30
3.	Field	
4.	Tutorial	
5.	Others (specify)	
Total		60

B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
1.0	Knowledge and understanding			
1.1				
1.2				
...				
2.0	Skills			
2.1	CLO1: Make architectural decisions based on cloud architectural principles and best practices	S2	Mini Project, Lab Exercises	Lab Based Assignments, Mini Project
2.2	CLO4: Indicate how to increase the performance efficiency and reduce costs of	S2	Mini Project, Lab Exercises	Lab Based Assignments, Mini Project



Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
	infrastructures built on AWS			
2.3	CLO2: Use cloud services to make their infrastructure scalable, reliable, and highly available	S4	Mini Project, Graduation Project, Lab Exercises	Case Study Implementation/ Laboratory /Mini project
2.4	CLO3: Use cloud managed services to enable greater flexibility and resiliency in an infrastructure	S4	Mini Project, Graduation Project, Lab Exercises	Case Study Implementation/ Laboratory /Mini project
2.5	CLO5: Use the cloud Well-Architected Framework to improve architectures that use cloud/AWS solutions.	S3	Oral /Written Communication, Seminar	Group Assignments, Mini Project
3.0	Values, autonomy, and responsibility			
3.1				
3.2				
...				

C. Course Content

No	List of Topics	Contact Hours
1.	Introducing Cloud Architecting <ul style="list-style-type: none"> What is cloud architecting Well-Architected Framework Best practices for building solutions on cloud global infrastructure 	8
2.	Adding a Storage Layer <ul style="list-style-type: none"> The simplest architecture Storing data in cloud Moving data to and from cloud Choosing Regions for your architecture 	4
3.	Adding a Compute Layer <ul style="list-style-type: none"> Architectural need Adding compute , Choosing an Machine Image (AMI) to launch an Elastic Compute Cloud instance Selecting instance type 	4



	<ul style="list-style-type: none"> Using user data to configure an instance Adding storage to instance Pricing options and considerations 	
4.	<p>Adding a Database Layer</p> <ul style="list-style-type: none"> Architectural need Database layer considerations Relational Database Service (Amazon RDS) DynamoDB Database security controls Migrating data into cloud databases 	4
5.	<p>Creating a Networking Environment</p> <ul style="list-style-type: none"> Architectural need Creating an networking environment Connecting networking environment to the internet Securing your cloud networking environment 	4
6.	<p>Connecting Networks</p> <ul style="list-style-type: none"> Architectural need Connecting to your remote network with Site-to-Site VPN Connecting to your remote network with Direct Connect Connecting virtual private clouds (VPCs) in with VPC peering Scaling your VPC network with Transit Gateway Connecting your VPC to supported cloud services 	4
7.	<p>Securing User and Application Access</p> <ul style="list-style-type: none"> Architectural need Account users and Identity and Access Management (IAM) Organizing users Federating users Multiple accounts 	4
8.	<p>Implementing Elasticity, High Availability, and Monitoring</p> <ul style="list-style-type: none"> Architectural need Scaling your compute resources Scaling your databases Designing an environment that's highly available Monitoring 	4



9.	<p>Automating Your Architecture</p> <ul style="list-style-type: none"> • Architectural need • Reasons to automate • Automating your infrastructure • Automating deployments • Elastic Beanstalk 	4
10.	<p>Caching Content</p> <ul style="list-style-type: none"> • Architectural need • Overview of caching • Edge caching • Caching web sessions • Caching databases 	4
11.	<p>Building Decoupled Architectures</p> <ul style="list-style-type: none"> • Architectural need • Decoupling your architecture • Decoupling with Simple Queue Service (Amazon SQS) • Decoupling with Simple Notification Service (Amazon SNS) • Sending messages between cloud applications and on-premises with MQ 	8
12.	<p>Building Microservices and Serverless Architectures</p> <ul style="list-style-type: none"> • Architectural need • Introducing microservices • Building microservice applications with container services • Introducing serverless architectures • Building serverless architectures • Extending serverless architectures with API Gateway • Orchestrating microservices with Step Functions 	4
13.	<p>Planning for Disaster</p> <ul style="list-style-type: none"> • Architectural need • Disaster planning strategies • Disaster recovery patterns 	4





Total	60
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D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	In-class Tests (written test)	Week 5,	10%
2.	Mid Term Exam (written test)	Week 8	20%
3.	Mini Project	Week 12	10%
4.	Labs , Exercises/Assignment	Every Week	20%
5.	Final Exam (written test)	Week 16	40%

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.).

E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	Architecting Cloud Computing Solutions: Build cloud strategies that align technology and economics while effectively managing risk”, 1st Edition, By Kevin L. Jackson Scott Goessling, 2018.
Supportive References	AWS Certified Solutions Architect Study Guide” 2nd Edition, by Ben Piper, David Clinton. Latest version 2021.
Electronic Materials	<ul style="list-style-type: none"> Online Online Course Notes available on Blackboard Online reference materials available on SDL
Other Learning Materials	Online AWS LAB

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Classrooms, laboratories



Items	Resources
Technology equipment (projector, smart board, software)	projector, smart board, software, AWS, Azure
Other equipment (depending on the nature of the specialty)	

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Students	CLO Survey
Effectiveness of Students assessment	Instructor	Quiz, Mid exam, Assignments, Exercises, Final Exam and Indirect Survey
Quality of learning resources	Convener, instructors, HOD	Regular follow ups
The extent to which CLOs have been achieved	Instructor, TA	Performance in the exam for a particular CLO(s)
Other		

Assessors (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify))

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	IT Council
REFERENCE NO.	IT Meeting # (1443-1444)
DATE	9/02/2022

