هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

2023
TP-153

Course Specification
(Bachelor)

Course Title:	Computer Architecture and Design
Course Code:	COMP - 558
Program:	Bachelor in Computer Science
Department:	Computer Science
College:	College of Computer Science and Information Technology
Institution:	Jazan University
Version:	*Course Specification Version Number*
Last Revision Date:	30/12/2023

Table of Contents

A. General information about the course:

1. Course Identification

1. Credit hours: (03 Hours)					
2. Course type					
A.	☐University	☐ College	☒ Department	☐Track	☐Others
B.	☐ Required		☒ Elective		
3. Level/year at which this course is offered: (Level 14 / Year 5)					
4. Course general Description:					
This course is designed for undergraduate students to gain knowledge in Cloud architecture and design it is a rapidly growing business and technology area. It has been one of the most challenging technologies and has changed the way IT is consumed by enterprises. In providing an end and systemic study on both architectural design and implementation of cloud computing. It offers a Industrial and research knowledge to IT professionals and researchers, and helps the students to find out the key challenges of cloud worlds and explore the ways to overcome these challenges using the best industrial practices validate in real enterprise.					
5. Pre-requirements for this course (if any):					
COMP – 452 (Cloud Computing)					
6. Pre-requirements for this course (if any):					
None					
7. Course Main Objective(s):					

1. **Discuss the basic concepts and understanding the Cloud Computing Infrastructure and cloud Architecture.**
2. **Explain the fundamental principles of Cloud Architecture and their major technologies and techniques.**
3. **Describe different Cloud Computing services and tools in real life scenario.**
4. **Illustrate the methods of Cloud Computing architecture and its application.**
5. **Analyze of Case Studies to adopt Cloud Computing Architecture, familiarize students with various types of services and applications.**

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	44	80
2	E-learning		

No	Mode of Instruction	Contact Hours	Percentage
3	Hybrid • Traditional classroom • E-learning • Other (Self Study)	11	20
4	Distance learning		

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	**Lectures**	22
2.	**Laboratory/Studio**	22
3.	**Field**	
4.	**Tutorial**	
5.	**Others (Exams and Revision)**	8
Total		52

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	**Define** the fundamentals of cloud computing architecture and its different types.	K1	• Lectures/Presentations • Media Lectures	• Midterm • Assignment- 1 • Assignment- 2 • Final Theory Exam
1.2	**Explain** cloud architecture principles and different service tools and technologies to manage cloud services	K2	• Lectures/Presentations • Media Lectures	• Midterm • Assignment- 1 • Assignment- 2 • Final Theory Exam
...				
2.0	**Skills**			

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
2.1	**Design** and implement the environment of cloud application.	S2	• Lectures /Presentations • Media Lectures • Tutorials	• Midterm • Assignment - 1 • Assignment – 2 • Lab Exam • Final Theory Exam
2.2	**Analyze** case studies to adopt cloud application.	S1	• Lectures /Presentations • Media Lectures • Tutorials	• Lab Exam • Assignment – 2 • Final Theory Exam
2.3	**Develop** cloud-based services, application and deployment to improve the cost	S2	• Lectures /Presentations • Lab Demonstration • Media Lectures • Group discussion	• Assignment - 2 • Lab Exam • Final Theory Exam
3.0	**Values, autonomy, and responsibility**			
3.1	**Demonstrate** case studies of various cloud providers Amazon, Microsoft and Google etc.	V2	Group Discussion	Assignment-2 (Group Assignment)
...				

C. Course Content

No	List of Topics	Contact Hours
1.	**Introduction to Cloud Architecture** Cloud Computing, Cloud Service Providers, Cloud Architecture, Benefits of Cloud Computing Architecture, Cloud Architecture Components, Deployment models and Types of Clouds	3T+4P
2.	**Cloud Native Architecture Principles** What are Architecture principles, Types of principles such as API, Monolithic, Polylithic, Polyglot, Orthogonal and Solid, Isolation and Layering in Cloud Native Application	4T+2P
3.	**Microservices Architecture & Design** What is MSA, Characteristics of microservices, Hexagonal Architecture, Enterprise microservices examples, Microservices and UI: Front End, Challenges of microservices and Microservices in AI FCFS.	4T+4P
4.	**Event-Driven Architecture (EDA)**	4T+4P

	Events, EDA, Event-Driven Topologies, Characteristics of EDA, Event-Driven Messaging models, EDA Maturity model, Decoupling your systems, Event-Driven Microservices Interaction and Event Security.	
5.	**Serverless Architecture (SA)** Evolution of Serverless, What is Serverless Computing, Benefits of Serverless Computing, Elements of Serverless, Why use SA, Best practices of SA, Types of SA, Advantage, drawback and future of SA.	4T+4P
6.	**Containerization** Container, Container Architecture, Container Image, Docker Architecture, Container Principles, Container Security, Stateless , Immutable Benefits of Container, Container Orchestration and Types of Orchestration tools	3T+4P
Total		**22T + 22P**

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Assignment-1	5th Week	10%
2.	Midterm Exam	7th Week	15%
3.	Assignment – 2 (Group Assignment)	9th Week	15%
4.	Lab Exam	As per schedule	20%
5.	Final Theory Exam	As per schedule	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	• Cloud Native Architecture and Design, Shivakumar R. Goniwada, Apress, 1st Edition 2021, ISBN-13: 978-1484272251. • Mastering Cloud Computing, R. Buyya, C. Vecchiola & S. Selvi, MK publisher, 1st Edition 2013, ISBN-13:978-0124114548.
Supportive References	• Cloud Computing Concepts, Technology & Architecture, T. Erl, Z. Mahmood & R. Puttini, Prentice Hall, 1st Edition 2013, ISBN-13: 978-0133387520.
Electronic Materials	• https://www.google.com.sa/books/edition/Cloud_Native_Architecture_and_Design/_O1-zgEACAAJ?hl=en&kptab=overview • https://www.google.com.sa/books/edition/Cloud_Native_Architectures/QshsDwAAQBAJ?hl=en&gbpv=0
Other Learning Materials	• None

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	• Classroom equipped with projector, whiteboard and sufficient seating arrangements. • Lab with AWS Academy access for each students.
Technology equipment (projector, smart board, software)	• Smartboards, whiteboards and projectors for classroom and lab • Following AWS Academy access needed for lab work: ▪ AWS Cloud Architecting ▪ AWS Cloud Developing
Other equipment (depending on the nature of the specialty)	• None

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	CRC / QAU / HoD	Course reports / result analysis
Effectiveness of Students assessment	Students	Course evaluation survey form
Quality of learning resources	Track leaders / CRC	Review meetings and star rating with suggestions for further modification and improvements
The extent to which CLOs have been achieved	Course Teachers / QAU	CLO assessment template that is further verified at course coordinator and QAU level.
Other		

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

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	**DEPARTMENT COUNCIL**
REFERENCE NO.	
DATE	