هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

2023
TP-153

Course Specification
(Bachelor)

Course Title:	Cloud Computing
Course Code:	CS1773
Program:	Computer Science
Department:	Computer Science and Engineering
College:	Computer Science and information technology
Institution:	Albaha University
Version:	2023 V1
Last Revision Date:	10 October 2023

Table of Contents

A. General information about the course:

1. Course Identification

1. Credit hours: (3)					
2. Course type					
A.	☐University	☐College	☐Department	☐Track	☐Others
B.	☐Required		☒ Elective		
3. Level/year at which this course is offered: (12)					
4. Course general Description:					

4. Course general Description

Lectures:

Cloud computing is an innovative solution for providing highly elastic/ scalable computing resources which enables organizations to gain on-demand pay-as-you-go computing power. The Cloud Computing undergraduate course provides a theoretical and practical background for the Cloud computing fundamental concepts. It includes concepts, models, technology mechanisms, and technology architectures for secure Cloud-Based datacenters. This course equips students with a solid theoretical knowledge to understand the inner mechanics, architectural layers, and models of cloud computing.

Labs:

The experimental part acts as an integral part to apply/practice the learnt theory acquired from lectures. Besides an introduction of Linux OS, GIT repositories, and GCC compiler, the lab highlights a simulation tool named CloudSim which allows Cloud-based datacenter users to evaluate their services and solutions before deploying it on real cloud computing environment. The used tool for the experimental work is a java-based open-source framework developed by CLOUDS Lab at the University of Melbourne. A series of labs starting from explaining the basics concepts of Cloud-based datacenter and ending with testing various solutions on how to provision and manage computing resources.

5. Pre-requirements for this course (if any)**:**

None

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

None

7. Course Main Objective(s):

The main objectives for this course are designed to help students to:

1. **Recognize fundamental principles of Cloud Computing.**
2. **Describe the different types of cloud delivery models.**
3. **Distinguish between different cloud deployment models.**
4. **Analyze the Cloud Management Mechanisms.**
5. **Evaluate the Service Quality Metrics and SLAs.**
6. **Know Cloud infrastructure and security mechanisms.**
7. **Implement a simulation of large-scale Cloud computing data centers.**
8. **Communicate concepts and techniques in oral presentations.**
9. **Work both independently and collaboratively**

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	44	100%
2	E-learning	0	0
3	Hybrid • Traditional classroom • E-learning		
4	Distance learning	0	0

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	**Lectures**	22
2.	**Laboratory/Studio**	22
3.	**Field**	0
4.	**Tutorial**	0
5.	**Others (specify)**	0
Total		44

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	Recognize fundamental principles of Cloud Computing	K1	- Lectures - Discussions	- Homework (rubric) - Midterm - Final exam
1.2	Describe the different types of cloud delivery models	K2	- Lectures - Discussions	- Homework (rubric) - Midterm - Final exam
2.0	Skills			
2.1	Distinguish between different cloud deployment models.	S1	- Lectures - Problem based learning - Assignments - Demonstration - Lab meetings	- Homework (rubric) - midterm - Final exam - Lab reports (rubric) - evaluation form (rubric)
2.2	Analyze the Cloud Management, Security, Infrastructure Mechanisms.	S3	- Lectures - Problem based learning - Assignments - Demonstration - Lab meetings	- Homework (rubric) - midterm - Final exam - Lab reports (rubric) - evaluation form (rubric)
2.3	Evaluate the Service Quality Metrics and SLAs.	S2	- Lectures - Problem based learning - Assignments - Demonstration - Lab meetings	- Homework (rubric) - Final exam - Lab reports (rubric) - evaluation form (rubric)
2.4	Implement a simulation of large-scale Cloud computing data centers.	S2	- Lectures - Problem based learning - Assignments - Demonstration	- Homework (rubric) - Final exam
2.5	Communicate concepts and techniques in oral presentations	S5	- Oral presentation	- Project evaluation form (rubric)
3.0	Values, autonomy, and responsibility			
3.1	Work both independently and collaboratively	V1	- Presentation - Guest Lectures - Debate/Discussion - Group Projects - Team-based learning - Case Studies - Seminars	- Rubrics

C. Course Content

No	List of Topics	Contact Hours
1.	Introduction to Cloud Computing	4
2.	Fundamental Concepts and Models	2
3.	Cloud-Enabling Technology	2
4.	Fundamental Cloud Security	2
5.	Cloud Security Mechanisms	2
6.	Cloud Infrastructure Mechanisms	2
7.	Fundamental Cloud Architecture	2
8.	Cloud Delivery Model Considerations	2
9.	Cost Metrics and Pricing Models	2
10.	Service Quality Metrics and SLAs	2
Total		**22**

No	List of Topics (Lab)	Contact Hours
1.	Intro to Linux OS	2
2.	GCC Compiler	2
3.	Introduction to Git repositories management	2
4.	An Introduction to CloudSim	2
5.	Prepare the Simulation Environment	2
6.	The Simulation Environment and Basic Components	2
7.	Create Datacenter	2
8.	Create Virtual Machines and Cloudlets	2
9.	Create processor list	2
10.	Datacenter Host Resource Scheduling	2
11.	Datacenter Host Resource Management	2
Total		22

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Homework	3,8	10%
2.	Midterm	6	20%
3.	Quizzes	4,9	10%
4.	Lab reports and discussions (rubric)	Every two Weeks	10%

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
5.	Lab exam evaluation form (rubric)	12	10%
6.	Final Exam	13	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 computing: concepts, technology & architecture by Erl, Thomas, Ricardo Puttini, and Zaigham Mahmood. Pearson Education, 2013.
Supportive References	-Nayan B. Ruparelia. Cloud Computing. The MIT Press; 2016. -DAN C. MARINESCU. Cloud Computing: Theory and Practice. Boston: Morgan Kaufmann, 2013. v. 1st ed ISBN 9780124046276 -REHMAN, T. B. Cloud Computing Basics. Bloomfield: Mercury Learning & Information, 2018. ISBN 9781683923503. - Computer Science Curriculum 2013 – http://cs2013.org - ACM (Association for Computer Machinery) Curricula Recommendations - -http://www.acm.org/education/curricula-recommendations
Electronic Materials	• ACM (Association for Computer Machinery) web site - http://www.acm.org/ • IEEE Computer Society web site -http://www.computer.org/portal/web/guest/home • Access to the Saudi Digital Library (SDL). • Using the learning management system of the university – Rafid System (https://lms.bu.edu.sa/). • All major cloud service providers: Cloud Computing Services | Microsoft Azure Cloud Computing Services - Amazon Web Services (AWS) IBM Cloud
Other Learning Materials	

2. Required Facilities and equipment

Items	Resources
Facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	• A classroom or lecture hall with whiteboard for 25 students. A computer laboratory.
Technology equipment (projector, smart board, software)	• A digital image projection system with connection to desktop computer and laptop computer. • High speed Internet connection.

Items	Resources
	• An instructor computer station.
Other equipment (depending on the nature of the specialty)	**Cloud service provider account?**

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	**Students** • Faculty • Peer Reviewers • Program Leader Course Coordinator	• Surveys (indirect). • Direct feedback from students (interview between Program leader and students). • Course evaluation by Peer Reviewers (indirect). • Class visits by Program Leader Comprehensive Course report (where we can find information about teaching difficulties and action plan, …)
Effectiveness of Students assessment	• Students • Faculty • Peer Reviewers • Course Coordinator • Exam Evaluation Committee • Course Coordinator	• Surveys (indirect). • Direct feedback from students (interview between Program leader and students). • Assessment results (direct) • Course evaluation by Peer Reviewers (indirect). • Comprehensive Course report (where we can find information about assessment difficulties and action plan, …) • Exam evaluation by the Exam Evaluation Committee (indirect)
Quality of learning resources	• Students • Faculty • Peer Reviewers • Course Coordinator	• Surveys (indirect) • Course evaluation by Peer Reviewers (indirect). • Comprehensive Course report (where we can find information about

Assessment Areas/Issues	Assessor	Assessment Methods
		difficulties and challenges about learning resources as well as consequences and action plan, …)
The extent to which CLOs have been achieved	• Faculty • Program Leader • Course Coordinator	• Student Results (direct) • Comprehensive Course report (where we can find the CLO assessment results)
Other	**None**	**None**

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

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	
REFERENCE NO.	
DATE	