

COURSE DESCRIPTIONS

Faculty	Science and Information Technology				
Department	Computer Science			NQF level	7
Course Title	Cloud Computing	Code	501474	Prerequisite	Data Mining
Credit Hours	3	Theory	3	Practical	0
Course Leader	Ms. Enas Kanan	email	E.kanan@jadara.edu.jo		
Lecture time	Mon, Sat 8:30-10:00 Sun, Thur13:00-14:30	Classroom	Blended C306 D309		
Semester	First 2024/2025	Production	2008	Updated	2024

Short Description

This course provides a comprehensive overview of the fundamental concepts, technologies, and best practices associated with cloud computing. The course is designed to equip learners with the knowledge and skills necessary to understand and navigate the cloud computing landscape. its enabling technologies, main building blocks, and hands-on experience through projects utilizing public cloud infrastructures (Amazon Web Services (AWS) and Microsoft Azure). Cloud computing services are being adopted widely across a variety of organizations and in many domains. Simply, cloud computing is the delivery of computing as a service over a network, whereby distributed resources are rented, rather than owned, by an end user as a utility.

The course will introduce this domain and cover the topics of cloud infrastructures, virtualization, software defined networks and storage, cloud storage, and programming models. As an introduction, we will discuss the motivating factors, benefits and challenges of the cloud, as well as service models, service level agreements (SLAs), security, for example cloud service providers and use cases. Modern data centers enable many of the economic and technological benefits of the cloud paradigm; hence, we will describe several concepts behind data center design and management and software deployment. Next, we will focus on virtualization as a key cloud technique for offering software, computation and storage services. We will study how CPU, memory and I/O resources are virtualized, with examples from Xen and VMWare, and present real use cases such as Amazon EC2. Within the same theme of virtualization, students will also be introduced to Software Defined Networks and Storage (SDN and SDS). Subsequently, students will learn about different cloud storage concepts including data distribution, durability, consistency and redundancy.

Course Objectives

By the end of the course, learners will have gained a solid foundation in cloud computing concepts, service models, deployment models. They will be well-equipped to make informed decisions regarding cloud computing solutions and contribute effectively to cloud-based projects and initiatives.

Course Goals and Learning Outcomes	
Goal 1	Students will learn the fundamental ideas behind Cloud Computing, the evolution of the paradigm, its applicability, benefits, as well as current and future challenges.
Learning Outcomes	<p>Explain:</p> <p>a1. The core concepts of the cloud computing paradigm.</p> <p>a2. How and why this paradigm shift came about.</p> <p>a3. The characteristics, advantages and challenges brought about by the various models and services in cloud computing.</p>
Goal 2	Master the basic ideas and principles in data center design; cloud management techniques and cloud software deployment considerations;
Learning Outcomes	<p>a4. Apply fundamental concepts in cloud infrastructures to understand the tradeoffs in power, efficiency and cost.</p> <p>b1. Know how to leverage and manage single and multiple datacenters</p> <p>c1. Build and deploy cloud applications that are resilient, elastic and cost-efficient</p>
Goal 3	Differentiate between CPU, memory and I/O virtualization techniques offering software, computation and storage services on the cloud; Software Defined Networks (SDN) and Software Defined Storage (SDS).
Learning Outcomes	<p>Discuss system, network and storage virtualization and outline their role in enabling the cloud computing system model.</p> <p>know cloud storage technologies and relevant distributed file systems, databases and object storage.</p>

Course Contents					
Week	Hours	CLOs	Topics	Teaching &	Assessment Methods

				Learning Methods	
W1 W2	6	a1 a2 a3	<p>Syllabus, Course Schedule. What is Cloud Computing</p> <ul style="list-style-type: none"> • Define Cloud Computing • Define Cloud Service Models (Saas,Paas,Iaas) • Define Cloud Deployment Models (Private,Public,Hybrid) • Cloud Essential characteristics • Advantages of Cloud Computing 	Face to face Lectures & Online resources	Quizzes Assignments Discussion and interaction
W3 W4	6	a1 a2 a3	<p>Cloud Service Providers</p> <ul style="list-style-type: none"> • Overview of Major Cloud Service Providers (Amazon Web Services, Microsoft Azure, Google Cloud Platform) • Comparison of Cloud Service Providers • Key Services and Offerings by Cloud Service Providers 	Face to face Lectures & Online resources	Quizzes Assignments Discussion and interaction
W5 W6	6	a1 a2 a3	<p>Virtualization and Containerization</p> <ul style="list-style-type: none"> • Introduction to Virtualization • Virtual Machines (VMs) and Hypervisors • Containerization Technologies • Benefits of Virtualization and Containerization in Cloud Computing 	Face to face Lectures & Online resources	Quizzes Assignments Discussion and interaction MIDTERM EXAM
W7 W8	6	a1 a2 a3 a4 b1	<p>Infrastructure as a Service (IaaS)</p> <ul style="list-style-type: none"> • Overview of IaaS • IaaS Features and Capabilities • Provisioning and Managing Virtual Machines in the Cloud • Networking and Storage in IaaS • Scalability and Elasticity in IaaS 	Face to face Lectures & Online resources	Quizzes Assignments Discussion and interaction
W9 W10 W11	9	a1 a2 a3 a4 b1	<p>Platform as a Service (PaaS)</p> <ul style="list-style-type: none"> • Introduction to PaaS • PaaS Features and Capabilities • Development and Deployment Platforms in the Cloud 	Face to face Lectures & Online resources	Quizzes Assignments Discussion and interaction

			<ul style="list-style-type: none"> Database Services and Middleware in PaaS 		
W12 W13	6	a1 a2 a3 a4 b1	Software as a Service (SaaS) <ul style="list-style-type: none"> Overview of SaaS SaaS Features and Capabilities Common SaaS Applications (Email, Customer Relationship Management, Collaboration Tools) 	Face to face Lectures & Online resources	Quizzes Assignments Discussion and interaction
W14 W15	6	a1 a2 a3 a4 b1	Virtual Private Networks (VPN) <ul style="list-style-type: none"> Software Defined Networks (SDN) Software Defined Storage (SDS) 	Face to face Lectures & Online resources	Quizzes Assignments Discussion and interaction
FINAL EXAM					

Course Assessment Plan

Assessment Method	Grade	CLOs					
		a1	a2	a3	a4	b1	c1
First (Midterm)	30	10	10	10			
The second (if applicable)							
Final Exam	40	8	8	8	8	8	
Coursework	30						
Coursework assessment methods	Assignments	20					5
	Case study						10
	Discussion and interaction						5
	Group work activities						
	Lab tests and assignments						
	Presentations						
	Quizzes	10	5	5			
Total	100	23	23	18	8	8	20

Infrastructure

Textbook	Handbook of Cloud Computing by Borko Furht · Armando Escalante 2015.
References	<ul style="list-style-type: none"> Cloud Computing, the complete cornerstone to Cloud

	<p>Computing Best Practices.</p> <ul style="list-style-type: none"> • Cloud Computing: Concepts, Technology & Architecture by Thomas Erl, Zaigha Mahmood, and Ricardo Puttini, Second Printing, 2013.
Required reading	
Electronic materials	
Other	

Plagiarism

Plagiarism is claiming that someone else's work is your own. The department has a strict policy regarding plagiarism and, if plagiarism is indeed discovered, this policy will be applied. Note that punishments apply also to anyone assisting another to commit plagiarism .

Plagiarism is different from group work in which a number of individuals share ideas on how to carry out the coursework. You are strongly encouraged to work in small groups, and you will certainly not be penalized for doing so. This means that you may work together on the program. What is important is that you have a full understanding of all aspects of the completed program. In order to allow proper assessment that this is indeed the case, you must adhere strictly to the course work requirements as outlined above and detailed in the coursework problem description. These requirements are in place to encourage individual understanding, facilitate individual assessment, and deter plagiarism.