San José State University
Department of Computer Science
Spring 2026
CS 218 – Topics in Cloud Computing

Course and Contact Information

Instructor:	Ramin Moazeni, PhD
Class Hours:	TTh: 6:00PM - 7:15PM
Office Hours:	Fri: 12:30PM – 1:00PM over Zoom or after class
Email:	Ramin.Moazeni@sjsu.edu
Classroom:	MH 234
Prerequisites:	CS 157B or instructor consent

Catalog Description

This course provides a solid foundation in the design, architecture, and operation of modern cloud computing systems. The course emphasizes how distributed systems principles are realized and adapted in cloud platforms, with focus on scalability, elasticity, reliability, fault tolerance, automation, and security.

Learning Outcomes

By the end of this course, a student should be able to:

- Explain core cloud computing models, architectures, and design principles.
- Analyze distributed systems challenges (latency, failure, consistency) in cloud environments.
- Evaluate virtualization, containerization, and orchestration technologies.
- Assess cloud storage, replication, fault tolerance, and reliability mechanisms.
- Analyze cloud security models and shared responsibility frameworks.
- Design and justify a scalable and secure cloud architecture for a given workload.

Core Topics

- Cloud service and deployment models (IaaS, PaaS, SaaS)
- Virtualization and containerization technologies
- Cloud-native application design
- Cloud resource management and elasticity
- Infrastructure automation and CI/CD concepts
- Storage, replication, and fault tolerance
- Observability and reliability in cloud systems
- Cloud security and trust management
- Architectural case studies of modern cloud systems

Important Dates

Class Begins: January 22, 2026
Midterm Exam: March 12, 2026 (6:00–7:15 PM)
Spring Recess: March 30 – April 3, 2026
Class Ends: May 7, 2026
Final Exam: May 14, 2026 (5:30–7:30 PM)

Required Texts

(Required) Thomas Erl, Ricardo Puttini, Zaigham Mahmood
Cloud Computing: Concepts, Technology, Security & Architecture (2nd Edition)
Pearson Education

Course Requirements and Assignments

SJSU classes are designed such that in order to be successful, it is expected that students will spend a minimum of forty-five hours for each unit of credit (normally three hours per unit per week), including preparing for class, participating in course activities, completing assignments, and so on. More details about student workload can be found in University Policy S12-3 at http://www.sjsu.edu/senate/docs/S12-3.pdf. Note that University policy F15-12 at http://www.sjsu.edu/senate/docs/F15-12.pdf states that "Attendance shall not be used as a criterion for grading."… "Students are expected to attend all meetings for the courses in which they are enrolled as they are responsible for material discussed therein, and active participation is frequently essential to ensure maximum benefit to all class members. In some cases, attendance is fundamental to course objectives; for example, students may be required to interact with others in the class. Attendance is the responsibility of the student."… "Participation may be used as a criterion for grading when the parameters and their evaluation are clearly defined in the course syllabus and the percentage of the overall grade is stated."

Assignments

Assignment specification and their corresponding due dates will be posted on Canvas.

The submissions are due at midnight on the due date. The assignments are to be submitted on time. A penalty of 10% per day is applied to late submissions. No assignments will be accepted after a week past its due date.

Course Project:

A programming group project of your choice related to the course. Detailed guidelines including milestones for the project will be posted on Canvas in the second week of the semester.

Absolutely NO late submission for the course project.

Exams

- Absolutely NO items may be shared during the exams, including books, notes, and calculators.
- Absolutely NO usage of cell phones during exams. Cell Phones must in off or silent mode and not within your reach.

Makeup exams will only be granted in case of documented medical emergency with an advanced notice to the instructor.

No students are allowed to miss either exam. Failure to take an exam during its scheduled time will result in a grade of zero on that exam.

Grading Policy

Your individual class grade will be weighted as follows:

Assignments	20%
Course Project	20%
Exams (Midterm and Final)	60% (each exam 30%)
Total	100%

The final "letter" grade will be determined by a curve based on class average at the end of the semester.

University Policies

Per University Policy S16-9, university-wide policy information relevant to all courses, such as academic integrity, accommodations, etc. will be available on Office of Graduate and Undergraduate Programs' Syllabus Information web page at http://www.sjsu.edu/gup/syllabusinfo/

Course Schedule (Tentative)

Date	Lecture	Readings	Assignments
Thu 1/22	Cloud Foundations – Motivation & Evolution	Erl Ch. 3	
Tue 1/27	Cloud Foundations – Characteristics & Challenges	Erl Ch. 3, 4	
Thu 1/29	Cloud Service Models – IaaS, PaaS, SaaS	Erl Ch. 4	
Tue 2/03	APIs, REST & Serverless as Cloud Service Models	Erl Ch. 4, Slides	
Thu 2/05	Cloud Deployment Models & Trust Boundaries	Erl Ch. 4, 16	
Tue 2/10	Distributed Systems Foundations for Cloud	Slides	**HW1 Due**
Thu 2/12	Distributed Systems Realities – Latency, Failure, Trade-offs	Slides	
Tue 2/17	Virtualization Fundamentals – Hypervisors & Virtual Machines	Erl Ch. 5	
Thu 2/19	Virtualization – Resource Pooling & Isolation	Erl Ch. 5	**HW2 Due**
Tue 2/24	Containerization Concepts & Images	Erl Ch. 6	
Thu 2/26	Containers vs VMs & Cloud-Native Design	Erl Ch. 6	
Tue 3/03	Kubernetes – Orchestration as a Control Plane (Conceptual)	Slides	
Thu 3/05	Cloud Resource Management & Elasticity	Erl Ch. 8	**Project Proposal Due**
Tue 3/10	Automation, Scaling & CI/CD Concepts	Erl Ch. 8, Slides	
Thu 3/12	**MIDTERM EXAM**		
Tue 3/17	Cloud Infrastructure & Management Mechanisms	Erl Ch. 8–9	
Thu 3/19	Cloud Storage Models	Erl Ch. 9	
Tue 3/24	Replication, Fault Tolerance & Disaster Recovery	Erl Ch. 9, 18	**HW3 Due**
Thu 3/26	Observability, Reliability & SLAs	Erl Ch. 18, Slides	
Tue 3/31	Cloud Security – Threat Model & Shared Responsibility	Erl Ch. 7	
Thu 4/02	**Spring Recess – No Class**		
Tue 4/07	**Spring Recess – No Class**		
Thu 4/09	Cloud Security Mechanisms & Trust Boundaries	Erl Ch. 10–11	
Tue 4/14	Fundamental Cloud Architectures	Erl Ch. 13	
Thu 4/16	Advanced & Specialized Cloud Architectures	Erl Ch. 14–15	
Tue 4/21	Case Studies – Large-Scale Cloud Systems	Papers	
Thu 4/23	Case Studies (Cont'd)	Papers	
Tue 4/28	Cloud Architecture Synthesis & Design Trade-offs	Slides	
Thu 4/30	Advanced Topics: Edge, Multicloud, Serverless Trade-offs	Erl Ch. 15, Slides	
Tue 5/05	Comprehensive Review: Foundations → Architectures	Slides	
Thu 5/07	Final Exam Review		
Thu 5/14	**FINAL EXAM**		

CS218 Topics in Cloud Computing – Section 1