

**College of San Mateo
Official Course Outline**

1. **COURSE ID:** CIS 493 **TITLE:** Cloud Security Fundamentals
Units: 4.0 units **Hours/Semester:** 64.0-72.0 Lecture hours; and 128.0-144.0 Homework hours
Method of Grading: Letter Grade Only
Prerequisite: CIS 151
Recommended Preparation:
 Eligibility for ENGL 838 or ENGL 848 or ESL 400.

2. **COURSE DESIGNATION:**
Degree Credit
Transfer credit: CSU

3. **COURSE DESCRIPTIONS:**
Catalog Description:
 An exploration of how to secure a cloud environment. We will examine the history of cloud computing, and various contemporary cloud environments, such as Infrastructure as a Service (IaaS), Platform as a Service (PaaS), and Software as a Service (SaaS). We will study cloud security operations, for both native and hybrid cloud environments. Other topics covered include network security, host security, Identity and Access Management (IAM), cryptography and data protection. This hands-on course is designed to prepare students for modern day infrastructure environments.

4. **STUDENT LEARNING OUTCOME(S) (SLO'S):**
 Upon successful completion of this course, a student will meet the following outcomes:
 1. Identify the risks in utilizing cloud services
 2. Identify the steps required to secure a cloud environment
 3. Investigate resiliency and availability in the cloud

5. **SPECIFIC INSTRUCTIONAL OBJECTIVES:**
 Upon successful completion of this course, a student will be able to:
 1. Investigate cloud environments
 2. Explore security fundamentals
 3. Explore Identity and Access Management
 4. Explore cloud security architectures
 5. Investigate resiliency and availability in the cloud
 6. Utilize data security and protection
 7. Explore utilizing and securing SAAS technologies
 8. Explore cloud incident response process

6. **COURSE CONTENT:**
Lecture Content:
 - Investigate cloud environments
 1. History of cloud computing
 2. Types of cloud computing
 - A. Infrastructure as a Service (IaaS)
 - B. Platform as a service (PaaS)
 - C. Software as a service (SaaS)
 3. Legacy security controls
 4. Benefits of cloud computing vs traditional infrastructure
 5. Limitations of cloud computing
 6. Mapping traditional infrastructure to cloud infrastructure
 7. Cloud computing in organizations
 - A. Infrastructure as code
 - B. DevOps
 - C. Tooling
 - Explore security fundamentals
 1. CIA triad
 2. Detective, Corrective, and Preventative Controls

3. Policy, governance, risk, and compliance
4. Network security
5. Disaster recovery and availability
6. Security operations
 - Explore Identity and Access Management
1. Key management
2. Users, Groups, Roles
3. Federation
4. Access controls and permission
5. Policies
 - Explore cloud security architectures
1. Detective controls
2. Corrective controls
3. Preventative controls
4. Load balancing
5. Logging
6. 3rd party tools and integration
7. DIY(Development Impact and You) tool development
 - Investigate resiliency and availability in the cloud
1. Disaster recovery
2. Infrastructure availability
3. Application resilience and availability
4. Monitoring
 - Utilize data security and protection
1. Cryptography
2. Key and credential management
3. HSMs
4. PKI
5. Cloud vs DIY
 - Explore utilizing and securing SAAS technologies
1. Access controls
2. Authorization controls
3. 3rd party data access and authorization
4. Logging
5. APIs
 - Explore cloud incident response process
1. Incident response policy
2. Incident response planning
3. Incident response procedures

7. REPRESENTATIVE METHODS OF INSTRUCTION:

Typical methods of instruction may include:

- A. Lecture
- B. Activity
- C. Directed Study
- D. Discussion
- E. Experiments
- F. Guest Speakers
- G. Individualized Instruction

8. REPRESENTATIVE ASSIGNMENTS

Representative assignments in this course may include, but are not limited to the following:

Writing Assignments:

Students will be assigned weekly homework problems from the required textbook. Approximately four extensive analysis projects will be assigned which require problem solving and critical thinking. Students will write a report for each project. Students also will create and deliver presentations.

Reading Assignments:

Students will read all chapters of the required textbook, readings parallel current assignments, and lecture content.

Extensive web searching is critical.

Other Outside Assignments:

Weekly homework problems, internet research, and working on presentations.

9. REPRESENTATIVE METHODS OF EVALUATION

Representative methods of evaluation may include:

- A. Class Participation
- B. Class Performance
- C. Class Work
- D. Exams/Tests
- E. Homework
- F. Projects
- G. Research Projects
- H. Written examination

10. REPRESENTATIVE TEXT(S):

Possible textbooks include:

- A. Samani, Raj; Reavis, Jim; Honan, Brian. *CSA Guide to Cloud Computing: Implementing Cloud Privacy and Security*, 1 edition ed. Syngress, 2014

Other:

- A. AWS Online Documentation <https://aws.amazon.com/documentation/>
- B. Azure Online Documentation <https://docs.microsoft.com/en-us/azure/>
- C. AWS Cloud Security Resources <https://aws.amazon.com/security/security-resources/>

Origination Date: July 2018

Curriculum Committee Approval Date: September 2018

Effective Term: Fall 2019

Course Originator: Kamran Eftekhari