

## CS/IS243 : Cloud Computing - Cloud Design

### General Information

Author:	<ul style="list-style-type: none"><li>Simon Mirzayan</li></ul>
Course Code (CB01) :	CS/IS243
Course Title (CB02) :	Cloud Computing - Cloud Design
Department:	CSIS
Proposal Start:	Spring 2025
TOP Code (CB03) :	(0701.00) Information Technology, General
CIP Code:	(11.0101) Computer and Information Sciences, General.
SAM Code (CB09) :	Advanced Occupational
Distance Education Approved:	No
Will this course be taught asynchronously?:	No
Course Control Number (CB00) :	CCC000608690
Curriculum Committee Approval Date:	03/13/2024
Board of Trustees Approval Date:	04/16/2024
Last Cyclical Review Date:	03/13/2024
Course Description and Course Note:	CS/IS 243 teaches students how cloud computing systems are built using a common set of core technologies, algorithms, and design principles centered around distributed systems. The Amazon Web Services (AWS) Management Console will be used to provision, load-balance and scale their applications using the Elastic Compute Cloud (EC2) and the AWS Elastic Beanstalk. The course covers design principals of scalable cloud systems and has hands-on labs on AWS and the department's private cloud server.
Justification:	Mandatory Revision
Academic Career:	<ul style="list-style-type: none"><li>Credit</li></ul>
Author:	<ul style="list-style-type: none"><li>Simon Mirzayan</li></ul>

### Academic Senate Discipline

Primary Discipline:	<ul style="list-style-type: none"><li>Computer Information Systems (Computer network installation, microcomputer technology, computer applications)</li></ul>
Alternate Discipline:	No value
Alternate Discipline:	No value

### Course Development

Basic Skill Status (CB08)	Course Special Class Status (CB13)	Grading Basis
Course is not a basic skills course.	Course is not a special class.	<ul style="list-style-type: none"><li>Grade with Pass / No-Pass Option</li></ul>

Allow Students to Gain Credit by Exam/Challenge

Pre-Collegiate Level (CB21)

Not applicable.

Course Support Course Status (CB26)

Course is not a support course

## Transferability & Gen. Ed. Options

### General Education Status (CB25)

Not Applicable

### Transferability

Transferable to both UC and CSU

### Transferability Status

Approved

## Units and Hours

### Summary

<b>Minimum Credit Units (CB07)</b>	3
<b>Maximum Credit Units (CB06)</b>	3
<b>Total Course In-Class (Contact) Hours</b>	90
<b>Total Course Out-of-Class Hours</b>	72
<b>Total Student Learning Hours</b>	162

### Credit / Non-Credit Options

#### Course Type (CB04)

Credit - Degree Applicable

#### Noncredit Course Category (CB22)

Credit Course.

#### Noncredit Special Characteristics

No Value

#### Course Classification Code (CB11)

Credit Course.

Variable Credit Course

#### Funding Agency Category (CB23)

Not Applicable.

Cooperative Work Experience Education Status (CB10)

### Weekly Student Hours

	In Class	Out of Class
Lecture Hours	2	4
Laboratory Hours	3	0
Studio Hours	0	0

### Course Student Hours

<b>Course Duration (Weeks)</b>	18
<b>Hours per unit divisor</b>	0
<b>Course In-Class (Contact) Hours</b>	
Lecture	36
Laboratory	54
Studio	0
<b>Total</b>	90
<b>Course Out-of-Class Hours</b>	
Lecture	72

Laboratory	0
Studio	0
<b>Total</b>	72

### Time Commitment Notes for Students

No value

### Units and Hours - Weekly Specialty Hours

Activity Name	Type	In Class	Out of Class
No Value	No Value	No Value	No Value

### Pre-requisites, Co-requisites, Anti-requisites and Advisories

#### Advisory

CS/IS240 - Cloud Computing - Fundamentals (in-development)

#### Objectives

- Describe the cloud computing model.
- Describe examples of infrastructure as a service.
- Describe examples of platform as a service.
- Describe examples of software as a service.
- Identify and mitigate security concerns associated with cloud computing.

### Entry Standards

Entry Standards

### Course Limitations

Cross Listed or Equivalent Course

### Specifications

Methods of Instruction

Methods of Instruction                      Lecture

**Methods of Instruction** Laboratory

**Methods of Instruction** Discussion

**Methods of Instruction** Demonstrations

### Out of Class Assignments

- Projects (i.e. AWS monitoring)
- Labs (i.e. deploy AWS Elastic Beanstalk)

### Methods of Evaluation

Exam/Quiz/Test

Project/Portfolio

Activity (answering journal prompt, group activity)

### Rationale

Exams (i.e. M/C tests and quizzes)

Projects (i.e. AWS monitoring)

Labs (i.e. deploy AWS Elastic Beanstalk)

### Textbook Rationale

No Value

### Textbooks

Author	Title	Publisher	Date	ISBN
Ben Piper	AWS Certified Solutions Architect Study Guide	Sybex	October 4, 2022	978-1119982623

### Other Instructional Materials (i.e. OER, handouts)

<b>Description</b>	Instructor provided links to Internet resources.
<b>Author</b>	No value
<b>Citation</b>	No value
<b>Online Resource(s)</b>	No value

### Materials Fee

No value

## Learning Outcomes and Objectives

### Course Objectives

Identify the general design principles in the cloud environment.

Explain strategies and best practices of cloud design.

Analyze the design principles of security in the cloud.

Summarize best practices for achieving reliability in the cloud.

Compare best practices for cost optimization of cloud services.

Utilize tools and features used in cloud design.

## SLOs

### Test resiliency of EC2 instances using failure injection scripts.

Expected Outcome Performance: 70.0

<i>ILOs</i> Core ILOs	Analyze and solve problems using critical, logical, and creative thinking; ask questions, pursue a line of inquiry, and derive conclusions; cultivate creativity that leads to innovative ideas.  Demonstrate depth of knowledge in a course, discipline, or vocation by applying practical knowledge, skills, abilities, theories, or methodologies to solve unique problems.
<i>CSIS</i> Information Technology Certificate	Demonstrate installing, configuring and maintaining computer and mobile devices, including diagnosing, resolving and documenting common hardware and software.  Demonstrate the proper server operation procedures, maintenance procedures and managing risk associated with real world networks.
<i>CSIS</i> Information Technology - A.S. Degree Major	Demonstrate installing, configuring, and maintaining computer and mobile devices, including diagnosing, resolving, and documenting common hardware and software.  Demonstrate the proper server operation procedures, maintenance procedures and managing risks associated with real world networks.
<i>CSIS</i> Computer Science - Certificate	Prepare a software project to implement a single scientific, mathematical, business, or technical function.
<i>CSIS</i> Computer Science - A.S. Degree Major	Prepare a software project to implement a single scientific, mathematical, business, or technical function.
<i>CSIS</i> Computer Software Technician	demonstrate the ability to independently create, save, modify and print a document using a word processing program and appropriate assistive technology
<i>CSIS</i> Web Development - Certificate	use industry standard tools and techniques to produce, publish and maintain Web sites and Web content.
<i>CSIS</i> Web Development - A.S. Degree Major	use industry standard tools and techniques to produce, publish and maintain Web sites and Web content.

### Monitor EC2 instances using CloudWatch.

Expected Outcome Performance: 70.0

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CSIS Web Development - Certificate	use industry standard tools and techniques to produce, publish and maintain Web sites and Web content.
CSIS Web Development - A.S. Degree Major	use industry standard tools and techniques to produce, publish and maintain Web sites and Web content.
<b>Deploy multi-tier infrastructure using CloudFormation.</b>	
Expected Outcome Performance: 70.0	
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## Additional SLO Information

**Does this proposal include revisions that might improve student attainment of course learning outcomes?**

No

**Is this proposal submitted in response to learning outcomes assessment data?**

No

**If yes was selected in either of the above questions for learning outcomes, explain and attach evidence of discussions about learning outcomes.**

No Value

**SLO Evidence**

No Value

## Course Content

Lecture Content

**Introduction to AWS Management Console, Regions and Availability Zones (4 hours)**

**Design Principles for Cloud Systems using Best Practices (4 hours)**

**AWS Elastic Beanstalk Architecture (4 hours)**

**Elastic Beanstalk Implementation (4 hours)**

**Auto-Scaling and Load Balancing Configuration (4 hours)**

**Git Repository and the Elastic Beanstalk Command Line Interface (EB CLI) (4 hours)**

**EC2 Deployment of A Server (4 hours)**

**Amazon Machine Image Configuration (4 hours)**

**CloudWatch Monitoring and Logging (4 hours)**

**Total hours: 36**

Laboratory/Studio Content

**Introduction to AWS Management Console, Regions and Availability Zones (6 hours)**

**Design Principles for Cloud Systems using Best Practices (6 hours)**

**AWS Elastic Beanstalk Architecture (6 hours)**

**Elastic Beanstalk Implementation (6 hours)**

**Auto-Scaling and Load Balancing Configuration (6 hours)**

**Git Repository and the Elastic Beanstalk Command Line Interface (EB CLI) (6hours)**

**EC2 Deployment of A Server (6 hours)**

**Amazon Machine Image Configuration (6 hours)**

**CloudWatch Monitoring and Logging (6 hours)**

**Total hours: 54**

## Additional Information

Is this course proposed for GCC Major or General Education Graduation requirement? If yes, indicate which requirement in the two areas provided below.

No

### **GCC Major Requirements**

No Value

### **GCC General Education Graduation Requirements**

No Value

### **Repeatability**

Not Repeatable

### **Justification (if repeatable was chosen above)**

No Value

## **Resources**

### **Did you contact your departmental library liaison?**

No

### **If yes, who is your departmental library liaison?**

No Value

### **Did you contact the DEIA liaison?**

No

### **Were there any DEIA changes made to this outline?**

No

### **If yes, in what areas were these changes made:**

No Value

### **Will any additional resources be needed for this course? (Click all that apply)**

- No

### **If additional resources are needed, add a brief description and cost in the box provided.**

No Value