



El Camino College
COURSE OUTLINE OF RECORD – Official

Course Acronym:	CIS
Course Number:	152
Descriptive Title:	Data Storage with AWS
Division:	Business
Department:	Computer Information Systems
Course Disciplines:	Computer Information Systems
Catalog Description:	This course introduces students to Amazon Web Services (AWS) data storage systems. Topics of the course include the design and management of cloud-based database systems and the concept of cloud-based data storage services. Students will define, operate, and scale databases utilizing Structured Query Language (SQL) database services and unstructured NoSQL database services within the AWS cloud. This course will also cover the design and operation of AWS data storage technologies using block-based and object-based storage.
Prerequisite:	CIS 150 with a minimum grade of C or equivalent experience
Co-requisite:	
Recommended Preparation:	
Enrollment Limitation:	
Hours Lecture (per week):	2
Hours Laboratory (per week):	3
Outside Study Hours:	4
Total Course Hours:	90
Course Units:	3
Grading Method:	Letter Grade only
Credit Status:	Credit, degree applicable
Transfer CSU:	Yes
Effective Date:	Proposed
Transfer UC:	No
Effective Date:	
General Education:	ECC
Term:	
Other:	

CSU GE:	
Term:	
Other:	
IGETC:	
Term:	
Other:	
Student Learning Outcomes:	<p>SLO #1 Cloud Database Concepts</p> <p>Explain the differences between file-based, hierarchical, network, relational, and object-oriented databases and the database design principles that leverage cloud computing technology.</p> <p>SLO #2 AWS Database Design and Management</p> <p>Demonstrate the ability to design and manage databases in AWS.</p> <p>SLO #3 AWS Data Storage Management</p> <p>Demonstrate the management of block-level and object-level data storage in AWS.</p>
Course Objectives:	<ol style="list-style-type: none"> 1. Describe the differences between Structured Query Language (SQL) databases and NoSQL databases. 2. Compare and contrast the various AWS database services platform. 3. Explain block-level AWS storage. 4. Design databases using AWS database services. 5. Set up object level storage lifecycle. 6. Explain the AWS Content Delivery Network. 7. Use data migration tools to import data to AWS data storage. 8. Identify set operations such as restrict, project, union, intersection, difference, divide, and join. 9. Design and document databases using connectivity, cardinality, entity relationship diagrams, relational schemas, and data directories. 10. Use object APIs to store and retrieve data in NoSQL database services.
Major Topics:	<p>I. Introduction to Database Technologies of Amazon Web Services (AWS) (3 hours, lecture)</p> <p>A. Introduction to relational and nonrelational databases</p> <p>B. Introduction to AWS database services</p> <p>C. Examine the various AWS Databases</p> <p>II. Database Design and Management in AWS (12 hours, lecture)</p> <p>A. Entity relationship modeling with Amazon RDS</p> <p>B. Design and manage a basic AWS SQL database with Aurora</p> <p>C. Design and manage a basic AWS NoSQL database with DynamoDB</p> <p>III. AWS Storage Services (12 hours, lecture)</p> <p>A. Block level storage configuration</p> <p>B. Object level storage management</p> <p>C. Configuring data lifecycle</p> <p>D. AWS Content Delivery Network</p> <p>IV. Data Management, Migration, and Security (9 hours, lecture)</p>

	<p>A. Data Migration to AWS B. Data Security configuration with AWS C. Data Backup configuration with AWS</p> <p>V. Introduction to Database Technologies of AWS (3 hours, lab) A. Introduction to relational and nonrelational databases B. Introduction to AWS database services C. Examine the various AWS Databases</p> <p>VI. Database Design (9 hours, lab) A. Overview of Database design B. Entity relationship modeling with Amazon RDS</p> <p>VII. Database Development and Management in AWS (18 hours, lab) A. Basic AWS SQL databases with Aurora B. Basic AWS NoSQL databases with DynamoDB</p> <p>VIII. AWS Storage Services (16 hours, lab) A. Block level storage configuration B. Object level storage management C. Configuring data lifecycle D. AWS Content Delivery Network</p> <p>IX. Data Management, Migration, and Security (8 hours, lab) A. Data Migration to AWS B. Configuring Data Security with AWS C. Configuring Data Backup with AWS</p>
Total Lecture Hours:	36
Total Laboratory Hours:	54
Total Hours:	90
Primary Method of Evaluation:	2) Problem solving demonstrations (computational or non-computational)
Typical Assignment Using Primary Method of Evaluation:	In a 1-2 page paper, explain the differences between a relational database and a non-relational database. Include the typical data model used for each type, advantages of each, and the type of usage that would benefit one over the other.
Critical Thinking Assignment 1:	Using Amazon Web Services, create a virtual machine running an Amazon Machine Image (AMI) using Linux as an operating system. Set up a web server that stores its files on an AWS S3 resource. Configure the S3 resources to be publicly accessible, but with an administration page that will require authentication in order to view the page and its assets.
Critical Thinking Assignment 2:	Your employer has a locally hosted MySQL database. You are tasked with importing the database to AWS RDS. After you inspect and test your RDS-based database, you are now tasked with migrating the database to AWS Aurora. Complete this task and write a 3-4 page paper about the migration process. List out the steps you needed to take and document any errors you may have encountered. Use screenshots if necessary. Specifically, elaborate on what considerations and steps are needed to take advantage of the Aurora that isn't available with MySQL or other AWS RDS solutions.

Other Evaluation Methods:	Class Performance, Homework Problems, Laboratory Reports, Objective Exam, Quizzes, Written Homework
Instructional Methods:	Demonstration, Discussion, Group Activities, Lab, Lecture, Multimedia presentations
If other:	
Work Outside of Class:	Answer questions, Problem solving activity, Required reading, Skill practice
If Other:	
Up-To-Date Representative Textbooks:	Deshpande, T., <u>DynamoDB Cookbook</u> , PACKT Publishing, 2015. (Discipline Standard) Coffing, T., <u>Amazon Redshift: A Columnar Database SQL and Architecture (Tera-Tom Genius Series)</u> , Coffing Publishing, 2014. (Discipline Standard)
Alternative Textbooks:	
Required Supplementary Readings:	
Other Required Materials:	
Requisite:	Prerequisite
Category:	sequential
Requisite course(s): List both prerequisites and corequisites in this box.	CIS 150 with a minimum grade of C
Requisite and Matching skill(s): Bold the requisite skill. List the corresponding course objective under each skill(s).	This course requires an understanding of computer information systems and cloud computing concepts. Students should be able to create cloud applications in AWS. CIS 150 - Describe the Cloud Computing Model; Create a cloud application utilizing AWS Computing Services (EC2).
Requisite Skill:	equivalent experience
Requisite Skill and Matching Skill(s): Bold the requisite skill(s). If applicable	
Requisite course:	
Requisite and Matching skill(s): Bold the requisite skill. List the corresponding course objective under each skill(s).	
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each skill(s). If applicable	
Enrollment Limitations and Category:	
Enrollment Limitations Impact:	
Course Created by:	Khai Lu
Date:	10/16/2018
Original Board Approval Date:	
Last Reviewed and/or Revised by:	
Date:	
Last Board Approval Date:	12/19/2022