Montgomery County Community College
CIS 246
Data Integration for Web Applications
3-2-2

COURSE DESCRIPTION:
This course is designed to introduce the student to the basic concepts involved in designing and integrating data management systems within web and mobile based applications. Topics covered in the course will include discussions of data integration design, data query techniques, API's for data access, data privacy issues, cyber security challenges.

PREREQUISITE(S):
CIS111B – Object Oriented Programming with a "C" or better
CIS 140 – Client-Side Web Development with a "C" or better

Upon successful completion of this course, the student will be able to:

LEARNING OUTCOMES	LEARNING ACTIVITIES	EVALUATION METHODS
1. Implement the basic concepts involved in data integration design.	Lecture Discussion Hands-On Lab Exercises Homework Assignments	Hands-On Lab Exercises Quizzes and Exams
2. Articulate issues surrounding data privacy and cybersecurity associated with data integration.	Lecture Discussion Hands-On Lab Exercises Homework Assignments	Hands-On Lab Exercises Quizzes and Exams
3. Create a basic database, indexes, and queries to support data integrations.	Lecture Discussion Hands-On Lab Exercises Homework Assignments	Hands-On Lab Exercises Quizzes and Exams
LEARNING OUTCOMES	LEARNING ACTIVITIES	EVALUATION METHODS
4. Demonstrate the different types of data integration strategies and methods.	Lecture Discussion Hands-On Lab Exercises Homework Assignments	Hands-On Lab Exercises Final project
5. Apply the concepts of designing, creating, and using an API for data integration.	Lecture Discussion Hands-On Lab Exercises Homework Assignments	Hands-On Lab Exercises Final project

6. Explain issues surrounding reliability, validation, and availability associated with data integration	Lecture Discussion Hands-On Lab Exercises Homework Assignments	Hands-On Lab Exercises Final project
7. Construct relevant queries and data integration process needed to populate reporting tools.	Lecture Discussion Hands-On Lab Exercises Homework Assignments	Hands-On Lab Exercises Final project
8. Compare and contrast the advantages and disadvantages of each data integration tool in a web development platform and identify the appropriate tool based on requirement.	Lecture Discussion Hands-On Lab Exercises Homework Assignments	Hands-On Lab Exercises Final project

At the conclusion of each semester/session, assessment of the learning outcomes will be completed by course faculty using the listed evaluation method(s). Aggregated results will be submitted to the Director of Educational Effectiveness. The benchmark for each learning outcome is that 70% of students will meet or exceed outcome criteria.

SEQUENCE OF TOPICS:

1. Introduction to data integration concepts
2. Key data integration strategies and methods
3. Authentication for data integration
4. Designing a data integration solution
5. Difference behind the various database solutions for data integration, such as SQL and NoSQL
6. Designing and querying a database for data integration
7. Queries and data integration process needed to populate reporting tools
8. Discuss and explain the different types of data-interchange format such as delimited files and JSON.
9. Construct relevant queries and data reports with languages such as SQL, Python, JavaScript, PHP and/or R.
10. Designing and creating APIs for data integration
    a. Read data
    b. Write data
    c. Validate Data
11. Micro-services and publication tasks for data integration.
12. Select the appropriate data integration method or tool based on requirement

13. Issues surrounding reliability, validation, and availability associated with data integration
14. Data privacy regulations and issues associated with data integrations
15. Cybersecurity considerations
16. Coordinating internal and external data integration development

LEARNING MATERIALS:

This course will use open access materials.

Open Access Resource - https://www.moesif.com/blog/api-guide/api-designguidelines/#
Additional Open Access Resources – To be developed.

Optional materials

Matthias Biehl, RESTful API Design: Best Practices in API Design with REST (APIUniversity Series Book 3) http://www.api-university.com, ISBN-13: 9781514735169

Perkins, Redmond, Wilson, Seven Databases in Seven Weeks: A Guide to Modern Databases and the NoSQL Movement - Pragmatic Bookshelf; 2 edition (April 15, 2018) ISBN-13: 978-1680502534

Other learning materials may be required and made available directly to the student and/or via the College's Libraries and/or course management system.

COURSE APPROVAL:

Prepared by: Mathew Krause and Marie Hartlein Date: 9/17/2019
Provost or designee Compliance Verification: Date: 2/26/2020

Revised by: Mathew Krause and Sergio Carbone Date: 10/22/2022
VPAA or designee Compliance Verification:
Therol Dix, J.D. Date: 2/22/2023

VPAA or designee Compliance Verification: Date: 2/22/2023

This course is consistent with Montgomery County Community College's mission. It was developed, approved and will be delivered in full compliance with the policies and procedures established by the College.