SAN DIEGO COMMUNITY COLLEGE DISTRICT
CONTINUING EDUCATION
COURSE OUTLINE

SECTION I

SUBJECT AREA AND COURSE NUMBER

COMP 692

COURSE TITLE

BUILDING RESTFUL WEB APIS

TYPE COURSE

NON-FEE VOCATIONAL

CATALOG COURSE DESCRIPTION

React and Node are a popular combination for building robust full-stack web applications, powering a host of modern web apps including Netflix, Walmart, LinkedIn, Uber, PayPal, and more. Over the span of two courses, you will learn full-stack development with MongoDB, Express, React, and Node.js, commonly referred to as the MERN stack. In this course you will learn how to build the APIs that connect to data in the database and expose that data to the web apps you build. In all, you will learn how to build data-driven apps using MongoDB, Node, and Express, and test, secure, and deploy your apps. (FT)

LECTURE/LABORATORY HOURS

60

ADVISORIES

Successful completion of COMP 691 NOSQL DOCUMENT DATABASES

RECOMMENDED SKILL LEVEL

Possess a 12th grade reading level; ability to communicate effectively in the English language.

INSTITUTIONAL STUDENT LEARNING OUTCOMES

1. Social Responsibility
   SDCE students demonstrate interpersonal skills by learning and working cooperatively in a diverse environment.
2. Effective Communication
   SDCE students demonstrate effective communication skills.
3. Critical Thinking
   SDCE students critically process information, make decisions, and solve problems independently or cooperatively.
4. Personal and Professional Development
   SDCE students pursue short term and life-long learning goals, mastering necessary skills and using resource management and self-advocacy skills to cope with changing situations in their lives.

COURSE GOALS

1. Outline the role of the MERN stack in modern web application development
2. Describe common, complimentary Node frameworks including Express and how they fit into the full-stack web application development cycle
3. Learn how to manage third-party packages with Node Package Manager (NPM)
4. Learn how to code a web server with Node
5. Understand how Express can be used to build a Representational State Transfer (REST) Application Programming Interface (API)
6. Explore how create, retrieve, update, and delete (CRUD) operations can be performed on a MongoDB database using Object Relational Mapping (ORM) tools like Mongoose
7. Learn how to authenticate and authorize users using Google Sign-In
8. Learn how to build a browser-based chat application using Node, Express, and MongoDB
9. Handle errors gracefully and learn about debugging techniques

COURSE OBJECTIVES

Upon successful completion, the student will be able to:

1. Describe the role of the MERN stack in modern web application development
2. Install and configure the components of the MERN stack including React, Node, Express, and complimentary tools and frameworks required to be successful with full-stack web development by utilizing NPM
3. Code a web server using Node and JavaScript
4. Code a REST API with create, retrieve, update, and delete endpoints using Node and Express
5. Perform CRUD operations from REST API endpoints with MongoDB, Node, Express, and Postman
6. Authenticate and authorize users using Google Sign-In
7. Create a browser-based chat application using Node, Express, and MongoDB
8. Add code to gracefully handle errors that may occur within the application

SECTION II

COURSE CONTENT AND SCOPE

1. Introduction to the MERN Stack
    1.1. What is MERN?
    1.2. MERN components
        1.2.1. React
        1.2.2. Node
        1.2.3. Express
        1.2.4. MongoDB
        1.2.5. Other tools and libraries
            1.2.5.1. Node Package Manager (NPM)
            1.2.5.2. Mongoose
            1.2.5.3. Socket.io
            1.2.5.4. PassportJS
    1.3. Why MERN?
        1.3.1. JavaScript everywhere
        1.3.2. JSON everywhere
        1.3.3. Node performance
        1.3.4. The npm ecosystem
        1.3.5. Isomorphic
        1.3.6. It's not a framework
2. Introduction to Node
        2.1.1. Understanding Node
        2.1.2. Understanding NPM
            2.1.2.1. Writing your own modules
            2.1.2.2. Managing third-party packages with NPM
            2.1.2.3. The package.json file
        2.1.3. The module wrapper function
        2.1.4. The path module
        2.1.5. The file system module
            2.1.5.1. Read from files
            2.1.5.2. Access directories
            2.1.5.3. Write to a file
        2.1.6. The OS module
        2.1.7. The URL module
        2.1.8. The event module
        2.1.9. Logger with event emitter
        2.1.10. The HTTP Module
        2.1.11. Creating a web server with node
3. Introduction to REST and Express
    3.1. Introduction to REST
        3.1.1. Resource based
        3.1.2. HTTP methods as actions
        3.1.3. JSON
    3.2. Introduction to Express
        3.2.1. Routing
            3.2.1.1. Request matching

APPROPRIATE READINGS

Reading assignments may include, but are not limited to: reading assignments from the textbook, supplemental reading assignments, industry-related periodicals or magazines, manuals, online help pages, articles posted on the Internet, and information from Web sites, online libraries and databases. Topics should be related to the MERN stack and may include information relating to components of the MERN stack including MongoDB, Express, React, and Node.

WRITING ASSIGNMENTS

Writing assignments may include, but are not limited to: completing assigned reports, providing written answers to assigned questions, performing internet research and reporting on that research. An example would include a case study of how Node can be used to create a basic or complex web server using JavaScript code.

OUTSIDE ASSIGNMENTS

Assignments may include, but are not limited to: appropriate internet research, reading, preparing reports and studying as needed to perform successfully in class. An appropriate assignment for instance, would include demonstrating how to use the components of the MERN stack to create a REST API. Then, write a simple JavaScript web script to connect and retrieve data from the API directly within the browser.

APPROPRIATE ASSIGNMENTS THAT DEMONSTRATE CRITICAL THINKING

Assignments which demonstrate critical thinking may include, but are not limited to: using Mongoose to connect to a MongoDB database in Node, using Mongoose to create a model of database data in the web application, using Node to create a web server, using Express to establish APIs for performing CRUD operations, and debugging and handling errors within an application.

EVALUATION

Evaluation that a student has met the course competencies will include multiple measures of performance related to the course objectives. Evaluation methods may include, but are not limited to performance in a variety of activities and assignments, such as completing a research project individually or in a group, hands-on projects, demonstration of use of the internet, quizzes, class participation, written and practical tests, attendance and punctuality.

Upon successful completion of all courses in the program a Certificate of Program Completion will be issued.

METHOD OF INSTRUCTION

Methods of instruction may include, but are not limited to, lecture, in-class and online discussions, hands-on demonstrations, computer-assisted instruction, field trips, and laboratory assignments.

This course, or sections of this course, may be offered through distance education.

TEXTS AND SUPPLIES

OER Textbooks

MongoDB: The Definitive Guide: Powerful and Scalable Data Storage,
Shannon Bradshaw, Eoin Brazil, Kristina Chodorow, O'Reilly, current edition

Supplies:

Pen, journal (composition book), notebook paper and a soft 3-ring binder, or a one-subject 110 sheet college ruled notebook, and appropriate storage media such as a USB Drive, external hard drive, or cloud-based storage.

PREPARED BY Zak Ruvalcaba DATE January, 23, 2021

REVISED BY ______________________________ DATE _______________

Instructors must meet all requirements stated in Policy 3100 (Student Rights, Responsibilities and Administrative Due Process), and the Attendance Policy set forth in the Continuing Education Catalog.

REFERENCES:

San Diego Community College District Policy 3100
California Community Colleges, Title 5, Section 55002
Continuing Education Catalog