CS 55.13 Course Outline as of Fall 2023

CATALOG INFORMATION

Dept and Nbr: CS 55.13 Title: SERVER-SIDE WEB DEV
Full Title: Server-Side Web Development
Last Reviewed: 10/24/2022

Units		Course Hours per Week		Nbr of Weeks	Course Hours Total	
Maximum	3.00	Lecture Scheduled	3.00	17.5	Lecture Scheduled	52.50
Minimum	3.00	Lab Scheduled	0	6	Lab Scheduled	0
		Contact DHR	0		Contact DHR	0
		Contact Total	3.00		Contact Total	52.50
		Non-contact DHR	0		Non-contact DHR	0

Total Out of Class Hours: 105.00 Total Student Learning Hours: 157.50

Title 5 Category:	AA Degree Applicable
Grading:	Grade or P/NP
Repeatability:	00 - Two Repeats if Grade was D, F, NC, or NP
Also Listed As:	
Formerly:	CIS 58.41

Catalog Description:
This is an introduction to server-side Web development using open-source technologies as well as a comprehensive course in server-side scripting languages such as PHP and JavaScript. Students will design and develop object-oriented full-stack web and mobile applications, using server-side and client-side scripting languages, cloud-based database and authentication services, and open-source frameworks and libraries. Advanced topics covered include dynamic generation of content using SQL and NoSQL databases, session management, cookies, Web services, e-commerce, and the Node.js JavaScript runtime. Previous programming experience recommended.

Prerequisites/Corequisites:
Course Completion of CS 50A

Recommended Preparation:
Completion of CS 10A and/or CS 50C AND Eligibility for ENGL 1A or equivalent

Limits on Enrollment:

Schedule of Classes Information:
Description: This is an introduction to server-side Web development using open-source

technologies as well as a comprehensive course in server-side scripting languages such as PHP and JavaScript. Students will design and develop object-oriented full-stack web and mobile applications, using server-side and client-side scripting languages, cloud-based database and authentication services, and open-source frameworks and libraries. Advanced topics covered include dynamic generation of content using SQL and NoSQL databases, session management, cookies, Web services, e-commerce, and the Node.js JavaScript runtime. Previous programming experience recommended. (Grade or P/NP)
Prerequisites/Corequisites: Course Completion of CS 50A
Recommended: Completion of CS 10A and/or CS 50C AND Eligibility for ENGL 1A or equivalent
Limits on Enrollment:
Transfer Credit: CSU;
Repeatability: Two Repeats if Grade was D, F, NC, or NP

ARTICULATION, MAJOR, and CERTIFICATION INFORMATION:

AS Degree:	**Area**			Effective:	Inactive:
CSU GE:	**Transfer Area**			Effective:	Inactive:
IGETC:	**Transfer Area**			Effective:	Inactive:
CSU Transfer:	Transferable	Effective:	Fall 2002	Inactive:	
UC Transfer:		Effective:		Inactive:	

CID:

Certificate/Major Applicable:
Both Certificate and Major Applicable

COURSE CONTENT

Student Learning Outcomes:
At the conclusion of this course, the student should be able to:
1. Design full-stack web and mobile applications using server- and client-side technologies to support authentication, business logic, and security.
2. Develop server- and client-side scripts employing databases to create robust data-driven Web and mobile applications.

Objectives:
At the conclusion of this course, the student should be able to:
1. Develop server-side and client-side scripts for publishing on the Web.
2. Employ coding best practices to create robust full-stack applications.
3. Design code for validation and authentication with attention to security and performance.
4. Design, implement and utilize databases to develop data-driven Web applications.
5. Create an advanced project using server- and client-side scripts with databases and user authentication.

Topics and Scope:

I. Server-Side Scripting Language Fundamentals

A. Server-side languages (JavaScript and PHP) vs. client-side languages (JavaScript)
B. Data types, values, and variables
C. Operators and expressions
D. Control structures: loops, conditionals, functions
E. Events
F. Data structures: objects and arrays
G. Class-based coding patterns: constructors, properties, and methods
H. Common objects on the server-side: Node-based JavaScript and PHP
I. Data storage, file manipulation, and dynamic data
J. Error-handling, debugging, and troubleshooting
K. Asynchronous programming
L. Web server software: HTTP connections, cookies, headers, sessions, requests, and responses
M. Working with local and BaaS (Backend-as-a-service) databases and authentication
N. Dynamic HTML generation
O. History of PHP and JavaScript server-side languages

II. Database Fundamentals (SQL and NoSQL)
A. SQL database architecture vs. NoSQL database architecture
B. Designing SQL database tables
C. Designing NoSQL database collections
D. SQL and NoSQL data types
E. Inserting data into SQL and NoSQL databases
F. Retrieving data from SQL and NoSQL databases
G. Updating data in SQL and NoSQL databases
H. Deleting data in SQL and NoSQL databases
I. Securing SQL and NoSQL databases

III. Backend-as-a-Service (BaaS) Fundamentals
A. Service account setup, security, and management
B. Shared secrets and application authentication
C. Database hosting, replication, and management
D. User authentication services
E. E-commerce services

VI. Headless Content Management System (CMS) Fundamentals
A. Introduction to Web content management systems such as WordPress
B. Web CMS database model and management
C. Dynamic application data delivery via means such as JSON

V. Client-Side Application Fundamentals
A. Model-View-Controller (MVC) coding pattern
B. User interface design and implementation
C. Reactive client-side libraries such as React
D. Client-side components, hooks, and JSX
E. Progressive web applications
F. Native vs. hybrid mobile applications
G. Hybrid application frameworks

VI. Full-Stack Application Fundamentals
A. Full-stack libraries such as Next.js
B. Full-stack application architecture and rendering
C. User data validation and security
D. Client-side vs. server-side code execution
E. Automated code testing and unit tests

VII. Professional Practices
A. Advanced version control with git

B. Shared code management using code hosting platforms for collaboration and version control, such as GitHub
C. Setting up and working with build systems
D. Application requirements and business logic
E. Application deployment and hosting

Assignment:

1. Textbook and other assigned reading (25-60 pages per week).
2. Coding assignments (7-15). All code submitted must be validated.
3. Application projects (1-3). Each project must include:
   A. Custom JavaScript or PHP coding.
   B. Client input processing and server-side dynamic output.
   C. Fully validated and tested code.
4. Quizzes and exams (2-4).
5. Discussions (5-8). Conducted in-class or online with participation from all students.
6. Project presentations and peer feedback (1-3). Each student must present their project to classmates, either online or in-class, and provide feedback to at least two peers. May be ungraded.

Methods of Evaluation/Basis of Grade:

Writing: Assessment tools that demonstrate writing skills and/or require students to select, organize and explain ideas in writing.

Project presentations and peer feedback	Writing 0 - 20%

Problem Solving: Assessment tools, other than exams, that demonstrate competence in computational or non-computational problem solving skills.

Coding assignments	Problem solving 30 - 60%

Skill Demonstrations: All skill-based and physical demonstrations used for assessment purposes including skill performance exams.

Application projects	Skill Demonstrations 10 - 30%

Exams: All forms of formal testing, other than skill performance exams.

Quizzes and exams	Exams 20 - 40%

Other: Includes any assessment tools that do not logically fit into the above categories.

Participation in discussions	Other Category 10 - 20%

Representative Textbooks and Materials:
Web Development with Node and Express. 2nd ed. Brown, Ethan. O'Reilly Media. 2019.
Learning React. 2nd ed. Banks, Alex and Porcello, Eve. O'Reilly Media. 2020.
Real World Next.js. Riva, Michelle. Packt. 2022.
Learning PHP, MySQL & JavaScript. 6th ed. Nixon, Robin. O'Reilly Media. 2021.
Instructor prepared materials