Objective
Provide students with the necessary skills to build server-side applications and APIs using frameworks and tools common in the industry.

Concepts
The course will cover how to build server-side web applications and APIs. We will also look at the differences between traditional server-side technologies like PHP and how it differs from Node.js, an asynchronous server-side alternative using JavaScript.

Prerequisites
ITP 303, ITP 304, ACAD 276, or sufficient experience. You should be proficient with the basics of building dynamic web pages using HTML, CSS, SQL, and a server-side technology.

Lecture
3 hours and 20 minutes / week

Course Structure
The first half of the course will cover the fundamentals of building traditional server-side rendered web applications with Laravel, a PHP framework. The second half of the course will cover building APIs using Node.js (server-side JavaScript) and how asynchronous programming differs from synchronous programming.

Required Reading

Grading
Assignments: 25%
Labs: 10%

Assignments and labs are due the following week at 11:59pm.

Class participation and attendance: 10%
Exam: 20%
Individual final project: 35%
Final course grade is determined by standard formulas:

<table>
<thead>
<tr>
<th>Grade</th>
<th>Percentage Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>100% - 93%</td>
</tr>
<tr>
<td>A-</td>
<td>92% - 90%</td>
</tr>
<tr>
<td>B+</td>
<td>89% - 87%</td>
</tr>
<tr>
<td>B</td>
<td>86% - 83%</td>
</tr>
<tr>
<td>B-</td>
<td>82% - 80%</td>
</tr>
<tr>
<td>C+</td>
<td>79% - 77%</td>
</tr>
<tr>
<td>C</td>
<td>76% - 73%</td>
</tr>
<tr>
<td>C-</td>
<td>72% - 70%</td>
</tr>
<tr>
<td>D+</td>
<td>69% - 67%</td>
</tr>
<tr>
<td>D</td>
<td>66% - 63%</td>
</tr>
<tr>
<td>F</td>
<td>62% and below</td>
</tr>
</tbody>
</table>

**Policies**

It is the responsibility of the student to make sure assignments, labs, and the final project are turned in on time. Failure to submit any course work by the deadline will result in a 0.

**Academic Integrity**

The use of unauthorized material, communication with fellow students during an examination, attempting to benefit from the work of another student, and similar behavior that defeats the intent of an examination or other class work is unacceptable to the University. It is often difficult to distinguish between a culpable act and inadvertent behavior resulting from the nervous tension accompanying examinations. When the professor determines that a violation has occurred, appropriate action, as determined by the instructor, will be taken.

Although working together is encouraged, all work claimed as yours must in fact be your own effort. Students who plagiarize the work of other students will receive zero points and possibly be referred to Student Judicial Affairs and Community Standards (SJACS).

All students should read, understand, and abide by the University Student Conduct Code listed in SCampus, and available at: http://www.usc.edu/student-affairs/SJACS/nonacademicreview.html

**Students with Disabilities**

Any student requesting academic accommodations based on a disability is required to register with Disability Services and Programs (DSP) each semester. A letter of verification for approved accommodations can be obtained from DSP. Please be sure the letter is delivered to me (or to your TA) as early in the semester as possible. DSP is located in STU 301 and is open 8:30 a.m. - 5:00 p.m., Monday through Friday. The phone number for DSP is (213) 740-0776.
Course Outline

1/14
Class Introduction
Traditional vs. API driven web applications
Installing PHP and Git
Intro to Git and GitHub
Reading: PHP Object Oriented Solutions – Chapter 1 & 2
Lab 1: Research Object Oriented Solutions

1/21
HTTP Lifecycle
Database-driven Web Pages Review
SQL Joins
PHP Data Objects (PDO), Prepared Statements, and Parameter Binding
Deploying plain PHP to a Platform-as-a-Service (PaaS)
Lab 2: Research MVC
Assignment 1

1/28
Model-View-Controller (MVC)
Laravel – Routes, Controllers, Query Builder, and Views
Deploying Laravel to a Platform-as-a-Service (PaaS)
Assignment 2

2/4
Laravel – CRUD, Flash Messages, Data Validation
Lab 3: Research Object Relational Mapping
Assignment 3

2/11
Laravel - Object Relational Mapping (ORM)
Assignment 4

2/18
Laravel - Middleware and Authentication
Lab 4 - Writing Middleware
Lab 5 - Research Node.js

2/25
RESTful API Design
Building a REST API with Laravel
Assignment 5

3/3
Exam
Lab 6 - Final Project Proposal

3/10
Intro to Node.js and NVM
Modules and NPM
Asynchronous Programming Patterns
<table>
<thead>
<tr>
<th>Date</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>3/17</td>
<td>Spring Break</td>
</tr>
<tr>
<td>3/24</td>
<td>Building an API with Express and Object-Relational Mapping</td>
</tr>
<tr>
<td></td>
<td>Deploying Node.js to a Platform-as-a-Service (PaaS)</td>
</tr>
<tr>
<td></td>
<td><strong>Assignment 6</strong></td>
</tr>
<tr>
<td>3/31</td>
<td>Real-Time with WebSockets</td>
</tr>
<tr>
<td></td>
<td><strong>Lab 7 - Research Testing</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Assignment 7 - Google Docs</strong></td>
</tr>
<tr>
<td>4/7</td>
<td>Testing and Continuous Integration (CI)</td>
</tr>
<tr>
<td></td>
<td><strong>Assignment 8</strong></td>
</tr>
<tr>
<td>4/14</td>
<td>Securing an API with JSON Web Tokens (JWT)</td>
</tr>
<tr>
<td></td>
<td><strong>Lab 8 - Research Relational vs Non-relational Databases</strong></td>
</tr>
<tr>
<td>4/21</td>
<td>NoSQL and MongoDB Guest Lecture</td>
</tr>
<tr>
<td></td>
<td><strong>Lab 9 - Q&amp;A Questions</strong></td>
</tr>
<tr>
<td>4/28</td>
<td>Developer Careers Q&amp;A</td>
</tr>
</tbody>
</table>

The final project is due on the Sunday of the last week of class at 11:59pm.