



# Advanced Back-End Web Development

ITP 405x (4 Units)

## 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

Monday 5-8:20pm

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

*PHP Object Oriented Solutions* by David Powers: Apress, 2013 – There is a free e-book version for USC students at

<https://link-springer-com.libproxy1.usc.edu/book/10.1007%2F978-1-4302-1012-2>.

## Grading

Assignments: 25%

Labs: 10%

Class participation and attendance: 10%

Exam: 20%

Individual final project: 35%

Final course grade is determined by standard formulas:

A	100% - 93%
A-	92% - 90%
B+	89% - 87%
B	86% - 83%
B-	82% - 80%
C+	79% - 77%
C	76% - 73%
C-	72% - 70%
D+	69% - 67%
D	66% - 63%
F	62% and below

### **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. Assignments are due at 11:59pm 1 week after they are assigned. Labs are due at 6pm 1 week after they are assigned.

### **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**

1/13	<p>Class Introduction  Traditional vs. API driven web applications  HTTP Overview  Installing PHP, Composer, and Git  Intro to Git and GitHub  <b>Reading: PHP Object Oriented Solutions – Chapter 1 &amp; 2</b>  <b>Lab 1: Research Prepared Statements</b></p>
1/20	MLK
1/27	<p>Database-driven Web Pages Review  SQL Joins  PDO, Prepared Statements, and Parameter Binding  Heroku  <b>Lab 2: Research MVC</b>  <b>Assignment 1</b></p>
2/3	<p>Model-View-Controller (MVC)  Laravel – Routes, Controllers, Query Builder, and Views  Deploying Laravel to a Platform-as-a-Service (PaaS)  <b>Assignment 2</b></p>
2/10	<p>Laravel – CRUD, Flash Messages, Data Validation  <b>Lab 3: Research Object Relational Mapping</b>  <b>Assignment 3</b></p>
2/17	Presidents' Day
2/24	<p>Laravel - Object Relational Mapping (ORM)  <b>Assignment 4</b></p>
3/2	<p>Laravel - Middleware and Authentication  <b>Lab 4 - Writing Middleware</b></p>
3/9	<p>Exam  <b>Lab 5 - Final Project Proposal</b>  <b>Lab 6 - Research Node.js</b></p>
3/16	Spring Break
3/23	<p>Intro to Node.js and NVM  Modules and NPM  Asynchronous Programming Patterns  <b>Assignment 5</b></p>

- 3/30 Building an API with Express  
Deploying Node.js to Heroku  
**Assignment 6**
- 4/6 Object-Relational Mapping
- 4/13 Real-Time with WebSockets  
**Assignment 7 - Google Docs**  
**Lab 7 - Research Relational vs Non-relational Databases**
- 4/20 NoSQL and MongoDB Guest Lecture
- 4/27 Developer Careers

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