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

Required Reading

Grading
Assignments: 40%
Class participation and attendance: 10%
Exam: 20%
Individual final project: 30%

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

Assignment Extensions
Assignments are due the following week at 11:59pm unless stated otherwise. If a
student needs an extension, the student must ask for one from the instructor and
extensions will be granted on a case by case basis. If an extension has been granted,
the assignment must be turned in within 5 days after the original due date, unless stated
otherwise. It is the responsibility of the student to notify the instructor and the TA once
the assignment with the extension has been completed. Failure to turn in assignments
by the due date or the extended due date 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
Before class  Environment setup

- 2 -
Introduction to Git and GitHub

Reading: Object-Oriented Programming Basics

1/10
Class Introduction
Database-driven Web Pages with PHP Review
SQL Joins
PDO, Prepared Statements, and Parameter Binding
Deploying PHP to Heroku
Assignment 1

1/17
MLK

1/24
The Model-View-Controller (MVC) Pattern
Laravel - Routes, Controllers, Query Builder, and Views
Deploying Laravel to Heroku
Assignment 2

1/31
Laravel - CRUD, Flash Messages, Data Validation
Assignment 3

2/7
Laravel - Object Relational Mapping (ORM)
Assignment 4

2/14
Laravel - Running Migrations, Authentication, and Middleware
Assignment 5 - Final Project Summary

2/21
Presidents' Day

2/28
Laravel - Writing Migrations, Mass Assignment, and Middleware
Assignment 6

3/7
Exam

3/14
Spring Recess

3/21
Laravel - Authorization with Gates and Policies
Assignment 7

3/28
Laravel - Mail and Queues
Assignment 8

4/4
Laravel - Building a REST API
Assignment 9

4/11
Introduction to Node.js and Asynchronous Programming
Building a REST API
Assignment 10

4/18     Guest Lecture: NoSQL and MongoDB

4/25     Guest Lecture: DevOps and Infrastructure

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