Coding II: Server-side web development, databases and analytics

ACAD 276 (4 Units)

USC Jimmy Iovine and Andre Young Academy

Objective

From e-commerce to news and information, modern web sites do not contain thousands of hand-coded pages. Sites are driven by web "templates" that flow in information from databases or other data sources. Student will learn the basics of creating data structures to house the core "data" of web sites and user server-side scripting to "flow" that information into web templates. They will also learn the basic techniques for tracking user behavior and traffic, and the fundamentals of performing analytics on that data.

Concepts

This course teaches the fundamentals of relational database management systems (RDBMS) and how to design and implement databases. Students will learn the Structured Query Language (SQL) for communicating with databases. They will learn and use the PHP scripting language to make SQL calls to databases and to flow those results into pages. Students will also use PHP to create data interfaces, as well as to create basic conditional routines and other constructs that allow for dynamic sites. They will perform basic analytics and will learn the fundamentals of alternative data structures, enterprise databases, and "big data" systems.

Prerequisites	Acad 275: Coding 1
Instructor	Patrick Dent
Contact	dent@usc.edu / STO331A (Stonier Hall) / 213-821-1400
Office Hours	TBA (see webdev) *Please make an appointment when possible.*
Grader	Zhongyang Gao <zhongyag@usc.edu>
Lecture and Lab	Mondays and Wednesdays, Noon – 2 p.m., VPD106
Website	http://webdev.usc.edu/acad276

Required Textbooks

None

Grading

The following percentage breakdown will be used in determining the grade for the course.

Assignments	30%
Participation and labs	15%
Examinations	20%
Major Project	35%
Total	100%

Grading Scale

The following shows the grading scale to be used to determine the letter grade.

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	66-65
F	64 or below

Major Project [DRAFT]

Students will build a database-driven web site built in MySql and PHP. The site will track user behavior and traffic, with custom analytic reports.

Project Timeline:

Week 4	*Project Proposal*
Week 6	*HTML Frontpage Build*
Week 7	*Database Build*
Week 9	*Alpha/framework Build*
Week 14	*Beta Build*
Week 16	*Final Alpha Build*
	Summary and write up

Course Structure

Students are expected to:

- Participate in lecture discussions and critiques
- Complete weekly lab assignments and projects
- Manage and complete individual class projects

Students are responsible for completing assignments and projects by stated deadlines. Most assignments will be uploaded by students to their USC Web space and linked from an assignment page.

Policies

No make-up exams (except for documented medical or family emergencies) will be offered nor will there be any changes made to the Final Exam schedule, except as permitted by university rules.

Due dates and requirements for all Labs and Assignments will be posted on the course site. Students will "post" their work to their USC web space as defined on the course site.

It if the student's responsibility to post work by the due date following the defined class procedures, even if you miss class. Work turned in late will lose 10% credit per day and late work is not accepted after two weeks past the due date. To receive credit for late work you MUST email the grader that you posted a lab or assignment after the due date or you will not receive credit.

An attendance sheet will be circulated each lecture. You must sign in for lecture to receive lecture attendance credit.

Incomplete and Missing Grades

Excerpts for this section have been taken from the University Grading Handbook, located at http://www.usc.edu/dept/ARR/grades/gradinghandbook/index.html. Please see the link for more details on this and any other grading concerns.

A grade of Missing Grade (MG) "should only be assigned in unique or unusual situations… for those cases in which a student does not complete work for the course before the semester ends. All missing grades must be resolved by the instructor through the Correction of Grade Process. One calendar year is allowed to resolve a MG. If an MG is not resolved [within] one year the grade is changed to [Unofficial Withdrawal] UW and will be calculated into the grade point average a zero grade points.

A grade of Incomplete (IN) "is assigned when work is no completed because of documented illness or other 'emergency' **occurring after the twelfth week** of the semester (or 12th week equivalency for any course scheduled for less than 15 weeks)."

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 your course instructor (or TA) as early in the semester as possible. If you need accommodations for an exam, the form needs to be given to the instructor at least two weeks before the exam.

DSP is located in STU 301 and is open from 8:30am to 5:00pm, Monday through Friday. Contact info: 213-740-0776 (Phone), 213-740-6948 (TDD only), 213-740-8216 (FAX), ability@usc.edu, http://sait.usc.edu/academicsupport/centerprograms/dsp/home_index.html.

Emergency Preparedness/Course Continuity in a Crisis

In case of emergency, when travel to campus is difficult, if not impossible, USC executive leadership will announce a digital way for instructors to teach students in their residence halls or homes using a combination of the Blackboard LMS (Learning Management System), teleconferencing, and other technologies. Instructors should be prepared to assign students a "Plan B" assignment that can be completed 'at a distance.' For additional information about maintaining your classes in an emergency, please access: http://cst.usc.edu/services/emergencyprep.html

Statement on Academic Conduct and Support Systems

Academic Conduct

Plagiarism – presenting someone else's ideas as your own, either verbatim or recast in your own words – is a serious academic offense with serious consequences. Please familiarize yourself with the discussion of plagiarism in *SCampus* in Section 11, *Behavior Violating University Standards*https://scampus.usc.edu/1100-behavior-violating-university-standards-and-appropriate-sanctions/. Other forms of academic dishonesty are equally unacceptable. See additional information in *SCampus* and university policies on scientific misconduct, http://policy.usc.edu/scientific-misconduct/.

Discrimination, sexual assault, and harassment are not tolerated by the university. You are encouraged to report any incidents to the *Office of Equity and Diversity* http://equity.usc.edu/ or to the *Department of Public Safety* http://capsnet.usc.edu/department/department-public-safety/online-forms/contact-us. This is important for the safety whole USC community. Another member of the university community – such as a friend, classmate, advisor, or faculty member – can help initiate the report, or can initiate the report on behalf of another person. *The Center for Women and Men* http://www.usc.edu/student-affairs/cwm/ provides 24/7 confidential support, and the sexual assault resource center webpage sarc@usc.edu describes reporting options and other resources.

Examples of behavior violating University standards:

· The submission of material authored by another person but represented as the student's own work, whether that material is paraphrased or copied in verbatim or near-verbatim form.

· Acquisition of term papers or other assignments from any source and the subsequent presentation of those materials as the student's own work, or providing term papers or assignments that another student submits as his/her own work.

· Obtaining for oneself or providing for another person a solution to homework, a project or other assignments, or a copy of an exam or exam key without the knowledge and expressed consent of the instructor.

· Unauthorized collaboration on a project, homework or other assignment. Collaboration between students will be considered unauthorized unless expressly part of the assignment in question or expressly permitted by the instructor.

If the instructor, a grader, or a lab assistant suspects you of academic dishonesty, it has to be reported to SJACS. Do not share lab assignments with another student. Do not submit another student's work as your own. Do not look at other students' papers during exams. Do not leave the room during an exam. Do not cheat! As Trojans, we are faithful, scholarly, skillful, courageous, and ambitious.

Support Systems

A number of USC's schools provide support for students who need help with scholarly writing. Check with your advisor or program staff to find out more. Students whose primary language is not English should check with the *American Language Institute* http://dornsife.usc.edu/ali, which sponsors courses and workshops specifically for international graduate students. *The Office of Disability Services and Programs* http://sait.usc.edu/academicsupport/centerprograms/dsp/home_index.htmlprovides certification for students with disabilities and helps arrange the relevant accommodations. If an officially declared emergency makes travel to campus infeasible, *USC Emergency Information http://emergency.usc.edu/*will provide safety and other updates, including ways in which instruction will be continued by means of blackboard, teleconferencing, and other technology.

Coding 2: Server-side web development, databases and analytics

Course Outline

Week 1a	Aug 22	Course introduction and overview. Web server and content workflow.
Week 1b	Aug 24	Database fundamentals, designing databases for web content, major db platforms. MySQL, working with MySQL Workbench. ***Lab:*** Assignment Web page (due W2a) **Assignment:** DB schema (due W2a)
Week 2a	Aug 29	Introduction to Structured Query Language (SQL). Reading data with SELECT and WHERE. Views **Assignment:** SQL statements pt 1 (due W2b)
Week 2b	Aug 31	SQL Review. Inserting, updating and deleting records, Reformatting data **Assignment:** RVS db schema. SQL statements pt 2 (due W3a).
	Sept 05	*University Holiday*
Week 3b	Sept 07	Introduction to PHP and PHPStorm. Introduction to PHP Scripting Language and basic tags ***Lab:*** Php exercise (due W4a) **Assignment:** Sports database (due W4a)
Week 4a	Sept 12	PHP and MySQL (mysqli). Populating pages with content from db. Looping through queries. Conditional Statements PHPMyAdmin **Assignment:** Displaying DB queries (due 4b)
Week 4b	Sept 14	Designing record interfaces. Drill-down workflow. Creating dynamic web forms to view and insert content
Week 5a	Sept 19	Creating dynamic web forms to view, insert, and update content in databases.

Week 5b	Sept 21	Validating data. Exam preparation. Individual class projects.
Week 6a	Sept 26	***PHP and Basic SQL Examination***
Week 6b	Sept 28	Introduction to object oriented programing. Mysqli object-oriented interface.
Week 7a	Oct 03	Aggregate functions, sub-queries with PHP. Paginated results.
Week 7b	Oct 05	Sending emails from PHP. File Uploads
Week 8a	Oct 10	Session and client variables. Includes, re-usable code, caching, variable scoping.
Week 8b	Oct 12	Security vulnerabilities in php and sql.
Week 9a	Oct 17	Intermediate PHP Functions
Week 9b	Oct 19	PHP Data Object (PDO)
		Advanced Joins
Week 10a	Oct 24	Business Intelligence Systems Part 1: Big data, data warehousing,
Week 10b	Oct 26	Business Intelligence Systems Part 2: business reporting, data mining
Week 11a	Oct 31	Query Performance Optimization part 1
Week 11b	Nov 02	Query Performance Optimization part 2
Week 12a	Nov 07	***Intermedia PHP and SQL Examinations***
Week 12b	Nov 09	PHP Frameworks 1
Week 13a	Nov 14	PHP Frameworks 2
Week 13b	Nov 16	Web Analytics
Week 14a	Nov 21	TBA Industry Event or Tour
	Nov 23	*University Holiday*
Week 15a	Nov 28	Quality Assurance processes and phases

Week 15b	Nov 30	Survey of server-side alternatives Special Topics (TBA) The Web development industry, Next-generation development
	Dec 02	Individual Website Final Build