C Sc 337--Web Development. 3 Units

Description: Introduction to the techniques and technologies for developing dynamic web sites. This includes web servers such as Apache, server-side scripting languages such as PHP, databases such as MySQL, testing server side software with frameworks such as PhpUnit, page layout with HTML and CSS, and JavaScript and AJAX for enriching web services. Security concerns such as XSS will be addressed with details for prevention of such vulnerabilities in web applications. Other technologies related to Web Development. This course includes a project to deploy a dynamic website. Weekly laboratory.

Prerequisite(s): CSc 127B or CSc 227 or equivalent course in a different programming language.
Typical Structure: 2 hours of lecture, 2 hours of lab
Usually Offered: Spring (every other year)

Topics

What is a web application? What are web servers, server-side languages, databases, and what role does each language we will use (PHP, HTML, CSS, JavaScript) play in web applications? Overview of HTTP request types, what each part of a URL actually means. Setting up LAMP

Overview of HTML/CSS: how to organize and lay out web pages. Resources for both HTML and CSS. HTML forms, getting input from users. Overview of security concerns related to user input.

Intro to PHP. Basic syntax (loose typing, functions, associative arrays, string manipulation), object-oriented programming in PHP, simple userauthentication. Testing with PhpUnit. Security concerns related to user authentication.

Intro to databases. Design of simple databases for web applications{primary keys, good database design. Creating and managing a MySQL database using phpMyAdmin, and connecting to a database with PHP. Discuss storing secure information.

Interfacing with MySQL using PHP. SQL syntax, how to [INSERT, SELECT, UPDATE, DELETE] and how to execute these commands in PHP. Discuss SQL injection attacks and how to prevent them. Discuss persistent XSS.

Overview of client-side scripting (VBScript, JavaScript). How to use JavaScript, things you can do with it. Scripting issues across different browsers. Using jQuery or other JavaScript libraries to handle these issues.

Working with the DOM. JSON. AJAX. How to do AJAX yourself, then how to do AJAX with jQuery. Discuss non-persistent XSS.

PHP Frameworks. What is templating, what is it, why use it? How to use Smarty.

Secure transactions. How does SSL work? Credit card processing, etc. Integrating CAPTCHA or instituting other ways to protect against bots. Discuss bot attacks and MITM attacks.

Working with API's. Twitter, Facebook (?), PayPal. How to use cURL. Discuss XML, its usefulness, how to design XML schemas and how to easily input and parse XML with PHP and how to output it nicely.

HTTP Headers. Cookies, Sessions. Discuss CSRF and ways to prevent.

How does the Internet work? DNS resolution, contacting the server, etc. How to get your own website: registering domain names, finding hosting, shared hosting vs. VPS hosting. DNS record types. Apache configuration? Security issues: sniffing packets, attacking hosts files.

Scalability. Distributed databases, caching (memcached), distributed authentication (Shibboleth), fast search (Lucene/Solr). Static vs dynamic pages and how web servers handle them. Compare servers to the one is use (most likely Apache).

How does email work? DNS mail records, POP/IMAP and SMTP. Describe what email headers look like and how they are abused by spammers. Sending email in PHP. Security concerns related to email.

Other topics as requested. HTTP error codes. Error handling and logging with PHP, MySQL, Apache. FTP/SFTP/SSH. SOAP? XML-RPC? Weeks to catch up as needed.

Attendance Attending class time is extremely important for this class. Attendance will be recorded. Missing three or more lectures will result in a
failing grade unless other provisions have been made with the instructor.

Academic Integrity Students are responsible for understanding and complying with the University's Code of Academic Integrity, which can be found at
http://deanofstudents.arizona.edu/codeofacademicintegrity

Course Objectives The course is intended for students who are already comfortable programming in a high level language and are interested in web development using common tools and technologies.

Classroom Behavior General classroom etiquette is expected. Cell phones should not ring audibly. Cell phone conversa- tions should be held outside of the classroom. Conversations between students should not be held during lecture (though during the "lab" parts of class time it is okay). Students should be on time to the start of class and are responsible for completing all in-class activities.

Threatening Behavior In this course, you are expected to follow the policies against threatening behavior by students as described in http://policy.web.arizona.edu/ policy/threatening.pdf .

Students with Disabilities If you anticipate barriers related to the format or requirements of this course, please meet with me so that we can discuss ways to ensure your full participation in the course. If you determine that disability-related accommodations are necessary, please register with Disability Resources (621-3268; drc.arizona.edu) and notify me of your eligibility for reasonable accommodations. We can then plan how best to coordinate your accommodations.

Changes to Syllabus The information contained in the course syllabus, excepting the grade and attendance policies, are subject to change, with reasonable advance notice, as deemed appropriate by the instructor.