I. GENERAL DESCRIPTION
A. Approval Date April 2015
B. Department Computer Science
C. Course Number CS 230W
D. Course Title WordPress and Drupal CMS Development
E. Course Outline Preparer(s) Douglas Putnam, Craig Persiko
F. Department Chairperson _______________________
   Craig Persiko
G. Dean _______________________
   David Yee

II. COURSE SPECIFICS
A. Hours Lecture: 3 weekly (52.5 total)
B. Units 3
C. Prerequisites None
   Corequisites None
   Advisories CS 130A, CNIT 132 and CS 160A
D. Course Justification WordPress and Drupal are PHP-based web
   frameworks used by education, government,
   and businesses as content management
   systems. Learning how to create, customize,
   and manage WordPress and Drupal web
   sites prepares students for employment.
E. Field Trips No
F. Method of Grading Letter, Pass/No Pass
G. Repeatability 0

III. CATALOG DESCRIPTION
This course introduces students to creating and deploying WordPress and Drupal content
management systems (CMS) for web development using custom plug-ins and modules.
Topics include WordPress and Drupal core features, APIs, plug-in and module
development, architecture, deploying to cloud hosting, PHP performance tuning, data
management, and security.

IV. MAJOR LEARNING OUTCOMES
Upon completion of this course a student will be able to:
A. Demonstrate an understanding of the architecture and core PHP files of
   WordPress and Drupal, and when to use these technologies instead of traditional
   web sites.
B. Create WordPress and Drupal custom plug-ins and modules by writing PHP code
   following the WordPress and Drupal APIs.
C. Create and deploy functional, Internet-connected personal or business web sites
   using WordPress and Drupal with user editable pages and integration of content,
syndication, plug-ins, modules, themes, and administration tools following current professional and industry standards.

D. Compare and contrast WordPress and Drupal options and features for a potential client, including performance tuning and security.

V. CONTENTS

A. Overview of rapid web site development
   1. Conceptual thinking about content deployment and management, usability, user interaction, and security
   2. Theory and application of rapid development technologies, including custom templates and modules
   3. Web 2.0 applications and user interaction/requirements
   4. Web technology for use by individuals and teams
   5. Overcoming inefficiencies of a CMS by using techniques such as caching
   6. Compare and contrast WordPress and Drupal
   7. Creating a WordPress or Drupal development environment
   8. Coding standards for WordPress and Drupal plug-ins and modules

B. The role of core WordPress files
   1. functions.php
   2. option.php
   3. formatting.php
   4. pluggable.php
   5. plugin.php
   6. user.php
   7. post.php
   8. taxonomy.php

C. Using WordPress APIs to add PHP code to core functionality
   1. Plugin API
   2. Widgets API
   3. Shortcode API
   4. HTTP API
   5. Settings API
   6. Dashboard API

D. Plugin development with PHP, such as a plugin to add products to an online store
   1. Plugin packaging
      a. The header
      b. The license
   2. Creating the PHP options page: the PHP array of options
   3. Plugin actions and filters
   4. Plugin security

E. WordPress Architecture
   1. The Loop
      a. The flow of the loop
      b. Determining content display using the loop
      c. Global variables and their relation to loop processing
      d. PHP code that works outside the loop
2. File system structure
   a. wp-content
   b. essential PHP files including: index.php, header.php, footer.php, sidebar.php

3. Data management and tables, including
   a. Using the Database class methods to create queries
   b. Understanding the database structure, including: wp_users, wp_comments, wp_links, wp_posts, wp_postmeta, wp_terms, wp_usermeta
   c. Custom post types, taxonomies, and metadata

F. Deploying WordPress
   1. Install and configure WordPress locally and on a remote server using a hosting service.
   2. Create a MySQL database for use by WordPress

G. Drupal architecture
   1. The Presentation Abstraction Control (PAC)
   2. HTTP GET and POST
   3. Routes and helper functions
   4. The “common canvas”

H. Install and configure Drupal
   1. Create a Drupal development environment on a local computer or on a Cloud service such as C9.io (Cloud 9)
   2. Install and configure Drupal on a Drupal hosting service such as Heroku

I. Understand Drupal core modules, such as
   1. Statistics
   2. Search
   3. Blogs, books, forums, polls, etc.
   4. Caching and performance options
   5. Multi-site support
   6. Security and update management
   7. Localization support

J. Reviewing Drupal add-in modules
   1. Content Construction Kit allows extending the database schema with events, invitations, reviews, articles, etc.
   2. Views as an abstraction of database queries for presenting content
   3. Panels for drag and drop visual design
   4. Rules for conditionally executed actions
   5. Context for defining conditions display of content
   6. Media modules to enable uploading and managing media

K. Drupal's accessibility support
   1. Drag and drop functionality
   2. Customizable visual contrast and intensity

L. Overview of Drupal database abstraction
   1. SQL query generation and cleansing
   2. Writing SQL queries without writing SQL

M. Working with content types
1. Text
2. Images
3. Multimedia

N. Extending Drupal
   1. Theming
   2. Search Engine Optimization
   3. Web statistics
   4. Analytics

O. For both WordPress and Drupal
   1. Setting up user accounts and administer user roles
   2. Configuring PHP for scalability and security.
   3. File caching and optimization.
   4. Updating WordPress and Drupal when security updates are available.
   5. Using security plug-ins and modules.

VI. INSTRUCTIONAL METHODOLOGY
A. Assignments
   1. In-class assignments
      a. Discussion of the features of WordPress and Drupal
      b. Using classroom computers:
         1. Install and create a WordPress web site
         2. Install and create a Drupal web site
         3. Use WordPress plug-ins to manage user roles and permissions
         4. Use Drupal modules to manage user roles and permissions
         5. Use various techniques for web site security
         6. Work with version control
         7. Update WordPress and Drupal
      c. Discussion on the role of taxonomy in organizing content
   2. Out-of-class assignments
      a. Readings from textbooks and reference manuals
      b. Installing and deploying WordPress and Drupal web sites
      c. Writing PHP code to create a WordPress plug-in
      d. Writing PHP code to create a Drupal module
      e. Installing Drupal modules to manage user roles and permissions
      f. Updating WordPress and Drupal to most recent version
      g. Optimizing PHP for WordPress and Drupal performance and security

B. Evaluation
   1. Completed student assignments as described in section A above.
   2. Written quizzes and/or tests that measure the student’s knowledge of topics such as:
      a. Describing the main features of WordPress and Drupal
      b. Discussing the function of the WordPress core PHP files
      c. Why we say “DON'T HACK THE CORE”
      d. Describing the WordPress APIs
e. Describing the role of the WordPress loop
f. Discussing the role of Drupal core modules
g. The preferred use cases for WordPress and Drupal
h. How to connect WordPress and Drupal to a MySQL database
i. Advantages and hazards of enhancing WordPress and Drupal through the use of contributed plug-ins and modules
j. How the PHP files involved in WordPress themes are related to the loop

3. A comprehensive final examination that measures the student’s ability to create both WordPress and Drupal plug-ins and modules, as well as their knowledge about deploying WordPress and Drupal web sites to the Internet

C. Textbooks and other Instructional Materials
   1. Angela Byron and Addison Berry, *Using Drupal*, O'Reilly 2012
   5. Online reference materials and tutorial documents on topics such as:
      a. WordPress Codex: https://codex.wordpress.org
      b. WordPress APIs: https://codex.wordpress.org/WordPress_APIs
      d. WordPress Support: https://wordpress.org/support/
      e. Drupal Community Documentation: https://www.drupal.org/documentation
      f. Drupal API: https://api.drupal.org/api/drupal
      g. The Drupal Cookbook: https://www.drupal.org/documentation/customization/tutorials/beginners-cookbook

VII. TITLE 5 CLASSIFICATION
CREDIT/DEGREE APPLICABLE (meets all standards of Title 5. Section 55002(a))