

**UNIVERSITY OF NEBRASKA AT OMAHA
COURSE SYLLABUS**

Department and Course Number	CSCI 2850
Course Title	Programming on the Internet
Course Coordinator	Robert Fulkerson
Total Credits	3
Repeat for Credit?	No
Date of Last Revision	June 2, 2015

1.0 Course Description Information

1.1 Catalog description:

This course is a continuation of the topics learned in CIST 1300. Specific technical topics may include one or more of the following: configuring a web server, a continuation of the programming learned in CIST 1300, using a database for data storage and retrieval, using web frameworks and using JavaScript for client-side programming.

1.2 Prerequisites of the course:

The prerequisites for this course include prior completion of CIST 1300 and CIST 1400.

1.3 Overview of content and purpose of the course:

This course is intended for students majoring in computer science or MIS with an interest in web application development and who want to further the programming they learned in CIST 1300.

The course will cover a broad range of topics, including but not limited to programming, regular expressions, file processing and hashes in a modern web programming language. Web server software, such as the Apache web server, will be covered and discussed. The basics of processing HTML forms will be covered and then an introduction to how MVC programming is implemented in the course's chosen language, including database coverage using sqlite3. As time allows, technologies such as jQuery or other JavaScript language libraries will be introduced.

The goal is to provide the students with a very well-rounded coverage of how modern web development is accomplished

1.4 Unusual circumstances of the course.

None

2.0 Course Justification Information

2.1 Anticipated audience / demand:

The course is intended for all students interested in furthering their web development skills.

2.2 Indicate how often this course will be offered and the anticipated enrollment:

This course is offered during the spring and fall semesters. Typical enrollments based on previous semesters indicate that approximately 30 – 35 students will take the course each semester.

2.3 If it is a significant change to an existing course, please explain why it is needed:

None

3.0 List of performance objectives stated in learning outcomes in a student's perspective:

3.1 The ability to write complex programs in a modern programming language.

3.2 The ability to understand how a web server works and how individual requests to the server are handled.

3.3 The ability to install and configure a web server from source code.

3.4 An understanding of how web forms are packaged on the client side and decoded on the server side.

3.5 An understanding of how the MVC model of web development works.

4.0 Content and Organization Information

4.1 Review of Perl concepts (7 hours)

4.1.1 Basic output using print, printf

4.1.2 Scalar data type

4.1.3 Basic input using <>

4.1.4 Variable interpolation

4.1.5 Escape characters

4.1.6 chomp() and chop()

4.1.7 Basic arithmetic (+, -, *, /, %, **, .., x)

4.1.8 Precedence of operators

4.1.9 Compound assignment operators

4.1.10 Unary increment and decrement operators

4.1.11 if selection

4.1.12 if/else selection

4.1.13 Boolean expressions (&&, ||, !)

4.1.14 Uninitialized variables

4.1.15 while repetition

4.1.16 Array data type

4.1.17 Perl-style for repetition

4.1.18 C-style for repetition

4.1.19 Data::Dumper for debugging

4.2 Extension of Perl concepts (4 hours)

4.2.1 Command-line argument processing (switches, arguments)

- 4.2.2 Contexts (array, scalar)
- 4.2.3 Default variables (\$_)
- 4.2.4 Subroutines
 - 4.2.4.1 Scoping (lexical, dynamic)
 - 4.2.4.2 Pass by reference
- 4.2.5 File processing
- 4.2.6 Hash data type

- 4.3 Regular expressions (7 hours)
 - 4.3.1 Matching (m//)
 - 4.3.2 Substitution (s//)
 - 4.3.3 Metacharacters (\s, \S, \d, \D, \w, \W, \b, \B)
 - 4.3.4 Special characters (., +, *, ?, { })
 - 4.3.5 Alternation
 - 4.3.6 Pattern anchors
 - 4.3.7 Grouping
 - 4.3.8 Back-referencing
 - 4.3.9 Greedy vs. non-greedy
 - 4.3.10 Compiled regular expressions
 - 4.3.11 Transliteration

- 4.4 Web servers (5 hours)
 - 4.4.1 Basic server operation
 - 4.4.2 HTTP protocols (0.9, 1.0, 1.1, 2.0)
 - 4.4.3 Installation, configuration and optimization of web server software

- 4.5 HTML5 Overview / Review (3 hours)
 - 4.5.1 Block vs. Inline elements
 - 4.5.2 Content vs. Structure
 - 4.5.3 URLs, relative and absolute
 - 4.5.4 Minimal page (<!DOCTYPE>, <html>, <head>, <title>, <meta>, <body>)
 - 4.5.5 Headers (<h1>, <h2>, <h3>, <h4>, <h5>, <h6>)
 - 4.5.6 Sectioning elements (<section>, <article>, <header>, <footer>, etc)
 - 4.5.7 Paragraphs, line breaks and blocks (<p>,
, <div>,)
 - 4.5.8 Naming and labeling elements (id, class)
 - 4.5.9 Comments (<!-- -->)
 - 4.5.10 Formatting (, <i>, , , <code>, <tt>, <sample>, <pre>)
 - 4.5.11 Block quotes (<blockquote>)
 - 4.5.12 More formatting (<sup>, <sub>, <ins>,)
 - 4.5.13 Abbreviations and acronyms (<abbr>, <acronym>)
 - 4.5.14 Images ()
 - 4.5.15 Image types (JPEG, GIF, PNG)
 - 4.5.16 Links (<a href>, <a name>)

- 4.5.17 Lists (, , <dl>, , <dt>, <dd>)
- 4.5.18 Tables (<table>, <tr>, <td>, <th>)
- 4.5.19 Audio and video (<audio>, <video>)
- 4.5.20 Audio and video formats supported in HTML5

4.6 HTML5 Forms and Processing (3 hours)

- 4.6.1 Overview
- 4.6.2 Submit and reset buttons
- 4.6.3 Checkboxes and radio buttons
- 4.6.4 Text fields, password fields, text areas
- 4.6.5 Combo boxes
- 4.6.6 Date/time, file upload, color picker, etc.

4.7 Model-View-Controller (MVC) Web Programming (8 hours)

- 4.7.1 Overview
- 4.7.2 Basic setup of MVC app
- 4.7.3 Routing
- 4.7.4 Database connectivity
- 4.7.5 Templates
- 4.7.6 Cookie and session management

4.8 JavaScript libraries (as time permits)

- 4.8.1 Overview of jQuery
- 4.8.2 Overview of AngularJS

5.0 Teaching Methodology Information

5.1 Methods:

The material is taught through lectures based on a common set of slides, assignments and exams for all instructors. Some sections may use hands-on laboratory classrooms for each lecture or for special lectures throughout the semester.

Some sections of the course will be flipped, with video lectures of the material in section 4 available for the students to watch outside of class with additional lecture material and hands-on activities and projects in class.

5.2 Student role:

Students are encouraged to read the material in the books in advance of the lecture so that new concepts and terms are not “sprung on them”. They are encouraged to participate in class discussions and ask questions when the material is unclear since all of the material is cumulative and builds on understanding of the material that has come before it in the course. Students are also encouraged to try out all of the example code demonstrated in lecture to familiarize themselves with the concepts being covered.

6.0 Evaluation Information

6.1 Describe the typical types of student projects that will be the basis for evaluating student performance:

Each student will write complete approximately 15 assignments on the various topics as they are covered during the semester. There will be a 5-minute presentation at the end of the semester (a lightning talk) on a topic to be agreed upon by the instructor and student. Additionally, the students will take a mid-term and a final exam along with quizzes as needed.

6.2 Describe the typical basis for determining the final grade (e.g. weighting of various student projects):

The class is based solely on points with no special weighting of exams, homework or presentation.

6.3 Grading type:

This section usually provides a mapping from a numeric score to a letter grade. The numeric score could be an overall percentage figure (based on section 6.2) or some number of points, if points are given for each activity. For example:

Percent	Grade	Percent	Grade
97 – 100	A+	77 – 79	C+
93 – 96	A	73 – 76	C
90 – 92	A–	70 – 72	C–
87 – 89	B+	67 – 69	D+
83 – 86	B	63 – 66	D
80 – 82	B–	60 – 62	D–
		0–59	F

7.0 Resource Material Information

7.1 Textbooks and/or other required readings used in course:

7.1.1 Schwartz, Randal L. *Learning Perl*. Beijing: O'Reilly, 2011. Print.

7.1.2 Stubblebine, Tony. *Regular Expression Pocket Reference*. Sebastopol: O'Reilly, 2007. Print.

7.2 Other student suggested reading materials:

7.2.1 "W3C." *HTML & CSS* -. N.p., n.d. Web. 02 June 2015.

<<http://www.w3.org/standards/webdesign/htmlcss>>

7.2.2 "Perl.com." *Perl.com*. N.p., n.d. Web. 02 June 2015. <<http://perl.com/>>.

7.2.3 "HTML(5) Tutorial." *HTML Tutorial*. N.p., n.d. Web. 02 June 2015.

<<http://www.w3schools.com/html/default.asp>>.

7.3 Current bibliography and other resources:

7.3.1 Schwartz, Randal L. *Learning Perl*. Beijing: O'Reilly, 2011. Print.

7.3.2 Stubblebine, Tony. *Regular Expression Pocket Reference*. Sebastopol: O'Reilly, 2007. Print.

7.3.3 Chromatic. *Modern Perl: 2014 Edition*. N.p.: n.p., n.d. Print.

7.3.4 Castro, Elizabeth. *HTML & CSS: A Visual QuickStart Guide*. Berkeley, CA:

Peachpit, 2013. Print.

7.3.5 "CSS Tutorial." *CSS Tutorial*. N.p., n.d. Web. 02 June 2015.

<<http://www.w3schools.com/css/default.asp>>.

7.3.6 "JavaScript Tutorial." *JavaScript Tutorial*. N.p., n.d. Web. 02 June 2015.

<<http://www.w3schools.com/js/default.asp>>.

7.3.7 "SQL Tutorial." *SQL Tutorial*. N.p., n.d. Web. 02 June 2015.

<<http://www.w3schools.com/sql/default.asp>>.

7.3.8 "W3C." *HTML & CSS* -. N.p., n.d. Web. 02 June 2015.

<<http://www.w3.org/standards/webdesign/htmlcss>>.

7.3.9 "Perl 6." *Perl 6*. N.p., n.d. Web. 02 June 2015. <<http://www.perl6.org/>>.

7.3.10 "Perl.com." *Perl.com*. N.p., n.d. Web. 02 June 2015. <<http://perl.com/>>.

7.3.11 "A next Generation Web Framework for the Perl Programming Language."

Mojolicious. N.p., n.d. Web. 02 June 2015. <<http://mojolicio.us/>>.

7.3.12 "HTTP/2." *Wikipedia*. Wikimedia Foundation, n.d. Web. 02 June 2015.

<<https://en.wikipedia.org/wiki/HTTP/2>>.

7.3.13 "jQuery." *jQuery*. N.p., n.d. Web. 02 June 2015. <<https://jquery.com/>>.

7.3.14 "HTML Enhanced for Web Apps!" *AngularJS*. N.p., n.d. Web. 02 June 2015.

<<https://angularjs.org/>>.

8.0 Other Information:

8.1 Accommodations statement:

8.2 Other:

8.3 Author(s):

Robert Fulkerson

9.0 Computer Science Accreditation Board (CSAB) Category Content (class time in hours):

<i>CSAB Category</i>	<i>Core</i>	<i>Advanced</i>
Data structures	6	0
Computer organization and architecture	0	0
Algorithms and software design	0	0
Concepts of programming languages	31	0

10.0 Oral and Written Communications:

Every student is required to submit at least 0 written reports (not including exams, tests, quizzes, or commented programs) to typically 0 pages and to make 1 oral presentations of typically 5 minutes duration. Include only material that is graded for grammar, spelling, style, and so forth, as well as for technical content, completeness, and accuracy.

11.0 Social and Ethical Issues:

None

12.0 Theoretical content:

Please list the types of theoretical material covered, and estimate the time devoted to such coverage.

Students will learn problem analysis concerning Internet-based application development.

13.0 Problem analysis:

Please describe the analysis experiences common to all course sections.

Students will learn the development of web-based applications; specifically, they will focus on Perl and other sever-based programming languages for backend development and HTML5/CSS/jQuery for front-end development.

14.0 Solution design:

Please describe the design experiences common to all course sections.

Students will learn the development of web-based applications; specifically, they will focus on Perl and other sever-based programming languages for backend development and HTML5/CSS/jQuery for front-end development.

CHANGE HISTORY

<i>Date</i>	<i>Change</i>	<i>By whom</i>	<i>Comments</i>
06/15/2002	Initial ABET version	Fulkerson	
06/13/2003	Cleanup	Wileman	
11/17/08	Update to include CS Program Outcomes	Fulkerson	This syllabus will be revised again in Spring 2009 for class resequencing of CIST1300/CSCI2850 in Fall 2009. These current outcomes are based on the course as taught through Spring 2009.
4/21/09	Update to become second in 1300/2850 sequence	Fulkerson	
6/2/2015	Update to cover new and revised material as well as use current version of document	Fulkerson	

