Programming web-based educational media

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**EDT 603 *Programming web-based educational media*, Spring 2016**

<!DOCTYPE html>  
<html>  
 <body>  
 <blockquote>  
 Anyone who has lost track of time when  
 using a computer knows the propensity  
 to dream, the urge to make dreams come  
 true and the tendency to miss  
 lunch.<br>  
 <strong>Tim Berners-Lee</strong>  
 <em>, inventor of the world wide web</em>  
 </blockquote>  
 </body>  
</html>

**Description:** In this course students learn techniques of web programming to develop interactive, educational media. Using the Python programming language and web development technologies (HTML5, Javascript, CSS), students gain practice in the object oriented programming and design of interactive software. For their final project, students will create their own educational website.

**Key words:** computer science, web development, python, interaction design, django, html, html5, css, javascript, OOP, data visualization, data science, d3

# Office Hours

Matt Curinga, Post Annex, Room 1

Monday, 11-1:00PM

Tuesday, 2:30-4:30PM

Thursday, 3-5PM

*office hours by appointment*

# Goals and Objectives

This course builds on CSC 602 to move beyond basic programming concepts; students will gain expertise in building more complex computer programs, over many iterations. At the end of the course, students will be able to design educationally sound web-based learning media, solve moderately complex problems using OOP, collaborate on programming projects, and identify methods for teaching programming and web development.

Specific teaching and learning goals include:

* designing web-based interactions and multimedia to support learning
* coding effective user interfaces for learning
* implementing Universal Design goals for accessible web sites
* identifying effective methods for teaching more advanced programming concepts and web design skills

Specific software development goals include:

* modeling real world problems with software
* planning iterations of a project
* testing and debugging
* Object oriented programming concepts:
* Abstraction
* Encapsulation
* Objects & Classes
* Composition
* Inheritance
* Polymorphism

# Required Books

Duckett, J. T. (2011). [*Html & css: design and build websites (1st ed.)*](http://htmlandcssbook.com/). Indianapolis, IN: Wiley Pubishing, Inc.



# Required Software/Online Accounts

* Software
  + [Python 3](https://www.python.org/downloads/)
  + [Sublime Text 3](http://www.sublimetext.com/3)
  + [Github Client](https://desktop.github.com/)
  + [Slack](http://slack.com) (recommend desktop and mobile clients)
* Accounts
  + [Github](https://github.com)
  + [Python Anywhere](https://www.pythonanywhere.com/)
  + [AU Ed Tech #code](https://auedtech.slack.com/signup)

# Bibliography

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Hayward, J. (2011). *Django JavaScript Integration: AJAX and jQuery*. Packet Publishing. ISBN 1849510342

Gamma, E., Helm, R., Johnson, R., & Vlissides, J. M. (1994). *Design Patterns: Elements of Reusable Object-Oriented Software* (1st ed.). Reading Mass.: Addison-Wesley Professional. ISBN 0201633612.

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Moreno, R., & Mayer, R. (2007). Interactive multimodal learning environments. *Educational Psychology Review*, *19*(3), 309–326.

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Shneiderman, B. (2002). Promoting universal usability with multi-layer interface design. *ACM SIGCAPH Computers and the Physically Handicapped*, (73-74), 8.

Teague, Jason. 2011. *CSS3: Visual QuickStart Guide.* Peachpit Press. Berkeley CA. ISBN 9780321719638.

Zelle, John. 2004. *Python programming: an introduction to computer science.*Franklin Beedle. Wilsonville, OR. ISBN 9781887902991.

# Schedule

|  |  |  |
| --- | --- | --- |
| Week | Date | Topic |
| 1 | 28-Jan | How the web works |
| 2 | 4-Feb | Document Structure, Text, and Lists |
| 3 | 11-Feb | Links and Style |
| 4 | 18-Feb | Media and Usability |
| 5 | 25-Feb | Layout and Responsive design |
| 6 | 4-Mar | Dynamic website and Django, **Single Page Website Due** |
| 7 | 11-Mar | URL Dispatching and Templates |
| - | 18-Mar | *Spring break* |
| 8 | 25-Mar | Defining Objects |
| 9 | 1-Apr | Saving Objects |
| 10 | 8-Apr | Customizing and Validating Forms |
| 11 | 15-Apr | Object composition and inheritance |
| 12 | 22-Apr | Searching Django models |
| 13 | 29-Apr | Users and Authentication |
| 14 | 6-May | Advanced Topics, Project Lab |
| 15 | 13-May | Wrap-up and Reflection |

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| --- | --- | --- | --- |
| Week | Date | Topic | Due |
| 1 | 1/26/16 | Structured Content with HTML |  |
| 2 | 2/02/16 | Design Thinking |  |
| 3 | 2/09/16 | Dynamic websites with Flask | Pitch |
| 4 | 2/16/16 | Studio (online) |  |
| 5 | 2/23/16 | Data visualization |  |
| 6 | 3/01/16 | Data in Python |  |
| 9 | 3/08/16 | Introduction to Javascript & JSON |  |
| - | 3/15/16 | *Spring Break* |  |
| 7 | 3/22/16 | Introduction to D3 |  |
| 8 | 3/29/16 | Midpoint critique | Midpoint critique |
| 10 | 4/05/16 | Studio |  |
| 11 | 4/12/16 | Studio |  |
| 12 | 4/19/16 | Studio (online) |  |
| 13 | 4/26/16 | Studio |  |
| 14 | 5/03/16 | Studio |  |
| 15 | 5/10/16 | Studio |  |
| 16 | 5/17/16 | Final Presentations | Final Project Due |

# Assignments & Grading

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| --- | --- |
| Assignment | Points |
| Self Evaluation | 10 |
| Group Evaluation | 0-3 extra credit |
| Pitch | 10 |
| Mid-point | 30 |
| Final | 40 |

# Books and online resources

## Documentation & Reference websites

* [World Wide Web Consortium](http://w3.org)
* [Mozilla Developer Network](https://developer.mozilla.org/en-US/)
* [jQuery](http://jquery.com/)
* [W3 Schools](http://www.w3schools.com/)
* [Regular Expressions](http://www.regexr.com/)

## Books

* [HTML and CSS: Design and Build Websites](http://www.wiley.com/WileyCDA/WileyTitle/productCd-1118008189.html), our textbook
* [JavaScript & jQuery: Interactive Front-End Web Development Hardcover](http://www.wiley.com/WileyCDA/WileyTitle/productCd-1118871650.html), also J. Duckett, same series
* [Dive into HTML 5](http://diveintohtml5.info/) [free online]
* [The Elements of Typographic Style Applied to the Web](http://webtypography.net/toc/) [free online]
* [Mastering Regular Expressions](http://shop.oreilly.com/product/9780596528126.do)

## Tutorial websites & online learning

* [Code Academcy](http://www.codecademy.com/)
* [P2PU School of webcraft](https://p2pu.org/en/schools/school-of-webcraft/)
* [Treehouse](http://teamtreehouse.com/) [paid]
* [Thinkful](http://www.thinkful.com/)
* [GeekCamp::HTML5 Tutorial](http://www.geekchamp.com/html5-tutorials/1-html5-overview)
* [SkilledUp::Learn Web Design](http://www.skilledup.com/learn-web-design-guide/)

## Design, accessibility, UX

* [A List Apart](http://alistapart.com/topic/html)
* [Smashing Magazine](http://www.smashingmagazine.com/)
* [Adobe Kuler](https://color.adobe.com/create/color-wheel/)
* [Nielsen/Norman Group](http://www.nngroup.com/articles/)
* [United States Section 508](http://en.wikipedia.org/wiki/Section_508_Amendment_to_the_Rehabilitation_Act_of_1973)
* <https://www.section508.gov/>
* <http://webaim.org/standards/508/checklist>
* [Usability.gov](http://www.usability.gov/index.html)
* [Research-Based Web Design & Usability Guidelines](http://www.usability.gov/guidelines/guidelines_book.pdf)
* [hex/html color chart](http://www.december.com/html/spec/color.html)

## Online Tools

* [w3c HTML Validation Service](http://validator.w3.org/#validate_by_uri+with_options)
* [w3c CSS Validation Service](http://jigsaw.w3.org/css-validator/)
* [Pastebin](http://pastebin.com/)
* [HTML Formatter](http://www.freeformatter.com/html-formatter.html)

## Media Resources

* [Creative Commons Search](http://search.creativecommons.org/), for images, music, etc
* [Wikimedia Commons](http://commons.wikimedia.org/wiki/Main_Page), images and other media (including stuff from Wikipedia), curated
* [Open Clip Art](https://openclipart.org/), free vector graphics
* [Creative Commons Music](http://creativecommons.org/music-communities)
* [Fossil Bank](http://fossilbank.wikidot.com/)
* [Colour Lovers Palettes](http://www.colourlovers.com/)
* [DaFonts](http://www.dafont.com/)