Programming web-based educational media

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Table of Contents

**EDT 603 *Programming web-based educational media*: Coding virtual escape rooms, Spring 2021**

<!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:** We will learn modern web programming and team software engineering techniques while designing and programming our own virtual escape rooms. Working in teams, students will work with the full stack of multimedia web programming: Javascript ES6, webpack, node, git, ReactJS, MongoDB, HTML5, CSS and Bootstrap.

In addition to key computer science concepts, we will hone our skills in interactive story telling, puzzle design, and multimedia production to create engaging online experiences for our users. This course is open to anyone with at least one semester of college-level computer programming in any language. No previous Javascript or web development required. This course will be fully online, with no fixed virtual class meeting. We will communicate and collaborate primarily through zoom and discord. For remote programming, we will use the collaborative editing features of the open source Atom Editor and will store our code on Github.

**Key words:** computer science, web development, mobile web, interaction design, html, html5, css, javascript, OOP, React, Bootstrap, git, node, mongodb, multimedia programming, escape rooms, puzzles, interactive fiction, IF

# 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 several iterations. At the end of the course, students will be able to solve moderately complex problems using object oriented and functional programming paradigms, and collaborate on team programming projects. They will write unit tests and practice test-driven development.

Specific software development goals include:

* modeling real world problems with software
* object oriented design
* functional programming
* understanding multi-tier, client-server programming
* iterative software development
* testing and debugging

# Online Documentation

* [Mozilla Developer Network Javascript Docs](https://developer.mozilla.org/en-US/docs/Web/javascript)
* [Mozilla Developer Network HTML Docs](https://developer.mozilla.org/en-US/docs/Web/HTML)
* [Mozilla Developer Network CSS Docs](https://developer.mozilla.org/en-US/docs/Web/CSS)
* [React Framework](https://reactjs.org/docs/getting-started.html)
* [Bootstrap](https://getbootstrap.com/docs/4.2/getting-started/introduction/)

# Recommended Books

Curinga, M. Peter Wentworth, P., Elkner, J., Downey, A, and Meyers, C. (2018). [Think Javascript](https://mcuringa.github.io/think-js/). [free open textbook]

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



# Schedule

|  |  |
| --- | --- |
| Module | Topic |
| 0 | Getting Ready for Web Programming |
| 1 | Hello World |
| 2 | HTML, CSS, JSX, Bootsrap |
| 3 | Unit tests |
| 4 | Routes & Navigation |
| 5 | Game state (React classes & hooks) |
| 6 | Lists, maps, and objects |
| 7 | *Studio* |
| 8 | Minimal prototype, UX |
| 9 | Functional programming |
| 10 | Reusable components |
| 11 | Asynchronous programming & threads |
| 12 | Files and local storage |
| 13 | Multiplayer: online storage |
| 14 | *Studio* |
| 15 | Escape room showcase |

# Books and online resources

### Documentation & Reference websites

* [Mozilla Developer Network](https://developer.mozilla.org/en-US/)
* [World Wide Web Consortium](http://w3.org)
* [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/)

### 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/)
* [Google Fonts](https://fonts.google.com/)