Fall 2018 Syllabus

05-430 / 05-630 - Programming Usable Interfaces (PUI)

Human-Computer Interaction Institute, CMU

Course Staff

Instructor:	Jason Hong (jasonh@cs.cmu.edu) NSH 3523, office hours by appointment
TA:	Fanglin Chen (fanglin@cmu.edu) / NSH 4609 Office hours: M 9:00pm -10:00pm, F 9am-10pm or by appointment
	Cole Gleason (cgleason@cs.cmu.edu) / NSH 4605 Office hours: M 12:30pm -1:30pm, W 11am-12pm or by appointment
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	Kristin Williams (krismawil@cs.cmu.edu) / NSH 4619 Office hours: Tue, Thur 4-5pm in the OH Lab (NSH 4602) or by appt

Meeting Times

Class lecture	Scaife Hall 125	MW 9:00am-10:20am	
Lab PUI-A	GHC 4301 (Gates Hillman Hall)	Mon 10:30am-11:50am	Kristin
Lab PUI-B	NSH 3002 (Newell Simon Hall)	Mon 10:30am-11:50am	Cole
Lab PUI-C	GHC 4301 (Gates Hillman Hall)	Wed 10:30am-11:50am	Fanglin
Lab SSUI-D	NSH 3002 (Newell Simon Hall)	Wed 10:30am-11:50am	Mary Beth

Web Sites

This syllabus	https://goo.gl/wrvhry
Canvas	https://canvas.cmu.edu/courses/6395 (for getting assignments, submitting homeworks, and getting slides)
Piazza	http://piazza.com/cmu/fall2018/0543005630 (signup link) (for asking and answering questions about HW and labs)

Course Description (PUI)

This course is a combination programming course and design studio. This course is intended for HCII masters' students who come to CMU with a minimal, but competent programming background. It is also appropriate for CMU HCI undergraduate "second majors" in HCII who have had an introductory programming course.

Students will learn how to use rapid prototyping tools, how to design and implement effective GUI interfaces, and how to perform rapid, effective iterative user tests. More specifically, students will:

- Learn the basics of what is hard and easy to rapidly prototype

- Learn how to express one's ideas in a computational form, using modern rapid prototyping tools as well as HTML + CSS + JavaScript
- Learn basic terminology and approaches used by programmers, so you can work effectively with them
- Experience the joy and frustration of programming a working prototype
- Learn basics of human perception and cognition as it relates to UX design
- Design and conduct informal user tests of prototypes to find flaws with your interfaces
- Get a taste for the future of HCI and user experience (UX) design

Practical experience with these concepts is also provided via an accompanying lab which meets once a week. In previous years, there were two labs, one focusing on prototyping and the other on GUIs. This year, the two labs will be the same in terms of content.

Prerequisites
You must have experience and some fluency in at least one programming language. This would normally be the equivalent of at least one course in programming in a general purpose programming language (such as C, C++, Pascal, Java, etc.), but is pragmatically defined as "can successfully write a 300 line program in a 48 hour period."

Students are expected to have a basic understanding of HTML, and perhaps some experience with CSS. If you do not, there are plenty of online tutorials that can help you get started.

Students taking the advanced SSUI lab will be expected to have more extensive programming experience, for example a background in computer science, or having taken three or more computer science courses, or several years of industry experience in developing software.

This class will be taught more as a graduate-level course, not an undergraduate course. As such, students will be expected to display a maturity and problem solving capability at the graduate level.

Textbooks
There is one required textbook for this course, Donald Norman's book The Design of Everyday Things. You can order it from www.bn.com or www.amazon.com, coordinate with other students in this course to get cheaper shipping. Get it today, your first reading assignment will be soon. Also, nearly everyone working in HCI/UX has read this book, and so you should too. You can read the entire book in a single sitting.

Another highly recommended book is Universal Methods of Design (amazon bn), which gives short overviews of lots of different methods.

Attendance
Class attendance is mandatory. However, rather than taking attendance (since the class will be rather large), we will ask questions on the midterm and final exam about things that happened in

class, for example, discussion topics, insightful questions, interesting videos, presentations, bad jokes, and more. These will be in the form of answering (for example) 10 out of 12 questions about things that happened in class, so that you can miss a few classes if you need to, such as for job interviews or if you are sick.

Lab attendance is also mandatory. There will be a software system in use for managing attendance. You can miss up to 2 labs without it affecting your grade.

No using laptops in class. I consider it disruptive to use mobile devices in class, and the research says that it directly and negatively affects learning. *No Facebook, no videos, no texting.* These kinds of non-academic activities not only make it harder for you to learn, they also make it harder for people behind you as well. TAs will collect machines until the end of class if they are disrupting learning. *The only exception is to use laptops for taking notes, and you will have to request to do so.*

The final exam date and time will be established by the University later in the semester. *You will be penalized if you miss the final exam – do not schedule travel home until you know when the final is.*

Academic Honesty
CMU policies on academic honesty and plagiarism apply to this course. In particular, you may verbally discuss assignments, but not share code. In addition, you should document discussions of any depth by naming people you helped or got help from. Copying or other evidence of going beyond these rules will result in a minimum penalty of a 0 on that assignment. See: http://www.cmu.edu/policies/documents/Cheating.html

In general, these kinds of activities are allowed and even encouraged:

- Trying out apps / web sites related to the assignment to get design ideas
- Reading reviews of related apps / web sites to get ideas of problems people face
- Drawing on and using design patterns from related apps / web sites
- Showing and discussing your prototypes with others (but not actual code that you are doing for a homework assignment… note that this can be hairy with the web since it's trivial to see content source, so don't share links to your hw assignments, share screenshots or only show work on your laptop)
- Discussing the concepts or doing small examples of how a prototyping tool / web programming works
- Searching for examples on how to use a specific programming API
- Discussing assigned readings

The following kinds of activities are not ok. These are just examples and not comprehensive.

- Sharing code or content you created for an assignment with someone else in this class
- Using the code or content that another person in this class created

- Using code taken from other web sites (code libraries that are meant to be reused are ok). It's ok to read the code and learn from it, but the vast majority of implementation needs to be your own.
- Using media content from other sites, e.g. images and audio. The exceptions are Creative Commons content (check the license) or content made publicly available.
- Paying people to do your homework (yes, this has happened before at other universities)

Special Needs
If you are will be missing class for religious reasons, *let us know during the first week of class and it will not be penalized.* If you have a disability and wish to request an accommodation, please contact the Equal Opportunities Services and Disability Resources. I will be happy to work with you and them to support your success in the class.

Accommodations for Students with Disabilities
If you have a disability and are registered with the Office of Disability Resources, I encourage you to use their online system to notify me of your accommodations and discuss your needs with me as early in the semester as possible. I will work with you to ensure that accommodations are provided as appropriate. If you suspect that you may have a disability and would benefit from accommodations but are not yet registered with the Office of Disability Resources, I encourage you to contact them at access@andrew.cmu.edu.

Grading
Your grade will be weighted as follows:

Lab Grade (10% lab attendance, 50% homeworks)	60%
Final Exam	20%
Midterm	20%
Extra Credit (see below)	3% (2% quiz, 1% bonus assignment)

Readings
There will be some online readings for this course. *Yes, content from these will be on the exams, even if we don't discuss the readings in class.*

Required reading assignments are posted below in the schedule at the end of this document. Readings must be completed *prior* to the appropriate lecture. Some readings are from the ACM digital library, and you are expected to use campus resources to download them (the ACM digital library is available free when accessed from any computer on the CMU network). To access the material free from other computers use the Cisco AnyConnect VPN client. After authentication with your CMU credentials, this program provides a VPN connection, which makes your requests look as if they are coming from the CMU network. Some excerpts not available on the digital library will be posted on Canvas.

Homework and Quizzes
Homework assignments will include a combination of prototyping, programming, and demonstrating understanding on paper, and will be assigned in lab. In addition, regular unannounced quizzes will be handed out in class based on readings and other course content. No make-up quizzes will be allowed if you are not in attendance when a quiz is handed out. *The average of your quiz scores will go toward extra credit.*

Late Policy
Homework assignments will be docked 10% for each day that it is late.

Useful Sites for Learning More about HTML, CSS, JavaScript
You are expected to learn the basics of HTML and CSS on your own. We will cover main ideas in a lab. If you are unsure of your programming skills, you may also want to go through JavaScript tutorials on your own as well.

- Khan Academy has tutorials on HTML, CSS, and JavaScript
- CodeCademy has a lot of interactive tutorials on HTML, CSS, JavaScript, and JQuery
- W3Schools has many examples of web programming
- Javascript.info has many examples of JavaScript
- Lynda (CMU students get free access to tutorials)

A student from previous years shared this link about the web developer roadmap, which shows a lot of the front-end and back-end technologies and how they link with one another.

Statement of Support for Students' Health & Well-being
Take care of yourself. Do your best to maintain a healthy lifestyle this semester by eating well, exercising, avoiding drugs and alcohol, getting enough sleep and taking some time to relax. This will help you achieve your goals and cope with stress.

If you or anyone you know experiences any academic stress, difficult life events, or feelings like anxiety or depression, we strongly encourage you to seek support. Counseling and Psychological Services (CaPS) is here to help: call 412-268-2922 and visit http://www.cmu.edu/counseling/. Consider reaching out to a friend, faculty or family member you trust for help getting connected to the support that can help.

PUI Lab Syllabus

The labs aim to give students hands-on experience with techniques learned in lectures. Lab topics include:

- Prototyping tools (e.g., Balsamiq, Invision)
- Critiques and user testing
- Using Chrome debugger
- Version control
- Javascript

We will also have in-lab work sessions to help students with lecture material and assignments.

Assignments

There are a total of 6 assignments (Assignment 0 - 5) + 1 final project + 1 optional assignment. All assignments will be posted on Canvas and Piazza.

Assignment Submission

Assignments should be submitted through Canvas before the deadline. Please be sure to double check that your work was submitted (we've had hiccups with this in the past)

Resources

10 Frameworks to Build Mobile Application with HTML, CSS & JavaScript

Web Tutorials

- Khan Academy
- Codecademy
- W3 Schools
- Lynda (CMU students have full access to tutorials)
- Solo Learn

JQuery Tutorials

- Codecademy

Schedule

	Lecture Topic	Notes and Readings for Lecture (read before class)	PUI Lab	SSUI Lab	Homework Assignments
Mon 8/27	Course Intro		Introductions + Skill assessment		HW0 + HW1 assigned, both due Fri Aug 31 at 11:59pm
Wed 8/29	What is Design?	How to Help Someone Use a Computer (read before class)			
Mon 9/03	No Class (Labor Day)		Note that a makeup lab will be held Wed at 10:30am in NSH 3305		
Wed 9/05	Whys and Hows of Prototyping	Prototyping for tiny fingers (may need VPN) / Some Techniques for Observing Users	In-lab paper prototyping exercise		HW2 assigned, due Wed Sep 12 at 11:59pm
Mon 9/10	Usability Engineering Design Process	How to Conduct a Heuristic Evaluation / Heuristic Evaluation and Expert Reviews	Introduction to InVision		
Wed 9/12	Wireframes and Design Specs	No reading			HW3 and HW4 assigned, both due Wed Sep 19 at 11:59pm
Mon 9/17	Advanced Prototyping Techniques	Getting the Right Design and the Design Right Optional: Parallel Prototyping	Web Basics: HTML + CSS		
Wed 9/19	Design Patterns	Browse these two sites: User Interface Design Patterns Library / Android Patterns			HW5 assigned, due Mon Oct 1 at 11:59pm
Mon 9/24	Web Basics 1 URL / HTML / HTTP / JavaScript / CSS / DOM / Events	No reading	Web Basics: Javascript		
Wed 9/26	Web Basics 2 REST / JSON / Databases / Cloud	Web APIs for Non-Programmers / A Non-Programmer's Introduction to JSON	Javascript Refresher and jQuery		
Mon 10/01	??? (Jason out of town)		JavaScript cont'd (Objects)		HW6 assigned, due Wed Oct 17 at 11:59pm
Wed 10/03	??? (Jason out of town)				

Mon 10/08	Properties of People 1	Design of Everyday Things (book)			
Wed 10/10	Properties of People 2				
Mon 10/15	Designing Interaction Techniques	Zhai, Kristensen 2012 Optional: Balakrishnan, 04	JavaScript cont'd (Databases)		
Wed 10/17	Midterm Review	No reading			HW7 assigned, due Wed Oct 24 at 11:59pm
Mon 10/22	Midterm Exam (Jason out of town)	No reading			
Wed 10/24	??? (Jason out of town)				HW8 assigned, due Fri Nov 30 at 11:59pm
Mon 10/29	Business Thinking and UX 1		In-lab Critique		
Wed 10/31	Business Thinking and UX 2				
Mon 11/05	Machine Learning and UX 1	The Great AI Awakening / The Business of Artificial Intelligence	Web APIs and Bootstrap.js		
Wed 11/07	Machine Learning and UX 2	Principles of Mixed-Initiative User Interfaces			
Mon 11/12	Information Visualization 1	Heer et al 2010	Libraries		
Wed 11/14	Information Visualization 2	Heer et al 2012			
Mon 11/19	Designing for Security & Privacy	You've Been Warned / Folks Models of Computer Security	Animations + Information Visualization		
Wed 11/21	Thanksgiving (no class)				
Mon 11/26	Animation Principles	Chang 93 / Material Design and Motion			HW9 (optional, for bonus) assigned, due Sun Dec 9 at 11:59pm
Wed 11/28	Accessibility	???			
Mon 12/03	All The Other Fun Stuff I Didn't Get to Show You this Semester	No reading	HW7 showcase		
Wed 12/05	Final Exam Review	No reading			