

## Spring 2009 Syllabus for HCI 574X - Computational Implementation & Prototyping in HCI

**Credits:** 3 (mixture of lecture and practical lab exercises)

**Prerequisites:** not a comp. sci., comp. eng. or similar "tech" major, new to software programming

**Time:** MWF 2:10-3:00

**Place:** Engineering Distance Education (EDE) - Howe Hall - Room TBA

**Instructor:** Chris Harding (charding@iastate.edu)

**Office Hours:** by appointment, send email first

This course teaches fundamental concepts of software programming and the practical use of the Python programming language to support computational thinking and rapid system prototyping in the context of human computer interaction (HCI).

The course is meant to teach non-technical HCI students (background in psychology, business, design, sociology, education, journalism, etc.) to "think like programmers" and to develop solutions of problems common in HCI. Python is a good starter language; its high-level concepts support the rapid implementation of computational HCI tools, such as user interface design, and information visualization.

This instructor-lead "first programming course" teaches fundamental programming concepts and practical skills. The lectures will feature practical examples and exercises, students will develop and run software during class running Python on a personal laptop (Windows, Mac, Linux). The course will include homework assignments, midterm exam, examination of related literature and an class project.

### **Does it count as HCI "Implementation" core course?**

The HCI graduate program requires its students to take an "Implementation" course. As HCI 574X is currently an experimental course it requires HCI Supervisory Committee approval to count as substitute for HCI 575 or HCI 520. Consult your advisor for details.

### **Course content/major topics to be addressed:**

- Creating, editing and running Python programs on different operating systems.
- Using the python shell and integrated development environments.
- Python basics: Statements, syntax, expressions, control structures, classes, functions, modules, numbers, strings, lists, dictionaries.
- File I/O operations.
- Exception handling.
- Debugging, documentation, software engineering basics.
- Data mining & internet scripting.
- Design of graphical user interfaces (GUIs)
- Data conversion and exchange
- Information visualization
- 2D graphics and image processing

### **Textbook:**

Learning Python, Third Edition (for Python 2.5) Mark Lutz, October 2007, Pages: 746, ISBN 10: 0-596-51398-4 | ISBN 13: 9780596513986

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**Home work assignments (30%)** : 6 homework assignments, time 1 week, good documentation required, help and group work during class (some HWs: other students grade HW for results, clarity, documentation effort)

**Midterm (20%)**: take home assignment, larger HW on all major topics so far

### **Class project (30%)**:

Find a topic: Browse the python package index , flag interesting packages, think about glueing together 1-2 packages (input-processing-output-visualization, GUI?) get familiar with the packages (run a simple example to make sure it works) write a paragraph describing the project idea (mini proposal) + links Put on project description on bulletin board Example: Take GPS points text file, process, plot path/speed/etc. in pyplot, export as KML file for Google Earth, wrap a Tkinter or wxPython GUI around it

Form groups of 3-4 students per project (should mix of on/off campus students),

Set up a google project and subversion (VCS) for each project. Use it for development, documentation

Use part of each student's project grade will come from the subversion traffic!

put the pieces together, document (how-to screenshots), wikki, create download package

Project presentation (15 min, 10 slides)

explain how it works (data, packages used, workflow, GUI)

who did what? (contributions)

pros/cons? Use in HCI?

Demo

Project description (per group, 5 pages)

### **Critique (10%)**:

"Other people's project" critique (3 pages, during finals week),

Per single student, at random

download, install, run project X, make screenshots

Good/bad? Code readability? suggestions for improvements?

Use in HCI?

### **Participation (10%)**

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HCI 574x - Computational Implementation and Prototyping in HCI - Spring 2010 Schedule				
			First day of class:	1/11/10
			SC = Software Carpentry website , LP = Learning Python Book, PV = Python Visualization Book	Schedule is preliminary - will very likely change!
Week	Date	Book Chapter	Topics	Notes
1	11-Jan	Intro		Syllabus, get Python set up, interactive prompt example, GPS vis. example
1	13-Jan	LP ch.1, ch. 2 p.37	simple math, prints, shell exit	What's python used for, interpreter, bytecode, scripts, interactive prompt (p.37), HW 1
1	15-Jan	LP Ch 3	LE Part 1 ex. 2,3 (4), 5,6,7	IDLE, other python IDEs
2	18-Jan	Holiday		
2	20-Jan	LP Ch 4 start	Data types overview, help, lists	Hand out python cheatsheet
2	22-Jan	LP Ch 4 finish	Dicts, tuples, files	
3	25-Jan	LP Ch 5	Numbers, Booleans, Sets	HW 2
3	27-Jan	LP Ch 6, SC	Dynamic typing, shell play around	
3	29-Jan	LP Ch 7	Strings	
4	1-Feb	LP Ch 8	List and dicts	
4	3-Feb	(LP Ch 9)	Files (Catch-up?)	HW 3
4	5-Feb	LP Ch 10	Statements	
5	8-Feb	LP Ch 11	Assignments, syntax, expressions, print	
5	10-Feb	LP Ch 12	If tests	
5	12-Feb	LP Ch 13	While and For loops	
6	15-Feb	LP Ch 14	<<< Catch-up? >>>	HW 4
6	17-Feb	LP Ch 14, SC	Documentation, Style (SC)	
6	19-Feb	LP Ch 15	Functions	
7	22-Feb	LP Ch 16	Scope, passing args	
7	24-Feb	LP CH 17	Functional progr., list comprehension	Have project proposals on bulletin board
7	26-Feb		<< Catch-up? >>>	

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8	1-Mar		Midterm review	hand out midterm
8	3-Mar		Answer midterm questions	Midterm due at midnight March 4
8	5-Mar	PV Ch 4 / Ch 10	Data organization, File (OS) operations, command line args, sh.util	
9	8-Mar	PV Ch 5 / Ch 10	Processing text and CSV files, FileInput	
9	10-Mar	PV Ch 5	Time functions, regular expressions	
9	12-Mar	PV Ch 6	Graphs and plots, bar charts, histograms (GPS plot)	HW 5
10	15-Mar	Spring Break		
10	17-Mar			
10	19-Mar			
11	22-Mar	SC	Subversion play around	Form project group, make google project
11	24-Mar	LP Part 5	Modules	
11	26-Mar	LP Part 6	OOP	
12	29-Mar		GUI design (Tkinter, wxPython)	
12	31-Mar	LP Part 7	Exceptions	
12	2-Apr		Catch-up?	HW 6
13	5-Apr		???	
13	7-Apr		Internet scripting?	
13	9-Apr		TCP/UDP network connection?	
14	12-Apr		Image processing?	
14	14-Apr		Vizzard?	
14	16-Apr		???	
15	19-Apr	Project week	Help with group projects	

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15	21-Apr		Help with group projects	
15	23-Apr		Help with group projects	
16	26-Apr	Work on project		
16	28-Apr	Class project presentations		Group project paperwork due (5 pg), docum., downloads
16	30-Apr	Class project presentations		assign "other people's" project critiques
17	3-May			
17	5-May			
17	7-May			"other people's" project critiques due