THE UNIVERSITY OF ARIZONA
College of Applied Science & Technology

APCV 401: Introduction to Human-Computer Interaction

Syllabus for Fall 2022-23, 2nd 7.5 weeks

2022-October-13 - 2022-December-15

Meeting time	Tuesdays, 18:00 - 19:30 MST via Zoom
People	Instructor: Dr. Ryan Straight
Office Hours	Virtual open-door. Link available in LMS.
Teams	@ryanstraight
Twitter	@ryanstraight
PGP	https://keybase.io/ryanstraight

The most recent version of this syllabus is always available as HTML or PDF.

Course Description

This course is a beginning level exploration of human-computer design, interaction and interfaces. The students will be introduced to the theory of human-computer interaction (HCI) as well as to the principles of effective visual design using user experiences.

Course Overview

On completing this course, students will have participated in each step of the interaction design process. They will be familiar with the vocabulary, tools, and methodologies of an interaction designer and know the role of each member of an interaction design team. Students will understand how human-computer interaction fits in the larger topic of interaction design.

This course utilizes a variety of educational activities to deliver and assess understanding of the course content. Students will work in collaborative groups to complete weekly questions from the reading assignments, participate in activities during the weekly course meetings, complete a series of five independent projects, and engage in other activities as assigned.

We will cover many topics in this class, we will find ourselves in many places and times, and we will be both historians and futurists. Any study of the intersection of technology and education requires a foray into myriad topics, including psychology, sociology, media studies, gender studies, geo-politics, security, futurism and more. Be prepared to become both consumers and creators. Bring your passion to this collaborative experience and we will all benefit greatly.

This course has been updated for inclusion in the Cyber Operations program. With this inclusion, the notions of security/usability balance, appropriate timing of security considerations, and the place of security at various points in the design, development, and testing of user interfaces is addressed. Through this, students will understand user interface issues that will affect the implementation and perception of security mechanisms and the behavioral impacts of various security 'policies.'

Course Objectives

This course is broken down into weekly topics and is constructed based on the following course objectives. Students will:

- Explain the difference between good and poor interaction design.
- Explain what is good and bad about an interactive product in terms of the goals and core principles of interaction design.
- Explain what is meant by problem space.
- Describe what a conceptual model is and how to begin to formulate one.
- Outline the core interaction types for informing the development of a conceptual model.
- Explain what cognition is and why it is important for interaction design.
- Explain what mental models are.
- Practice generating and eliciting mental models from others.
- Identify and explain implicit and explicit security policies in systems.
- Analyze the role of social engineering and its continued use as a primary attack vector.
- Discuss and describe the role of and best practices in authentication passwords.
- Describe the social mechanisms that are used by people when communicating and collaborating.
- Discuss how social media have changed the ways in which we keep in touch, make contact, and manage our social and work lives.
- Describe some of the new forms of social behavior that have emerged as a result of using new social media and communication technologies.
- Describe how emotions relate to the user experience
- Identify examples of interfaces that are both pleasurable and usable.
- Present well-known models and frameworks of emotion and pleasure.
- Critique the persuasive impact of an online agent on customers.
- Cite examples of different kinds of interfaces
- Discuss the difference between graphical and natural user interfaces (GUIs vs NUIs).
- Compare and select interfaces appropriate to given applications or activities.
- Discuss how to plan and run a successful data gathering program.
- List steps for planning and running a data gathering interview.
- Cite important practices for questionnaire design
- Describe frameworks for focusing an observation in the field
- Discuss the difference between qualitative and quantitative data and analysis.
- Analyze and report data gathered from a questionnaire.
- Explain strategies for analyzing data from an interview or observation.
- Evaluate and design authentication interfaces.
- Explain the main principles of a user-centered approach to Interaction Design
- Describe a simple lifecycle model of interaction design.
- Perform each step of the interaction design lifecycle on a project with a given scope
- Describe different kinds of requirements.
- Identify different kinds of requirements from a simple description.
- Match data gathering techniques to requirements gathering activities
- Perform hierarchical task analysis on a simple description.
- Describe prototyping and different types of prototyping activities.
- Produce simple prototypes from the models developed during the requirements activity.

- Create a conceptual model for a product and justify your choices.
- Explain the use of scenarios and prototypes in design.
- Analyze policies that users control and hidden policies controlled by a system.
- Define key concepts and terms used in evaluation.
- Describe a range of different types of evaluation methods.
- Discuss some of the practical challenges that evaluators have to consider when doing evaluation.
- Match different evaluation methods to their appropriate stages of the design process.
- Define the components of the DECIDE framework described in the book.
- Describe the components required to conduct a usability test and the kind of information that can be gathered
- Conduct a simple usability test of an existing website or interactive product.
- List and define the 10 heuristics identified by Nielsen, et al.
- Conduct a heuristic evaluation of an existing website or interactive product.
- Define and demonstrate how implementing security impacts the user experience.

Expected Learning Outcomes

Through the achievement of said course objectives, students will be able to:

- identify good design principles applied to human-computer interaction systems
- communicate why some interaction choices are better than others
- describe and evaluate best practices regarding interface security measures
- create an interface prototype from the ground up
- evaluate existing prototypes and interfaces according to user interface and experience guidelines
- implement interface accessibility improvements

Required Readings

Preece, J., Sharp, H., & Rogers, Y. (2019). *Interaction Design: Beyond Human-Computer Interaction.* **5th ed**. Chinchester, West Sussex, UK: Wiley. ISBN: 978-1119547259. http://www.id-book.com.

Browsing the book's website is highly encouraged.

Security-related readings are also required and can be found in the LMS, including the OWASP Secure Coding and Testing guidelines: https://www.owasp.org/

Additional readings will be provided on a module-by-module basis.

Content and Assessment

Assessments in this class rely heavily on *you* (and not in the way you may expect). Read below to find out how.

Schedule

The general course schedule is maintained in detail in the LMS. Recorded class sessions are available through Teams. Attending class sessions (or watching the recorded session if you missed class) is **absolutely necessary and vital** to your success in this class.

For the purposes of this class, weeks begin on MONDAY.

Below is the basic schedule with weekly topics and due dates. There is no final exam, instead there is a final project. **CH#G** the group questions relevant to that chapter due that week, and **P#** and **U#** refer to the project and bonus assignment due that week (i.e., **P1** is **Project 1** and so on).

Week	Module	Topic	Due date
1	1	Intro to class & Interaction Design	2022-10-23
2	1	Cognition and conceptualization	2022-10-30
3	2	Social networks, emotion, CMC	2022-11-06
4	2	Interviews, questionnaires, surveys, prototyping	2022-11-13
5	3	Heuristics & philosophy of technology	2022-11-20
6	4	User experience	2022-12-04
7	5	Usability testing	2022-12-04
8	5	Finals week	2022-12-13

Assignments

Following is a basic list of assignments and their point values. Note that this may change throughout the semester depending on class needs. Drill down into each assignment to learn more. There is a final project in lieu of a final exam, due as described above. Total does not include possible extra credit. This course's grades use the standard grading scale (A-E) and points do not round.

Assignment	Point value
Weekly reading responses	150 (15pts x 10 chapters)
Project 1: The Conceptual Model	30
Project 2: Personas	35
Project 3: Lo-Fidelity Prototypes	40
Project 4: Usability Testing Plan	50
Project X: XR Project or Annotated Bibliography	120
User Experience Analyses	*30 (6pts x 5)*
Final Reflection	*10*
	Total: 425

Assignment Details

Each module culminates in a project wherein students are provided with a real-world problem to solve. Projects are individual in nature but may require students to perform interview or testing simulations with third parties outside the class. Each project has an associated (entirely optional and bonus) User Experience Analysis that allows students to apply what they've accomplished in the project to a more personal, creative, familiar experience.

Project 1: The Conceptual Model

This project is intended to allow you to demonstrate your understanding of the conceptual model, how it fits into the larger realm of interaction design, and to flex your creative muscles. There is no required format for how the material should be presented beyond using a table where specified. Students will also reflect on the importance of and need to include security considerations at the conceptual stage.

- 30 points, evaluation and point distribution in assignment rubric.
- *6 bonus points for optional UXA*

Project 2: Personas

This project aims at introducing students to the concept of personas and their usefulness and place in the interaction design process. Personas should be in narrative form and should include a photo, name, and

personal details that bring the persona to life. Each persona must include likes, dislikes, and goals for visiting the site and be referenced to the analytics data when possible. Students are also introduced to Creative Commons and public domain materials.

- 35 points, evaluation and point distribution in assignment rubric.
- *6 bonus points for optional UXA*

Project 3: Lo-Fi Prototypes

Students are given a scenario in which they provide a low fidelity prototype to a client for testing. Students will provide an appropriate interface metaphor, interaction type, the paper prototype itself, a step-by-step documentation of the interactions within the prototype (as per the scenario), and a reflection of their process *and* the experience of having someone else 'test' the prototype. Students' artistic skills are not evaluated. Inclusion a of standards-based authentication module is required.

- 40 points, evaluation and point distribution in assignment rubric.
- *6 bonus points for optional UXA*

Project 4: Usability Testing Plan

Students will be introduced to methods for testing the usability of websites and perform tests on real-world websites. Define different methods for evaluating a website's usability and choose the appropriate test given example sites at different stages of development. Given a site with a predefined set of usability issues, propose methods for resolving those issues.

- 50 points, evaluation and point distribution in assignment rubric.
- *6 bonus points for optional UXA*

Project X: XR Project or Annotated Bibliography

The final project in the class can be either a group or solo project. See the assignment information page for details.

- 120 points, evaluation and point distribution in assignment rubric.
- *6 bonus points for optional UXA*

Final Reflection

Students will subjectively reflect on the class as a whole (both in content and delivery), addressing their expectations of the experience, what they perceived (specifically regarding the online environment), and what and how students felt were their biggest accomplishments and hurdles throughout the semester. This is not intended to be a replacement for TCEs.

- *5 bonus points*

Evaluation

You'll notice this course does something a bit different with project grades: it is **your** responsibility to explain **how** you achieve the targets listed, not to simply state that you did. Each project comes with a **grading declaration** quiz. For each list of targets (ie, rubric), you will be required to complete the project's associated quiz to, again, explain how you feel you fulfilled that portion of the assignment. Once the declaration is submitted, the assignment submission folder will open and you will submit your assignment files there.

You cannot submit an assignment without first completing its associated grading declaration!

Gateway Requirements

Also be aware that there are **gateway requirements** prior to reaching the assessment rubric. For example, if a project requires you to submit an 8-10 page paper and your submission is only 6 pages (ie, does not meet

the gateway requirements) **I will simply not grade it**. These gateway requirements are made clear in each assignment document.

Your grading declaration is a gateway requirement. If it is missing or incomplete, again, the assignment will not–*cannot!*–be evaluated!

Class Policies

"Quicksand" Policy

In this class we cover all the technical tools and skills that you will need to complete the projects and more (considerably more). That said, if you want to explore beyond this and use skills or techniques that are not covered in class, the rule is: like quicksand, if you get yourself in, you must get yourself out. This does not mean that I do not encourage these explorations; quite the opposite! Just that I cannot be responsible for techniques that we haven't covered. That said, **you must** check if you wish to make changes that will significantly alter the nature of an assignment (i.e., using a different coding language, changing a gateway requirement, and so on). (Adapted from Dr. Sarah Sweeney's policy.)

Communication

I am nearly always available through electronic means. My policy is that I will respond *usually* immediately, *mostly* within 24 hours, and *at the latest* to questions within 48 hours (or by Monday morning if sent during the weekend, during which I do not work). If I do not respond in this windows do not hesitate to bug me. All questions that are class-related and not personal in nature should be posted in Teams to the class channel so everyone can benefit from the response (or chime in). Personal issues may be sent via direct message (DM). **All** emails sent to me should have subjects beginning with **APCV 401**. All emails I send (that are not automatically created by the LMS) will have the same. This makes finding things considerably easier. Still, I reiterate: Teams is *far and away* the better way to contact me.

Also note that I *do not respond* to communications about making up missed work or improving grades during the end of the semester. It is your responsibility to keep an eye on your grade throughout the semester and contact me with your concerns before the course is nearly ended. If you missed some points in week 2 you should not be petitioning in week 7 to make them up.

Program Technology

Classes in this program are technology-driven, as you may expect. As such, you are required to have ready access to a relatively modern computer and an account that allows you to install software on that computer. You should also *be excited* to try and use new technologies. We do a lot of that.

- The Learning Management System: the class LMS can be found on D2L at https://d2l.arizona.edu/. Log in with your NetID. This is where you will find assignment dropboxes and grades.
- Discussion: we will have a full-class chatroom/discussion board/forum on Microsoft Teams. You will find the link to join the team in the LMS.
- Social: updating your profiles in both D2L and Teams is **required**. We're spending a lot of time together, so no excuse to just be a NetID for 8 weeks. A current image is the bare minimum for this (note that students may not be able to add a Teams profile picture; this is fine).
- Tools: tou may be asked to use software that requires more processing power than your computer has. Contact the instructor if you feel this will prevent you from participating.
- Meetings: class meetings are hosted via Zoom. **It is REQUIRED that you have a microphone and headphones for the class meetings**. (A cheap set of earbuds will work if your laptop has a mic

and you will be from a relatively quiet place.) **You *will be expected* to use them**. Should we have a class activity that requires a microphone and you do not have one you *will not* receive credit for that assignment. Having working headphones and a microphone is **not negotiable**.

- Browser: you will need to install the latest edition of the Chrome browser for this class. Tech support is vastly simpler if everyone uses the same browser.
- Assignments: document submissions are required to be in PDF format unless otherwise noted. Assignments should also be in APA 6th ed. formatting (7th, if you're comfortable using it; `papaja` defaults to 6th, which I am fine with), which is best achieved using the papaja Rmarkdown package and Zotero for citation management. Alternately, Microsoft Word (free for students) or Google Documents (free for all) also work, but everything is manual, obviously.
- Portfolio: also note that the program uses GitHub extensively and you should already have an account and be familiar with it.
- Coding: our program, as noted, relies heavily on a variety of technologies and you will be learning, as such, a variety of different coding languages. Being proficient with the IDEs for various languages is required (though you will learn as you go). The suggested IDEs for the languages we cover are:
  - R: RStudio (some classes may use RStudio Cloud)
  - Python: Jupyter Notebook, Replit, Spyder, IDLE
  - C++: Replit
  - Java: Netbeans, Eclipse
  - Kotlin: Android Studio
  - AWS: Cloud9
  - Azure: Visual Studio
  - Swift: Xcode

Other technologies and software may be required in specific classes, which can be found in the *Required or Special Materials* section.

Student Workload

The material covered and assignments required in a shortened 7.5 week semester are equal to those in a full 16 week semester with half the time allotted. Time management and "working ahead" are practical necessities in an accelerated semester. **Do not fall behind**. "I didn't have time" is not an acceptable excuse for missing assignments or readings.

According to University policy, at least 15 contact hours of recitation, lecture, discussion, seminar, or colloquium, as well as a minimum of 30 hours of student homework are required for each unit of student credit. A contact hour is the equivalent of 50 minutes of class time or 60 minutes of independent-study work. For an online course this equates to 45 hours of work per credit; 135 hours total for the semester in a 3-credit class (9 hours per week). The hour requirements specified above represent minimums for average students, and considerable deviation (more or less) of these requirements may occur. **In shortened, accelerated 7.5 week classes this workload is doubled**. *You should expect to spend 18 hours per week on this class. Budget your time wisely and always look ahead.*

http://catalog.arizona.edu/policy/credit-definitions

Use of Student Work

Assignments completed for this course may be used as examples of student work in an instructor or program portfolio. Names and other identifying elements will be removed before inclusion. Students who do not wish their work to be used must inform the instructor in writing before the start of the second week of classes.

Academic Dishonesty

Cheating and plagiarism are unethical. Students are expected to do their own work. Plagiarism includes copying or cutting and pasting from online sources, taking information from a book or article, copying someone else's paper, or having someone else do your work for you. Research sources must be properly documented. Students found cheating or intentionally plagiarizing will receive a zero for the assignment and may be dismissed from the class with a failing grade, required to attend workshops, have a permanent note included on his or her transcript, or any combination thereof to the instructor's discretion.

I take this **very seriously** and, as professional academics in this field, I expect you to, as well. **When in doubt, cite!** See your program materials for a primer on APA style, citation, and avoiding plagiarism and cheating.

In a course like this it is likely you will come across much in the way of inspiration, be it in class or through your own research. Keep a constant log of all assets you either use in your work (code snippets or free vectors or audio clips, for example) or note down what the inspiration was for submitted work. Being *inspired* by something you love is perfectly fine, provided you note it; simply *using* it is not.

Syllabus Policies

The full text of the UA policies no longer needs to be included in syllabuses and can be found at: Syllabus Policies | Academic Affairs

These include:

- Absence and Class Participation
- Threatening Behavior Policy
- Accessibility and Accommodations
- Code of Academic Integrity
- Nondiscrimination and Anti-Harassment Policy
- Subject to Change Statement

The following sections are *supplemental* to these required policies. Be sure to read them in their entirety!

Classroom Behavior Policy

While we meet only virtually, in order to foster a positive learning environment, students and instructors have a shared responsibility. We want a safe, welcoming, and inclusive environment where all of us feel comfortable with each other and where we can challenge ourselves to succeed. To that end, our focus is on the tasks at hand and not on extraneous activities. Please focus on the meeting during the meeting.

Attendance and Meetings

Unless otherwise stated, all my classes meet entirely online with synchronous, optional weekly live meetings. You're an adult – be responsible for your attendance. If you miss a class you are to watch the recording and participate in any relevant discussion. There are also a number of things that you are expected to complete within the first week of class, namely reading this syllabus *in full*, reading the FAQ, understanding *grading declarations* and *gateway requirements*, and completing the Introduction Video assignment (if applicable), among others. Failure to do these can result in being administratively dropped from the class. Likewise, if your particular financial situation requires you to physically attend a class (veterans' benefits, some international enrollment requirements, et cetera), no/poor attendance can result in being administratively dropped from the class. *Note: instructors are **not** obligated to administratively drop students for failure to participate.* If a student is administratively dropped in the first half of the class a "W" will be administered if s/he has maintained a passing grade (60% or higher). An "E" will be administered for anything lower unless extenuating circumstances dictate otherwise as deemed appropriate by the instructor.

See the class attendance policy in the General Catalog: http://catalog.arizona.edu/policy/class-attendance-participation-and-administrative-drop

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Paper/Assignment Submission

All assignments, papers, projects should be submitted in the specified method based on the *system time* in the LMS. Due to the frantic nature of the accelerated semester, **no late work will be accepted for partial points**. Keep in mind, however, that much work is iterative and **you are still expected to complete it as later assignments/work are predicated on earlier assignments/work**. Be aware that instructors **are not obligated** to accept late work at all! Students are responsible for ensuring proper delivery of their assignments/papers/projects. If an agreement has been made with the instructor to accept work after the due date or in a unique format it is **the student's responsibility** to let the instructor know when this is done. Submissions of this nature may not necessarily be graded and returned along the same schedule as others. This policy may change for individual assignments. **Do not wait until the last minute to submit**. Your router going down or your computer's clock being different from that of the LMS are **not** valid reasons for being late. It is also highly suggested you keep your 'working' folder in Google Drive or some other cloud-copy backup location like Box.net. Your University of Arizona Google Apps for Education account comes with free, unlimited storage. Use it.

All formal written assignments submitted should be properly formatted and stylized. I *require* that APA format be followed *when appropriate* (the **papaja** R package is *incredibly* handy for this). You may omit the cover page and abstract APA requirements for small assignments and should use whatever template is provided for you should one be provided. For the activities or when you are required to present content in a particular format, just follow best practices for including your name, the class, the date, and the assignment in the header.

Grading Turn-Around Time

Please note that I generally do not begin to grade an assignment until after the due date since it is my preference to grade all students' submissions at one time, as well as return grades and feedback simultaneously. I will do my best to provide grades and useful feedback expediently.

However, some submissions require me to spend a significant time working through the materials. This may cause me to be delayed in grading that project. Additionally, if I am traveling I may be delayed in grading your submission. If this happens I will let everyone know.

You are expected to retain an electronic copy of all work submitted. If transmission of the work fails, you are expected to "resend" the document or message (in the case of online discussions). This is entirely your responsibility.

Social Media Policy

Should this course require participation in social media you have the option of using "burner" accounts if you feel uncomfortable with using a personal account for academic work. You may even choose to use a unique, unrelated email account to sign up for various platforms. You are in no way required to follow, friend, etc., your instructor, only to provide information about the account you decided to use. If this is the case for this class, you will be notified of the social media requirement.

The reason for this policy is as follows: if you are active on social media already and want to combine your personal and professional/academic activities, you may; if you are active on social media and *do not* want to mingle your personal and professional/academic activities, you have that option (this method is preferred for students); if you are *not* active on social media and have no intention of maintaining a presence after

this course, simply abandon or delete your burner account. It is your instructor's wish to reap the benefits of developing personal learning networks and getting global perspectives while maintaining a safe, secure environment for you.

If you use a "professional" account, you are encouraged to connect with the program, college, and university on social media.

Office Hours and Scheduling Meetings

I have a *virtual* open-door policy. That is to say, feel free to send me a DM and see if I'm available to chat any time. I like to think of it as dropping by the department's building and peeking your head in my door. Just as it is in person, I'm not always available right that second, so you're welcome to 'wait in the hall' (until I've finished doing whatever I was doing) or schedule an appointment with me. I'm happy to do a video conference via Teams or Zoom.

For lecture recordings, which are used at the discretion of the instructor, students must access content from an approved source only. Students may not modify content or re-use content for any purpose other than personal educational reasons. All recordings are subject to government and university regulations. Therefore, students accessing unauthorized recordings or using them in a manner inconsistent with UArizona values and educational policies (Code of Academic Integrity and the Student Code of Conduct) are also subject to civil action.

Life, Physical, and Mental-Health Challenges

If you are experiencing unexpected barriers to your success in your courses, please note the Dean of Students Office is a central support resource for all students and may be helpful. The Dean of Students Office can be reached at (520) 621-2057 or DOS-deanofstudents@email.arizona.edu.

If you are facing physical or mental health challenges this semester, please note that Campus Health provides quality medical and mental health care. For medical appointments, call (520) 621-9202. For After Hours care, call (520) 570-7898. For the Counseling & Psych Services (CAPS) 24/7 hotline, call (520) 621-3334.

Basic Securities

Any student who has difficulty affording groceries or accessing sufficient food to eat every day, or who lacks a safe and stable place to live, and believes this may affect their performance in the course, is urged to contact the Dean of Students for support. Furthermore, please notify the professor if you are comfortable in doing so. This will enable them to provide any resources that they may possess. (Adapted from Sara Goldrick-Rab.)

What to Expect

Given the nature of our field, it is entirely possible that materials considered adult, controversial, or objectionable in nature will crop up from time to time. We will be spending the majority of our time on the Internet and we should not only understand but respect the fact that it is a free and open place. As responsible adults, I encourage and expect everyone to be safe, smart, and secure when engaged online. Should you have any questions or concerns about content, please email me to discuss an alternative assignment.

A Personal Note

We live in a digital age. We communicate through digital means. While I fully expect your submitted assignments to employ proper spelling, grammar, construction, and styling, I not only allow but expect and encourage you to express yourself using whatever communicative means you like, presuming it stays true to the conduct policies listed above. I will use emoticons; I will type in the text chat without using proper capitalization and punctuation; I will use reaction gifs and make references to memes in casual situations; I will share entertaining but relevant media. If I can do it, so can you. Just remember: a place and time for everything, just as the way you speak with friends on a Friday night out is not the same as when you're giving a conference presentation. Context is everything. Be yourself but be respectful and always work in good faith.

*Information contained in the course syllabus, other than the grade and absence policy, may be subject to change with advance notice, as deemed appropriate by the instructor and as needed to accommodate students' progress. Always **link** to this document instead of downloading a local copy, though you are encouraged to keep a copy for your records.*

Syllabus dated: 2022-November-29.