

Introduction to Ubiquitous Computing (Info 150)

College of Computing & Informatics, Drexel University
Course Syllabus, Spring 2021

Monday, Wednesday and Friday, 4–4:50 p.m. EDT

Professor

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Office hours by appointment

The most profound technologies are those that disappear. They weave themselves into the fabric of everyday life until they are indistinguishable from it.

—Mark Weiser

Course Overview

This course introduces the field of ubiquitous computing (ubicomp), which refers to the modern era of computers embedded into everything we do and everywhere we are. From smartphones to smart homes, students will explore what makes an object or device “smart.” Topics include privacy, interfaces, location, and context-awareness. It engages students of any background in reflecting on the role of ubiquitous computing in everyday life and thinking critically about the impacts of present and future technologies.

Course purpose

This course is part of the User Experience core competency within the Information Systems major. It is also an elective, particularly for the Human Computer Interaction minor, but it may be taken as a Free Elective by students in other programs.

Expected learning outcomes

Upon successful completion of this course, you will be able to:

- Describe the scope of the field of ubiquitous computing
- Know the types and capabilities of ubiquitous computing
- Analyze challenges and risks of innovating with ubiquitous computing
- Understand the history of ubiquitous computing and its unmet potential as a vision

Textbook and readings

The required textbook for this course is *Ubiquitous Computing Fundamentals*, edited by John Krumm (2010, ISBN 1420093606). All other readings will be made available on Blackboard.

You'll be expected to do the scheduled readings each week prior to our Wednesday meeting. The readings are straightforward and relevant, and some are even fun (though many students find the textbook to be dry). There will be weekly quizzes to help you gauge your comprehension and keep you on track. You will also have ample opportunity to demonstrate mastery of the readings through the assignments.

Structure of the course

This course makes use of both live (synchronous) and self-paced (asynchronous) elements. To begin with the synchronous portion, this course is scheduled to meet Mondays, Wednesdays and Fridays at 4:00 p.m. We will meet as a class on Zoom on Mondays and Wednesdays for discussion and activities. Again, you should have completed the week's assigned readings prior to our Wednesday meeting. You can use our scheduled time on Fridays to watch the prerecorded lecture videos on Blackboard and participate in other course activities, but you are also free to do this work on your own schedule.

Contacting me

Student–instructor interaction is an important part of any course. I am available to you, even in this asynchronous, online setting. I want to help you succeed in this course, in your program at Drexel—and in life. Please contact me with any questions, problems, discoveries or anything else.

Feel free to email me at any time. Note, however, that I do not generally check email on nights or weekends. In our always-on society, it is important to set boundaries—firstly because healthy lives require off-time, and also because our academic activities require uninterrupted periods of time for reading, writing and thinking. Moreover, taking time for rest and pursuing leisure activities have been shown to improve productivity, creativity and accomplishment, as Alex Pang discusses in his book [Rest: Why You Get More Done When You Work Less](#). I hope you will join me in living with more balance.

In light of the pandemic

Against all our hopes, the pandemic is still with us. (Though, dare we say, the end seems to be near.) We all wanted to be back on campus by now, but the world has not cooperated with our wants. Besides this, of course, our lives have been disrupted in so many ways.

As such, there are a few agreements I would like us to make as a class. First, remember that nobody signed up for this. We're still social distancing, we're still learning (and teaching) from home, and our lives are still being disrupted in big and small ways. At times you may be angry, frustrated or fearful. You may fall ill, as might your family members or roommates. Troubles may come up that we can't see yet. It will be difficult. But you're not alone. We're all in this together. We will help each other and do our best to get through this. Let's prioritize supporting each other. Let's do our best to be flexible and understanding when unexpected situations come up.

Assignments and Grading

This class will provide you with a platform for learning and trying new things. You will get the chance to connect what we learn and discuss in class with what you have learned and practiced in other classes in the form of multimedia content, be it text, video or audio. The class will also give you a chance to develop work that you are proud of and that you can use in your portfolio—and I hope it will also be a fun way to instill what you will learn this quarter.

Assignments

As a class, we will create and publish work in our online magazine, *Digital Shroud*. The work you do for this class will be posted there, meaning it will have an audience that extends beyond our class both in space and time. Feel free to share your posts with friends and colleagues, who will be able to read and respond to all of our work. Throughout this class, you will create four posts (each of equal importance) for *Digital Shroud*. These posts may take the form of:

- Text with interspersed images and infographics (published directly on Medium)
- Videos (uploaded to YouTube and embedded on Medium)
- Audio (uploaded to SoundCloud and embedded on Medium)

If text, each post should be about 1,200 words; video or audio should be about 5 minutes. You may work with a partner on up to two of your posts, but you can also do all four posts on your own. You may publish on *Digital Shroud* using your real name or a pen name. If you are not comfortable making your work public, you may submit your work on Blackboard.

For the content of your posts, you may choose from the topics below (more detail on each can be found on Blackboard). Over the course of the term, you should choose at least one topic from each category. If you have an idea based on a topic not listed here, let's talk!

Category A: Scope of the Field and Capabilities of UbiComp



Evaluate an existing ubiComp system



Summarize recent academic research within ubiComp



Conduct a small-scale research study

Category B: Challenges and Risks of Innovating in UbiComp



Create a prototype of a new ubiComp system



Imagine the future with design fiction



Create a proposal for a larger-scale research study

Category C: History and Unmet Potential of the Field



Profile and critique a historical ubiComp system



Profile a ubiComp thought leader or institution

Each of your posts will be developed in four stages. The schedule of due dates is given on the last page of this syllabus. The stages are:

1. **Pitch:** On Blackboard, submit a 1–2-sentence overview of your idea for a post. I will approve (perhaps with modifications) within a day or so.
2. **Draft:** On Eduflow, submit a complete first draft of your post (all types of files allowed).
3. **Peer review:** On Eduflow, submit comments and ideas to your classmates to help them improve their work. You'll complete two peer reviews for each post of your own.
4. **Final:** On Medium, publish your complete post. On Blackboard, submit the URL of your post.

Grading

Research has demonstrated that traditional methods of grading diminish students' learning, decrease students' interest in the subject matter, and prevent students from taking creative risks. Moreover, many students experience anxiety about grades. In this class, we are here to learn, to become interested in the subject matter, and to take creative risks by trying new things (not just following a rubric)—and we certainly don't need more anxiety in our lives. So we will take a different approach to assessment.

My intention with this class is to help you to work in an organic way, as you will after graduation. So while you will get a final grade in the class, I will not put quantitative grades on individual assignments. Rather, when I review your work, I will ask questions and make comments meant to engage your work rather than simply evaluate it. You, too, will reflect deeply on your work and that of your peers throughout this quarter, and we will discuss your learning and effort as the course progresses. We will do this throughout the course, but there are three things I will ask you to do as anchors for this process:

- **Goal-Setting:** During Week 1, we will set goals for our learning this quarter to give us each a concrete place to aim for in addition to the general course learning outcomes listed above.
- **Midterm Reflection:** During Week 4, I will provide you with a link to an online form that will guide you through a reflection on your work thus far—particularly with respect to the goals you set for yourself. At the end, you'll be asked what letter grade you would give yourself for your work to date. This is your chance to assess yourself realistically and challenge yourself to improve in the second half of the term. I will respond to your reflection, and we'll have a conversation if our respective assessments do not match.
- **Final Reflection:** During Exam Week, I will provide you with another link to an online form where you'll complete your final self-reflection for the term. Again, I'll ask you what grade you would give yourself. I prefer to give everyone the grade they would give themselves, I do reserve the right to make adjustments.

For reference, here is my interpretation of the letter grades:

- *A – Excellent:* Original and creative thinking, and strong writing. Goes above and beyond in effort and participation, and demonstrates mastery of the course content through application. Supplements required coursework with additional readings, reflections and observations.
- *B – Good:* Demonstrates understanding of the facts and concepts presented in class with few misapprehensions. Most writing is well done with well supported arguments.
- *C – Acceptable:* Meets most expectations. Some learning is shaky or ignored. Not fully present.
- *D – Poor:* Shows flawed understandings of course content. Little participation or effort.
- *F – Failing:* Deep misunderstandings, poor attention, very low participation.

I know this process is quite different from how we usually think about grades. If any of this causes more anxiety than it alleviates, contact me at any time to discuss your progress in the course. As the course goes on, you'll be able to track your progress in the My Grades section on Drexel Learn.

If you are worried about getting a good grade in this class, your best strategy should be to do the readings, dedicate yourself to mastering the course material, ask questions often, complete the assignments diligently and on time, and engage earnestly with all your classmates.

Policies

Academic integrity

You are expected to conduct yourself in a respectful manner as befitting the university environment. This includes academic integrity. In this course, as with any Drexel course, cheating will not be tolerated. This includes plagiarism (using others' intellectual work without reference) and cheating. All work you submit must be your own work, with sources properly cited. Any plagiarism or other academic dishonesty will result in a sanction that may extend to failing the course. I am obligated to report incidents of cheating (including plagiarism) to Drexel administration. A student who is found in violation twice (even if in two

different courses) will be expelled from the university. For more information, please refer to the [Provost academic integrity policy](#) or to resources regarding [Student Conduct and Community Standards](#).

Changes to the syllabus

I am here to help you learn, and I want to make sure we achieve the expected learning outcomes in this course. To do this, I may have to make some changes to the syllabus—for instance, if it becomes clear that we need to spend more time on some topic. I'll do my best to honor the syllabus as is, and I'll be sure to let you know about any changes as far in advance as possible.

Dropping the course

If you are considering whether to continue your enrollment in the course, please refer to the [Course Add/Drop Policy](#) and the [Course Withdrawal Policy](#).

Student conduct

Drexel University adopted a student conduct policy requiring that all students have the responsibility to be aware of, and abide by, the University's policies, rules, regulations, and standards of conduct. The Student Conduct and Community Standards policy information is available in the [Official Student Handbook](#).

Appropriate use of course materials

It is important to recognize that some or all of the course materials provided to you may be the intellectual property of Drexel University, the course instructor, or others. Use of this intellectual property is governed by Drexel University policies, including the [Acceptable Use Policy](#). Briefly, this policy states that course materials, including recordings, provided by the course instructor may not be copied, reproduced, distributed or re-posted. Doing so may be considered a breach of this policy and will be investigated and addressed as possible academic dishonesty, among other potential violations. Improper use of such materials may also constitute a violation of the University's [Code of Conduct](#).

Participating in course evaluations

Student evaluations are a required element of every course. Evaluation forms are completely anonymous. They are confidentially used to make improvements in our curriculum and teaching. They are also used by administration in evaluating faculty performance, and in decisions about promotion, tenure and retention. Please take part in course evaluations.

Time management

Drexel University assumes that each credit-unit requires four hours of work per week (i.e., a 3-unit course means a student will spend 12 hours per week on that course), including reading, participation and completing assignments. This is a three-credit course. Please plan accordingly.

Support and Recommendations

If you are experiencing anxiety, depression or other issues

Drexel offers free and confidential support for anxiety-related problems, depression, family concerns, relationship issues, adjustment issues, eating disorders, alcohol- and drug-related problems, and questions about gender and sexual identity, all through the Drexel Counseling Center. The Counseling Center is located at Suite 201 in the Creese Student Center at 3210 Chestnut. The

telephone number is (215) 895-1415. **For emergencies, or to reach an on-call counselor after regular business hours, please call (215) 416-3337.** Learn more [on the Counseling Center website](#).

If you need technical support

Get 24/7 technical support for Blackboard Learn from the Instructional Technology Group [online](#) or by calling (215) 895-1224. For any other technical support (email, logins, etc.), Drexel University IT is here for you. You can contact them through email at consult@drexel.edu, by phone at (215) 895-2020, or by submitting the online [Problem Report Form](#).

Support for equality and diversity

Drexel University strives to promote an environment of equality of opportunity and compliance with university policies and federal, state and local laws prohibiting discrimination based upon race, color, religion, gender, marital status, pregnancy, national origin, age, disability and veteran status. If you have a question or complaint concerning discrimination, harassment, and/or retaliation, contact the Office of Equality and Diversity [online](#) or at (215) 895-1405.

Coaching, mentorship and tutoring

The [Center for Learning and Academic Success Services](#) (CLASS) serves as the organizing department for a variety of programs and services that promote coaching, peer mentoring and tutoring at Drexel. The Center is located on campus at the Creese Student Center (3210 Chestnut Street), Suite 050.

Campus activities and community

Find the Student Handbook, conduct and community standards, and the Counseling Center at [on the Student Life website](#). Consult this site for information on campus activities and student programs.

English help

The [English Language Center](#) offers English language instruction and support services to students, especially those who speak English as a second language. They are located at 229 N. 33rd Street. The telephone number is (215) 895-2022.

If you have a disability or are facing other challenges

Students [requesting accommodations](#) due to a disability at Drexel University need to request a current Accommodations Verification Letter (AVL) in the [ClockWork database](#) before accommodations can be made. These requests are received by Disability Resources (DR), who then issues the AVL to the appropriate contacts. For additional information, [visit the DR website](#), reach them by phone at (215) 895-1401, or by email them at disability@drexel.edu.

Free health services

The [Student Health Center](#) is located at 3401 Market St, Ste 105. You can call them at (215) 220-4700.

Career counseling

[CCI Career Services](#) offers help with job placement, job postings and credentialing. Outside our college, the [Steinbright Career Development Center](#) (SDLC) offers individualized career counseling, career fairs, career programs and resume workshops. The office is located at 3201 Arch Street, Suite 250, Philadelphia, PA 19104. The telephone number is (215) 895-2185.

Course Schedule

The schedule below shows the topic for each week, the readings to be done before Wednesday’s session, and the assignments due each week. Pitches are due on Fridays and should be turned in by 4:00 p.m. All other assignments should be turned in by 9:00 p.m. (After 9 o’clock you can do something fun or turn in for a good night’s sleep.)

Readings listed “Krumm” are from the course textbook. Other readings will be provided on Blackboard, but references are given here for your convenience:

- Weiser, M. (1991). The computer for the 21st century. *Scientific American*, 265(3), 94–105.
- Abowd, G. (2016). Beyond Weiser: From ubiquitous to collective computing. *Computer*, 49, 17–23.
- Bradbury, R. (1950, September 23). The veldt. *The Saturday Evening Post*.
- Lupton, D. (2020). The internet of things: Social dimensions. *Sociology Compass*, e127701.
- Yang, Q., et al. (2020). Re-examining whether, why, and how human-AI interaction is uniquely difficult to design. *Proceedings of the 2020 CHI Conference on Human Factors in Computing Systems*.

Wk	Dates (M-Su)	Topic	Read by Wednesday	Assignments
1	Mar 29–Apr 4	Introduction	<i>Skim</i> : Krumm ch. 1 Weiser 1991	Fri, Apr 2: Pitch 1 (due 4 p.m.)
2	Apr 5–11	Visions of the Field	Abowd 2016 Bradbury 1950	Fri, Apr 9: Draft 1
3	Apr 12–18	UbiComp Systems	Krumm ch. 2	Wed, Apr 14: Peer Reviews 1 Fri, Apr 16: Pitch 2 (due 4 p.m.) Sun, Apr 18: Final 1
4	Apr 19–25	Privacy	Krumm ch. 3	Fri, Apr 23: Draft 2 Sun, Apr 25: Midterm Reflection
5	Apr 26–May 2	IoT and Smart Cities	Lupton 2020	Wed, Apr 28: Peer Reviews 2 Fri, Apr 30: Pitch 3 (due 4 p.m.) Sun, May 2: Final 2
6	May 3–9	From GUI to UUI	Krumm ch. 6	Fri, May 7: Draft 3
7	May 10–16	Human–AI Interaction	Yang et al. 2020	Wed, May 12: Peer Reviews 3 Fri, May 14: Pitch 4 (due 4 p.m.) Sun, May 16: Final 3
8	May 17–23	Location	<i>Skim</i> : Krumm ch. 7	Fri, May 21: Draft 4
9	May 24–30	Context-Awareness	<i>Skim</i> : Krumm ch. 8	Wed, May 26: Peer Reviews 4 Sun, May 30: Final 4
10	May 31–Jun 6	Review	–	–
Ex	Jun 7–13	–	–	Fri, Jun 12: Final Reflection