INFO H566
Experience Design for Ubiquitous Computing

Department of Human-Centered Computing
Indiana University School of Informatics and Computing, Indianapolis
Spring 2015

Section no.:	31979
Credit hours:	3
Time:	Thursday 6:00pm–8:40pm
Location:	IT 357, Informatics & Communications Technology Complex [map]
First class:	January 15, 2015

Instructor:	Stephen Voida, Ph.D. in Computer Science, Assistant Professor
Office hours:	**Thursday**, 3:00–4:30pm and by appointment
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Prerequisites: None

COURSE DESCRIPTION

An introduction to research topics in ubiquitous and pervasive computing, including sensors, ambient displays, tangibles, middleware, mobility, and location and context awareness. These topics are explored from a user-centered design perspective, focusing on how a situated and embedded model of computing affects requirements gathering, interaction design, prototyping, and evaluation techniques. Students gain expertise with contemporary ubiquitous and pervasive computing technologies and learning to incorporate them into a user-centered research and design process.

Prerequisite(s): *None*.

Required Text(s):

Title:	*Ubiquitous computing fundamentals*
Author(s):	Krumm, J. (Ed.)
Year:	2009
Publisher:	Chapman and Hall/CRC Press
Book site:	http://research.microsoft.com/en-us/um/people/jckrumm/UbiquitousComputingFundamentals/
ISBN:	978-1-4200-9360-5

Title:	*Divining a digital future: Mess and mythology in ubiquitous computing*
Author(s):	Dourish, P. & Bell, G.
Year:	2011
Publisher:	MIT Press
Book site:	http://www.dourish.com/digitalfuture/
ISBN:	978-0-262-01555-4

Additional Readings:

Texts for this course will also include conference and journal publications that are all available online via university site licenses and/or posted to the course management website (check the "Resources" page). You will need to be logged in to the university network or connected via vpn.iu.edu to access site-licensed articles for free.

Learning Outcomes:

Upon completion of this course, students will

	PGPLs	Assessment
1. Understand how the vision of ubiquitous computing is articulated and continually reinterpreted by a community of researchers and practitioners	1. K&S 2. CT	RS RE
2. Understand how traditional HCI methods (e.g., requirements gathering, prototyping, evaluation) need to be adapted to ubiquitous computing contexts	1. K&S 2. CT 4. EB	RS R-DR R-FS
3. Apply critical reading skills to texts with a diversity of disciplinary approaches, including theoretical texts, design texts, and technical texts	2. CT 1. K&S	RS R-LR
4. Apply the design and evaluation methods of ubiquitous computing to the study of a novel or existing ubiquitous computing technology	1. K&S 2. CT 3. EC	R-DR R-PP R-FS
5. Analyze a body of research to identify the contributions that have been made and areas in which additional, novel contributions might be made	2. CT 1. K&S 3. EC	RS RE R-LR R-PP R-FS
6. Evaluate the strengths, weaknesses, and applicability of ubiquitous computing enabling technologies in a variety of contexts	2. CT 1. K&S 3. EC 4. EB	RS TT-P TT-W R-DR R-FS
7. Communicate, via both written and oral modalities, about technology and technical information in ways that will be accessible to people from a variety of backgrounds and experiences	3. EC 2. CT 1. K&S	CP TT-P TT-W R-PP R-FS

Principles of Graduate and Professional Learning (PGPL):

Learning outcomes are assessed in the following areas:

1. Knowledge and skills mastery (K&S)
2. Critical thinking and good judgment (CT)
3. Effective communication (EC)
4. Ethical behavior (EB)

ASSESSMENT & EVALUATION

Reading Summaries (RS)	10%
Reflective Essay (RE)	10%
Class Participation (CP)	15%
Technology Tutorials	
• In-Class Presentation (TT-P)	10%
• Technology Survey and "How-To" Materials (TT-W)	20%
Research Deliverables	
• Initial Literature Review (R-LR)	5%
• Design Rationale Document (R-DR)	5%
• In-Class Progress Presentation (R-PP)	5%
• Final Research Paper Submission with Poster/Demo/Video (R-FS)	20%

Grades for reading summaries and class participation will be recorded as individual grades; technology tutorials and research deliverables will receive team grades (modulated based on peer evaluation/contribution reports that you will submit as part of each group/team deliverable).

Late Submission Policy:

In fairness to the instructor and students who completed their work on time, a grade on an individual assignment deliverable (e.g., a reading summary) shall be reduced 10%, if it is submitted late and a further 10% for each 24-hour period it is submitted after the deadline. Reading summaries and deliverables completed as part of a group (e.g., a technology tutorial or research project milestone) will not be accepted after the specified deadline; a late submission on these assignments will result in a zero grade.

Grading Scale:

A+	97 – 100	Outstanding achievement, given at the instructor's discretion
A	93 – 96.99	Excellent achievement
A–	90 – 92.99	Very good work
B+	87 – 89.99	Good work
B	83 – 86.99	Marginal work
B–	80 – 82.99	Very marginal work

C+	77 – 79.99	Unacceptable work (Core course must be repeated)
C	73 – 76.99	Unacceptable work (Core course must be repeated)
C–	70 – 72.99	Unacceptable work (Elective or core course must be repeated)
D+	67 – 69.99	Unacceptable work (Elective or core course must be repeated)
D	63 – 66.99	Unacceptable work (Elective or core course must be repeated)
D–	60 – 62.99	Unacceptable work (Elective or core course must be repeated)
F	Below 60	Unacceptable work (Elective or core course must be repeated)

Incompletes:

The instructor may assign an Incomplete (I) grade only if at least 75% of the required coursework has been completed at passing quality and holding you to previously established time limits would result in unjust hardship to you. All unfinished work must be completed by the date set by the instructor. Left unchanged, an Incomplete automatically becomes an F after one year. http://registrar.iupui.edu/incomp.html

ASSIGNMENTS:

Reading Summaries:

In order to ensure that all students are adequately prepared for discussion and ready to join in the in-class activities, for each class period in which you are not presenting, you will write a 4-point summary of and thoughts about each of the required readings.

- Briefly *summarize* the work in about a paragraph (i.e., describe what the authors did).
- Discuss the *insights and/or contributions* of the paper, focusing in particular on how the research conforms to, deviates from, or challenges the original visions of ubiquitous computing.
- Identify about some *limitations of the work* (e.g., technological shortcomings, ideological biases, cultural constraints, etc.) and what kinds of follow-on research questions might be explored in order to address those issues.
- List at least three *discussion points or issues* that you would like to raise/pursue as part of our in-class discussion.

These summaries are to be completed individually (e.g., not in consultation with one another) and are due at 6:00pm the night before class (Wednesday), to allow that week's presenters time to incorporate some of the more interesting points and questions into their in-class presentation. Please note that your grade for this component of the class will be determined based on whether or not you completed the assignment on time (e.g., submitted an online post including all four *clearly enumerated* required elements), not necessarily on whether or not you were able to fully grasp all of the nuances of these (admittedly sometimes complex/dense) articles. The goal of this assignment is to demonstrate your preparation for the in-class discussion; as a result, late submissions **will not be accepted/scored.**

Of the 14 weeks of class for which we have outside readings, you are required to submit **at least 12 weeks** of reading summaries. *You may elect to drop/skip up to two weeks of summaries without penalty (or explanation)*—please use these drops to account for illnesses, travel, overwhelmingly busy weeks, etc.

Reflective Essay:

The "final examination" for the course will be the submission of a summative reflective essay based on one or more prompts provided by the course instructor. This 3–5 page essay should demonstrate each student's individual knowledge about the original goals and aims of Weiser's ubicomp vision, the ways that this vision has been driven and been realized by the research community and through commercial product development over the last 25 years, and the outstanding challenges and open questions faced by the research community. This deliverable will be evaluated both on the merits of the student's case/argument and the clarity with which it is presented. For example, the writing should be polished and edited and any points made in support of the students' case/arguments should be supported with appropriate citations to course readings.

Class Participation:

I expect students to be appropriately prepared for each class meeting, to attend all class meetings on time, and to conduct themselves in a professional manner. The central focus of this course is a seminar-style discussion of the issues, challenges, and trade-offs associated with Weiser's vision of ubiquitous computing and the real-world instantiation of that vision. Every student in the classroom is expected to play an active role in shaping and contributing to that discussion.

The class participation grade will be derived both from the student's performance in preparing for and co-leading the seminar discussion of the readings and from their engaged, knowledgeable, and respectful participation in the in-class discussion. As a presenter/discussant, you will gain experience in reading, synthesizing, and presenting a collection of people's research in a specific sub-area of ubiquitous computing. You will present at least once during the semester. However, depending on the size of the class you may be asked to present more than once OR you may be asked to co-present with a colleague. Your presentation should last at least 45 minutes and at most 60 minutes, after which you will be in charge of leading an open discussion. Your discussion should cover (at the least) the required readings as well as any optional readings listed for that topic. You should prepare in advance a short list of issues or questions that you would like to address over the discussion period. In addition to or instead of presenting the required/optional reading, you could, for example:

- demonstrate software from the readings;
- conduct a breakout session, where different parts of the class discuss a different key question from the readings;
- design a class exercise for the class based on the readings; or
- critique a particular design from the reading.

After class, you are responsible for submitting (via email or Box) the lecture slides to the instructor for posting to Oncourse.

Class participation will be assessed each week on a 5-point scale using the following rubric:

- Serving as a discussion leader or actively participating in the discussion; contributing multiple times to the discussion with thoughtful, relevant comments or questions: 5/5 (100%)
- Incidental participation in the class discussion; contributing minimally with relevant comments or questions: 4/5 (80%)
- Engaged attention to the class discussion, with the contribution to the discussion including completing the reading summary and proposed in-class discussion questions for the class (co-)leaders submitted to OnCourse prior to class: 3/5 (60%)
- Present but not engaged in the in-class discussion; not paying attention or contributing, buried in a laptop, et cetera: 2/5 (40%)
- Not physically present in class: 0/5 (0%)

The lowest two in-class participation scores will be automatically dropped, allowing you some flexibility in the case that an out-of-class emergency comes up (e.g., illness, traffic accident, paper deadline, etc.) However, you will still be responsible for covering the assigned readings and submitting your summaries for every week (even if you can't physically be present), and you will be held to all technology tutorial and research project deadlines, since these projects involve the participation of multiple students working in teams.

Technology Tutorial:

One important skill for doing ubiquitous computing research is to be able to identify critical technologies and how to use them in developing system design briefs or prototype applications. This class will introduce a number of these critical technologies, and it is expected that students will have some additional ideas about technologies that would be considered important or interesting from a ubiquitous computing perspective. Each student will be responsible for developing a tutorial for a given technology. This tutorial is intended to give the reader an understanding of what the technology is, how to obtain it, and how to use it in practice to develop some application—that is, an example of how to "get started" using the technology. Tutorials should also include a list of references and/or URLs that a novice could use to become more expert or gather additional information about the technology.

Students may work individually or in groups of up to three on developing this "how-to" tutorial. The tutorials are to be placed on the Oncourse class wiki and will be made available to students in this and subsequent semesters as "jumping-off" points for scoping their research projects and. Topics for your tutorial must be approved by the instructor in advance, and the instructor can help to identify potential technologies that would be suitable for developing a corresponding tutorial.

Technology tutorials consist of two deliverables. The first is a short (10–15-minute), in-class presentation of the content of the technology tutorial, with a short walkthrough or demonstration showing how the technology might be used. The second is the technology summary, "how-to" write up, and references, which should be posted to the wiki as a shared resource for students in this (and subsequent) semesters to use as a reference.

A few of things to bear in mind about the technology tutorials assignment:

- For most all of the student in the class, this assignment is about learning a new technology. *I don't expect students to become experts in using these technologies.* The goal is to provide the class with a mechanism to "divide and conquer" the process of learning about new technologies. If everyone takes the time to dig around on the web to understand one new technology and then teaches it to everyone else, we all collectively learn about 10–12 new technologies—a Good Thing!
- Given that all of the students in the course will be learning about new technologies, much of what I expect students to do is to spend time *researching what resources already exist* on the Internet to help newcomers get started with a technology. Often, the information that this assignment requires you to produce and present exists someplace online already—"getting started" tutorials or SDKs from a technology company's website, Q&A posts from coding community websites (e.g., StackExchange), blog posts from other enterprising developers, etc. Find and aggregate the "good parts" from these resources; this will help to save the rest of the class time that we might have spent doing the same thing later on.
- When you're working with a new technology, much of the initial cost is spent figuring out where to start. This is about as far as I expect students to go with these tutorials:
    - *Where do you get the [device/software toolkit/tool]?*
    - *What other equipment/software/supplies do you need to make it work?*
    - *How do you connect it to your [computer/prototype/design process]?*
    - *Can you provide one example of a step-by-step set of instructions to get the technology to do the most basic thing that it can do (i.e., a "Hello World" program or output)?*

  The idea is that students will show someone how to get through all of the typically-annoying startup stuff so that if they wanted to use the [device/software toolkit/tool], they'd at least be ready to go and know where to look for more details with a minimum of overhead.

Research Project:

The purpose of the project is to gain experience doing original research in ubiquitous computing, synthesizing your results in written form, and presenting them in a public venue (this class). You are required to develop a project in an area *related to* ubiquitous computing. The results of this project should be reported in a 6–10-page long manuscript following the Ubicomp conference style guidelines. The project will also be presented to the class in a workshop-like session at the end of the semester.

As I expect and hope for a wide set of backgrounds of the students taking the course, the kinds of projects that you propose/work on will vary in scope. For **example, your project could be:**

- Design-oriented: conducting formative user studies (interviews, surveys, and observations), creating mockups of user interfaces, evaluating the mockups with

users, and iterating several times, resulting in a useful, usable, and desirable design of a ubiquitous computing application;

- Implementation-oriented: creating or extending a ubiquitous computing system or application; or
- Evaluation-oriented: designing a user study and conducting the user study on an existing system.

Talk to the instructor before settling on a project and submitting a project proposal. You may work in groups of 3 or more students; your proposal should include a justification for the number of group members and your group's composition, relative to the scope of and goals for the research project.

More details about each deliverable will be provided as the course progresses. Note that for each deliverable, each research team must also submit a corresponding team assessment. These team assessments must be signed by each team member and submitted in hardcopy.

More details about each specific deliverable will be provided as the course progresses. Note that for each deliverable, each research team must also submit a corresponding team assessment. These team assessments must be signed by each team member and submitted in hardcopy. Your individual grade on the project will depend on both the overall group grade and your contributions to the group's work, as reported in peer evaluation forms that you will submit at each research project milestone.

High-quality submissions may be nominated by the instructor for revision and submission to a suitable, peer-reviewed publication venue (e.g., as a poster, demo, or video to the ACM International Joint Conference on Pervasive and Ubiquitous Computing or as a long or short paper to the ACM SIGCHI Conference on Human Factors in Computing Systems.)

WEEKLY SCHEDULE

Week	Date	Agenda	Readings	Deliverable
1	15 Jan	Course introduction and overview	—	—
2	22 Jan	Ubiquitous computing vision/history: Disappearing computing	Want, R. (2010). An Introduction to ubiquitous computing. In J. Krumm (Ed.), *Ubiquitous Computing Fundamentals* (pp. 1–36). Boca Raton, FL: Taylor & Francis/CRC Press. Weiser, M. (1991). The computer for the 21st century. *Scientific American 265*(3), 94–104. Abowd, G. D., Mynatt, E. D., & Rodden, T. (2002). The human experience. *IEEE Pervasive Computing, 1*(1), 48–57.	—
3	29 Jan	Ubiquitous computing vision/history: "Calm" computing, socially- and culturally-embedded computing	Tolmie, P., Pycock, J., Diggins, T., MacLean, A., & Karsenty, A. (2002). Unremarkable computing. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems* (CHI '02, pp. 399–406). New York: ACM Press. Dourish, P. & Bell, G. (2011). Contextualizing ubiquitous computing. In P. Dourish & G. Bell, *Divining a Digital Future: Mess and Mythology in Ubiquitous Computing* (pp. 9–43). Cambridge, MA: MIT Press. Dourish, P. & Bell, G. (2011). Making room for the social and cultural. In P. Dourish & G. Bell, *Divining a Digital Future: Mess and Mythology in Ubiquitous Computing* (pp. 45–60). Cambridge, MA: MIT Press.	Technology tutorials: Team and topic proposals

4	5 Feb	Ubiquitous computing systems: Technical challenges and infrastructure	Bardram, J., & Friday, A. (2010). Ubiquitous computing systems. In J. Krumm (Ed.), *Ubiquitous Computing Fundamentals* (pp. 37–94). Boca Raton, FL: Taylor & Francis/CRC Press.	—
5	12 Feb	Ubiquitous computing systems: Infrastructure, power, and networking	Weiser, M. (1993). Some computer science issues in ubiquitous computing. *Communications of the ACM, 36*(7), 75–84. Kindberg, T., & Fox, A. (2002). System software for ubiquitous computing. *IEEE Pervasive Computing, 1*(1), 70–81. Paradiso, J. A., & Starner, T. (2005). Energy scavenging for mobile and wireless electronics. *IEEE Pervasive Computing, 4*(1), 18–27. Estrin, D., Culler, D., Pister, K. & Sukhatme, G. (2002). Connecting the physical world with pervasive networks. *IEEE Pervasive Computing, 1*(1), 59–69. Dourish, P. & Bell, G. (2011). What lies beneath. In P. Dourish & G. Bell, *Divining a Digital Future: Mess and Mythology in Ubiquitous Computing* (pp. 95–116). Cambridge, MA: MIT Press.	Technology tutorials: Presentations
6	19 Feb	Ubiquitous computing interaction design: Tangibles, surfaces, and proxemics	Quigley, A. (2010). From GUI to UUI: Interfaces for ubiquitous computing. In J. Krumm (Ed.), *Ubiquitous Computing Fundamentals* (pp. 237–284). Boca Raton, FL: Taylor & Francis/CRC Press. Ishii, H., & Ullmer, B. (1997). Tangible bits: Towards seamless interfaces between people, bits, and atoms. In *Proceedings of the ACM SIGCHI conference on Human factors in computing systems* (CHI '97, pp. 234–241). New York: ACM Press. Greenberg, S., Marquardt, N., Ballendat, T., Diaz-Marino, R., & Wang, M. (2011). Proxemic interactions: The new ubicomp? *interactions, 18*(1), 42–50.	Technology tutorials: Presentations

7	26 Feb	Ubiquitous computing interaction design: Location-aware computing, wearables, and augmented reality	Varshavsky, A., & Patel, S. (2010). Location in ubiquitous computing. In J. Krumm (Ed.), *Ubiquitous computing fundamentals* (pp. 285–320). Boca Raton, FL: Taylor & Francis/CRC Press. Benford, S., Seager, W., Flintham, M., Anastasi, R., Rowland, D., Humble, J., … Sutton, J. (2004). The error of our ways: The experience of self-reported positions in a location-based game. In *Proceedings of the 6th International Conference on Ubiquitous Computing* (UbiComp 2004, pp. 70–87). Berlin: Springer-Verlag. Starner, T. (2013, April–June). Project Glass: An extension of the self. *IEEE Pervasive Computing, 12*(2), 14–16. Rhodes, B. (1997). The wearable remembrance agent: A system for augmented memory. *Personal Technologies, 1*(4), 218–224.	Technology tutorials: Presentations
8	5 Mar	Ubiquitous computing research: Field studies and living laboratories	Bernheim Brush, A. J. (2010). Ubiquitous computing field studies. In J. Krumm (Ed.), *Ubiquitous Computing Fundamentals* (pp. 161–202). Boca Raton, FL: Taylor & Francis/CRC Press. Intille, S., Larson, K., Tapia, E., Beaudin, J., Kaushik, P., Nawyn, J., & Rockinson, R. (2006). Using a live-in laboratory for ubiquitous computing research. In *Proceedings of the 4th International Conference on Pervasive Computing* (PERVASIVE 2006, pp. 349–365). Berlin: Springer-Verlag.	Technology tutorials: Presentations Technology tutorials: Tech survey and instructional materials

9	12 Mar	Ubiquitous computing research: Ethnography	Taylor, A.S. (2010). Ethnography in ubiquitous computing. In J. Krumm (Ed.), *Ubiquitous Computing Fundamentals* (pp. 203–236). Boca Raton, FL: Taylor & Francis/CRC Press. Dourish, P. & Bell, G. (2011). A role for ethnography: Methodology and theory. In P. Dourish & G. Bell, *Divining a Digital Future: Mess and Mythology in Ubiquitous Computing* (pp. 61–89). Cambridge, MA: MIT Press.	—
10	19 Mar	*Spring Break (no class)*		
11	26 Mar	Ubiquitous computing applications: Context-aware systems and smart environments	Dey, A.K. (2010). Context-aware computing. In J. Krumm (Ed.), *Ubiquitous Computing Fundamentals* (pp. 321–352). Boca Raton, FL: Taylor & Francis/CRC Press. Patterson, D., Liao, L., Fox, D., & Kautz, H. (2003). Inferring high-level behavior from low-level sensors. In *Proceedings of the 5th International Conference on Ubiquitous Computing* (UbiComp 2003, pp. 73–89). Berlin: Springer-Verlag. Patel, S. N., Robertson, S., Kientz, J. A., Reynolds, M. S., & Abowd, G. D. (2007). At the flick of a switch: Detecting and classifying unique electrical events on the residential power line. In *Proceedings of the 9th International Conference on Ubiqiutous Computing* (Ubicomp 2007, pp. 271–288) Berlin: Springer-Verlag. Streitz, N. A., Geißler, J., Holmer, T., Konomi. S., Müller-Tomfelde, C., Reischl, W., … Steinmetz, R. (1999). i-LAND: An interactive landscape for creativity and innovation. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems* (CHI ’97, pp. 120–127). New York: ACM Press.	—

12	2 Apr	Ubiquitous computing applications: Domestic and urban computing	Edwards, W. K., & Grinter, R. E. (2001). At home with ubiquitous computing: Seven challenges. In *Proceedings of the 2001 International Conference on Ubiquitous Computiung* (Ubicomp '01, pp. 256–272). Berlin: Springer-Verlag. Intille, S. S. (2002). Designing a home of the future. *IEEE Pervasive Computing, 1*(2), 76–82. Paulos, E., & Goodman, E. (2004). The familiar stranger: Anxiety, comfort, and play in public places. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems* (CHI '04, pp. 223–230). New York: ACM Press. Dourish, P. & Bell, G. (2011). Domesticity and its discontents. In P. Dourish & G. Bell, *Divining a Digital Future: Mess and Mythology in Ubiquitous Computing* (pp. 161–184). Cambridge, MA: MIT Press.	**Research project: Team and topic proposals (Due Monday 6 April by 11:59am EDT)**
13	9 Apr	Ubiquitous computing applications: Healthcare, wellness, play, and ludic engagement	Consolvo, S., McDonald, D. W., Toscos, T., Chen, M. Y., Froehlich, J., Harrison, B., … Landay, J. A. (2008). Activity sensing in the wild: A field trial of UbiFit Garden. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems* (CHI '08, pp. 1797–1806). New York: ACM Press. Lin, J. J., Mamykina, L, Lindtner, S., Delajoux, G. & Strub, H. (2006). Fish'n'Steps: Encouraging physical activity with an interactive computer game. In *Proceedings of the 8th International Conference on Ubiquitous Computing* (UbiComp '06, pp. 261–278). Berlin: Springer-Verlag. …	**Research project: Initial literature review**

13 *(con't)*			Klasnja, P., Consolvo, S., & Pratt, W. (2011). How to evaluate technologies for health behavior change in HCI research. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems* (CHI '11, pp. 3063–3072). New York: ACM Press. Mueller, F., Agamanolis, S., & Picard, R. (2003). Exertion interfaces: Sports over a distance for social bonding and fun. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems* (CHI '03, pp. 561–568). New York: ACM Press. Gaver, W. W. (2002, June). Designing for *Homo ludens*. *I3 Magazine, 12*.	
14	16 Apr	Privacy and ethics in ubiquitous computing: Overview	Langheinrich, M. (2010). Privacy in ubiquitous computing. In J. Krumm (Ed.), *Ubiquitous Computing Fundamentals* (pp. 95–160). Boca Raton, FL: Taylor & Francis/CRC Press.	**Research project: Design rationale** Individual Reflective Essay question posted
15	23 Apr	Privacy and ethics in ubiquitous computing: Challenges and issues	Hong, J. I., & Landay, J. A. (2004). An architecture for privacy-sensitive ubiquitous computing. *In Proceedings of the 2nd International Conference on Mobile Systems, Applications, and Services* (MobiSys '04, pp. 177–189). New York: ACM Press. Nguyen, D. H., & Hayes, G. R. (2010). Information privacy in institutional and end-user tracking and recording technologies. *Personal and Ubiquitous Computing, 14*(1), 53–72. Dourish, P. & Bell, G. (2011). Rethinking privacy. In P. Dourish & G. Bell, *Divining a Digital Future: Mess and Mythology in Ubiquitous Computing* (pp. 137–160). Cambridge, MA: MIT Press.	**Research project: Progress ("checkpoint") presentations**

16	30 Apr	Wrapping up and looking ahead	Dourish, P. & Bell, G. (2011). Reimagining ubiquitous computing: A conclusion. In P. Dourish & G. Bell, *Divining a Digital Future: Mess and Mythology in Ubiquitous Computing* (pp. 187–290). Cambridge, MA: MIT Press. Abowd, G. D. (2012). What next, ubicomp?: Celebrating an intellectual disappearing act. In *Proceedings of the 2012 ACM Conference on Ubiquitous Computing* (UbiComp '12, pp. 31–40). New York: ACM Press. Dourish, P. & Mainwaring, S. D. (2012). Ubicomp's colonial impulse. In *Proceedings of the 2012 ACM Conference on Ubiquitous Computing* (UbiComp '12, pp. 133–142). New York: ACM Press.	Individual Reflective Essay **DUE (6pm)**
	Final exams			**Research project: Final papers due (DUE Friday 8 May 11:59pm EDT)**

CODE OF CONDUCT

All students should aspire to the highest standards of academic integrity. Using another student's work on an assignment, cheating on a test, not quoting or citing references correctly, or any other form of dishonesty or plagiarism shall result in a grade of zero on the item and possibly an F in the course. Incidences of academic misconduct shall be referred to the Department Chair and repeated violations shall result in dismissal from the program.

All students are responsible for reading, understanding, and applying the *Code of Student Rights, Responsibilities and Conduct* and in particular the section on academic misconduct. Refer to *The Code* > *Responsibilities* > *Academic Misconduct* at http://www.indiana.edu/~code/. All students must also successfully complete the Indiana University Department of Education "How to Recognize Plagiarism" Tutorial and Test. https://www.indiana.edu/~istd You must document the difference between your writing and that of others. Use quotation marks in addition to a citation, page number, and reference whenever writing someone else's words (e.g., following the *Publication Manual of the American Psychological Association*). To detect plagiarism instructors apply a range of methods, including Turnitin.com. http://www.ulib.iupui.edu/libinfo/turnitin

Academic Misconduct:

1. **Cheating:** Cheating is considered to be an attempt to use or provide unauthorized assistance, materials, information, or study aids in any form and in any academic exercise or environment.
   a. A student must not use external assistance on any "in-class" or "take-home" examination, unless the instructor specifically has authorized external assistance. This prohibition includes, but is not limited to, the use of tutors, books, notes, calculators, computers, and wireless communication devices.
   b. A student must not use another person as a substitute in the taking of an examination or quiz, nor allow other persons to conduct research or to prepare work, without advanced authorization from the instructor to whom the work is being submitted.
   c. A student must not use materials from a commercial term paper company, files of papers prepared by other persons, or submit documents found on the Internet.
   d. A student must not collaborate with other persons on a particular project and submit a copy of a written report that is represented explicitly or implicitly as the student's individual work.
   e. A student must not use any unauthorized assistance in a laboratory, at a computer terminal, or on fieldwork.
   f. A student must not steal examinations or other course materials, including but not limited to, physical copies and photographic or electronic images.
   g. A student must not submit substantial portions of the same academic work for credit or honors more than once without permission of the instructor or program to whom the work is being submitted.
   h. A student must not, without authorization, alter a grade or score in any way, nor alter answers on a returned exam or assignment for credit.

2. **Fabrication:** A student must not falsify or invent any information or data in an academic exercise including, but not limited to, records or reports, laboratory results, and citation to the sources of information.
3. **Plagiarism:** Plagiarism is defined as presenting someone else's work, including the work of other students, as one's own. Any ideas or materials taken from another source for either written or oral use must be fully acknowledged, unless the information is common knowledge. What is considered "common knowledge" may differ from course to course.
    a. A student must not adopt or reproduce ideas, opinions, theories, formulas, graphics, or pictures of another person without acknowledgment.
    b. A student must give credit to the originality of others and acknowledge indebtedness whenever:
        1. directly quoting another person's actual words, whether oral or written;
        2. using another person's ideas, opinions, or theories;
        3. paraphrasing the words, ideas, opinions, or theories of others, whether oral or written;
        4. borrowing facts, statistics, or illustrative material; or
        5. offering materials assembled or collected by others in the form of projects or collections without acknowledgment
4. **Interference:** A student must not steal, change, destroy, or impede another student's work, nor should the student unjustly attempt, through a bribe, a promise of favors or threats, to affect any student's grade or the evaluation of academic performance. Impeding another student's work includes, but is not limited to, the theft, defacement, or mutilation of resources so as to deprive others of the information they contain.
5. **Violation of Course Rules:** A student must not violate course rules established by a department, the course syllabus, verbal or written instructions, or the course materials that are rationally related to the content of the course or to the enhancement of the learning process in the course.
6. **Facilitating Academic Dishonesty:** A student must not intentionally or knowingly help or attempt to help another student to commit an act of academic misconduct, nor allow another student to use his or her work or resources to commit an act of misconduct.

OTHER POLICIES

1. **IUPUI course policies:** A number of campus policies governing IUPUI courses may be found at the following link: http://registrar.iupui.edu/course_policies.html
2. **Classroom civility**: To maintain an effective and inclusive learning environment, it is important to be an attentive and respectful participant in lectures, discussions, group work, and other classroom exercises. Thus, unnecessary disruptions should be avoided, such as ringing cell phones engagement in private conversations and other unrelated activities. Cell phones, media players, or any noisy devices should be turned off during a class. Texting, surfing the Internet, and posting to Facebook or Twitter during class

are generally not permitted. Laptop use may be permitted if it is used for taking notes or conducting class activities. Students should check with the instructor about permissible devices in class. IUPUI nurtures and promotes "a campus climate that seeks, values, and cultivates diversity in all of its forms and that provides conditions necessary for all campus community members to feel welcomed, supported, included, and valued" (IUPUI Strategic Initiative 9). IUPUI prohibits "discrimination against anyone for reasons of race, color, religion, national origin, sex, sexual orientation, marital status, age, disability, or [veteran] status" (Office of Equal Opportunity). Profanity or derogatory comments about the instructor, fellow students, invited speakers or other classroom visitors, or any members of the campus community shall not be tolerated. A violation of this rule shall result in a warning and, if the offense continues, possible disciplinary action.

3. **Right to revise:** The instructor reserves the right to make changes to this syllabus as necessary and, in such an event, will notify students of the changes immediately.
4. **Bringing children to class:** To ensure an effective learning environment, children are not permitted to attend class with their parents, guardians, or childcare providers.
5. **Disabilities Policy:** In compliance with the Americans with Disabilities Act (ADA), all qualified students enrolled in this course are entitled to reasonable accommodations. Please notify the instructor during the first week of class of accommodations needed for the course. Students requiring accommodations because of a disability must register with Adaptive Educational Services (AES) and complete the appropriate AES-issued before receiving accommodations. The AES office is located at UC 100, Taylor Hall (Email: aes@iupui.edu, Tel. 317 274-3241). Visit http://aes.iupui.edu for more information.
6. **Emergency Preparedness:** Safety on campus is everyone's responsibility. Know what to do in an emergency so that you can protect yourself and others. For specific information, visit the emergency management website. http://protect.iu.edu/emergency

MISSION STATEMENT

The Mission of IUPUI is to provide for its constituents excellence in

- Teaching and Learning;
- Research, Scholarship, and Creative Activity; and
- Civic Engagement.

With each of these core activities characterized by

- Collaboration within and across disciplines and with the community;
- A commitment to ensuring diversity; and
- Pursuit of best practices.

IUPUI's mission is derived from and aligned with the principal components—Communities of Learning, Responsibilities of Excellence, Accountability and Best Practices—of Indiana University's Strategic Directions Charter.

STATEMENT OF VALUES

IUPUI values the commitment of students to learning; of faculty to the highest standards of teaching, scholarship, and service; and of staff to the highest standards of service. IUPUI recognizes students as partners in learning. IUPUI values the opportunities afforded by its location in Indiana's capital city and is committed to serving the needs of its community. Thus, IUPUI students, faculty, and staff are involved in the community, both to provide educational programs and patient care and to apply learning to community needs through service. As a leader in fostering collaborative relationships, IUPUI values collegiality, cooperation, creativity, innovation, and entrepreneurship as well as honesty, integrity, and support for open inquiry and dissemination of findings. IUPUI is committed to the personal and professional development of its students, faculty, and staff and to continuous improvement of its programs and services.