I564 - Prototyping for Interactive Systems

Indiana University School of Informatics - IUPUI

Spring 2007

Course Info: 3 Credit Hours | Room: IT 270 | Thursday 5:45 – 8:25 | Section: 11215

Instructor Info: Dr. Anthony Faiola, Associate Professor, Assoc. Dir., HCI Graduate Program

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Contact Policy: Contact Dr. Faiola by phone 8am-9pm any day or email anytime.

Prerequisites: None (Not an extension of any undergraduate course.)

COURSE DESCRIPTION

The course covers methodologies for designing and prototyping graphic user interfaces, including rapid (paper) and dynamic (interactive) prototypes. Principles of design research and visual communication are discussed in the context of interaction design, cognition and user behavior, as well as usability testing techniques for concept validation.

REQUIRED COURSE TEXT

Title:	**Paper Prototyping**
Author:	Carolyn Snyder
Copyright:	2003
ISBN:	I-55860-870-2
Publisher:	Morgan Kaufmann Publishers
Web site:	http://www.paperprototyping.com/

Title:	**Design Research: Methods and Perspectives**
Author:	Brenda Laurel (Edited by)
ISBN:	0262122634
Publisher:	MIT Press
Web site:	http://mitpress.mit.edu/catalog/item/default.asp?ttype=2&tid=10029

Title:	**Thoughtful Interaction Design: A Design Perspective on Information Technology**
Author:	Jonas Löwgren & Erick Stolterman
ISBN:	0262122715
Publisher:	MIT Press
Web site:	http://mitpress.mit.edu/catalog/item/default.asp?tid=10334&ttype=2

Title:	**Bring Design to Software**
Author:	Terry Winograd
ISBN:	0201854910
Publisher:	ACM
Web site:	http://hci.stanford.edu/bds/ [Available for free Download.]

Papers on Oncourse:

1. Interaction design prototyping of comm. Devices, Pering
2. Design the PDA of the future, Marcus
3. Low vs high fidelity prototyping, Rudd

EXPANDED COURSE DESCRIPTION

- Overview: This course is about the application of prototyping in the context of user-centered design (UCD). Emphasis will be placed on the prototyping process, which includes: applying good design, product conceptualization, user modeling and product validation through product testing. Interaction design will be a key factor for creating successful prototypes, i.e., about the modeling of the user's experience and creating the most effective, efficient and comfortable experience for the user.
- Theory and Practice: There will be considerable reading and practice every week. Theory plays an important part to establish an understanding of knowledge of the interrelated aspects of process and product development. The reading schedule will continue up until the last four weeks of classes; at which point students will be given full time to finishing their final project.
- Design: Prototyping is about the visual representations of complex systems and interaction models that meet high levels of design and usability. Drawing is important to do this successfully. Prototyping is not about perfecting one's drawing skills per se, but the intellectual and physical freedom to express ideas on paper instantly, easily, and spontaneously. Regarding generating visualizations of ideas, computer graphic software is still rather primitive compared to the directness of pen and paper. Hence to better express visual concepts through images, it is recommended that students use any extra time available to study books, magazines, and web sites on design. This helps to continually provide a visual vocabulary of good design. Also, if time allows, students should try to keep a daily drawing dairy or notebook. They may want to draw both objects and figures. The key is to become comfortable with the drawing process in which mental images and concepts are translated into visual form.
- Prototyping Tools: Beside the theoretical background of this course, we will cover a range of tools for making static and dynamic prototypes.
- It should be noted that the range of literature that discuss the prototyping, in some cases use different terms to describe the various aspects of the process. There is a general agreement and use of most of the terms, but in some cases professionals are rather relaxed about the exact usage of terms. For example, all practitioners will agree on the general meaning of a dynamic prototype as a working model. However, whether it would be considered as the core product for the finished product is another matter. Some firms only use Flash or Director to make their dynamic prototypes that would eventually be programmed in C++ or Java. So, company policy, budget, and skill-set of the designer have much to do with the final output.
- Not Software Centered**:** Because this course is NOT software-centered, all students should attempt to learn the mechanics of the dynamic prototyping tools. Software demos will be provided if needed. Those who already know any of the digital tools, whether a Macromedia or Adobe products or Visual Basic, have an advantage. It is, however, recommended that students attempt to broaden their skill-set by learning these digital prototyping tools on their own.

COURSE OBJECTIVES / OUTCOMES

The learning outcomes of this course will include that each student acquiring the ability to explain terms and apply concepts related to the following range of prototyping topics:

1. Prototyping basic terms
2. Prototyping paper and dynamic techniques
3. A user-centered approach as applied to prototyping
4. User needs / requirements and product assessments
5. Design research processes and the life-cycle of interaction design
6. Various design research theories and methods
7. Interface design concepts and techniques
8. Product design evaluation and usability testing methods

Students will be able explain, recognize, and apply with considerable depth:

1. Knowledge about prototyping related to:
    - Prototyping terms and principles
    - A user-centered approach to prototyping and interaction design
    - Interface design principles and processes
    - Design theory and methods
    - A user-centered approach to interaction design that will include:
        - Analyzing user needs and requirements
        - Creating interface designs and related prototypes
        - Adapting specific product evaluation/testing methods

2. Methods of product design and development related to:
    - Producing prototypes based on user assessments
    - Applying prototype principles and a user-centered approach to interaction design
    - Apply evaluation and usability testing methods to prototypes to validate design decisions

COURSE TEXT, READING, and CLASS DISCUSSIONS

Assessing Your Competence of the Reading Material:
We will cover one chapter per week from the course text, in addition to supplemental readings in human computer interaction. Each student should not only read but arrive at a competent understanding of the materials. Three measures will be used to assess learning competency from the weekly readings:

1. Weekly discussions, directed by specific questions, will be given in an open class discussion format. During this time the instructor will challenge student comprehension, while adding practical applications to the theoretical content.
2. Weekly quizzes will be given to assess learning and comprehension, as well as to determine if students are doing the reading.
3. A final paper or project report will be assigned in which students will summarize and integrate theories and case studies from the semester-long reading assignments.

Class Lectures and Discussion:
The purpose of the class lectures to provide ONLY a very brief overview of the chapter and to help stimulate discussion. Questions generated by the students and the class discussion will be necessary to provide more depth to the issues in each chapter.

After all students have read the weekly reading assignment, students will take turns each week playing the role of discussion leader. This will happen two or three times in the semester. Whatever teams are responsible to lead the discussion, they must do the following:

1. Come prepare to class to provide questions that can help the class into the content of the chapter.
2. Prepare 8-10 key points to discuss from the chapter reading – in the form of questions.
3. The question will be handed out at the start of class each week. (Students will have time to consider each of the points and prepare themselves to respond. They may discuss with one another if problems arise during the review period.)
4. Discussion Time: After the class has been given their points, they will have 10 minutes to review and prepare for the class discussion. (This time is NOT for reading the chapter materials, but ONLY for assessing who will cover what.) The class discussion time should be very interactive. The discussion team leaders will lead the discussion and approve or disapprove the responses from the class. However, the atmosphere of the discussion should be informal. Limit the total discussion to about 45-50 min. The instructor will provide support throughout the discussion.

COURSE GRADE BREAKDOWN

	GRADING CATEGORY	% OF GRADE	WEEKS TO COMPLETE
1.	Mini Prototype Assignment	10%	(2 weeks)
2.	Midterm Project & Report	30%	(6 weeks)
3.	Midterm Project Presentation	5%	
4.	Final Project & Report	35%	(8 weeks)
5.	Final Project Presentation	5%	
6.	Class participation*	15%	

***Participation and engagement observed during class time:**

- Quiz and/or Test scores (50% of participation, if applicable.)
- Responsive and knowledgeable of text material for open discussions
- Evidence of active preparation in team and class discussions.
- Evidence of active preparation in team projects and report development.
- Class attendance and promptness to class time.
- Attitude and investment in the course as a whole.

GRADE SCALE

Letter grade	Percentage
A+ A A- B+ B B- C+ C	97-100 93-96.99 90-92.99 87-89.99 83-86.99 80-82.99 77-79.99 73-76.99

GRADING PRINCIPLES & POLICIES

Evaluation Forms: Students should review all grading forms that will be used by the instructor to grade projects, presentations, papers, and other assignments, as well as the forms used by teams to assess one another. Please see the course web site under the section called “Evaluation Forms.” These documents will show you the checklist and criteria by which each class assignment will be evaluated.

Grade Review at the Midterm: Students will be shown their midterm grades after the midterm project has been evaluated. If students want to see their grades at any other time during the semester, they should contact the Instructor by email and the Instructor will send them the grades by email.

POINTS TO NOTE *for* SUCCESS

1. **Rigor:** This course will move along at a quick pace, being organized around a collection of weekly chapter readings and design exercises related to HCI theory and application. Though this course is an

introduction to the HCI for graduates, it attempts to become as specific as possible about the major models and concepts of interaction design.

2. **Accountability:** Team and individual assignments and projects are not merely for learning but also a test of your character whereby diligence and accountability to the assignments and your teammates will be assessed.
3. **Cooperation and Communication:** Cooperation with the instructor and teammates (if applicable) is vital for maintaining a high degree of productivity and harmony in weekly team assignments and during class time. Oral and written communication is an important part of this course. We will have weekly open discussion sessions, small group discussions about reading materials and your projects, projects reports, and a short course paper. The reports provide a way to explain in detail the theoretical and practical aspects of each project.
4. **Creativity:** This course demands not only a weekly response to assignments, but also some degree of creativity in product design and concept development. This is actually one of the more exciting and dynamic aspects of the course, where students have a chance to develop products where they can apply much of the theory gained during the weekly assignments.

POLICIES *for* ATTENDANCE & ASSIGNMENT/PROJECT DEADLINES

1. **Missing class WILL affect your grade**. Students are allowed two (excused or unexcused) absences before their grade will be affected. In other words, whether you are sick or have personal problems or issues for missing class, it will amount to the same. Missing class means you do not show for the entire evening of class. The grade reduction policy works in this way.
    a. On the third missed class your final grade will drop 5 points (regardless of the reason).
    b. On the fourth missed class your final grade will drop 10 points (regardless of the reason).
    c. On the fifth missed class a grade of "F" will be issued for the course and the student will have the option of dropping the course.
2. **Responsible for all materials or content**: All material covered in class or any assignments made during class are the students' responsibility. In other words, if class is missed, the student is responsible to find out what was covered, whether course content, an assignment, or a revision to a due date, time, or place of an assignment.
3. **Class Tardiness and Incompletes**: Because evening classes are so lengthy, coming late to class can also affect your grade. 15 to 60 minutes late will result in a note being recorded. An accumulation of regular tardiness could reduce your grade at the end of the class under the category of class participation, which is a % of your final grade. Two 60 minutes (or more) late will count as one missed class and will then follow the same policy as above. Incompletes will NOT be issued except under very extreme personal conditions that have been reviewed by the instructor and in some cases in consultation with the Dean's Office.
4. **Deadlines:** ALL assignment deadlines are outlined in this Syllabus. BUT are described in DETAIL in the weekly DELIVERABLES handouts. The instructor will give reminders of these dates, BUT in the end, each student is responsible for the deadline. Also, course assignment deadlines should be adhered to, to insure fairness to all students. For the purpose of maintaining an equal and fair evaluation of each student's work, no student will receive special treatment. As a result, the following rules will apply to this course:
    a. <u>All assignments must be ready</u> to hand in at the designated time and place as stated on the assignment sheet, as discussed in class or communicated via email, or on the syllabus.
    b. <u>All assignments handed in late will be reduced 10 points for every day late</u> (24 hrs. from the due date and time).
    c. <u>Not coming to class to hand in an assignment or forgetting to bring the assignment does NOT constitute a valid reason.</u> In other words, if a student has not finished an assignment and decides to not come to class, both the absence will be recorded and a zero grade will be assigned to the project without exception. This arrangement is especially necessary in light of team-based projects in which other teammates are usually dependent on one another to come to class with assignments finished. It is advisable that teammates keep in very close communication about project deadlines and handing in assignments.

OTHER IMPORTANT POLICIES

1. **University Attendance Policy**: Attendance is required. The University regulations state: "Students are expected to be present for every meeting of the classes in which they are enrolled." IUPUI faculty are required to submit to the office of the Register a record of student attendance through the semester, on which they will take action if the record conveys a trend of absenteeism. As a result, ATTENDANCE WILL BE TAKEN IN ALL CLASSES. An Attendance sheet will be passed out in class for each student to sign their name. If you do not sign your name while in class you will be marked absent. The instructor is not expected to remember who attended when, so signing the sheet while in class is important. Signing the attendance sheet for another student is absolutely prohibited. Any student found doing so will be in violation of university policies on ethics and/or conduct.
2. **Bringing your children to class:** University Policy states that: "Children are not permitted to attend class with parents, guardians, or childcare providers. This conduct has the effect of unreasonably interfering with an individual's work or academic performance creating an offensive learning environment." "A student must not violate course rules as contained in a course syllabus, which are rationally related to the content of the course or to the enhancement of the learning process in the course." *[Code of Student Rights, Responsibilities, and Conduct, page 29]*
3. **Academic Dishonesty / Integrity / Plagiarism:** Using another student's work on a project or assignment, cheating on a test, or any other form of dishonesty or plagiarism will result in a grade of zero on that assignment and possibly an "F" in the course, and will be referred to the Dean of Students. All students should aspire to high standards of academic honesty. This class encourages cooperation and the exchange of ideas. For further reference, students may see:
    a. http://www.iupui.edu/~resgrad/grad/academic_misconduct_curriculum_subcommittee.rtf.
    b. http://life.iupui.edu/dos/code.htm).
4. **Values and ethics**: Profanity or derogatory comments about or towards the instructor or any member of the class will NOT be tolerated. Violating this rule will result in a warning and if the offense continues, administrative action will be taken.
5. **Code of Student Rights, Responsibilities and Conduct:** All students are responsible for reading, understanding, and applying the Code of Student Rights, Responsibilities and Conduct of IUPUI. (students can access http://life.iupui.edu/dos/code.htm for further information regarding the above points)
6. **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 any accommodations needed for the course.

BIBLIOGRAPHY

The following is a representative sample of the selected readings in addition to the course text.

Buchenau, M. and J. Fulton Suri, Experience prototyping. Proceedings of the conference on Designing interactive systems. New York City, New York, United States: ACM Press. pp. 424-33. 2000.

Erikson, T. *Notes on design practice: Stories and prototypes as catalysts for communication.* In Envisioning technology: The scenario as a framework for the system development lifecycle (ed. Carroll, J.) Addison Wesley, 1995.

Halskov Madsen, K. & Aiken, P. H. "Experiences Using Cooperative Interactive Storyboard prototyping." Communications of the ACM Vol 36.4 (1993): 57-67. Storyboarding is used to design a user interface for a VCR.

Mayhew, D. J. The Usability Engineering Lifecycle: A Practioner's Handbook for User Interface Design. San Diego, CA: Academic Press, 1999. Contextual task analysis, usability evaluation, rapid prototyping, and other HCI design techniques are described at all phases of the system design process.

Schrage, M. (1996) "Cultures of Prototyping," in *Bringing Design to Software*, T. Winograd, Editor, Addison-Wesley, Reading, MA, pp. 191–205.

Wilson, B., Jonassen, D., & Cole, P. Cognitive Approaches to Instructional Design. In G.M. Piskurich, Ed. The ASTD handbook of instructional technology. New York: McGraw-Hill, 1993. The use of rapid prototyping to aid instructional design is discussed.

WEEKLY SCHEDULE

WK	READING ASSIGNMENT	CLASS TIME	PROJECTS DUE
1		• Cover Syllabus • Discuss Reading • Give Mini Assignment #1	----------
2	**Snyder**: Part 1: Chapters 1 - 4 === **Students prepare for Discussion**===	• **Class Discussion** • Freehand Demo • Review Assignment 1	Mini Assignment #1 – 1st prototype draft (work-in-progress)
3	**Snyder**: Part 2: Chapters 5 - 7 === **Students prepare for Discussion**===	• **Class Discussion** • Critique Project #1 • **GIVE MIDTERM ASSIGNMENT**	**Mini Assignment #1 – Final Prototype DUE**
4	**Snyder**: Part 2: Chapters 8 - 10 === **Students prepare for Discussion**===	• **Class Discussion** • Visual Basic Demo	Mini Assignment #2 – 1st prototype draft (work-in-progress)
5	**Snyder**: Part 2: Chapter 11 Part 3: Chapter 12 - 13 === **Students prepare for Discussion**===	• **Class Discussion** • Do cog. walkthrough	Mini Assignment #2 – 2nd prototype draft (work-in-progress)
6	**Laurel**: People section a === **Students prepare for Discussion**===	• **Class Discussion**	**Mini Assignment #2 – Final prototype DUE**
7	**Laurel**: People section b === **Students prepare for Discussion**===	**Class Discussion Leaders:** Megan & Edgardo	**Midterm Project Due:** • Paper prototypes and cog-walkthroughs completed
8	**Laurel**: Form section === **Students prepare for Discussion**===	**Class Discussion Leaders:** Chris & Rob	**Midterm Project Due**: • Digital prototypes
9	**Laurel**: Process section **[PART 1: Pp. 144-184]** === **Students prepare for Discussion**===	**Class Discussion Leaders:** Megan & Edgardo ========== **Midterm Presentation** ========== **Final Assignment Discussed** **New team assignments:** **Team 1:** Edgardo & Rob **Team 2:** Chris & Meagan	**Midterm Presentation:** • Digital prototypes With storyboard completed • Do Final cog-walkthrough / focus group discussion with other team and instructor.
10	**HOLIDAY OR SPRING BREAK**		
11	**Laurel**: **Process section** **[PART 1: Pp. 185-241]** === **Students prepare for Discussion**===	**Class Discussion Leaders:** Edgardo & Rob	**Midterm Project Due**: One-Page Summary of Project • **Send by email.** ========== • IV paper prototypes due. • Ethnography data due.
12	**Laurel**: **Action section** === **Students prepare for Discussion**===	**Class Discussion Leaders:** Edgardo & Rob	• IV digital paper prototypes due.
13	**Löwgren & Stolterman:** Chapters 1 - 3	**Class Discussion Leaders:** Chris & Meagan	• Focus group data due. • Team join and work on final product.
14	**Winograd:** Chapters - Introduction, 1, 3, 4 === **Students prepare for Discussion**===	**Class Discussion Leaders:** Edgardo & Rob	• Work on dynamic prototype

15	**NO READING**	• Work on Final Project and/or class critique	• Progress report: • Work on dynamic prototype
16	Final Presentation	• **Final Presentation**	• **Final Presentation** • **May have medical staff visit presentation.**
17	Final Project and Report Due	• **Final Project / Report DUE**	• **Final Project / Report DUE**

Note: Week by week we will discuss the best times to give demos in software.