Syllabus for OPIM 316, Section 001, Spring 2007:  
Systems Analysis & Design for Entrepreneurs and Intrapreneurs  
Steven Kimbrough

What is Systems Analysis and Design?

Systems Analysis and Design (SA&D) is the art of converting ill-defined, rough, vague, even fuzzy business concepts into instructions that are clear enough to be implemented and turned into a valuable software-based application or artifact.

What is the course about? What makes it special?

We will do systems analysis and design. During the first \( \approx \frac{2}{3} \) of the course, the class (including the instructor) will work together as a team to do the analysis and produce the (high-level) design for an innovative, entrepreneurial system. Our first task will be to select a system concept to be the subject of our design. Class sessions will be a mixture of background briefings (aimed at supporting our design task) and group meetings/exercises aimed both at coming up with new ideas (“brainstorming”, “divergent thinking”) and at deciding which ideas to use going forward (“convergent thinking”). The instructor will serve as facilitator and team leader, contributing more as a “guide on the side” than as a “sage on the stage.” At the end of this exercise we will have articulated an interesting new concept and a credible design for it. The concept will be ready for implementation. Again as a team, the class will work with outside consultants and programmers to see to it that a demonstration prototype is built during the semester. (Class participants are not expected to undertake programming, although they are welcome to do so.)

Drawn from extensive practice, a great deal of experience and technique is available for systems analysis and design. Much of this takes the form of diagrammatic methods such as UML. Our focus will, as it is in practice, be on the end work product. We will, however, produce that product using the best available methods and techniques, including eXtreme Programming and agile development concepts. Students will learn these as a side effect of participating in the exercises.

During the last approximately \( \frac{1}{3} \) of the class students will form several teams and focus more independently on a second exercise. The work products of these teams will be presented to the class and a panel of outside experts at the end of the semester.

Who should take this course?

The practice of Systems Analysis and Design is routinely undertaken by managers in all parts of the enterprise, for at bottom it is the art of thinking clearly and with discipline about how to turn an idea into an application or artifact. It is especially important for entrepreneurs—or intrapreneurs in an enterprise—because creating new, original products and services requires new, original creative and critical thinking. Systems Analysis and Design is also a specialization for many consulting firms, who will recognize and appreciate the methodological skills acquired in this course. In consequence this course will be useful to entrepreneurs, consultants, general managers, and especially anyone interested in learning to sharpen his or her critical thinking skills.
Focus and Philosophy of the Class

The focus of the course is on the development of what are today considered to be “smaller” systems, of the sort that might be developed by entrepreneurs (or intrapreneurs). Such systems may be built either as fielded applications or as demonstration prototypes. They are built in organizations of all sizes, from major international corporations, to individuals creating startups in their garages. These systems are in contrast, for example, to large-scale comprehensive transaction processing systems for large enterprises or logistics systems for the Department of Defense. The principles for analysis, design, and development of these smaller, entrepreneurial systems are rather different than for large-scale systems. It is on the smaller, entrepreneurial systems that this class focuses.

The teaching philosophy for this course recognizes both the “sage on the stage” (lecture) and “guide on the side” (learning by doing, extensive interaction with students) models. The course will tilt as much as possible towards the “guide on the side” mode, with much of the action in the course organized around group working sessions. Inevitably, some lectures will be necessary (because they are helpful). These will be conducted in the style of a management briefing.

Grading

Assignments (pertaining to the team design exercise): 40%
Class participation: 30%
Term project: 30%

Instructor

Professor Kimbrough has been professionally involved in analysis, design, and implementation of information systems since the 1970s. His interests and involvement span commercial, entrepreneurial and research systems.

Professor Kimbrough has been a member of the faculty of The Wharton School since 1984. He has won a number of awards for research papers and has been the William Davidson Visiting Professor of Computer and Information Systems, University of Michigan, School of Business Administration. He has served as Principal Investigator for large research projects funded by the U.S. Coast Guard, the Defense Advanced Research Projects Agency, and the National Science Foundation.

Of late he has been especially active in the following research areas. (1) Models of strategic rationality. Professor Kimbrough teaches a course called “Agents, Games, and Evolution,” (OPIM 319) which explores strategic (game-theoretic) behavior by agents (people, animals, computer programs) possessing realistically limited rationality. (2) Text mining. Professor Kimbrough is co-inventor of two pending patents for extracting information from text. He is especially interested in using text mining for business intelligence, for environmental scanning, and for finding new uses for products. (3) Evolutionary computation. Professor Kimbrough originated a variant of evolutionary computation that is especially suited for constrained optimization problems, which are prevalent in business applications. He continues to work in this area actively.

In and out of the classroom, Professor Kimbrough relishes good conversations and bad jokes.

Class Schedule

Following the best practices in Systems Analysis and Design we will proceed iteratively and use an adaptive planning approach. The major milestones and activities are as follows.
**Week 1** T, 1/9/07, and R, 1/11/07. Overview of the course and how we will proceed. Themes: System development lifecycle, agile and iterative development. Read: Larman, *Agile and Iterative Development*, chapters 1, 2 and 3 (40 pages). Look at:

- “Manifesto for Agile Software Development,” http://agilemanifesto.org/

First group brainstorming and decision exercise: identify candidate system concepts for analysis and design, identify key business and technology issues requiring clarification.

**Week 2** T, 1/16/07 and R, 1/18/07. Clarification of key business and technology issues, first iteration. Instructor briefings; team meeting and decision processes. Recommended reading: Larman, *Agile and Iterative Development*, chapters 4, 5 and 7 (50 pages).

**Week 3** T, 1/23/07 and R, 1/25/07. Search for contractors to implement envisioned system. (The instructor will make available a modest budget for this purpose.) Capabilities? Availability? Decision, based on team decision process, of which system to design. Identify key milestones and dates for the process.

Workproducts: System vision statement, key milestones and dates.

**Week 4** T, 1/30/07 and R, 2/1/07. System functionality, first round. Instructor briefings on methods, including story cards, UML use cases and related matters. Group exercises to settle on (first round of) system functionality. Initiate contact with potential outside contractors.


1. “The Cathedral and the Bazaar” by Eric Raymond
2. Selections from *Free Culture: The Nature and Future of Creativity* by Lawrence Lessig

Workproducts: System functionality list, refine list of key issues, identify potential blockers.

**Week 5** T, 2/6/07 and R, 2/8/07. Iteration: Vision statement, and system features and functions (group decision process).

Articulate the functionality list, refining key issues and potential blockers.

Review progress with outside contracting.

**Week 6** T, 2/13/07 and R, 2/15/07. System architecture design. Briefings on LAMP and related core technologies. Group decision process on architecture.

Workproduct: Architecture specification ready for contractor.

**Week 7** T, 2/20/07 and R, 2/22/07. User interface design. Briefings on toolkits, capabilities and availability. Group decision process to identify central user interface metaphors and modes of interaction.

**Week 8** T, 2/27/07 and R, 3/1/07. Iterations: revisit all past decisions. Significant handout to outside contractor.

Form groups for part 2 of the course.
Spring break  Week of 3/5/07.

Week 9  T, 3/13/07 and R, 3/15/07. Instructor meets with groups individually. In-class technology briefings related to group projects. Groups each produce a menu of potential systems and receive instructor feedback.


Workproduct from groups: System vision statement.


Workproduct from groups: System functionality statement.


Groups each produce system architecture design and user interface concept.

Week 13  T, 4/10/07 and R, 4/12/07. Instructor briefings: Making the sale and using UML to do so. Instructor meets with groups individually. Groups iterate all decisions and prepare final “sales” briefing.

Week 14  T, 4/17/07 and R, 4/19/07. Student project presentations.

Readings

Textbook to purchase:

- Agile and Iterative Development by Craig Larman.

Handed out in electronic format and/or available on the Web:

3. “The Cathedral and the Bazaar” by Eric Raymond
4. Selections from Free Culture: The Nature and Future of Creativity by Lawrence Lessig

…plus instructor briefing notes in response to requirements as they develop.