Course Overview

Practical development of software requires an understanding of successful methods for bridging the gap between a problem to be solved and a working software system. In this course you will study a variety of ways to understand the problem you are solving, the various factors that constrain the possible solutions, and approaches to deciding among alternatives.

Course Objectives

Successful completion of this course will provide you with the knowledge and skills to
- Identify different classes of problems and their structures.
- Analyze technical, organizational, usability, business, and marketing constraints on solutions.
- Apply engineering approaches to frame solutions.

Prerequisite

- Experience with at least one large software system, either through industrial software development experience or an undergraduate course in software engineering, compilers, or operating systems.

Organization

The course consists of a series of lectures conducted by faculty and staff from the School of Computer Science at Carnegie Mellon University. The lectures, captured on DVDs, lead the way through a series of assignments and chatroom discussions.

Your best approach to successfully complete the course is to follow three simple steps.
1. Do the assigned readings.
2. Watch the lecture.
3. Complete the assignments.

All course materials, with the exception of the texts and DVDs, will be available on the Carnegie Mellon Blackboard System. Email with specific information about the course Blackboard site will be sent to you prior to the start of class.

Feedback and Support

Office hours and computer conferences will take place in the Virtual Classroom on the course Blackboard site. Your instructor for the course will conduct course discussions in the Virtual Classroom every week, specific time to be determined. Should your instructor decide to use another chat tool, they will notify you at the beginning of the course. Other times, your instructor will be available by email. In addition, you should feel free to post questions and comments on the course electronic bulletin board at anytime to discuss the readings, the course, and issues related to software engineering with members of your class.
Readings

Weekly readings are used to stimulate discussion and as a way to expose you to course topics not covered directly in the lectures. For most lectures, you will be assigned a few readings to complete before watching the lecture.

The required textbooks for this course are *Mythical Man Month* by Frederick Brooks, *More About Software Requirements* by Karl Wiegers, *The Design of Everyday Things* by Donald Norman, *Advanced Use Case Modeling* by Frank Armour and Granville Miller, and *Contextual Design* by Hugh Beyer and Karen Holtzblat.

In addition to the textbooks, you will be required to purchase a number of readings from the Harvard Business Review online.

Evaluation

The course grade will be determined by four factors.

- **Assignments:** The questions are formulated to help you to focus on the important points in the readings and to exercise particular skills
- **Project:** For the project you will apply course techniques and share your results to the rest of the class in a presentation and written report.
- **External Viewpoints Reports (EVR):** Each project group will be responsible for sharing the major points of a book with the rest of the class in a presentation and written report.
- **Instructor judgement:** The instructor reserves the right to raise or lower your quantitatively determined grade based on their judgement of your mastery of course material; this judgement will be based in part on your ability to participate constructively in class discussions.

Assignments will be graded on a “pass” system with each receiving a P-, P, or P+. You will not be graded on a curve, but whether you get all “passes” (66% of all possible points possible).

Schedule

<table>
<thead>
<tr>
<th>Lecture</th>
<th>Lecture Title</th>
<th>Readings</th>
<th>Assignments</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Unit One: Course Organization</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Introduction &amp; Overview</td>
<td>Shaw 05</td>
<td></td>
</tr>
<tr>
<td><strong>Unit Two: Requirements Engineering</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Requirements Engineering 1</td>
<td>Wiegers 05 Ch. 1-3; Easterbrook 04 Ch 1 &amp; 2</td>
<td>A1</td>
</tr>
</tbody>
</table>
| 3 | Requirements Engineering 2 | Wiegers 05 Ch. 6-8; Hickey 03  
**Skim:** Nuseibeh 00; Young 02; Ambler 07;  
Japenga 03 | A2 |
| 4 | External Viewpoints Reports (EVR): Are Requirements Enough? | | EVR |
| 5 | Requirements Engineering 3 | Wiegers 05 Ch. 12-19; Goldstein 05 | A3 |
| 6 | Requirements Analysis for Studio Projects | | P1 |
| **Unit Three: Eliciting Technical Needs** | | | |
| 7 | Contextual Design 1 | Beyer 95 Ch. 1-7 | A4 |
8 | Contextual Design 2 | Beyer 95 Ch. 8-13 | A5
9 | EVR: Supporting Interaction in Context | | EVR
10 | Contextual Design 3 | Beyer 95 Ch. 14-16 | A6
11 | Contextual Design for Studio Projects | | P2
12 | Use Cases 1 | Armour 01 Ch. 1-4 & 13 Skim: 5, 6 & 16 | A7
13 | Use Cases 2 | Armour 01 Ch. 7-10 & 15 Skim: 11, 12 & 18 | A7
14 | EVR: Use Cases, Scenarios, Delivery Modes | | EVR
15 | Use Cases for Studio Projects | | P3

Unit Four: Making the Result Useful

16 | Prototypes and User Feedback | Beyer 95 Ch. 17-20 | A9
17 | Usability Issues | Norman 02 | A10
18 | EVR: Focus on Users | | EVR
19 | An Engineering Discipline of Software | Shaw 90; Brooks 95 Ch. 16 & 17 | A11
20 | Usability 3 | Nielsen 93 Ch. 5 & 6 | A11
21 | Usability Analysis for Studio Projects | | P4

Unit Five: Understanding and Analyzing Business, Economic, and Policy Constraints

22 | Economics and Value: Why Learn About Them? | Garrison 05; Lane 07; Poladian 03; Varian 03 | A12
23 | Utility Theory | Jackson 01; Jackson 99; Tomayko 01 | A13
24 | Using Value to Decide What to Design | Poladian 02; Asundi 01 | A14
25 | EVR: Software, Business, & Policy | Erdogmus 02; Bahsoon 05 | A15
26 | Business, Economic, Policy | Babej 06; Griffiths 05; Hellenmans 07; King 07 | A16
27 | Business Analysis for Studio Projects | | P5

Bibliography


External Viewpoints Report Books


