This syllabus describes the course Advanced Software Engineering. As you will notice, the course content is quite different than what is advertised in the course catalog. Since the research agenda of the software engineering group has changed dramatically over time, so has the content of the Advanced Software Engineering courses. This change will be reflected in future course catalogs.

This syllabus explains the organization of the course, outlines the expectations for the course, and provides the rules that will govern grading and class participation.

**Course Description**
Software engineering is concerned with the cost effective development and evolution of software systems. In this course we will explore techniques that can be considered “advanced” software engineering techniques.

The purpose with this course is to provide the student with a foundation in formal modeling and formal analysis. The students will be introduced to the basic ideas behind formal modeling, exposed to the main approaches to formal modeling and analysis, and get a chance to try some methods on smaller examples. Furthermore, the students are expected to learn how to critically read and evaluate research papers, and how to prepare a research proposal.

**Course Goals**
- Understand the importance of modeling in software engineering
- Learn about different modeling and analysis approaches.
- Try several approaches on small examples and gain experience with some existing tools.
- Learn how to critically read and evaluate research papers.
- Learn how to write an effective research proposal.

**Requirements**
Undergraduate software engineering (or equivalent experience). Some knowledge of sets, finite state machines, propositional logic, predicate logic, and at least two different programming languages.
On Line Resources
The course web page is located at the following URL:

http://www-users.cs.umn.edu/~heimdahl/csci8801/

Also accessible from

http://www.cs.umn.edu/~heimdahl/

Course Administration and Personnel
Professor
Mats P.E. Heimdahl, 6-201 EE/CS
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E-mail: heimdahl@cs.umn.edu
Telephone: (612)-625-2068
URL: www.cs.umn.edu/~heimdahl

Teaching Assistant(s)
None

Texts
Required Readings

Software Abstractions: Logic, Language, and Analysis
Author: Jackson, Daniel ; ISBN: 0262101149 Publisher: MIT Press

Readings will be assigned as the course progresses. Most will be available to download from the web.

Optional Readings
Everything about modeling, testing, and analysis you can find in the library and on the web.

Tests
There will be no midterm or final in the course.

Assignments
The assignments in the course are as follows:

1. Several short modeling exercises using various tools and techniques.
2. A short (2-3 page) evaluation of each major modeling approach covered in class. The exact number of short papers will be determined later, but I expect you will have to turn in approximately four reports.
3. In class presentations. You will be required to present your models and your evaluations in class at regular intervals.
4. A term project. The term project in this class will be a research proposal. This proposal must outline the importance of the proposed research, contain a critical evaluation of related work, define the proposed research project, and provide a research plan. The details of how to write such a proposal will be presented in class. There is a strict page limit of 15 pages on the proposal. However, you cannot substitute quality with quantity.
5. An annotated bibliography of all papers read in preparation of the research proposal. The bibliography must be prepared using BibTeX and must contain an evaluation of the paper, some keywords, and the name of the creator of the entry. I will notify you when we will start this procedure.

6. Class participation. The class is a research seminar class so discussion and class participation are important. You are expected to participate in discussions, present models and papers in class, and lead the discussion of the models and papers you present.

**Expected work load**
The modeling may take quite a bit of your spare time. We do not have a large project, but the modeling assignments can be quite time consuming.

**Grading**
About 40% of your grade will be based on the assignments. You are graded on the quality of the work you produce, not on how many hours a week you spend.

30% of your grade will be based on your research proposal/term project and the remaining 30% based on class participation.

Students are required to perform satisfactory on both assignments and term project to receive a passing grade. All assignments and projects will be awarded 100 points. A general guideline for grading will be the following:

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<th>Total Score (s)</th>
<th>Letter Grade</th>
<th>S/N Grade</th>
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<tbody>
<tr>
<td>100≤s&lt;95</td>
<td>A</td>
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<tr>
<td>95≤s&lt;90</td>
<td>A-</td>
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<td>87≤s&lt;83</td>
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<td>83≤s&lt;78</td>
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<td>78≤s&lt;75</td>
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**Additional Course Information**
This section contains some general rules that will be enforced during the course. Please review these guidelines carefully.

**Integrity and Ethics**
Academic integrity is essential to a positive teaching and learning environment. All students enrolled in University courses are expected to complete coursework responsibilities with fairness and honesty. Failure to do so by seeking unfair advantage over others or misrepresenting someone else’s work as your own, can result in disciplinary action. The University Student Conduct Code defines scholastic dishonesty as follows:
Scholastic Dishonesty: Scholastic dishonesty means plagiarizing; cheating on assignments or examinations; engaging in unauthorized collaboration on academic work; taking, acquiring, or using test materials without faculty permission; submitting false or incomplete records of academic achievement; acting alone or in cooperation with another to falsify records or to obtain dishonestly grades, honors, awards, or professional endorsement; altering forging, or misusing a University academic record; or fabricating or falsifying data, research procedures, or data analysis.

Within this course, a student responsible for scholastic dishonesty can be assigned a penalty up to and including an “F” or “N” for the course. If you have any questions regarding the expectations for a specific assignment or exam, ask.

Classroom Climate
All students are expected to behave as scholars at a leading institute of technology. This includes arriving on time, not talking during lecture (unless addressing the instructor), and not leaving the classroom before the end of the lecture. Disruptive students will be warned and potentially dismissed from the classroom.

Make-up
Make-ups for graded activities may be arranged if your absence is caused by documented illness or personal emergency. A written explanation (including supporting documentation) must be submitted to your instructor; if the explanation is acceptable, an alternative will be arranged. Whenever possible, make-up arrangements will be completed prior to the scheduled activity. A student not taking an exam or not turning in an assignment will receive a score of 0. Alternative times for the final exam will be arranged only under university criteria for rescheduling a final exam.

Late submissions
Programming assignments and homework are due at the beginning of class. Late work is not accepted without prior approval. Any assignment turned in after class will be considered late and will be subject to the usual penalties. Submitting all assignments is a necessary condition for passing this class. Assignment submitted late will be penalized 10% per day, including weekends and holidays.

Incomplete
The I grade indicates that the instructor has (1) reasonable expectations that the student can complete an unfinished course on her/his own no later than the end of the next quarter and (2) believes that legitimate reasons exist to justify extending the deadline for course completion. The only acceptable reasons will be documented illness or personal emergency. A written explanation (including supporting documentation) must be submitted to your instructor; if the explanation is acceptable, an Agreement for the Completion of Incomplete Work will be filled out as a contract between the student and the instructor.

Special needs
It is University policy to provide, on a flexible and individual basis, reasonable accommodations to students that have disabilities that may affect their ability to participate in course activities or to meet course requirements. Students with disabilities are encouraged to contact their instructor early in the quarter to discuss their individual needs for accommodations.