CS195 – Senior Seminar
Spring 2011

Catalog text: Prerequisite: CS 130 and senior standing as a computer science major or minor. In this capstone class, students reflect on computer science as a discipline, the connections with other disciplines, the impacts of technology upon society, and ethical considerations introduced by computers. In the process of completing a major project, students consider marketing, design, implementation, testing, and maintenance. In this class, seniors complete and present their online portfolio. As the culmination of their program, students explore the transition to graduate school or the commercial sector.

Course Objectives and Overview
The objectives for the course reflect a collection of learning goals established by Westmont and by the Mathematics and Computer Science department for the computer science major. This senior seminar addresses a number of Westmont's learning standards (WLS) and the department's learning outcomes (DLO):

- integrate the major (through seminar and project)
- explore interdisciplinary connections with other disciplines (WLS 2, Critical-Interdisciplinary Thinking)
- project practice (DLO 1 core knowledge and skills, and DLO 3 tackle an ill-defined problem)
- complete portfolio (DLO 2 oral and written communication; WLS 5, Written and Oral Communication)
- social and ethical thinking (DLO 4 integration of faith and major; WLS 4, Active Societal and Intellectual Engagement)
- presentations (DLO 2 oral and written communication; WLS 5, Written and Oral Communication)
- initiate transition from college to graduate school or professional career

As a capstone course, this class aims to accomplish a number of things at once. First, it provides a comprehensive understanding of the field of computer science. Such an understanding involves not only a solid grasp of each facet of CS, but an awareness of how the facets interact with each other. Furthermore, the broad-reaching familiarity sought from this course will reveal the many relationships between computer science and nearly every other discipline. As a result, our graduates will be able to contribute in a meaningful way to a wide variety of professional environments that they may encounter after graduation.

The nature of these contributions involves an ability to make clear and compelling presentations as well as the ability to think socially and ethically about technology and its implications. The ability to communicate in writing and orally has increasingly become an important qualification for advancement in the computer industry. This class will
exercise both these skills. Furthermore, as technology continues to impinge on every area of our lives, the ability to think critically about the impacts, with a foundational understanding of ethics, is fundamentally important. We will review the primary ethical theories and practice applying them to dilemmas in the current technological milieu.

Throughout all of this, a second goal is to initiate and facilitate the transition from the undergraduate experience at Westmont into the next season of students' lives, whether it be in graduate school or in the commercial sector.

To accomplish these objectives, students will read selected papers, write and discuss these readings in seminar context, complete a significant major project, and present their finalized portfolio to the department community. The project will typically involve a significant implementation along the lines of that accomplished in CS130, Software Development. Peers and lower division students may be enlisted to assist with these projects. The project serves as the culmination of students' portfolios begun in their first year. The portfolios represent not only a repository of work accomplished during their education but can serve as a useful tool for applications to graduate school and jobs.

**Course requirements:**

**Seminar: readings, discussions and presentations.** Assigned readings throughout the semester will draw from classic papers in the literature, current developments in specific areas of computer science, applied ethics in the area of technology, and relevant current events reported in the news. Some of the readings and discussions for this class will tie together various classes in the major. Other readings will provide a final opportunity to reflect on the relationship between faith and computer science as a discipline. Readings will be followed by student presentations and discussion in seminar format. For a given reading, each student will prepare a short presentation covering the key points and claims made in the reading and questions thereby triggered. Students will be selected randomly to share their summary and initiate discussion. Participation in discussion contributes a significant portion to the grade. More importantly, reading critically for key points and questions and writing short reflective summaries exercise skills that are explicit goals for both Westmont and our department. Similarly, making oral presentations and interacting verbally represent learning goals but also have become critically important in the computer profession.

**Integrative essay.** In addition to short written analyses of assigned readings, students will prepare a more substantial essay (1600-1800 words) addressing the relationship between computer science as a discipline and faith as a life-organizing framework. This essay provides the student with an opportunity to reflect on “the nature of becoming a whole person,” given a particular faith and a training in computer science.

**Project.** The senior project serves as the cornerstone of the capstone experience. It
should play the most prominent role in the student's portfolio and be the most prominent talking point during interviews for either graduate school or industry. Each student will be responsible from beginning to end for the conceptualization, implementation, and testing of their project. However, students will be able to (and are encouraged to) enlist the assistance of other students in the computer science major. Those students will receive credit for helping on another student's project and are required to earn such credits (CS192) as part of the major, so it should not be too difficult to get help.

The completed project should reflect a significant amount of work. Following a two week time of identifying a topic, getting a proposal approved, and creating a detailed plan, students have roughly ten weeks to complete the project. Faculty will assist in sizing your project, but depending on the availability of support from peers, you should estimate between 12 and 30 person-hours per week will be available to you over the span of ten weeks. Your time management for this course will be critical as you will be responsible for readings and presentations in addition to managing your helpers and keeping your project progressing.

**Portfolio.** Students majoring in computer science will have started a portfolio during their first computer science course. During the senior seminar, students complete their portfolio with the addition of their senior project. Although the organization and content of students' portfolios will have been reviewed multiple times during the first three years, department faculty and peers critique the portfolios and students have this final chance to make further revisions. The portfolio serves as the public web-based presentation of each senior's work during their undergraduate education. While the bulk of the work will have been completed prior to the senior seminar, the portfolio will count for a significant portion of the grade.

**Preliminary schedule:**
- week 1: overview, interview techniques, project topic brainstorming and proposals
- week 2: mock interviews, ethics reading 1, and reviews
- week 3: social impacts reading 1, project plan presentations, project support interviews
- week 4: computer science integrative reading 1
- week 5: ethics reading 2, project progress report 1
- week 6: ethics reading 3, job seeking skills 1
- week 7: computer science integrative reading 2, project progress report 2 (milestone 1)
- week 8: social impacts reading 2
- week 9: ethics reading 4, project progress report 3 (milestone 2)
- week 10: computer science integrative reading 3
- week 11: job seeking skills 2, project progress report 4 (milestone 3)
- week 12: social impacts reading 3, portfolio presentation and review 1
- week 13: computer science integrative reading 4, project progress report 5 (milestone 4)
- week 14: job seeking skills 3
- week 15: final project and portfolio review
Example readings:
Paul Graham, *Hackers and Painters*;
Deborah Johnson, *Computer Ethics*;
Richard Spinello and Herman Tavani (Eds), *Readings in Cyberethics*;
Lawrence Lessig, *Free Culture: How big media uses technology and the law to lock down culture and control creativity*;
Adam Thierer and Clyde W. Crews Jr. (Eds), *Copy Fights: The future of intellectual property in the information age*;
Chris DiBona, Sam Ockman and Mark Stone (Eds), *Open Sources: Voices from the open source revolution*;

Grading:
The grade for the senior seminar is split between the class participation (essays 20%, presentations 15% and class discussions 15%), the project (40%), and the completion of the portfolio (10%). Presentations will be evaluated with respect to preparedness, organization, content, and delivery. Class participation will significantly contribute to the grade. The project will be graded in terms of concept, design, management, implementation, and packaging. The portfolio will be evaluated in terms of presentation and completeness. In all three areas of evaluation (participation, project, and portfolio), student work will be collectively evaluated by the entire computer science faculty.

Administrivia:
Location: Winter Hall 311 (Mathematics/Computer Science Seminar Room)
Day & Time: Mon., Wed., & Fri., 9:15-10:20 AM
Faculty: Dr. Kim Kihlstrom & Dr. Wayne Iba