Fall 2013

CEG 4980/4981-01: Team Projects I and II

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CEG 4980 and CEG 4981: Team Projects I and II
Department of Computer Science and Engineering, Wright State University
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Brief Course Description

CEG 4980/4981 (Team Projects I and II) is a summative computer science and engineering design project course that builds upon previous computer science, computer engineering, science, mathematics and communications course work. CS 4980/4981 projects are two semesters in length and must be completed in groups of at least three students. Projects are selected under the guidance of the course instructor and/or other faculty advisors and are tailored to student interest and the specific degree program (BSCS or BSCE) of each student. Students are evaluated both on their individual contributions as recorded in a graded engineering journals and on the quality of their collective efforts as reflected in group generated products.

Course Objectives

After successfully completing this course, a student should be able to:

1. Develop a standards-compliant requirements specification document that describes the requirements of a computer solution to a practical problem. An example of an appropriate requirements specification standard is IEEE Std 830-1998 (IEEE Recommended Practice for Software Requirements Specification).

2. Create a computer hardware or software product that satisfies a requirements specification document and complies with appropriate ethical and legal standards governing similar products.

3. Maintain a personal project journal that documents the history of one's participation in a project. Journal content includes, but is not limited to, notes on background research, interviews with clients or domain experts, drawings and sketches, research on similar or competing products, design ideas, and testing and verification data.

4. Collect and analyze product performance to demonstrate it satisfies defined requirements. Produce appropriate documentation of those analyses in a project journal and formal test documents formats.

5. Produce differential analyses of candidate designs that explore their relative merits and weaknesses and how those affect final product suitability. These differential analyses will include, but not be limited to, analysis of candidate designs including explanation of tradeoffs related to time and space complexity of alternative candidate solutions.

6. Work productively in a team environment and effectively manage group activities to deliver a product on a schedule.

7. Effectively communicate technical ideas in a number of media including oral presentation, written reports, display posters, and web pages (custom or template based).

8. Use formal revision control tools (e.g. Apache Subversion or Git) to manage and archive repositories of group documents (e.g. source code, group design documents, hardware descriptions, etc.)

9. Integrate knowledge learned in your degree program to support an ongoing design effort.

Course Coordinator

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Faculty Project Advisers

Nikolaos Bourbakis	Erik Buck	Travis Doom	John C. Gallagher
Prabhaker Mateti	Michael Raymer	Ronald Taylor	Richard VanHook
Thomas Wischgoll			

Textbook

There is no required textbook. The instructor will, however, distribute reference and supplementary materials via a class Wiki. Students are expected to be familiar with those materials and apply them to their projects as appropriate.

Detailed Course Description

CS/CEG 4980/4981 is a project-based course. Students will work in groups to complete some significant computer science and engineering project of their choosing. In this context, a significant computer science and engineering project is defined as a project that applies contemporary technology and methodology to solve a real problem subject to at least two "non-technical" constraints. Acceptable non-technical constraints include performance requirements related to safety, financial, political, regulatory, legal, or ethical considerations. Projects problem statements and scoping of work will be conducted with the assistance of the course instructor and/or faculty project advisers, who will provide project ideas and industry and research contacts for groups desiring them. Project management and conduct, however, will be handled by the student groups themselves, who will be encouraged to treat the instructor as a client and/or stake holder in the project's success.

Each student will be formally evaluated based equally on personal effort and group achievement. Each student will receive a grade that is an average of a score given to her/his group's communal products and a score given to the student's individual efforts as measured by entries in a personal project journal. This grading methodology is intended to mimic real life. Your personal success as a designer is a function of the quality of your products and of the visibility of your contributions to that quality.

Students will meet with an instructor up to three times per week. On Some Mondays and all Wednesdays, all students will meet together in the first floor "scale-up" classroom in Russ Engineering. During those sessions, we will complete group exercises intended to help students receive experience in practical engineering practice. These exercises will include, but not be limited to, peer evaluation of group documents, design reviews, elevator talks, presentations, and product critiques. Students will, in addition, meet for one hour with their project technical advisor in individual project groups. These meetings are intended to be private discussions of project progress and a forum to receive advice and support specific to their projects.

In addition to a participation in the M/W whole class activities, each group will be responsible for producing a formally evaluated project presentation at the end of each quarter. Details of the requirements for these presentations, along with other elements (group and individual) that will be formally evaluated will be discussed later in this syllabus.

Course Grades

You will have an opportunity to earn up to 100 points for various activities relating to your project. Letter grades will be assigned based on the following scale:

A	90 points and up
B	89 - 80 points
C	79 - 70 points
D	69 - 60 points
F	59 points and below

Note that more than two unexcused absences from class activities (formal class meetings or individual project group meetings) will result in a failing grade in the class regardless of achieved point score.

Points are earned in three categories. Those categories, and the maximum number of points earnable in each, are:

Individual Performance Grade (50 points maximum)

Points in this category are awarded based on assessments of your personal contributions to the group effort. The instructor will make these assessments based on observations of your participation in group meeting, examination of your engineering journal, and regularity of contribution to your group documents.

Points in the "Individual Performance" Category will be awarded as follows:

Journal Regularity (5 points)	The fraction of weeks in the quarter for which there is a substantive journal entry times 5.
Journal Neatness (5 points)	The project adviser's evaluation of the journal's clarity, legibility, and organization
Analysis of Design Alternatives (10 points)	The project adviser's evaluation of the quality of the differential analyses of alternative design options. Did you explore more than one way of doing things? Did you base your eventual decision on rational analysis? What was the analysis method and what were your assumptions? Are there any conditions in which an alternative design becomes preferable? What are they?
Recorded Testing and Critical Review (10 points)	The project adviser's evaluation of how well you ensured the merit of your ideas. Did you test? How? Why should anyone believe your ideas are workable?
Meeting Contribution (10 points)	The project adviser's subjective evaluation of how much you participated in project group and whole class meetings.
Self-Assessment and Review (10 points)	At the end of each term, each student will be required to complete a worksheet that identifies places in the notebook that contain examples of the use of materials learned in other courses or learned during the conduct of the project. Each student will also be required to indicate places in the notebook that document the consideration of appropriate ethical, legal, and professional standards as well as the consideration of the tradeoffs involved in different alternative designs. This worksheet will be provided in class.

Group Documents (40 points maximum)

Points in this category are awarded based on assessments of documents and products your group collectively authors. The *specific* documents each group will be required to produce are generally a function of the type of project the group selects. All groups will produce a standards compliant requirements specification. Each group will negotiate the manifest of the other required group documents and point values with the instructor early in the first term of the project. The results of the negotiation will be recorded and will become a binding part of the syllabus for that group. Typically, the list of documents resembles the following:

Requirements Specification (10 points)	This document should explain specifically what you intend to do for your project and which team members will be responsible for what aspects of it. It should be developed according to some standard. The instructor will provide a template compliant with IEEE Std 830-1998. Students may, however, use any appropriate specification standard with instructor or faculty project adviser approval. This document will serve as a "contract" between the instructor and the group. The group's final products will be evaluated against the expectations spelled out in the requirements specification agreed upon by the team and the instructor.
Project Management Plan (5 points)	This document should explain specifically how to intend to manage your project and how you intend to schedule work efforts. The instructor will provide a template for this document. However, students may use any format that provides as least the same information with the approval of the instructor or the faculty project adviser.
Design Notes (5 points)	This document should contain a clear description of the design and how that design satisfies requirements and meets specifications. This document should discuss the design at a level of abstraction above that of the implementation. Appropriate forms for this document will be discussed in class.
Implementation Notes (5 points)	This document should contain "engineer's notes" that would allow a reasonably skilled computer scientist or computer engineer to understand and modify your group's products. The discussion should be focused and practical.
Users' Manual (5 points)	This document should contain installation and operation instructions for the users of your product(s). It should be aimed at the "average user" and should not require that the reader be an engineering professional.

Testing Plan and Report (10 points)	This document should provide a formalized test plan for your products. How did you ensure they met specifications? What tests did you run and what were the results?

Group Presentation / Public Communications (10 points maximum)
At the end of each academic term, every group will give a formal project progress and/or final presentation that will be open to the entire university community. Each group will also be required to produce a poster that summarizes the achievements of the project for a general audience.

Attendance

Not attending class or weekly group meetings harms the other members of your group and makes it much more difficult for the instructor and/or faculty project adviser to assess your individual contributions to the group. Therefore, attendance and active participation in the weekly group meetings is required. Failure to attend a meeting or gross lateness of arrival (more than 15 minutes late) will result in point deductions and will negatively affect your final grade. Since groups will be given latitude in scheduling group meeting times, it should be possible to schedule around individual member's commitments. Emergencies, however, do happen. Lateness or absence can be excused if there is a valid reason. The instructor, with the consultation of your engineering group members, reserves the right to determine what constitutes a valid reason.

Repository and Version Control

All groups are required to use a version control system (https://en.wikipedia.org/wiki/Revision_control) to maintain archives of all group activities. We officially support Subversion (https://en.wikipedia.org/wiki/Apache_Subversion) and will maintain a subversion server for student use. Groups may use alternative version control systems (e.g. Git) with the instructor's permission if use of an alternative system is a legitimate requirement for the project.

Design Journal

Specific advice on maintaining the individual journal will be provided in class. Students may, at their individual options, maintain a traditional paper notebook or an electronic notebook.

The Boffin Factory (Russ 348)

Space is available in the Boffin Factory (Russ 348) for meetings, build space, and housing/storage of your products. There is also a small budget available to fund materials and supplies needed by student project groups. At your option, you may write small proposals to fund the purchase of materials you need. The money is not infinite, so you will need to well-justify your expenditures. We will discuss proposal strategies in our group meetings.