CBE Final Year Projects / Theses

CENG/BIEN 4920/4930, ENEG 4920 (Fall 23-24)

Course Syllabus

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Course Description

This is a project course representing the capstone experience for chemical engineering, bioengineering and sustainable energy engineering students. Students choosing final-year projects undertake a design project in the realm of their discipline as a group. Integrating what they have learned in the program, they will go through the design process including conceptualization and ideation, literature and market survey, prototyping and testing. Project topics are diverse and vary from year to year, reflecting the wide scope and contemporary relevance of the discipline. Students choosing final-year thesis undertake a research project individually in a research laboratory, culminating in a Bachelor's thesis. They will perform scientific research under the mentorship of full-time researchers, which will include literature review, experimental design, laboratory or computational work, data analysis, and dissemination of research findings. In all projects, students engage in open-ended problem solving, wet-lab and/or dry-lab experimentation, and societal impact assessmen1ts.

Expected Learning Outcomes

By the end of this course, students should be able to:

1. Design a process, product or methodology relevant to their discipline by integrating knowledge and skills learned in their major, exercising creative and critical thinking in the process, to meet societal needs or to advance science.

2. Find, identify, and critically evaluate data and information related to the project topic, and use it effectively in their own design or research.
3. Design and conduct wet-lab or computational experiments safely and competently, to optimize and evaluate designs or support new findings.
4. Evaluate the impact and limitation of the project outcome on contemporary society or on the scientific field, demonstrating a sense of professional ethics and responsibility.
5. Articulate and advocate for the design or the research finding, both in writing and orally.
6. Collaborate effectively and professionally in project teams or with other co-workers to achieve pre-defined and agreed goals.
7. Manage a project effectively by means of proper coordination and work allocation among team members, good communication and documentation, and time management.

Course Requirements and Grading

The final-year project/thesis is perhaps the most important course in an engineering degree, accounting for 6 credits. It is a capstone experience that integrates everything you learned, and is a critical component of your engineering training.

For every credit in HKUST, you are expected to spend about 3 hours per week for one semester. That comes to **9 hours per week per student**, as the workload is spread over two semesters. It is based on this level of time commitment that the milestones are set for your project. Accordingly, you should set aside that amount of time in your weekly timetable to work on your FYP/FYT.

You will be graded on (percent weighting in parentheses):

1. **Completion of the 4 milestones on time (20%)**

The **milestones** are as described in the project proposal, and the deadlines are in the tentative schedule below. This is assessed by the project supervisor, roughly as a percentage of completion. For example, if you have only completed half of the tasks expected of you, you will earn half of the points.

2. **Teamwork (5%)**

This concerns how well the team works together to achieve the project deliverables, and how fairly and meaningfully each member contributes to the project. Individual projects (FYTs) will also have a teamwork component and are based on how well the student works with other postgraduate students in the laboratory. This will be assessed by the supervisor based on his/her observation. A grading rubric will be provided.

3. **Project logbook (5%)**

Each team is required to keep an **online project logbook** using Google Doc (or other similar co-working software). This "living" document takes the place of periodic progress reports. The logbook should document the team meetings (date and time,

attendance, matters discussed, action items, etc.), major task completed and hurdles encountered, and decisions made. The supervisor and the TAs will have access to the logbook. Teams should use this mechanism to manage the project, as well as to keep the supervisor abreast of their progress on a day-to-day basis. The TAs will monitor the logbook regularly to assess how well the project is managed and how well the logbook is kept.

4. **Interim presentation (10%)**

In December during the final exam period of the Fall semester, each team will deliver a short presentation on their project progress to a panel of faculty (not including their supervisor). It will be graded on aspects such as the comprehensiveness of literature review, the amount and level of achievements, the quality of the design (including the reasoning behind decision choices), and presentation skills.

5. **Final poster presentation (20%)**

In May towards the end of the Spring semester, each team will prepare a poster presentation about the whole project, and stand by at the poster to present it to assessors. Each poster will be assessed by 3 groups of professors and outside experts (not including their supervisor). It will be graded on aspects such as such as the amount and level of achievements, the quality of the design (including the reasoning behind decisions and choices), understanding of how the work translates into the real world, and presentation skills.

6. **Final project report (40%)**

The final project report covering every aspect of the project will be due during the final exam period of the Spring semester. The report will be read and collectively assessed by a faculty panel. _All team members are required to be attend a grading meeting to answer any question that the panel might have._ More details about the expected length, content, format, and grading rubric will be provided later.

Adjustment of scores to account for individual contributions in team projects: All members of the same team will receive the same aggregate score (combining all 6 categories above) as a baseline for the determination of the final grade. The supervisor, in consultation with the FYP committee, will adjust the scores of each student in the team based on his/her contribution to the project, based on information gleaned from the observations of the supervisor, the project logbook, the declared contributions of the final project report, as well as anonymous peer assessments. The score adjustment is done in a way that the total score of the team is fixed.