CE 4900 Independent Study Proposal

Please work with the faculty member supervising your independent study to prepare the proposal below. Provide sufficient detail so that the CE Curriculum Committee can evaluate the relevance as an Engineering Topic Elective and determine if the planned effort justifies the number of proposed credits. This proposal must be submitted to the CCEE Advising Center (Town 382) and approved by the CE Curriculum Committee before you are eligible to register for CE 4900.

Deadline: Proposals will not be accepted after the 10th week of classes.

Student Information:

Name: _____ Date Submitted: _____

Email Address: _____ ID Number: _____

Class Standing: First Year ☐ Sophomore ☐ Junior ☐ Senior ☐

Advisor: _____

Preliminary Information:

Faculty Supervisor: _____

Semester of the Independent Study: _____

Requested Number of Credits: _____

Note: One (1) credit corresponds to about 48 hours of work, or 3-4 hours per week, in a semester. *Total credits requested here should match the total hours of work in Question 4*. No more than six (6) credits total of CE 4900 can be applied as Engineering Topic Electives.

Will you work in a lab? Yes ☐ No ☐

If yes, have you completed the necessary safety training? Yes ☐ No ☐

Description of Activities:

1. Justification: Briefly state the topic of the independent study and explain your motivation for proposing it.
   Example: I will use the computational fluid dynamics (CFD) software OpenFOAM to redesign mixing streams at a wastewater treatment plant (WWTP). Although the CE curriculum has courses in fluid mechanics, hydraulics, and WWTP design, it does not have any in CFD.

2. Prior Experience: Explain any prior study or experience that has prepared you for the independent study you are proposing.

   Example: I have learned fluid mechanics in ABE 3780 and introductory environmental engineering in CE 3260, and I worked for the Ames Water and Pollution Control Department as an intern during the summer of 2023.

3. Learning Outcomes: List the learning outcomes for the proposed independent study. In other words, explain what you will be able to do after the study is complete. Use words such as explain, compute, derive, design, and evaluate. Avoid terms that are difficult to quantify, such as understand, learn, and know. Try to include terms from higher levels of Bloom's Revised Taxonomy.

   Example: (1) Explain the key elements of CFD modeling; (2) Construct a computational grid for a complex flow; (3) Compute a complex flow with CFD; (4) Check that solutions from engineering software are reasonable by applying conservation laws; (5) Evaluate designs for mixing streams at a WWTP by comparing degrees of mixing.

4. Approach: List the specific activities planned for the semester, including the steps, skills, and research required for the study. Include an estimate of the time required for each activity and be sure that the total number of hours corresponds to the number of credits requested. In the task/hours breakdown, no one task should have more than 16-20 hours. If some research is being done for credit and some for pay, please explain the breakdown for each.

   Note: Blank table provided on last page.

   Example:

Activity/Task	**Hours**
Learn about CFD in general	16
Become familiar with OpenFOAM and learn how to set up a flow and run example problems	16
Assess the problem of the mixing streams at a WWTP	6
Construct a CFD model of the flow in OpenFOAM	16
Simulate different designs	16
Evaluate the results	16
Write a report that demonstrates that I have achieved the learning outcomes	10

5. Reporting progress and demonstrating achievement: Describe how you will interact with your faculty supervisor during the term (weekly meetings, email summaries, etc.) and identify the project's deliverables (written report, presentation, draft of a journal, article, etc.) to be produced by the end of the semester. The deliverable should document your achievement of the outcomes listed under Question 3.

6. Grading: Students will earn a letter grade (A-F) upon completion of the Independent Study. Discussion with faculty supervisor regarding grading should be held as a part of the contract development.

Approval Signatures:

Student: _____ Date: _____

Faculty Supervisor: _____ Date: _____

Advisor: _____ Date: _____

Advisor will not sign unless all tasks have less than 20 hours and the total is sufficient for the number of credits.

CE Curriculum Committee Chair: _____ Date: _____

Activity/Task	Hours