

## Proposal for ENVE 4900 Independent Study

Please work with the faculty member supervising your independent study to prepare the proposal below. Provide sufficient detail so that the ENVE Curriculum Committee can evaluate the relevance as an engineering topics elective and determine if the planned effort justifies the number of proposed credits. This proposal must be submitted to the CCEE Advising Center before you enroll in ENVE 4900.

**Priority Review Deadlines:** For Fall Semester – April 1; For Spring Semester – November 1

### Student Information:

Name: \_\_\_\_\_ ID Number: \_\_\_\_\_  
Classification: FR SO JR SR Email: \_\_\_\_\_  
Adviser: \_\_\_\_\_

### Preliminary Information:

Faculty supervisor: \_\_\_\_\_

Semester of the independent study: \_\_\_\_\_

Requested number of credits: \_\_\_\_\_

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 total hours of work in Question 4.

No more than six (6) credits total of ENVE 4900 can be applied as Engineering Topics Electives.

Will you work in a laboratory? **(mark one)** Y N

Have you completed the necessary safety training? **(mark one)** Y N NA

### Description of Activities:

- 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 ENVE curriculum has courses in fluid mechanics, hydraulics, and WWTP design, it does not have any in CFD.*
- 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 EM 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 2016.*
- 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, and (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.

*Example: I will learn about CFD in general (16 h) and become familiar with OpenFOAM by learning how to set up a flow and run example problems (16 h). I will assess the problem of the mixing streams at a WWTP (6 h), construct a CFD model of the flow in OpenFOAM (16 h), simulate different designs (16 h), evaluate the results (16 h), and write a report that demonstrates that I have achieved the learning outcomes (10 h).*

<i>Activity/Task</i>	<i>Hours</i>

5. **Reporting progress and demonstrating achievement:** Describe how you will interact with your faculty supervisor during the term (weekly meetings, e-mail summaries, etc.) and identify the project’s deliverables—a written report, presentation, draft of a journal article, etc.--to be produced by the end of the semester. The deliverable must document your achievement of the outcomes listed under #3. *An electronic copy of the final report/deliverable should also be sent to Jenna Levendusky ([jlev@iastate.edu](mailto:jlev@iastate.edu)) for the ENVE Curriculum Committee.*

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 \_\_\_\_\_

Faculty supervisor SIGN \_\_\_\_\_

Faculty supervisor PRINT \_\_\_\_\_

Adviser \_\_\_\_\_

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

ENVE Curriculum Committee Chair \_\_\_\_\_