

Capstone Courses and Professional & Ethical Responsibility
CHEG 237W Fall 2006

Seniors:

CHEG 237W is the first of three 'capstone' courses you will be taking this year. (The other two are CHEG 239W and 243, Design). The capstone we refer to is the capstone of an arch – the last stone added at the top. In the structure, the capstone is held up by all the lower stones, and it cannot be laid until they are all in place. The capstone does not merely sit on the lower pieces, however. It ties the individual lower pieces together, making the arch a strong, coherent overall structure.

Capstone courses are like that. Here you build upon your previous studies, starting with foundations in mathematics and basic sciences you laid a long time ago. You use these fundamentals without even having to think about them, because you have used them time and again as you added higher levels to your engineering knowledge. The last few stones, (transport processes and reactor design perhaps), use most of the layers that have been laid before. As you put in the final pieces of your engineering education, it also should start to look like a strong, coherent overall structure.

Once you have built your arch, you are ready to step through it into the world of engineering. A year from now many of you will be responsible for designing, running, and improving the performance of process equipment out in the world. To that end, we are also looking at how your work as engineers affects the rest of humanity. We will formally cover professional ethics as part of the design course; this assignment is just an informal introduction to professional thinking. I am relying on your having read the [AIChE Code of Ethics](#), which was assigned in the controls class.

To get you started thinking about passing through that arch, we have asked you to address professional and ethical responsibility in your final presentation. On the following page, I outline the assignment for this course.

Here is the assignment, to be submitted as part of your final lab oral presentation. Present a single slide, outlining your approach to one of the issues listed below, relating to the use of the equipment you studied in an actual industrial situation.

- What do I need to know to operate the equipment safely?
- What are the major risks associated with this process?
- How does this affect the environment?
- What do I need to know to design the equipment properly?
- How do I design with uncertainties in measured properties?

You are free to use your imagination, but for the imagination-challenged, here are some examples of real-world processes using our unit operations:

Experiment	Process Example
Distillation	Solvent recovery from pharmaceuticals synthesis
Pneumatic Control	Distillation control
Kinetics A or B	Biodiesel synthesis
Heat Exchange	Reactor feed preheat (e.g. for Ethylbenzene synthesis)
Double Effect Evaporation	Cane juice concentration for sugar
Pump & Fluid flow	Reactor feed pumps
Gas Absorption	Scrubbing toxic acid gases (HCl, H ₂ S) from reactor vents

There are many possible good answers to this assignment – I don't expect the attempts to address these things to all look the same. Remember that we have very tight time constraints – you don't need to go overboard here.

Good luck!

-- EA/LZ