**ECHE 362 Senior Laboratory**

**Fall 2015**

**Objectives for this course:**

The overriding goal of this course is to help prepare you for industrial practice as an engineer. If graduate school is your goal for next year, don’t worry, this class will help you there as well. The laboratory assignments in this class are intended to mimic situations you would see on the job. We will assume that the laboratory is a pilot plant for a fictious company (Gardner-Edwards Chemical Co – named after Prof. Nelson Gardner and Prof. Robert Edwards). As engineers, you will receive a series of assignments requiring that you use existing equipment and knowledge to find answers to the problems posed. The objectives for you are to increase your ability to: 1) plan and execute experiments, 2) analyze the results using appropriate theory, 3) scale-up and evaluate a possible industrial process based on your results, and 4) effectively communicate your findings in both written and oral forms. There are deadlines to meet, and you’ll be working on two or three assignments in parallel, as you will find in industry. Planning and organization will be essential, as will initiative and effort. These elements will be a part of whatever you do after this semester.

Specific examples of the skills you will be working on include:

1. Reading and comprehending open-ended assignments: What questions must be answered to complete the assignment? What constraints are there (time/equipment/money)? What information do I need to get that I don’t have already?
2. Preparing an experimental plan: What variables are to be controlled, and to what values? What data needs to be acquired and how? How can I check my data to see if it is reasonable? What are the safety concerns?
3. Working with a team: How to best use everyone’s skills? How to communicate with each other and coordinate the team’s activities? Without cooperation, there will be chaos.
4. Self-learning: While most of the background you need to handle these assignments has been presented in your other courses, there may be material that is new that you have to find and learn quickly. You may find that you need to learn how to do calculations you’ve never seen in class, or that you need a quick review on class material you knew once, but have forgotten.
5. Professionalism: We treat our colleagues with respect. The work we present as our own is our own. The work of others is specifically referenced. We are responsible for the quality and integrity of our work; we don’t change data or calculations to fit a pre-conceived notion of “the right answer”. We are punctual; always on-time for group meetings, lab sessions, and report due dates.
6. Critical Thinking: What assumptions am I making and are they valid? Does my data agree (within reason) with theory – if not, why not? What trends can I find in my data? Is my design conservative/robust – would it fail if I’m off by 10% on any one value? What parameters are critical to success/failure/profitability?