# Winter 2011 Course and Curriculum Evaluation of Assessment

**August 15, 2011**

*Competency Changes:*

1. **Closed Feedback Loop:** The Undergraduate (UG) Committee reviewed the competencies, consolidated a few, but decided against a complete overhaul, as the perceived benefit was low.
2. **Closed Feedback Loop:** **3.1.5** was reworded regarding the expectations concerning psychrometric charts. (Now reads “Students will be able to read pure component and mixture phase diagrams (e.g. psychrometric chart, solid solubility, liquid-liquid, VLE) and construct mass balances from them using the lever rule, tie lines, etc.”)
3. Consider adding “flows with evaporation and/or condensation” to competency 3.4.3 (“Students will understand convective heat transfer and use of heat transfer coefficients for laminar and turbulent flows, internal and external flows, fully developed flow, flow with entry effects, and forced and free convection.”). **Responsible Faculty: UG Committee.**

*General Action Items:*

1. **Feedback Loop:** Competency 6.6 (rationalize units, order of magnitude estimates/reasonableness) recommended to be assessed throughout the curriculum. Possible ideas: Teaching Moment in faculty meeting; benchmark assessments in quiz, exam, etc.; clicker or Poll Everywhere exercises. **Responsible Faculty: Undergraduate Committee**.
2. **Closed Feedback Loop:** ChemCad license issues resolved.
3. **Ongoing Feedback Loop:** Consider introducing simulators earlier in curriculum and providing simulator options (like Aspen and Unisim). The UG Committee is addressing curriculum-wide computer program usage, but planning to adopt Aspen this year. **Responsible Faculty: Undergraduate Committee**.
4. **Ongoing Feedback Loop:** Consider effectiveness of 391. **Responsible Faculty: Undergraduate Committee**.
5. **Ongoing Feedback Loop:** Improve the UO experience for all involved. The UG committee is considering all options, especially in view of the department’s desire and college funding to make this a showcase lab. **Responsible Faculty: UG Committee, 475 and 477 instructors, Mike Beliveau**.

*ChEn 170:*

1. **Feedback Loop:** The instructor is still concerned about the number of competencies for an introductory course. He feels it is redundant to have competencies that are “introduce . . .” when other higher level competencies could be used to teach them at an introductory level. The Undergraduate Committee agrees that the competency list is lengthy for this class, but we would like to discuss a more concrete proposal. Please suggest which competencies should be eliminated or combined. **Responsible Faculty: 170 Instructor**.
2. **Closed Feedback Loop:** Implementation of hands-on, open ended projects.
3. Teamwork is strong.

*ChEn 191:*

1. No action items.

*ChEn 273:*

1. **Closed Feedback Loop:** The UG Committee changed the flow chart and catalog to make Math 113 prerequisite to 273 to improve performance on transient balances.
2. **Closed Feedback Loop:** The instructor created a practice sheet for transient balances. Looks good. Please continue using and note any changes in student performance.
3. **Closed Feedback Loop:** Competency 3.1.5 reworded.

*ChEn 373:*

1. **Ongoing Feedback Loop:** Competency 6.6 remains weak. (“Students will be able to rationalize units, make order of magnitude estimates, assess reasonableness of solutions, and select appropriate levels of solution sophistication.”) The instructor feels that we need to train faculty how to teach this, for example by giving more “what if” questions, activities to assess “reasonableness”, and more opportunities to think. **Responsible Faculty: Undergraduate Committee**.
2. **Closed Feedback Loop:** The instructor continued to emphasize 3.7.1 and 3.7.6, with noted improvement in these areas of entropy and first law for closed systems.
3. **Feedback Loop:** Instructor taught in a new way. Check L3 performance to assess effectiveness. **Responsible Faculty: UG Committee**.

*ChEn 376:*

1. **Feedback Loop:** Consider adding “flows with evaporation and/or condensation” to competency 3.4.3. **Responsible Faculty: UG Committee.**
2. **Closed Feedback Loop:** 10.2.2 updated.
3. **Closed Feedback Loop**: Competency 3.4.7 (radiative heat transfer) coverage increased a day with additional homework and quizzes. Student performance and student and faculty evaluations increased significantly (from 3.31 to 3.98 and from 3.0 to 4.0, respectively). The instructor plans to continue the current coverage in the future, but this item is complete.
4. Instructor tracked time spent on homework assignments via self-reporting by students. The average was 2 hours, with some outliers to be addressed.
5. The instructor changed LMTD instruction and provided an equation-based method for the F factor to supplement/supplant the chart based method used in previous semesters. He also used compare and contrast with the effectiveness/NTU method. He will see if the L3 performance improves next year, but previous high student and faculty ratings suggest a lack of long term retention as a root cause for previous poor L3 performance. **Responsible Faculty: 376 instructor.** This is up to the instructor’s prerogative, but the Undergraduate Committee believes that it may go beyond what was intended in the competencies.
6. Instructor revised the syllabus to introduce competencies in chronological order with subheadings to improve student understanding of the competencies covered.
7. **Feedback Loop:** Added Leadership Feedback Program to project, with students setting two measurable goals for areas of weakness and provided them with constructive praise/criticism of performance. Please continue. **Responsible Faculty: 376 instructor.**

*ChEn 386:*

1. **Closed Feedback Loop:** Instructor suggested combining competencies 3.6.4 (“Students will understand the kinetics of competing reactions and their influence on product yield and selectivity.”) and 10.1.3 (“Students will be able to select and size isothermal reactors for series and/or parallel systems of reactions.”). The Undergraduate Committee feels that these competencies focus on different aspects of comprehension and design and should remain separate.
2. **Closed Feedback Loop**: Due to time constraints, the instructor feels that coverage does not fit well with Fogler’s approach and is a more appropriate topic for ChEn 373. The UG will continue to monitor student performance on this skill during annual reviews of L3 results.
3. **Closed Feedback Loop:** The instructor suggested changes to competency 3.6.1 (“Students will understand fundamentals of kinetics including definitions of rate and forms of rate expressions and relationships between moles, concentration, extent of reaction and conversion.”) by removing the words “forms of” and add “stoichiometry. Suggested wording:

3.6.1a Students will understand fundamentals of kinetics including (a) definitions of rate, (b) rate expressions, (c) reaction order, and (d) Arrhenius temperature dependence. and relationships between moles, concentration, extent of reaction and conversion.

3.6.1b: Students will understand the importance of stoichiometry in reaction kinetics including the relationships between moles, concentration, conversion, and extent of reaction.

The instructor should feel free to include these changes at the course syllabus level because the specific interpretation is up to the faculty member. While we like the detail, the Undergraduate Committee does not recommend making all curriculum competencies this specific.

*ChEn 391:*

1. **Feedback Loop:** The UG Committee continues to work to address the ongoing criticisms of this class (including too late coverage of resumes; unneeded oral presentation practice, especially the canned business presentations better done with “real” numbers in plant design and the technical presentations are only good if students have done the research themselves; and the industrial speaker and plant trips, which could be done elsewhere like the college lecture requirement and AIChE). **Responsible Faculty: Undergraduate Committee**.

*ChEn 451:*

1. Offer simulator options (see item 3 under “General Action Items”). **Responsible Faculty: Undergraduate Committee**.

*ChEn 477:*

1. One instructor feels there are too many competencies and too few experiments to cover all of them for all students. His example was if one unit is down, that prevents coverage of some competencies, and even if all are operational, with the number of students in the sections, only a subset (~1/3 ) will experience that experiment anyway. He suggests managing experiments with critical components to be able to avoid months-long repair delays (which have occurred for both distillation units in the previous two semesters). **Responsible Faculty: Mike Beliveau, with 475 and 477 instructors, to consider/prioritize and provide list to Randy Lewis.**
2. **Feedback Loop:** The UG Committee continues to work to address the ongoing criticisms of this class (experiment quality/appropriateness, statistics integration, writing amounts and format, and hands-on experience). **Responsible Faculty: UG Committee, 475 and 477 instructors, Mike Beliveau**.