Undergraduate Program Assessment

Department of Chemical Engineering

Student Learning Objectives

• Technical Knowledge: an ability to apply knowledge of mathematics, science (particularly chemistry), as well as chemical engineering
• Experiments: an ability to design and conduct experiments, relevant to the study of chemistry and chemical engineering as well as to analyze and interpret data
• Design: an ability to synthesize and design process systems, including their component unit operations, and to optimize process systems and alternatives to meet desired needs
• Teams: an ability to function on multidisciplinary teams
• Professional & Ethical: an understanding of professional and ethical responsibility
• Communication: an ability to communicate effectively orally and in writing
• Global/Societal Impact: the broad education necessary to understand the impact of chemical engineering systems in a global, economic, environmental, and societal context
• Life-Long Learning: recognition of the need for, and an ability to engage in life-long learning, particularly through an appreciation of recent research and its impact in chemical engineering
• Contemporary Issues: knowledge of contemporary issues relevant to chemical engineering, achieved particularly through exposure to emerging areas and current research
• Applications: an ability to use the techniques, skills, and modern science and engineering tools necessary for chemical engineering practice

Assessment tools

• Indirect methods:
  o Student Self-Assessment (SSA), which indicates the student perception of their degree of achieving course objectives in each required chemical engineering course
  o Questions added to standard course evaluation forms (SRTI), developed by the department
  o Senior Survey and Critique (SS), conducted each May, with student feedback on individual courses as well as overall assessment of Program Outcomes collected.
  o Alumni Survey (AS), distributed to BS ChE Alumni approximately every two years or as necessary at intervals as needed based on the timing of changes made in the curriculum.
  o Advisory Board Survey (ABS), which gives both quantitative and qualitative feedback on appropriateness of Program Outcomes and the extent to which the curriculum is designed to achieve these outcomes.

• Direct method: Faculty Assessment (FA) in each course, which indicates how well the faculty judge that students with passing grades completed the required course materials. In 2003, the faculty adopted a uniform method of FA, whereby indicators for each course objective are selected from the course assignments or exam problems. The faculty member examines student performance on each indicator and converts this to a scale of 1=Poor to 5=Excellent, reflecting student mastery.

**Data are collected on a numerical scale of 1-5 for the SSA, FA, AS, and ABS, with 5 corresponding to an objective or outcome that is completely accomplished and a score of 1 to an objective that is not accomplished at all.

Highlighted recent activities

• The Professional Seminar course was redesigned, expanding it from a single course in the senior year to three one-credit courses taken during the sophomore, junior, and senior years. The change was made in response to AS and SS results below threshold in Program Outcomes related to Professional and Ethical issues and Lifelong Learning, as well as statistics on student placement and comments made on the AS.
• The courses Thermodynamics I and Fluid Mechanics were moved to later in the program course sequence, partly in response to SSA data (values below threshold for ChE 226 and ChE 230, as well as qualitative comments on student surveys and during the Student Critique.
• In response to SSA data and extensive discussions among faculty, the sequence of courses on transfer was condensed, from a three-course sequence to a two-course sequence.