The American Chemical Society (ACS) Division of Chemical Education (Chem Ed) Examinations Institute (found at <http://chemexams.chem.iastate.edu/>) has several standardized examinations in various disciplines of chemistry. These exams can be found by following the “Exams” link on the webpage aforementioned.

For General Chemistry (our CHEM 1311 & 1312 lecture course sequence), there are specialized exams for each semester as well as exams that cover the full year course (found by clicking “General Chemistry” on <http://chemexams.chem.iastate.edu/materials/exams.cfm>). We chose an exam that covered the full year course material, but was only an hour long (55 minutes)—GC06B. Since the students taking this exam are doing so voluntarily in exchange for the hopes of scholarship money (more on that below), the collected faculty members of the Department of Chemistry decided that a one-hour exam would have more takers than a two-hour exam.

The exam (Stock Code GC06B, Title: General Chemistry 2006 (brief) – a short test for the full year course) is a 50 question, multiple choice timed examination. The exam is confidential, so I cannot provide a copy. There are 5 questions on “Atomic Structure”, 5 questions on “Molecular Structure”, 5 questions on “Stoichiometry”, 6 questions on “Energetics” (thermodynamics), 4 questions on “Dynamics” (kinetics), 5 questions on “States of Matter/Solutions”, 6 questions on “Equilibrium”, 4 questions on “Electrochemistry and Redox”, 5 questions on “Descriptive Chemistry/Periodicity” and 5 questions on “Experimental”.

The ACS Chem Ed Examinations Institute collects data on all examinations given and reports statistical data for every examination. The mean for the 50-question test is 27.45, standard deviation () 8.08, the median is 26.0, KR21 is 0.83 and Std error/meas 3.36. Thus, one  below the mean is 19.37 (and a score of 19 is the 16th percentile) and one  above the mean is 35.53 (and a score of 36 is the 83rd percentile).

One last issue to address is the scholarship money. For the past several years, we offered $250 to the person making the highest score on the exam in any semester. We also offered $200 to anyone scoring in the 85th percentile (or higher), $150 to anyone scoring in the 75th to 84th percentile, and $100 to anyone scoring in the 50th to 74th percentile. We did the same thing this year.

Despite an increased attempt to reach students by emails (on 11/12/12 and 12/4/12) to all of the chemistry and forensic chemistry majors taking CHEM 1312 in the fall semester, **no** students took the exam at the end of the fall semester (on Thursday, December 6, 2012). There were 4 chemistry majors and 14 forensic chemistry majors who were invited to take the examination. After the low turnout, the students were emailed and asked about their non-attendance. Four students responded. One indicated that she had to work at that time. One was ill. One indicated that she had a prior engagement, and one indicated that it was difficult to get back to campus in the evening.

We also had low attendance in the spring semester, with 5 students taking the exam (on Thursday May 2, 2013), scoring 26, 25, 23, 19, and 16 (3 were forensic chemistry majors and 2 were chemistry majors). There were 15 chemistry majors and 34 forensic chemistry majors who were invited to take the examination (2/15= 13% chemistry participation, 3/34 = 9% forensic chemistry participation; 5/49 = 10% overall participation). Four of the 5 students scored one standard deviation below the mean or higher—4/5 = 80% (the one who didn’t was a chemistry major); all scored below the mean; one earned the median score. Overall, the participation rate was 2/19 = 11% for chemistry majors, 3/48 = 6% for forensic chemistry majors, and 5/67 = 7% overall. The students who did not take the exam were emailed and asked about their non-attendance. One student responded and indicated that he would have preferred an earlier time.