General Education Assessment  
2010-11  

Math: Calculus  
Math: Statistics  

University in the High School Program  
The University at Albany, SUNY  

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Background

In 2010-11 the University at Albany assessed the degree to which students were achieving student learning outcomes in the Math and Oral Discourse General Education categories. As with previous assessments, the assessment of General Education courses offered through the University in the High School (UHS) program were conducted at the same time. The UHS sample was chosen to be generally representative of the categories rather than random.

Math: Calculus There were a total of 35 courses offered through UHS in 2010-11 that met the Math: Calculus General Education requirement. Seven of those courses were selected for the sample, with enrollments ranging from 5 to 16. Five of the seven instructors sampled completed the General Education assessment forms and submitted supporting documentation. One instructor did not complete the General Education assessment forms, but did submit supporting documentation. One instructor did not respond.

Math: Statistics There were a total of 10 courses offered through UHS in 2010-11 that met the Math: Statistics General Education requirement. Three of those courses were selected for the sample, with enrollments ranging from 11 to 36. Two of the three instructors sampled completed the General Education assessment forms and submitted supporting documentation. One instructor did not respond.

Math: Logic There were no courses offered through the University in the High School program that met the Math: Logic General Education requirements.

A representative sample of classes from each category was selected by IRPE and the General Education Committee. The UHS office provided materials electronically, and IRPE redacted instructor information.
The Math: Calculus General Education requirement has three learning objectives that must be fulfilled:

1. Students will demonstrate an understanding of basic mathematical functions and their graphical representations together with an ability to understand how many quantities of interest in mathematics, the sciences, and the social sciences can be modeled by functions, and their properties understood graphically.

2. Students will demonstrate the ability to calculate derivatives, and use them to analyze graphs, solve problems (growth/decay, optimization, rates of change) and make approximations.

3. Students will demonstrate the ability to use integrals to calculate quantities of interest (area, volume, work, moments, probabilities).

**Figure 1: Math: Calculus Learning Objective 1**
Figure 2: Math: Calculus Learning Objective 2

Figure 3: Math: Calculus Learning Objective 3

Large majorities of the assessed students either met or exceeded expectations in all three learning objectives in this category.

Recommendations: None.
MATH: STATISTICS

The Math: Calculus General Education requirement has four learning objectives that must be fulfilled:

1. Students will demonstrate the ability to find the values of basic measures of center (mean, median), location (percentile) and spread (variance, standard deviation, interquartile range)

2. Students will demonstrate the ability to extract information from graphs and other displays (such as scatter plots and histograms).

3. Students will demonstrate the ability to choose an appropriate statistical procedure for evaluation of various types of data.

4. Students will demonstrate the ability to calculate confidence intervals and to set up and interpret the results of standard hypothesis tests (mainly for means of one and two sample tests), which require the use of tables (mainly of the normal and t distributions).

Figure 4: Math: Statistics Learning Objective 1
2. Students will demonstrate the ability to extract information from graphs and other displays (such as scatter plots and histograms).

- Exceeded, 30.56%
- Did Not Meet, 2.78%
- Met, 61.11%
- Approached, 5.56%

Figure 5: Math: Statistics Learning Objective 2

3. Students will demonstrate the ability to choose an appropriate statistical procedure for evaluation of various types of data.

- Exceeded, 27.78%
- Met, 63.89%
- Approached, 8.33%

Figure 6: Math: Statistics Learning Objective 3
Recommendations:

The GEAC should give consideration to dramatic differences in performance between UHS and on-campus populations (this is detailed in the results section below).
Results

We are unable to compare the UHS Math: Calculus figures to on-campus results, as there were no responses from the on-campus sample in the Math: Calculus category.

In the Math: Statistics category, performance is significantly higher in the UHS sample. We harbor some concerns that the number of students “approaching” and “did not meet” is so low as to raise speculations about grade inflation. In the UHS sample, the percentage of students who were “approaching” or “did not meet” each of the learning objectives ranges from a low of 5% in category 4 to a high of 10% in category 1. In the on-campus sample, the percentage of students who were “approaching” or “did not meet” each of the learning objectives ranges from a low of 22% in category 1 to a high of 54% in category 3.1 While slight variation across populations would be normal, these results appear aberrant.

![Performance on the Math: Statistics Learning Objective 1](image)

Figure 8: Performance on the Math: Statistics Learning Objective 1

1 Note that the complete report of the assessment of the Math General Education category from 2010-11 is available from IRPE.
Figure 9: Performance on the Math: Statistics Learning Objective 2

Figure 10: Performance on the Math: Statistics Learning Objective 3
Figure 11: Performance on the Math: Statistics Learning Objective 4

It is important to note that the majority of students who enroll in University in the High School courses tend to be highly motivated and high performing. In fact, only juniors and seniors with an overall average of B or better are allowed to enroll in UHS classes. One could reasonably expect students who have a high average overall to perform well in these classes. Additionally, on-campus students taking courses meeting this General Education requirement may be doing so only to fulfill the General Education requirement, and that is a potential explanation of the differences across these populations.
Process notes

- This year the UHS office collected all the requested materials and scanned the sample documents into .PDF format before sending them to IRPE electronically. The names of the instructors were redacted from the forms, which were then coded. While this was a labor intensive endeavor for the IRPE office, it saved a substantial amount of paper, as well as additional copying time and paper when the material is be made available to the General Education Assessment Committee. IRPE encourages instructors to submit electronic versions of their teaching materials and assessment forms.