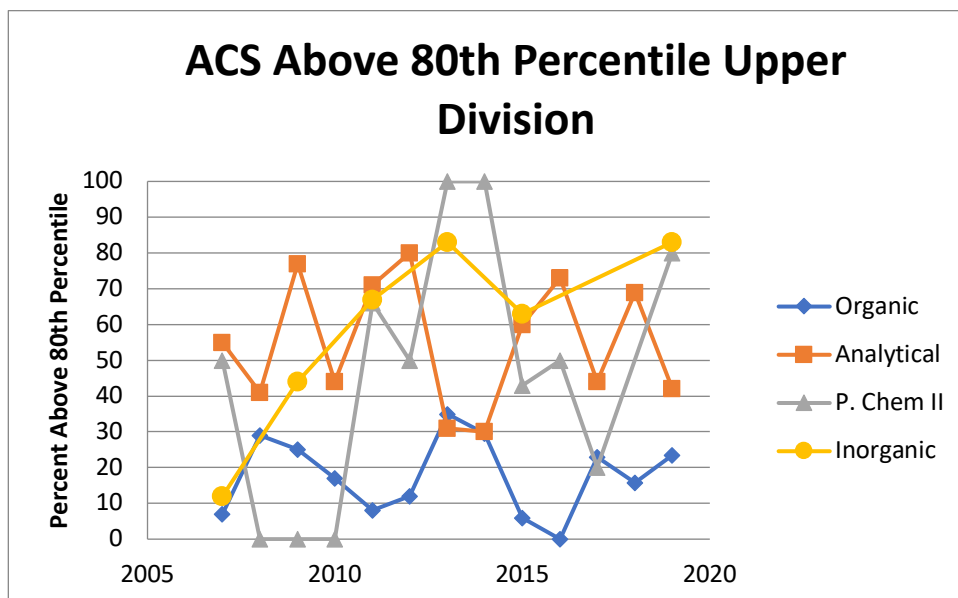
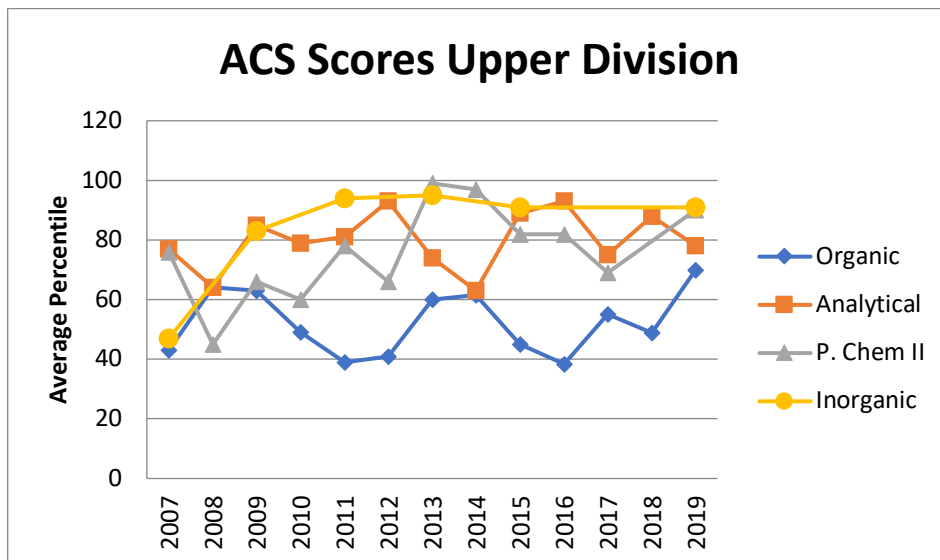


### 2.1.1.2.1 Chemistry Content

Our PLO related to students' learning the content of our discipline is primarily assessed through the use of course-based final exams published by the American Chemical Society. This was last assessed as a PLO in 2017. The following four graphs summarize our students' performance on these exams over the past years. (All data are available on the shared program review drive at <https://westmont.egnyte.com/fl/3eb3Y10qth>.) Unfortunately, because of the COVID quarantine, we are not able to include ACS exam data for 2020.

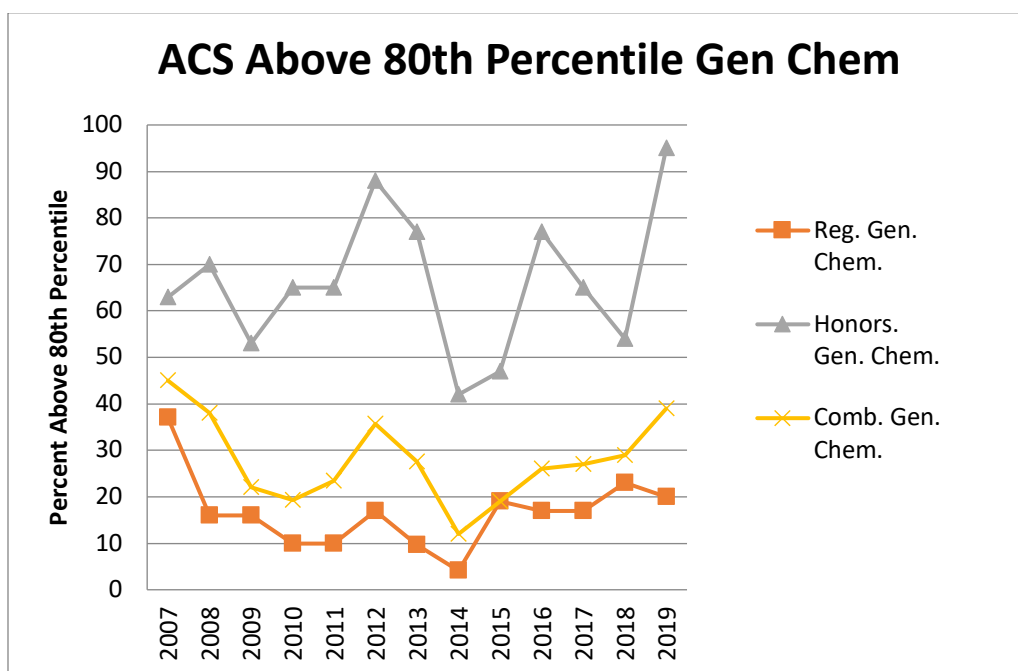
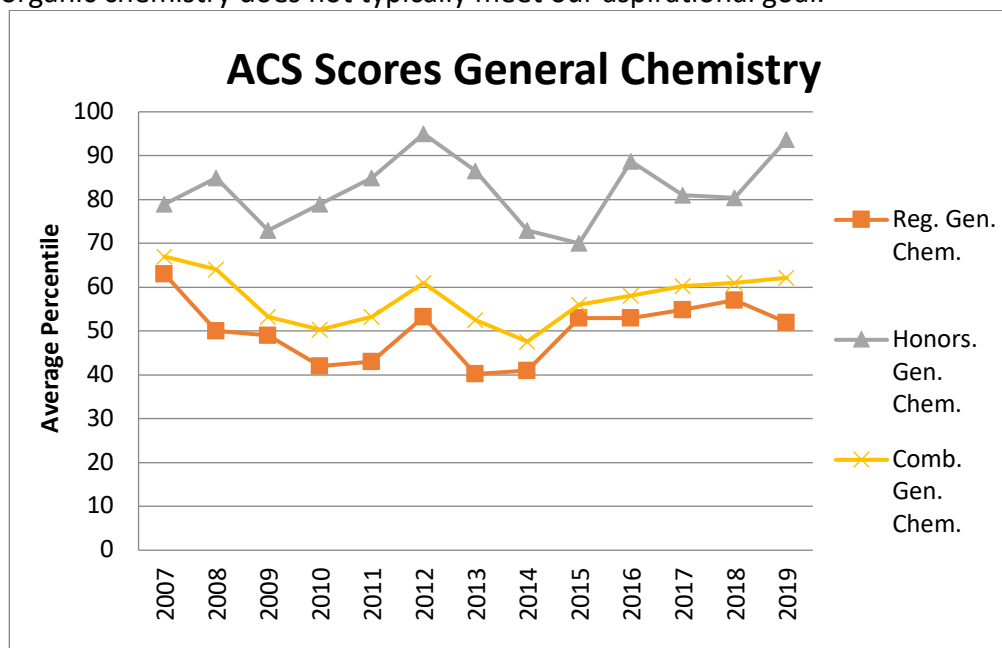
We will examine our upper-division classes first, then consider the scores for General Chemistry.



Our students demonstrate considerable learning on the final exams in our upper-division classes. Specifically, the class average in most upper-division classes is consistently above our PLO target of 60<sup>th</sup> percentile. The one exception to this is organic chemistry, which includes a

number of students who are not chemistry majors. Even in this course, our students are scoring just above the national average (53<sup>rd</sup> percentile, on average, for 2016–2019).

The second graph shows that most upper-division courses meet our target of having more than 30% of the students scoring above the 80<sup>th</sup> percentile. These data are much noisier, because large fluctuations will be expected owing to the small numbers of students involved. Again, we see that organic chemistry does not typically meet our aspirational goal.



Our lower-division course, General Chemistry, is divided into two large sections (45–50 students each) for typical students and an honors section (about 20 students) for students who

are academically strong in science and math. All groups show significant evidence of learning in our courses, but students in the honors section, unsurprisingly, score much higher. The exam average for the combined sections is almost always above the national average (50<sup>th</sup> percentile), and frequently meets our aspirational department goal of 60<sup>th</sup> percentile. However, we do not meet this goal every year. Moreover, the honors section always meets the percent-over-80<sup>th</sup>-percentile goal, but the combined average of all sections seldom does.

Overall, we find these data encouraging, even though not every student in every class is scoring in the top quartile of the nation. We have taken some steps to try to improve on these results. As discussed in our 2017 annual report, in order to encourage persistent learning some of the faculty have taken steps to make mid-term exams more cumulative (for example by including material from previous units on each exam). We have also been moving in the direction of online homework, which allows students to see immediately whether they understand a concept or not, rather than having to wait several days for graded work to be returned.