



College of the Canyons

Santa Clarita, CA

- **IPEDS enrollment, Fall 2010:** 23,332
- **Type of community:** Suburban
- **Number of campuses:** 2
(chemistry courses are offered only at the main campus)
- **Number of chemistry students:** 1,100
- **Number of full-time chemistry faculty:** 5
- **Number of adjunct chemistry instructors:** 8–10, depending on the semester
- **Structure:** Chemistry Department is part of the Division of Math, Science, and Engineering
- **Focus of chemistry program:** Transfer
- **Sections of the Guidelines used:** 3.2, 4.1, 5.1

Kathy M. Flynn, professor of chemistry at the College of the Canyons, reports that administrators and faculty members involved in the college's course approval process readily accept the *American Chemical Society (ACS) Guidelines for Chemistry in Two-Year College Programs* as an authority. The College of the Canyons has used the Guidelines to

- Cap enrollment in chemistry classes at 24 students
- Include on-campus labs for online chemistry courses
- Influence plans for new laboratories

When Flynn began teaching at the College of the Canyons in 1993 as an adjunct instructor, it was not uncommon for 30 students to be crammed elbow-to-elbow in the college's one chemistry laboratory. Everyone shared glassware and bench space. "It was not the best teaching environment," she said. Within a few years, the college renovated classrooms to make two additional laboratories. Then in 2008, with state funds and a bond for a second science building, the college built a new organic chemistry laboratory with a stockroom and storage facility near the other chemistry laboratories.

In 2011, with 4 labs and 18 sections spanning 7 different courses, demand for chemistry instruction exceeded the college's capacity to provide it. This situation has occurred frequently since 2006, when enrollments began to grow quickly. Waiting lists for chemistry courses are now common.

Balancing Enrollment Growth and Supervision of Students in Laboratories

By adhering to the Guidelines, the college's chemistry faculty members have prevented a return to overcrowding in laboratories. Flynn explains that faculty "have been vocal about keeping to the class size recommendations set forth by ACS [and] the administration has been open to this recommendation."

As the Chemistry Department created new courses over the years, faculty members would cite the Guidelines in their formal requests to limit enrollment to 24 students. Older courses were grandfathered in and generally had more than 24 students until 2008, when Flynn and her colleagues began updating the outlines for all existing courses. Their revised outlines included the 24-student cap.

"It's been a little bit of a negotiation," Flynn said of the queries she has fielded as one of the senior, full-time members of the Chemistry Department. Often faculty members and administrators involved in the college's seven-level course approval process, which takes about two years to complete, have asked about the relatively small class size.

"There's always a question about the cap," Flynn said, explaining that the question is asked more in a spirit of discovery than of antagonism. "It's not that they're saying you can't do it. They just want to know why."

Before the Curriculum Committee considers a new or revised course, the following people must approve it: the department chairman, the division dean, computer support personnel, facilities personnel, the articulation officer, the matriculation officer, and the chief instruction officer. At the Curriculum

Committee meeting, the author of the chemistry course usually gets a “Justification, Please” request about the cap. With this level of scrutiny, an instructor’s pedagogical preferences are not sufficient; documentation of the need for a smaller class size is required.

Flynn finds the most effective answer to be pointing colleagues to the recommendation in the Guidelines that “laboratory capacities should not exceed 25 students” and “no faculty member should be responsible for more than 25 students in a laboratory at one time.”

There has been some discussion about separating the lecture and lab sections in order for a single large lecture to serve more students, who would then separate into groups of 24 for labs. So far this has not happened because the chemistry faculty consider the small class size a strength in dealing with the varied academic skill levels of the college’s diverse student population. Without an ACS position on the effectiveness of instruction in larger lectures, faculty members have relied on their personal teaching experience in deciding this point.

Blending Online Delivery with In-Person Labs

The College of the Canyons uses a hybrid format for its online chemistry courses: Lecture materials are delivered online, and students come to campus for chemistry labs. Although this blended delivery does not satisfy everyone, Flynn said that so far it is the best option for providing students with flexible learning opportunities that meet the recommendation in the Guidelines that students have hands-on experiences manipulating chemicals, studying their properties and reactions, and using modern laboratory equipment and instruments.

Rebecca A. Eikey, chair of the Chemistry Department, explained that by requiring students who

take chemistry online to come to campus for labs, the college ensures that they engage in three to six hours (depending on the course) of lab experiments and instruction each week. Flynn describes online delivery as a work-in-progress because faculty are trying to keep up with technology advances and are also attempting to determine what works best for students. One of the challenges the faculty is still considering is the question of how to provide chemistry tutoring online.

Influencing the Design of New Laboratories

The Guidelines have also been a factor in the college’s design of new laboratories. According to Eikey, discussions of the new chemistry laboratories that the college would like to build at its Canyon Country campus have included mention of the Guidelines. During the early planning in fall 2011, the new laboratories were slated to have 12 stations and accommodate up to 24 students.

“It is great to have these Guidelines as a reference point,” Eikey wrote in an e-mail.

The content of this case study was provided by Kathy M. Flynn. She earned her bachelor’s and master’s degrees from San Diego State University and her Ph.D. in inorganic chemistry from the University of California, Davis. She was an adjunct instructor at the College of the Canyons and Los Angeles Pierce College before becoming a full-time member of the Chemistry Department faculty at the College of the Canyons in 1999. She also previously served as director of the college’s nanotechnology program. Prior to embarking on a college teaching career, Flynn worked in industry as a chemist.