

A FIRST-YEAR INTRODUCTORY SEMINAR

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Advising undergraduate students is an important task for engineering faculty. Not only must it be done well, but it must also be done efficiently. Advising first-year students is particularly challenging because at that point the students are involved in only a few engineering activities and have only a vague idea of what engineering actually is. Most of their time and effort is focused on simply surviving their mathematics, chemistry, physics, and general education courses. Typical engineering curricula do not offer the first-year student an opportunity to learn what an engineering career really involves and whether or not it is the correct course of study for them.

In an effort to address and overcome this problem, many departments have added engineering courses to their first-year curricula.^[1] Some universities have added design courses,^[2,3] while others have added introductory engineering courses.^[4,5] These courses typically use various combinations of videos, lectures, plant trips, guest speakers, and faculty and student presentations. Students are usually graded on their performance on homework assignments, written and oral reports, and examinations.

The University of Dayton previously required all first-year engineering students to complete a two-credit hour course, "Introduction to Engineering," and it was attended by students from all of the engineering majors. Faculty members from each engineering department taught sections of the course, but this led to substantial variation in the course emphasis and quality. Attempts were made to coordinate and improve the course, but in 1987 it was dropped in a move to control the rising number of credit hours required for graduation.^[6] Since then some of the engineering departments at the University of Dayton have added required, no-credit introductory seminars for their first-year students.

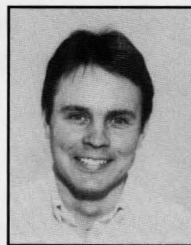
COURSE STRUCTURE

The seminar course "Introduction to Chemical Engineering" is offered to incoming chemical engineering students

and is described in the university bulletin as an "introduction to the chemical engineering faculty, facilities, and curriculum, including a survey of career opportunities in chemical engineering." It was originally conceived through our efforts to improve the effectiveness of advising. The program (outlined in Table 1) was developed to improve communication between the students and their advisors.

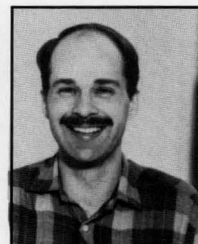
The seminar provides an opportunity for the faculty to share information with the students and offers the students an opportunity to ask questions which they may otherwise hesitate to ask during a one-on-one visit with their advisor. It also attempts to involve the first-year students in departmental activities and to demonstrate that there is fun, challenge, and reward in the work of the department and in the field of chemical engineering.

The primary reason for teaching the course on a no-credit basis is that most of our students would be subject to a tuition surcharge for exceeding the university's maximum



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Amy Grosjean received her BChE from the University of Dayton in the spring of 1993. While an undergraduate she worked at General Motors and Procter and Gamble, and during her senior year she served as the student coordinator for the first-year seminar program.

Up to this point in the program the students have only been told about chemical engineering. The fifth meeting consists of a tour of our departmental laboratories and includes demonstrations of some of the equipment. The tour is conducted by upper-level students who describe the work they are performing in our transport phenomena, unit operations, and process control laboratories.

TABLE 1
Schedule of Class Meetings

- Departmental welcome and faculty introduction; announcement of student AIChE kick-off meeting
- Discussion of chemical engineering, highlighting career opportunities. Video presentation
- Job-experience presentations by senior students
- Job-experience presentations by practicing engineers
- Tour of chemical engineering laboratories
- Computer/word processing tutorial
- Joint meeting with junior/senior seminar
- Registration advising

number of credit hours for full-time students (students are charged a flat tuition for taking from twelve to seventeen credit hours). Since it is a no-credit course and we are not really interested in increasing the students' workload, grading is on a pass/fail basis. Attendance at all class meetings is the sole criterion for determining whether a student passes or fails the course. Any student who misses a class meeting is required to attend a faculty-approved student AIChE meeting to make up for their absence. This attendance policy is clearly explained during the first class meeting, and since the course does show up on the students' transcripts, very few students miss class. During the four years that it has been taught, no one has failed the course.

The course meets once a week for eight weeks, and covers the topics listed in Table 1. Originally we met every two to three weeks in an attempt to distribute the course throughout the semester, but the result was poor attendance since many students forgot about scheduled class meetings.

Involving the student AIChE chapter in the seminar was designed to provide a service activity for that organization as well as to alleviate the faculty workload associated with the course. This involvement, coordinated by a student assistant, has been surprisingly effective. The upper-level students are very enthusiastic because they believe that they have important information to share with the first-year students, and the first-year students are often more at ease asking questions of upper-level students than of faculty. An added bonus is that attendance of first-year students at AIChE activities has also increased since the introduction of this course. This is probably due to improved communication between upper-level and first-year students.

A student-faculty social is held after one of the seminar meetings, and the first-year students are encouraged to at-

tend so that they can meet faculty and upper-level students in an informal atmosphere.

COURSE SPECIFICS

At the first meeting, the departmental faculty is introduced and the structure of the course is explained. The student AIChE officers are also introduced and given the opportunity to discuss the purpose and activities of AIChE as well as to announce the first meeting of the year.

The second meeting is designed to give the first-year students a broad overview of chemical engineering as a profession, including its history, future prospects, skills required, industries involved, and job opportunities. This is accomplished through a presentation by the faculty coordinator, followed by the showing of an AIChE video, "Frontiers in Chemical Engineering."

The third and fourth meetings expose the first-year students to actual chemical engineering job experiences, first by senior students and then by practicing engineers. In both instances we attempt to cover the spectrum of chemical engineering industries and job types. To illustrate, at the most recent presentations, the senior students discussed working with environmental, consumer products, automotive, and petroleum companies, while the practicing engineers discussed their work in research, technical sales, and manufacturing. The first-year students' enthusiasm for these presentations is indicated by the large number of questions they ask. They are particularly interested in the internship and cooperative education programs.

Up to this point in the program the students have only been told about chemical engineering. The fifth meeting consists of a tour of our departmental laboratories and includes demonstrations of some of the equipment. The tour is conducted by upper-level students who describe the work they are performing in our transport phenomena, unit operations, and process control laboratories. For many of the first-year students this is their first visual exposure to chemical engineering, and they are usually quite impressed by the work of the upper-level students. Hearing an upper-level student say things like "We're studying the recycling of plastics in this injection molding device" or "I'm working on the redesign and instrumentation of this heat exchanger" is probably equivalent to an entire semester of simply discussing chemical engineering in a classroom.

The sixth meeting is used to introduce the departmental personal computer facilities that are available to the students. Since they are all required to write papers in their

courses, the first-year students are usually pleased to learn that word processing facilities are available to them. Upper-level students present a tutorial on the computers, while the department provides each first-year student with a computer disk. We have found that use of the computer facilities is a convenient way to get our first-year students involved in department activities.

At this point the first-year students attend an upper-level seminar given by a guest speaker. This joint seminar not only shows the first-year students the type of seminar they will be attending in later years but it also provides additional interaction with upper-level students.

The final meeting of the course occurs near the midpoint of the semester and is devoted to a discussion of midterm grade reports and registration for the next term. Since the first-year students have never registered on campus (their first-term registration is handled through the mail), it is important to instruct them in the logistics of registration and to ensure that they register for the correct courses. After a short introduction by the faculty, this meeting is turned over to upper-level students, thereby giving the first-year students both the faculty and student viewpoints concerning registration.

FACULTY AND STUDENT PERCEPTIONS

During the last class meeting we ask the students to complete a course evaluation that poses three questions:

1. *What do you believe was the purpose of this course?*
2. *Do you feel that the course accomplished this purpose?*
3. *What would you do to improve this course?*

Most of the students correctly identify that the purpose of the course is to initiate communication between the faculty and the new students and to provide them with information about chemical engineering. They also recognize that the course offers an opportunity to get to know one another. The students feel that the course accomplishes these goals. Typical comments include: "I feel more comfortable about what I am trying to become. Now I know what it is."; "I found it [the course] very helpful."; and "It didn't waste any time and accomplished its purpose nicely." On occasion, students found that chemical engineering was not what they were interested in, and we were able to effectively counsel them concerning alternate programs of study.

We were surprised when the students suggested that the course could be improved by expanding its scope (the course met only five times the first year it was taught). The students requested that we add the meeting with practicing chemical engineers, increase their interaction with upper-level students, and provide more information concerning student chapter AICHE activities.

The upper-level students have always been happy to assist

us with this course. They feel that they have useful information and experiences to share with the first-year students. They do a good job, although they sometimes say things that make the faculty cringe, such as "I don't really use chemical engineering in my job."

We have been pleasantly surprised by the success of this course. We were worried that the students might see it as a waste of time since it is a no-credit course that requires only their attendance. Based on the evaluations, however, this does not appear to be the case. The current format appears to be optimal; there is a substantial amount of contact time, and the first-year students are exposed to chemical engineering in a variety of contexts. The course ends at the middle of the term, before the students lose interest, and allows them to subsequently focus all of their attention on the more rigorous courses. Also, involvement of the first-year students in departmental activities, particularly in student AICHE activities, has increased since the course was added to the curriculum.

Since we see all the students on a regular basis and have an opportunity to share information with them and answer their questions, we feel our advisory role has been improved. We have also noticed that the students know what to expect and are better prepared for their individual advising meetings. We feel that the small amount of time and effort required to conduct this course is a good investment in our first-year students.

CONCLUDING REMARKS

Both faculty and students are pleased with this introductory seminar. It is an effective and efficient means of initiating communication between the department and its first-year students, and the increased contact between faculty and students enhances our advising program. The seminar also encourages the first-year students to participate in departmental activities and is a good service project for the student AICHE chapter.

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