

School of Civil and Environmental Engineering

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Degree Program(s) Assessed	Assessment Methods	Number of Individuals Assessed
BS - Civil Engineering	<i>Exit Interviews</i>	26
	<i>Fundamental of Engineering Exam</i>	30
	<i>Board of Visitors</i>	*
	<i>Employer Survey</i>	18
	<i>Student Advisory Committee</i>	8
	<i>OUA Undergraduate Program Alumni Survey</i>	22
	<i>Faculty and Professional Evaluations</i>	26
MS - Civil Engineering	<i>Exit Interviews</i>	12
	<i>Theses/Report Defense (Committee Evaluation)</i>	12
	<i>OUA Graduate Program Alumni Survey</i>	0
	<i>Board of Visitors</i>	*
MS - Environmental Engineering	<i>Exit Interviews</i>	7
	<i>Theses/Report Defense (Committee Evaluation)</i>	7
	<i>OUA Graduate Program Alumni Survey</i>	0
	<i>Board of Visitors</i>	*
PhD - Civil and Environmental Engineering	<i>Exit Interviews</i>	0
	<i>Theses/Report Defense (Committee Evaluation)</i>	0

* The Board of Visitors evaluates program components (curriculum, students, faculty, facilities, etc.) While they do speak to individual students, they do not formally assess specific individuals.

A variety of assessment tools are in use by the School of Civil and Environmental Engineering, for the purpose of monitoring and improving the program. The School also uses these tools as part of the assessment process required for maintaining accreditation by the Accrediting Board for Engineering and Technology.

Analysis and Findings:

Employer Survey

The 2002 Employer Survey was performed in July 2002. The survey was sent to 22 employers, and 18 responses were received. These employers were selected to represent a cross section of those who have employed our graduates from the past five years. Participants included public institutions at all levels (federal (US Army Corps of Engineers), state (Oklahoma Department of Transportation) and local (City of Tulsa Public Works)), industry (Koch and Hilti), large consulting firms (Atkins America), and a few small specialty firms. It is felt that these employers hire a representative group of our graduates in terms of ability, specialization, and demographics. In the case of employers that hire a large number of our graduates (such as the Corps of Engineers or the OK Department of Transportation), the survey was distributed to more than one supervisor with direct contact with employees from our program. The survey included a variety of questions aimed at determining the employers' assessment of the quality of our graduates, with particular attention paid to achievement of most of our Program Educational Objectives and Program Outcomes. In general, a high level of satisfaction was expressed by the employers of our recent graduates. Two areas did receive some negative comments, with three of the 18 respondents stating their OSU-degreed employee did not meet their expectations. These areas were in planning and scheduling of projects and in written communication. These findings have been passed on to the School's Curriculum Committee, which is investigating possible curricular responses.

Exit Interviews

Beginning December 2001, the exit interviews administered to all graduating seniors by the School Head were altered to be more focused. Each student is now asked to fill out a two-page survey form asking his or her views of the program, particularly the degree to which the program accomplished certain types of learning. The interviews begin with a scan of the student's written responses and any comments that the student might have to amplify on his or her responses. The interviews usually last about fifteen minutes, although some last longer.

Without exception the students--for the past three years at least—have been extremely positive about their educational experience at OSU. An analysis of the data for spring 2003 illustrates this conclusion. Interviews were conducted with all 16 graduating seniors. All 16 had taken the FE exam, and 14 had passed it. Two had not yet received word regarding their success on the exam. These 16 students each responded to 8 multiple-choice questions, meaning that there were 128 multiple-choice responses. Of these 128 responses all but 3 were in the first three categories ("very well," "well," and "adequately"). In particular, 34.3% of the responses were "very well," 53.1% were "well," and 10.3% were "adequate." Thus, 97.7% were adequate or better.

The question addressing students' teamwork experiences provide a current example of the quality control process. Noting the relatively low student assessments on teamwork experiences, the Head followed up on the team work issue during the open-ended part of the interviews. The result is that he learned that we do not provide our students with as many teamwork experiences as he had thought. The result is that two things will occur beginning in the fall semester, 2003. One is that teamwork will be increased in the Senior Seminar course (CIVE 4042 - Engineering Practice). Two, the faculty will discuss this issue at its annual retreat in August and will be asked to identify courses in which teamwork will be added or expanded.

Fundamentals of Engineering Exam

This is a national, standardized exam administered twice each year. It is the first step to professional registration and passing it is necessary for most entry-level jobs in civil and environmental engineering. All CIVE students are encouraged to take the exam, and approximately 80% of all CIVE graduates have done so before graduation. The vast majority of those students who do not take it are international students who plan to return to their home countries.

Data detailing the performance of CIVE students on the exam are made available to the Associate Dean of Engineering each semester. These data do not give results for individual students but rather composite scores for groups of students, categorized according to the discipline listed on their application. All examinees take the same morning 'general' exam. Students than have a choice of taking either another 'general' exam in the afternoon, or a discipline specific afternoon exam. The vast majority of CIVE students elect to take the 'civil engineering' afternoon section. As such, results are sent to the Dean's office categorized by the specific exam taken by a given group of examinees. A detailed statistical analysis of these results is prepared twice each year by an assessment specialist in the College of Engineering, Architecture, and Technology.

As an example of the way these results are used, focusing on the 1997 - 2002 summaries for the morning and afternoon exams, the following conclusions were recently drawn:

- 1) During this period, CIVE students performed significantly above the national average on the following topic areas:
 - chemistry, dynamics, electrical circuits, materials science, mechanics of materials, statics, and thermodynamics.
- 2) CIVE students performed significantly below the national average on the following topic areas:
 - computers (general exam) and computer and numerical methods (civil exam).
- 3) For the past two years' results, CIVE students performed above the national average on at least one occasion on the following topic areas:
 - thermodynamics and dynamics.
- 4) Also in the past two years, CIVE students performed below the national average, on at least one occasion, on the following topic areas:
 - mathematics, computers (general exam), computer and numerical methods (civil exam), hydraulics and structural design.

Note that a 'significant difference' here is defined as 'greater than one standard deviation' from the mean value of the national test scores. The significance of the above information is of course open to debate. As mentioned above, the two sections in which CIVE students have consistently performed below the national averages over the past five years are computers (from the general exam) and computers and numerical methods (from the afternoon civil exam). The School's Curriculum Committee is currently investigating ways in which to address this situation. Among the issues under review are the timing of the exam (i.e. students taking the exam too early in their programs), the prevailing attitude about the exam (i.e. students viewing the exam as something to take more than once, the first time "just to see what it's like"), as well as specific course content that may be addressed toward specific deficiencies (i.e. incorporation of more spreadsheet skills within courses).

Board of Visitors

The Board of Visitors, which consists of eight civil and environmental engineering professionals, many of whom are alumni of our programs and/or employers of our graduates, met twice this academic year. They met with faculty, students, and administrators and reviewed curricula, programs, and departmental resources. In general, they expressed a high level of satisfaction with the program and the direction it is moving. In particular, they are enthusiastic about the capital campaign underway that will eventually lead to great improvements in the department's labs. They expressed concern about the enrollment in the program. They encouraged the department to maintain the curriculum as it is, covering a broad range of CIVE topic areas and not allowing excessive specialization. They cited the 5-year FE results study as support of this position.

Undergraduate Program Alumni Survey

The OSU Office of University Assessment performs a wide variety of assessments aimed at meeting the requirements for the university-level accreditation of the Higher Learning Commission, as well as those set by the regents of the university system. Among the assessment tools used is the Undergraduate Program Alumni Survey, which is performed on a three-year cycle. It focuses on alumni of undergraduate programs who graduated approximately two and five years before the time of the survey. In the most recent survey, performed in January 2002, graduates of the BSCE degree program in 1996 and 2000 were contacted. Questions asked of all alumnus center on the graduate's satisfaction with their experiences at OSU, as well as his or her current employment status. However, individual programs have the opportunity to ask additional questions of their graduates specifically. These questions have been tailored to assist in determining our program's achievement of its Educational Objectives and Program Outcomes. Overall, these graduates expressed satisfaction with their OSU educations and experiences. They also indicated a high level of continuing education and professional advancement. They also provided some additional insight into specific aspects of their civil engineering education that have been particularly useful in their professions.

Student Advisory Committee

This committee consists of eight student leaders who represent student concerns to the departmental leadership. They meet with the department head periodically. In general, this group expresses satisfaction with the program. Concerns that do arise routinely include the sub-standard educational technology in Engineering South classrooms, the sub-standard lab facilities for the department, and the lack of a common area for CIVE students to congregate. These last two, in particular, have been addressed, as discussed below.

Faculty and Professional Evaluations

Each student takes at least one "capstone" design course. This generally occurs in the student's final year. In these courses, group design projects are completed, the products of which (reports, design work, and presentations) are presented to faculty (in addition to the course instructor) and to participating professionals. These individuals evaluate these products and present the evaluation to the students and course instructor. In all cases available for review, the practitioners reported satisfaction with the work performed. They offered suggestions for the improving the projects themselves but felt the curriculum had prepared the students adequately for the work.

Graduate Theses Defenses

The examination committee for each candidate assesses the candidate's academic record as well as the product of his/her graduate research (creative component report or thesis). As required, the examining committee found all students who passed this examination satisfactory.

Uses of Assessment Results:

A number of program changes have been implemented as a result of the various assessment results.

Curriculum Review

In response to several of the assessment results cited above, a review of the program curriculum is planned for Fall 2003. Among the issues to be addressed are writing in the CIVE professional school curriculum, integrating more spreadsheet applications in upper-level courses, and the way the FE Exam is managed. In addition, emerging issues, such as pressure to lower the overall credit hour requirements and the potential impact of the American Society of Civil Engineers' endorsement of the master's degree as the first professional degree will be addressed.

Revision of the Engineering Statistics from STAT 4033 to STAT 4910

In response to comments from both students and faculty (collected in student surveys and solicited faculty input), a change was made to the statistics course requirement for civil engineering students. A new course, STAT 4910 Engineering Statistics, was developed to meet the specific needs of engineering students. This course is focused more on engineering analysis and less on statistical theory. It was taught for the first time in the Spring 2003 semester.

Content of CIVE 4273 Construction Engineering and Management

CIVE 4273 Construction Planning and Scheduling previously was a required course for all Civil and Environmental students that focused primarily on the critical path method. It also served as the entry course in the graduate program in Construction Engineering and Project Management. To expand the exposure of construction to undergraduate students and to provide a common base of knowledge for entry into the graduate program, CIVE 4273 was changed in title and content. The new title is Construction Engineering and Management. The new course content includes the topics of project planning, development of cost estimates and project schedules, construction methods and fundamental terminology used in the engineering and construction industry. This course revision provides a broader exposure to undergraduate students and forms the foundation for graduate courses that contain more in-depth coverage of the topics covered in this course. With the revised CIVE 4273 course title and content, the subsequent graduate level courses in construction management were also modified. These courses are eligible as electives to undergraduate students.

Content of CIVE 4042 Engineering Practice

Over the years the Board of Visitors has offered many suggestions to the Head. The most recent recommendation was two years ago when the Board recommended that public finance be included in the curriculum. The past two years this subject matter has been included in the Senior Seminar as a result of the Board recommendation. Student feedback has also produced course changes. We added a segment discussing how to run meetings, and another on listening skills. We used the class as a committee to decide what topics to add to the course. We also expanded the coverage of contemporary issues by discussing the BS as a professional degree and ASCE Proposition 465.

Initial implementation of CIVE 3623 - Engineering Materials Lab

In response to both student demand and discussions with alumni and employers, CIVE 3623 is being introduced into the curriculum this fall semester. The course will address basic construction materials including Portland cement concrete, asphalt concrete, aggregates, metals and composite materials. It will also include behavioral characteristics, use and quality control of these materials, as well as basic statistical procedures used for material specifications. Laboratory sessions will provide "hands on" experience in performing standard tests. This course will initially be offered as an elective, but it is anticipated that it will eventually be integrated into the required curriculum.

Non-Curricular Improvements

Some of the assessment tools in place may also identify opportunities to improve the program in ways outside the curriculum. One such example occurred when the Student Advisory Committee identified a need among CIVE students for a gathering place within Engineering South (the location of the School offices and a majority of the professional school courses). A lounge for CIVE students had previously existed in the basement of Engineering South but had been consumed in the expansion of the computer labs the previous year. Another room in the basement was identified as underused and, with the School Head's approval, the room was painted and furnished for use as the Civil Engineering Student Lounge. The room serves as a study area for students with breaks between classes in Engineering South and is also used for ASCE officer meetings and for groups to meet to work on group projects.

Furthermore, the capital campaign to raise the funding necessary to dramatically improve the laboratory situation in the department is continuing. Groundbreaking for the new structures lab took place in March 2002. Renovations of the geotechnical and hydraulics labs, and new space for the environmental labs in the Advanced Technology Research Center are also planned. This will address the concerns about the lab space expressed in several recent assessments.