Department/Degree Program Plan for integrating the Discipline-Specific Spoken, Visual and Written Communication Requirement into undergraduate curriculum

Date: 11/22/04
Department/Degree Program: CEE
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Submission of plan includes:
(three to four pages)
1. A brief statement of departmental and/or program goals and objectives for an integrated, sequenced approach to spoken, visual, and written communication,
2. A plan for developing and implementing a curriculum reflecting these goals and objectives, including an outline of phasing, and
3. A plan for assessing outcomes.

APPROVAL SIGNATURES

Department Representative: William Cox  Date: 11/22/04
College Dean:  Date: 11/11/04
Proposed Communications Program
Via Department of Civil and Environmental Engineering
December 1, 2004

Overview

The Via Department of Civil and Environmental Engineering Communications Program proposed in this document is designed to be consistent with University guidelines for incorporation of communication into the curriculum. The proposed program is a modified version of the Department’s “Writing across the Major” program currently in place for satisfying the University’s “Writing Intensive” requirement. Program components are distributed over the sophomore, junior, and senior years. The program is intended to be effective for the class of 2009 and will apply to students entering in fall 2005 and thereafter. As described in the implementation section below, some of the proposed changes will be implemented as early as fall 2005 to accommodate transfer students and others not following a normal course sequence.

Program Goals and Objectives

The overall goal of the CEE Communications Program is to facilitate development of adequate student skills so that graduates are prepared to communicate effectively within the environment of professional engineering practice. In order to meet this goal, the student at graduation should be able to

- Prepare written documents successfully describing the results of design, analysis, fieldwork, research, or other forms of inquiry for use by a range of audiences such as employers, clients, fellow professional practitioners, governmental agencies, and the public.
- Make effective oral presentations using appropriate visual communication and technology to various audiences such as employers, clients, citizen groups, and professional organizations.

Program Components

The goal of the CEE Department is to integrate communications throughout the curriculum, but minimum program requirements will be considered to have been met when the six required courses described below are completed:

- CEE 2804 – Introduction to Civil and Environmental Engineering
- CEE 3304 – Fluid Mechanics for Civil and Environmental Engineering
- CEE 3514 – Introduction to Geotechnical Engineering
- CEE 3684 – Civil Engineering Materials
- Engl 3764 – Technical Writing
• Choice of one of the following design project courses: CEE 3434 (Design of Steel Structures I), 4014 (Estimating, Production, and Cost Engineering), 4104 (Water and Wastewater Treatment Design), 4274 (Land Development Design), 4544 (Applied Geotechnical Analysis), or 4664 (Pavement Design).

CEE 2804 has improvement of communication skills as a basic objective. The course meets in a large lecture section once each week and in multiple small group sections of 10-15 students once each week. Instruction in writing and oral presentation by communications specialists is included in the lecture section. Students are required to prepare three memos, one of which must be submitted for review prior to submission for final grading, and a longer paper that is reviewed and re-submitted prior to final grading. Students make two oral presentations, the second of which must incorporate visual communication. Written assignments and presentations cover topics within the field of civil and environmental engineering. The course therefore provides the opportunity for students to develop skills in written, oral, and visual communications within a civil and environmental engineering context.

CEE 3304, 3514, and 3684 are three credit courses that include labs. Students complete 6-9 lab reports in each course, usually working in pairs. Reports near the beginning of each semester are reviewed prior to submission for final grading. Lab reports in 3514 require cover memoranda summarizing experimental results in a style that would be used for a supervisor or client of a geotechnical firm.

Engl 3764 focuses on instruction in technical writing and includes writing assignments in the style of the student's discipline. This course includes in-depth instruction from communications specialists and provides opportunities for expanding the skills introduced in CEE 2804 and applied in CEE 3304, 3514, and 3684.

CEE 3434, 4014, 4104, 4274, 4544, and 4664 are "design-project" courses considered to be essential elements of an engineering education. Although differing in subject matter, each of these courses shares several characteristics due to application of departmental guidelines (copy attached) covering several aspects of course operation. In each case, students work in teams of 3-5 members to develop project designs that address significant societal needs in the form of basic infrastructure systems. The guidelines set forth specific expectations about the use of writing in these courses, including minimum page limits and a requirement that all students participate in writing. Students also make oral presentations that include the use of visual communication.

Other courses that require writing and/or presentations are primarily electives. None of these courses is taken by all students, but most students take one or more additional courses providing opportunities for development of communications skills.
Management of the Communications Program

The CEE Curriculum Committee will provide oversight for implementation and continued operation of the CEE Communications Program. The Committee will periodically review program operations and oversees addition or removal of design project courses from the approved list. Changes are approved only when the guidelines as described in this memo continue to be satisfied.

The courses included in the Communications Program are generally assigned to regular faculty. Graduate teaching assistants are assigned to grade papers and conduct some of the laboratory exercises. The faculty member in charge of each course ensures that TAs responsible for grading have adequate skills for assessing student work and providing initial feedback to students for revision of work submitted.

Implementation Plan

Transition from the current WI program to the proposed Communication Program will not require curricular changes but will be accomplished by relatively minor modifications of courses currently in the WI program that will continue as the foundation of the new program. Changes primarily affect CEE 2804 and the design project courses where a requirement for visual communication is being added. In the normal course sequence for students entering in 2005, modifications to 2804 would need to be in place in 2006-07; changes to the design project courses would be needed by 2008-09. However, earlier dates for implementing modifications are necessary to accommodate transfer students and others who enroll in the modified courses at earlier dates. Therefore, changes to 2804 will be implemented in fall 2005 and those affecting the design project courses in 2006-07.

Modified courses will continue to satisfy current WI requirements since changes will increase rather than reduce the communication component of the modified courses. Thus, students subject to the current WI requirement will continue to meet graduation requirements as course modifications are implemented. This approach eliminates the need for clear delineation between the current and proposed programs with respect to satisfaction of graduation requirements of different classes.

Assessment of Student Accomplishment

Assessment of student writing will be an integral part of each of the courses in the Communications Program. Evaluation of student performance will be conducted and samples of student work will be maintained as part of routine implementation of the CEE Department’s continuous Quality Improvement Program (QIP) created as a mechanism for self assessment as required by the CEE accreditation process, which is subject to ABET guidelines. QIP requires that faculty in each CEE course maintain a course notebook containing an assessment of student learning in relation to course objectives on
each occasion that a course is offered. Standard procedures involve collection of a sample of student work in support of the assessment and its inclusion in the course notebook. A sample of six to twelve of these notebooks is reviewed by the CEE Curriculum Committee and two registered professional engineers from private practice biennially (during spring semester of even numbered years).

Since the ultimate goal of the Communications Program is facilitation of student abilities to meet prevailing standards for communication in the civil and environmental engineering profession at the time of graduation, a final assessment will be conducted within the design project courses normally taken in the senior year. At present, a sample of student projects is subjected to evaluation by practicing civil and environmental engineers as part of the QIP process as described above. This existing process for external assessment will be expanded by establishing a process for external assessment of oral and visual communication as demonstrated by in-class presentations. This process is still in development but will likely involve class visitation by engineering practitioners whose evaluation will include the technical aspects of student projects as well as communication. A potential alternative means of evaluating student presentations is use of communications specialists instead of professional engineers (or perhaps in combination).

Assessment results will be reported through the Department’s six year accreditation cycle and the five-year SCHEV assessment. Effective communication skills have been established as a desired CEE program outcome, which requires demonstration of accomplishment as part of the Department’s continuous outcomes assessment process overseen by ABET. The SCHEV assessment process also requires documentation of results but operates on a different reporting cycle. Reduction of redundancy through coordination / consolidation of reporting requirements associated with the two assessment processes will be sought.