

**DEPARTMENT REPORT
OF
PROGRAM LEARNING OUTCOMES ASSESSMENT**

Department: Environmental Engineering Technology

Program (Degree): Environmental Engineering Technology

Type of Degree: X AAS AA AS ATS AIS

Chairperson: Dr. Nicholas Scambilis Date: May 5, 2003

Person(s) Interviewed: Dr. Nicholas Scambilis, Jennifer Wise

- I. Program Curriculum:** A description of the basis for the program curriculum (i.e., how it is derived and validated). Include accreditation organizations, advisory committees or external groups that influence curriculum. Describe curriculum review activities including the review of course master syllabi.*

Due to strong interest from students and local industry leaders, the Environmental Engineering Technology degree program was developed and approved in 2000. There continues to be a viable need for employees trained and skilled in environmental engineering technologies.

Four groups of people contributed to the development of the program: (1) Tech Prep, (2) Business and Industry Leaders, (3) the Sinclair Safety Engineering Technology/Environmental Engineering Technology Advisory Committee, and (4) professional consultants in the field.

The program provides a full range of courses to prepare students for entry-level positions in the environmental engineering field. The curriculum provides a background in environmental laws and regulations, site assessments, emergency response to situations involving hazardous chemicals and wastes, storage, treatment, transportation and disposal of hazardous wastes, sampling and analysis, and remediation. Students may choose from three elective tracks: Chemical Track, Industrial Hygiene Track, and Hazardous Material Abatement Track. Students could also receive a certificate in Hazardous Waste Operations and Emergency Response.

Master Syllabi will be reviewed in 2003.

* Note: Every department is required to review Master Syllabi and Program Learning Outcomes a minimum of every two years.

II. Program Learning Outcomes: A description of what you intend for students to know (cognitive), think/feel (affective), or do (psychomotor), when they have completed your degree program. A suggested manageable number of outcomes should be in the range of five to ten. Describe Program Learning Outcomes review activities.*

The program learning outcomes for Environmental Engineering Technology will be reviewed in 2003.

Learning Outcomes	Related Courses
Develop skills and knowledge to identify, analyze and process hazardous substances and wastes.	SRM 151; EVT 215, 216, 260
Apply knowledge of environmental laws and regulations in performing compliance assessments and pollution prevention surveys.	EVT 110, 200
Demonstrate ability to conduct environmental site assessments, detect the presence of hazardous substances and determine the environmental liability associated with property transfer.	EVT 210, 260, 240
Apply the principals of water and wastewater properties by designing water and wastewater treatment systems and analyzing contamination distribution in streams, rivers and groundwater.	CHE 121, 134; MAT 122, 132, 133; EVT 107, 120, 130, 240
Demonstrate and use testing equipment to sample and analyze air, water, soil and groundwater.	EVT 106, 120, SRM 219
Demonstrate environmental techniques and principals by performing remedial investigation, feasibility studies and by designing remediation systems.	EVT 260, 265

III. Assessment Method(s): A measurable indicator of success in attaining the stated learning outcome(s). The methodology should be both reliable and valid. Please describe in detail.

- a. Formative Assessment Methods(s) and Description: a measurable indicator of student in-progress success in attaining the stated learning outcome(s).

Multiple performance based formative assessments are utilized. For example, students' ability to apply knowledge and skills is assessed through environmental site assessment and presentations of findings and cases studies related to real world problem solving situations. Students may also research, either individually or in teams, current environmental issues and present their findings either in writing and/or orally.

Examinations over course contact are also administered.

Faculty continue to develop formative assessment of the Engineering Core Competencies on a course by course basis.

- b. Summative Assessment Method(s) and Description: a measurable indicator of end-of-program success in attaining the stated program learning outcome(s).

EVT 278 is the Environmental Capstone. Environmental Engineering Technology degree students are assessed to determine their attainment of program outcomes by employing reflective learning through demonstration of environmentally related principles and practices.

Summative assessment is completed via the capstone, EVT 278. Students must incorporate aspects of environmental engineering technology in this course. The course is organized so that the students operate as a contractor team and must divide the work and make sure that each necessary aspect is completed. Because they must operate as a team, this capstone builds group skills as well. Evaluation for the course is based on a checklist, which the instructor shares with students when the project is assigned. Course requirements also include an oral presentation from each student on their piece of the project. Evaluation is given as a group grade. Students are also expected to network with the community by demonstrating their skills to potential employers. This helps students build confidence in their job skills.

Students in EVT 278 have completed different capstone projects. A recent class designed a landfill disposal and recycling facility that incorporated the environmental and safety aspects of the program.

A survey of employers and graduates will be conducted in 2003 to evaluate the program outcomes.

To meet TAC-ABET certification requirements, department faculty are exploring the use of additional summative methodologies including: a written survey/questionnaire, portfolios, and performance appraisals.

- IV. **Results:** A description of the actual results of overall student performance gathered from the summative assessment(s). (see III.b.)

Feedback from employers indicates students are doing well and have the necessary professional knowledge and skills.

More design type projects are needed in the curriculum. The current curriculum focuses more on environmental assessments. Students also need additional opportunities to develop creative thinking related to real design problems prior to the capstone course.

- V. **Analysis/Actions:** From analysis of your summative assessment results, do you plan to or have you made any adjustments to your program learning outcomes, methodologies, curriculum, etc.? If yes, describe. If no, explain.

Faculty are exploring the integration of design projects within existing EVT courses. The design projects will require application of knowledge, creative thinking, and evaluation skills.

- VI. **General Education:** A description of where and how within the major the three primary general education outcomes* (communication, thinking, values/citizenship/community) are assessed.

- a. Where within the major do you assess written communication? Describe the assessment method(s) used. Describe assessment results if available.

Written communication exercises are included and assessed in all required technical courses in this program. Emphasis on general education skills is on a course-by-course basis and evaluation of these skills is done by the individual instructor.

- b. Where within the major do you assess oral communication? Describe the assessment method(s) used. Describe assessment results if available.

Oral skills are practiced through team discussion and team reports in and EVT 110, 210, and 200.

The evaluation checklist for oral communication is currently used in EVT courses.

- c. Where within the major do you assess thinking? Thinking might include inventing new problems, seeing relationships and/or implications, respecting other approaches, demonstrating clarity and/or integrity, or recognizing assumptions. Describe the assessment method(s) used. Describe assessment results if available.

All EVT courses include creative thinking and problem solving exercises. Students identify and evaluate relationships expressed in mathematical equations and engineering models in most courses. Students use thinking skills in EVT 200 to explain concepts. Students discuss controversial issues in EVT 110 and 200. Students complete essay questions involving critical thinking in EVT 110, 200, 210 and 107 and 240.

- d. Where within the major do you assess values/citizenship/community? These activities might include behaviors, perspective, awareness, responsibility, teamwork, ethical/professional standards, service learning or community participation. Describe the assessment method(s) used. Describe assessment results if available.

Many EVT courses, especially EVT 200, EVT 110, and EVT 210 involve teamwork. These courses take students out into the community through field trips and research

and involve local organizations. Outside speakers are used in EVT 110, 120, 180 and 200 from community organizations like OSHA and the EPA.

Faculty members have integrated the Core Competencies of the Engineering & Industrial Technology Division, including citizenship and professionalism, into the curriculum.