Bachelor of Science in Environmental Engineering
Undergraduate

Expanded Statement of Institutional Purpose

Institutional Mission Reference
The B.S. degree program in Environmental Engineering offers a high quality degree program that meets national standards of excellence. It is a significant component of the University's commitment to science, engineering, and technology, particularly in fields of major importance to the region. The program provides the skills and knowledge unique to Environmental Engineering that support the engineering profession in meeting the growing needs of the region and the nation. Simultaneously, the program comprises the general education components that yield a well-rounded graduate who is aware of societal needs and issues.The program faculty are committed to the highest quality of teaching and discovery of new knowledge.

Institutional Goal(s) Supported
The B.S. degree program in Environmental Engineering supports the University goals of (a) quality undergraduate programs, (b) quality teaching, (c) application of engineering principles to serve the local community through applied research and development, and (d) life-long learning. The major strategic initiatives supported by the department are Strategic Initiative 1 (High-Quality, Distinctive Undergraduate Programs), Strategic Initiative 8 (Enhanced Quality of University Life), Strategic Initiative 9 (Inclusive and Supportive University Environment), and Strategic Initiative 10 (Strengthen and extend the existing relationships with community colleges, the U. S. Navy, and industry).

Intended Educational (Student) Outcomes, Methods for Assessment, Criteria for Success, Assessment Results, and Use of Results

Intended Outcome 1
Students who qualify for graduation will be proficient in mathematics through differential equations, probability and statistics, calculus-based physics, general chemistry, soil science, a biological science, engineering science, and fluid mechanics and have the ability to apply knowledge in these areas to environmental engineering problems.

Method for Assessing Outcome 1 and Criterion for Success: On the basis of senior exit surveys the program will receive ratings of 5.0 on a scale of 1 to 7 (1=Not at All, 4=Moderate, 7=Extreme) on questions related to this outcome.

Summary of Assessment Data Collected for Outcome 1: In the period from Fall 2001 to Spring 2002 the program's weighted average score for the stated outcome item on the senior exit survey was as follows:
Apply knowledge of Engineering: 6.00
Apply knowledge of Mathematics: 6.00
Apply knowledge of Science: 6.00

Intended Outcome 2
Students who qualify for graduation will be able to design and conduct experiments and to critically analyze and interpret data in various environmental engineering focus areas.

Method for Assessing Outcome 2 and Criterion for Success: On the basis of senior exit surveys the program will receive ratings of 5.0 on a scale of 1 to 7 (1=Not at All, 4=Moderate, 7=Extreme) on questions related to this outcome.

Summary of Assessment Data Collected for Outcome 2: In the period from Spring 2001 to Spring 2002 the program's weighted average score for the stated outcome item on the senior exit survey was as follows:
Ability to analyze & interpret data: 6.13
Ability to conduct experiments: 5.62
Ability to design experiments: 5.75

Intended Outcome 3
Students who qualify for graduation will have ability to develop design criteria to meet desired needs and to design an environmental engineering system, component, or a process satisfying these criteria.

Method for Assessing Outcome 3 and Criterion for Success: 85% of graduates will earn at least ratings of 'good or better' performance on the technical portions of their senior design assessment. On the basis of senior exit surveys the program will receive ratings of 5.0 on a scale of 1 to 7 (1=Not at All, 4=Moderate, 7=Extreme) on questions related to this outcome.

Summary of Assessment Data Collected for Outcome 3: In the period from Spring 2001 to Spring 2002 86% of graduates were rated 'good or better' on the technical portions of their Senior Design Assessment. In the period from Spring 2001 to Fall 2002 the program's weighted average score on the senior exit survey for the stated outcome item was as follows:
Design system component, process: 5.88

Intended Outcome 4
Students who qualify for graduation will have ability to function on multi-disciplinary teams

Method for Assessing Outcome 4 and Criterion for Success: 85% of graduates will earn at least ratings of 'good or better' performance on the team work portions of their senior design assessment. On the basis of senior exit surveys the program will receive ratings of 5.0 on a scale of 1 to 7 (1=Not at All, 4=Moderate, 7=Extreme) on questions related to this outcome.

Summary of Assessment Data Collected for Outcome 4: In the period from Spring 2001 to Spring 2002 100% of graduates were rated 'good or better' on the team work portions of their Senior Design Assessment. In the period from Spring 2001 to Fall 2002 the program's weighted average score for the stated outcome item on the senior exit survey was as follows:
Multidisciplinary teams: 5.91

Intended Outcome 5
Students who qualify for graduation will be able to identify and formulate an engineering problem, to collect and analyze relevant data, and to develop a solution

Method for Assessing Outcome 5 and Criterion for Success: 85% of graduates will earn at least ratings of 'good or better' performance on the technical portions of their senior design assessment. On the basis of senior exit surveys the program will receive ratings of 5.0 on a scale of 1 to 7 (1=Not at All, 4=Moderate, 7=Extreme) on questions related to this outcome.

Summary of Assessment Data Collected for Outcome 5: In the period from Spring 2001 to Spring 2002 86% of graduates were rated 'good or better' on the technical portions of their Senior Design Assessment. In the period from Spring 2001 to Fall 2002 the program's weighted average score for the stated outcome item on the senior exit survey was as follows:
Identify engineering problems: 6.00
Solve engineering problems: 6.00
Formulate engineering problems: 6.00

Intended Outcome 6

Students who qualify for graduation will understand and appreciate professional and ethical responsibilities and understand professional practice issues such as procurement of work, bidding versus quality based selection processes, and interaction between design and construction professionals.

Method for Assessing Outcome 6 and Criterion for Success: On the basis of senior exit surveys the program will receive ratings of 5.0 on a scale of 1 to 7 (1=Not at All, 4=Moderate, 7=Extreme) on questions related to this outcome.

Summary of Assessment Data Collected for Outcome 6: In the period from Spring 2001 to Fall 2002 the program's weighted average score for the stated outcome item on the senior exit survey was as follows:
Ethical responsibility: 5.75
Professional issues: 5.84

Use of Assessment Results from Intended Outcome 6 to Improve Academic Program: In order to increase the coverage of professional practice issues we developed a new course, CEE 304 (Introduction to Fundamentals of Civil and Environmental Engineering Infrastructure Systems) to replace ENMA 302 (Engineering Economics) in the curriculum. The professional practice issues are addressed in this course along with the topics of engineering economics and probability and statistics. The course is included in the 2002-04 University Catalog, and it became a requirement beginning Fall semester 2002.

It was also decided that scheduled class time should be devoted to topics related to engineering ethics in two required courses: CEE 340 (Hydraulics and Water Resources), and CEE 404 (Environmental Engineering Design Project). The coverage includes viewing and discussions of the National Society of Professional Engineers' (NSPE) video-tape titled "Gilbane Gold" as well as the highlights of the NSPE and ASCE codes of ethics and the " Order of the Engineer." Guest lecturers cover some of these topics.

Intended Outcome 7

Students who qualify for graduation will be able to effectively present ideas and technical material to diverse audiences in writing, visually, and verbally.

Method for Assessing Outcome 7 and Criterion for Success: 85% of graduates will earn at least ratings of 'good or better' performance on the oral presentation portions of their senior design assessment. On the basis of senior exit surveys the program will receive ratings of 5.0 on a scale of 1 to 7 (1=Not at All, 4=Moderate, 7=Extreme) on questions related to this outcome.

Summary of Assessment Data Collected for Outcome 7: In the period from Spring 2001 to Spring 2002 100% of graduates were rated 'good or better' on the technical portions of their Senior Design Assessment. In the period from Spring 2001 to Spring 2002 the program's weighted average score for the stated outcome item on the senior exit survey was as follows:
Written communication 6.12
Oral communication: 5.63

Use of Assessment Results from Intended Outcome 7 to Improve Academic Program: To improve the achievement of Outcome 7, in addition to the capstone design course, we decided to include a term project in all 400-level courses, required and elective, beginning Fall 2003 semester. Depending on the number of students enrolled in the course this can be an individual or a group project. The students will be expected to submit a final written report and give an oral presentation near the end of the semester. A draft written report to be submitted at least a month before the presentation will be evaluated by a graduate assistant majoring in English.

Intended Outcome 8

Students who qualify for graduation will have the broad education necessary to understand the impact of engineering solutions in a societal and global context.

Method for Assessing Outcome 8 and Criterion for Success: On the basis of senior exit surveys the program will receive ratings of 5.0 on a scale of 1 to 7 (1=Not at All, 4=Moderate, 7=Extreme) on questions related to this outcome.

Summary of Assessment Data Collected for Outcome 8: In the period from Spring 2001 to Spring 2002 the program's weighted average score for the stated outcome item on the senior exit survey was as follows:
Impact of engineering solutions in global/societal context: 5.50

Intended Outcome 9

Students who qualify for graduation will understand the importance of professional licensure and commitment to life-long learning.

Method for Assessing Outcome 9 and Criterion for Success: On the basis of senior exit surveys the program will receive ratings of 5.0 on a scale of 1 to 7 (1=Not at All, 4=Moderate, 7=Extreme) on questions related to this outcome.

Summary of Assessment Data Collected for Outcome 9: In the period from Spring 2001 to Spring 2002 the program's weighted average score for the stated outcome item on the senior exit survey was as follows:
Lifelong learning: 6.04

Intended Outcome 10

Students who qualify for graduation will have knowledge of current issues and awareness of emerging technologies

Method for Assessing Outcome 10 and Criterion for Success: On the basis of senior exit surveys the program will receive ratings of 5.0 on a scale of 1 to 7 (1=Not at All, 4=Moderate, 7=Extreme) on questions related to this outcome.

Summary of Assessment Data Collected for Outcome 10: In the period from Fall 2001 to Fall 2002 the program's weighted average score for the stated outcome item on the senior exit survey was as follows:
Understand contemporary issues: 5.71

Intended Outcome 11:

Students who qualify for graduation will have an ability to use modern engineering techniques, skills, and tools including computer-based tools for civil engineering analysis and design.

Method for assessing Outcome 11 and criterion for success:

On the basis of senior exit surveys the program will receive ratings of 5.0 on a scale of 1 to 7 (1=Not at All, 4=Moderate, 7=Extreme) on questions related to this outcome.

Summary of assessment data collected for Outcome 11:

In the period from Spring 2001 to Fall 2002 the program's weighted average score for the stated outcome item on the senior exit survey was as follows:
Availability of computers: 5.84
Ability to use modern engineering tools: 5.75
Laboratory facilities to use modern engineering tools: 5.00

Intended Outcome 12:
Students who qualify for graduation will have knowledge of fundamentals in the following focus areas: water supply and resources, environmental systems modeling, environmental chemistry, wastewater management, hazardous waste management, atmospheric systems and air pollution control, environmental and occupational health.

Method for assessing Outcome 12 and criterion for success:
On the basis of senior exit surveys the program will receive ratings of 5.0 on a scale of 1 to 7 (1=Not at All, 4=Moderate, 7=Extreme) on questions related to this outcome.

Summary of assessment data collected for Outcome 12:
In the period from Fall 2001 to Springl 2002 the program's weighted average score for the stated outcome item on the senior exit survey was as follows:

Knowledge of fundamentals in the areas of water supply and resources, environmental systems modeling, environmental chemistry, wastewater management, hazardous waste management, atmospheric systems and air pollution control, and environmental and occupational health: 6.2

Intended Outcome 13:
Students who qualify for graduation will have knowledge of fundamental concepts of waste minimization and pollution prevention.

Method for assessing Outcome 13 and criterion for success:
On the basis of senior exit surveys the program will receive ratings of 5.0 on a scale of 1 to 7 (1=Not at All, 4=Moderate, 7=Extreme) on questions related to this outcome.

Summary of assessment data collected for Outcome 13:
In the period from Fall 2001 to Spring 2002 the program's weighted average score for the stated outcome item on the senior exit survey was as follows:

Proficiency in advance principles and practice in water supply and resources, wastewater management, hazardous waste management, and atmospheric systems and air pollution control: 6.34

Intended Outcome 14:
Students who qualify for graduation will be proficient in environmental, geotechnical, structural, and water resources engineering and have had exposure to transportation engineering.

Method for assessing Outcome 14 and criterion for success:
On the basis of senior exit surveys the program will receive ratings of 5.0 on a scale of 1 to 7 (1=Not at All, 4=Moderate, 7=Extreme) on questions related to this outcome.

Summary of assessment data collected for Outcome 14:
In the period from Fall 2001 to Fall 2002 the program's weighted average score for the stated outcome item on the senior exit survey was as follows:
Knowledge of fundamental principles of waste minimization and pollution prevention: 6.50

Intended Outcome 15:
Students who qualify for graduation will understand the roles and responsibilities of public institutions and private organizations in environmental management.

Method for assessing Outcome 15 and criterion for success:
On the basis of senior exit surveys the program will receive ratings of 5.0 on a scale of 1 to 7 (1=Not at All, 4=Moderate, 7=Extreme) on questions related to this outcome.

Summary of assessment data collected for Outcome 15:

In the period from Fall 2001 to Spring 2002 the program's weighted average score for the stated outcome item on the senior exit survey was as follows:
Understanding of the roles and responsibilities of public institutions and private organizations in environmental management? 6.67

Intended Outcome 16:
Students who qualify for graduation will be proficient in environmental, geotechnical, structural, and water resources engineering and have had exposure to transportation engineering.

Method for assessing Outcome 16 and criterion for success:
On the basis of senior exit surveys the program will receive ratings of 5.0 on a scale of 1 to 7 (1=Not at All, 4=Moderate, 7=Extreme) on questions related to this outcome.

Summary of assessment data collected for Outcome 16:
In the period from Fall 2001 to Springl 2002 the program's weighted average score for the stated outcome item on the senior exit survey was as follows:
Ability to apply environmental systems and process modeling techniques: 6.17