

2011 ANNUAL REPORT

**ENVIRONMENTAL SCIENCE
GRADUATE PROGRAM**

Division of Applied Science & Technology

College of Information Technology and Engineering

December 2011

ANNUAL REPORT
ENVIRONMENTAL SCIENCE GRADUATE PROGRAM
2011

I. Assessment Activities

A. Program Goals

1. Increase the effectiveness of Environmental Science students on the job, their opportunities for advancement and their preparation for further education, such as Ph.D. programs and schools of law. Maintain a curriculum that is up-to-date and effective, with new courses added as needed, and serves both majors and non-majors.
2. Promote faculty development so that they may be competitive with practicing professionals in their field, have the competence and expertise to teach current-content, and maintain leadership in the community with regard to environmental protection and management.
3. Effectively transfer technical information to the professional and general community in the form of courses, seminars, library holdings and student reports.
4. Attract qualified students into the program, effectively evaluate them and improve their competencies to work in the Environmental Science field.
5. Deliver graduate courses and seminars at convenient times, provide a convenient registration process, and pursue cultural and ethnic diversity and adequate financial assistance.

B. Learning Outcomes & Data Collection

1. Course effectiveness

The program is playing a major role in the community and region by increasing the effectiveness of students on the job, and students' opportunities for advancement. There are many jobs available in this field for which undergraduate preparation is generally insufficient for the job requirements. Students regularly report promotions and an increase in their employability as a result of the program. Local professionals who participate in some comprehensive project review teams for graduating students have provided feedback that the proficiency of the Environmental Science students is commensurate with the requirements of this field.

2. Faculty

The faculty consist of a program coordinator and four adjunct faculty members. The faculty has considerable experience in the areas taught. They organize and participate in national conferences and local professional activities. The program could significantly expand with additional expertise through the hiring of new faculty. The lone full-time faculty also has responsibilities in the ENVE program, advising students and teaching courses.

3. Community

The program has its primary focus on the local community. Over the past few years about 20% of the students are not majoring in the environmental science field and take a class because of the material relevant to their needs. The program is therefore beneficial as a valuable community continuing education resource.

4. Student qualifications and competence

The Environmental Science program student entrant average GRE scores have consistently been higher than the average of other Marshall University programs. For students to be admitted they must have the requisite education qualifications (appropriate degree and undergraduate GPA or standardized scores), environmental science background and/or practical science. A GRE exam is required for students who do not achieve an undergraduate GPA of 2.5.

The Environmental Science student exit requirements are focused on the preparation and defense of a comprehensive project. The project involves submitting a project proposal, conducting research, writing an extensive report and making an oral presentation during which the student is questioned extensively by full time faculty and representatives of local industry if in attendance. The Program and College have given the Comprehensive Project a great deal of attention in terms of review and change in procedures the past two years. The Comprehensive Project continues to be well received by the employer. The objective of this effort is to ensure that the student nearing graduation takes advantage of this opportunity. The program is satisfied with the quality and performance of the students. The feedback from industrial representatives regarding this process continues to be good. Thesis is also an option should students so choose.

In each course, students are assessed based on their performance in homework, quizzes, exams, projects and oral presentations. A few courses evaluate the student's contribution to class discussion.

5. Scheduling/diversity/financial aid

The majority of students now access the Web to register. A greater number of courses are being offered. The types and scheduling of courses are continually being modified to address the greater number of full-time, Huntington-based students coming into the program the types of courses. New course offerings are constantly being evaluated and new ideas for academic program delivery being tried. For example, many courses are being offered as video-link between the South Charleston and Huntington campuses to complement standard delivery of courses at Huntington campus and the South Charleston campus.

A significant number of the current Environmental Science students are female and increasing. Although the number of "minorities" is small it is steadily increasing.

Many international students are enrolled in the program.

Most of the full-time students are receiving financial aid, paying their own expenses or receive graduate assistantships with tuition waivers.

6. Enrollment

Enrollment has increased some this year. The student enrollments have been: 79 for Fall 11, 61 for Fall 10, 33 for Fal 09, 34 for Spring 09, 70 for Sp 08 and 61 for Fall 08, compared to 91 for Fall 2007, 61 for Spring 07; 68 for Fall 2006; 77 for Spring 2006, 75 for Fall 2005. The program larger enrollments in the 1970s, fell in the early 1980s and began rising in 1987. Growth was about 50% per year until 1993. A decline was experienced from 1993 due in part by organizational restructuring by employers of our students, a shift of U.S. government environmental policy and regulations and changing economy. Over time, increases are expected as the economy changes, increasing environmental awareness and interest from full-time students. ES remains generally the largest MS program (by class enrollment) in the College. The program could be significantly bigger with more faculty.

7. Policies/Administration

The Division has communicated with students that have not been active recently to complete their MS degrees. Many students have returned to complete their comprehensive projects. There remain files of non-degree students who just take courses for their own professional development

All advising is done by the single full-time faculty member in the program, who also advises some Environmental Engineering students. The proportion of graduate students in the South Charleston region has been decreasing compared to the Huntington campus. The Environmental Science and Safety Technology programs, in the Division, continually review efficient means to function. Several students in each program take courses in the other program, with the support of their advisors.

The program relies on an informal advisory process, wherein adjunct faculty, graduates, students and employers would meet with the full time faculty to help decide policy, procedures and curriculum plans. A college-wide board consisting of local professionals meets periodically to review the college operation.

8. Goal Attainment

Many of the students entering this program are already working in their chosen field. One measure of success for the program is whether graduates achieve the promotions they seek, and whether those not employed in this field are able to enter it. Formal and informal feedback from students indicates that they are satisfied with their investment in Environmental Science graduate education. In addition, employers frequently call when searching for new employees. Many graduates are employed by the West Virginia Department of Environmental Protection with which the division and college maintains a very close relationship. Employers are increasingly contacting the division seeking employees. Additionally, many (including 3 recent) graduates pursue PhD's at other institutions.

C. Results

The Environmental Science program gives the graduate students the appropriate preparation and strengthened abilities to perform more effectively compete in the job market. Most of the environmental classes being taught presently are utilizing Wimba and WebCT. This system places all notes, assignments, communications on-line, allowing students instant access to course material and discussions anywhere they have internet access.

II. Current Plans

The faculties of the Environmental Science MS and BS degree programs are currently attempting to bring the two programs functionally together. The two programs, housed in the College of Information Technology and Engineering and College of Science, respectively, currently do not effectively share research or instructional materials, faculty, or curricula. To bring the two programs together, a curricular plan has been developed, and is being implemented, that will connect the curricula of the two degree programs initially through shared 400-500 level courses. ES MS students could benefit from the field studies courses offered by the IST/ES program, and the Four hundred level IST/ES BS courses, and ES BS students could benefit from the expertise and curricular offerings in environmental policy, risk assessment, and regulation. Because the immediate focus for the IST/ES BS program, its students, and faculty is a more effective

connection to the resources and goals of the ES MS program, the curricular revisions are considered to be the initial...not final step in the process of integrating resources and goals between these programs. Presently, the faculties of the two programs are developing plans to more effectively share research resources and space. In the view of the IST and ES BS faculty, the most significant need for the undergraduate program is the addition of a faculty member for the ES MS graduate program. In the cooperative effort that is presently ongoing between the two programs, the addition of this faculty member strengthens significantly the efforts of all of us.

A significant effort is being made to further develop the Environmental Science program, together with the graduate safety technology program. The Environmental Science program has improved the program assessment tools and assessment plan, and will continue to make improvements.

No laboratory space is currently available at the Huntington campus or South Charleston. Work to share laboratory space with the ES BS program is being done, as well as efforts to acquire equipment and integrate it into the program. Use of the lab in the new Engineering Lab would be very beneficial but as of now is very limited. The lack of lab space has been detrimental to the program, as many courses would benefit from a lab and field component. Although many Environmental students tend to have significant work experience, newly dedicated space serves for storage, calibration and demonstration of table-top experiments and field instrumentation were needed and will add value to the program. Additionally, recent equipment purchases will allow for direct field experience in several of the ES courses.

The program has created close ties to programs in the College of Science. Listing of ES courses as requirements or electives in COS programs is common, as are students enrolling in ES courses from the programs. As an emphasis in Water Resources Management is being created in the ES program, similar listing of COS courses will occur. It would be hugely beneficial if the CITE ES MS program had a corresponding BS program in CITE. BS ES programs are growing nationally, and MU is not taking advantage of that potential growth. In fact, an integrated environmental science and engineering program that recognizes the diversity of sciences in the field would greatly benefit the University, but cannot be accomplished under current structure and with the number of faculty currently available.

Assessment is a process that will see many changes in coming months. Faculty are developing a new assessment program that will be taking form over the next year, and beyond, to improve the current system, which is largely qualitative.

III. Assistance Needed

There continues to be a need for better quality classroom and laboratory space. Currently, classes are being offered at South Charleston campus and Huntington campus through two-way video link. Additional lab and field equipment is also needed. The use of Wimba largely prevents any field experience, as coordinating is nearly impossible. Classes are sometimes split, with each having a field experience, but this also makes for complicated logistics and burden on faculty. The program desperately needs additional faculty, dedicated lab space, and less reliance on Wimba, especially for classes that could benefit from lab or field studies.

Simply put, the program cannot live up to its potential with only one faculty member. The program has “hit a wall” as far as being able to grow, and this problem is largely due to lack of full-time faculty. Field and lab experiences are critical tools, but can not be added under current conditions (i.e. lack of faculty and lab space). New courses and areas of emphasis are needed, but difficult to add due to lack of faculty and lab space. The University should have the MS-ES, MS-ENVE and a BS-ES under one umbrella, with a minimum of 3 full-time faculty and fully equipped lab space in Huntington. This would allow sharing of resources, cross-listing of

400-500 level courses, and continuity between BS and MS programs, as well as the connection between these multi-disciplinary fields as is seen in the profession.

IV. What we have learned though this process

This assessment process serves to monitor the relevance and marketability of the Environmental Science program, helps to focus on specific issues and establishes a yearly record for the 5-year program review. The assessment reaffirms that the Environmental Science program serves effectively a diverse population of professionals, and increasing number of full-time students, who deal with the impact of modern civilization activities on the natural environment.

The program is in the midst of changing the Assessment process, and future reports will reflect these changes. Outcomes will be modified, therefore we are not going to be able to use the exact same assessment measures used in the past or on previous reports. Additionally new rubrics are being developed for each of the specific program course outcomes. The faculty is currently working on this. Faculty will include in each course syllabi four or five course objectives. By asking the question exactly what are the four or five most important learning outcomes students need to know from each class, then the evaluation of those objectives will be easy to determine. This should be done with specific test questions on exams or student assignments given orally or written to show mastery of the subject.

New assessment tools will be added every year as necessary.

Assessment of Student Outcomes: 2011

Program: MS Environmental Science

Component / Course / Program Level					
Outcome	Person or Office Responsible	Assessment Tool, Objective or Approach	Standards/Benchmark	Results/Analysis	Action Taken
Improve the effectiveness of environmental scientists and managers in their efforts to protect the public health and welfare with respect to environmental pollution.	Program Coordinator	Working closely with graduating students and employers to determine the needed skills for the profession	Selected topics in ES 614, ES 660 and ES 630, with overlay among the courses on critical areas.	Based on responses to the specific topics, students are obtaining the needed education in the critical areas. Also validated by Comprehensive project presentations.	None. Will work with ES BS program to develop advisory group.
Ability to assess environmental problems and solutions by applying scientific concepts	Instructor	Select representative questions on midterm and final exams.	rubric: 1 = meeting/exceeding outcome standard, 2= approaching outcome standard, 3 = failing outcome standard Goal of 80% meet/exceed standard.	Ongoing – method will be used in coming academic year by program coordinator to test effectiveness of assessment method.	
Ability to assess environmental problems and solutions by applying economic and political concepts	Instructor	Select representative questions on midterm and final exams.	rubric: 1 = meeting/exceeding outcome standard, 2= approaching outcome standard, 3 = failing outcome standard Goal of 80% meet/exceed standard.	Ongoing – method will be used in coming academic year by program coordinator to test effectiveness of assessment method.	

Ability to identify, understand, and critically evaluate competing perspectives on environmental issues	Instructor	Select representative questions on midterm and final exams.	rubric: 1 = meeting/exceeding outcome standard, 2= approaching outcome standard, 3 = failing outcome standard Goal of 80% meet/exceed standard.	Ongoing – method will be used by program coordinator to test effectiveness of assessment method.	
Provide a forum for trained professionals to exchange information regarding protection of the environment	Program Coordinator	Have full time and adjunct faculty that stay current in the field and maintain a relationship with other practitioners	Class presentations required in several core courses. Select presentations evaluated by peers.	Based on the instructor and peer evaluation of a variety of presentations more foundation is needed for the full-time students.	Incorporation of more explicit instructions and examples prior to presentations.
Provide the community with information, resources and trained professionals to assist them in making effective choices in public debate and private decisions regarding the environment	Program Coordinator	Insure that students and faculty are well-rounded, well-trained, and involved	Reputation of program among professionals, policy makers, and the public Goal of 25% of graduates have published papers on their project/thesis within 3 years.	The program continues to be a major “go to” organization in the region regarding all aspects of environmental policy and science	Will work with ES BS program to develop advisory group.
ES 660 Environmental Law Student will understand a variety of environmental laws like: clean water; clean air; RCRA;TSCA and others that would impact on the students ability to function as a safety professional.	Instructor	The student will be able to research environmental laws as applicable in U.S. Code of Federal Regulations.	Student will be able to explain the tenants of such rules and laws effectively in a written examination. 80 %	The average overall score for the course was above 80%,	
ENVE 615 Environmental Chemistry The student will demonstrate the ability to apply the basic tools and concepts related to environmental chemistry.	Instructor	Three hourly exams, 11 homework assignments, 9 laboratory experiments, and 2 lab exams	Students will average at least 80% for the course.	The average overall score for the course was was above 80%, but individual ES students have averaged less than 80% for the course	

ES 614, Environmental Risk Assessment The student will demonstrate the ability to apply the basic tools and concepts related to risk assessment.	Instructor	2 take-home exams, 8 homework assignments and 4 quizzes	Students will average at least 80% for the course.	The average overall score for the course was above 80%, but individual ES students have averaged less than 80% for the course	
The student will demonstrate the ability to communicate effectively, through written assignments and through public speaking presentations.	Program Coordinator	Written and orally presented Comprehensive Project Report for TE 699 (Comprehensive Project).	Students will receive a passing grade on the written and orally presented Comprehensive Project Report for TE 699.	All students who completed TE 699 received passing grades.	
The student will apply statistical analysis concepts appropriately	Instructor	ENGR 610 and assignments in courses which require statistical analysis	Students should demonstrate appropriate use of applied statistics in coursework	Subjectively, the students do this in their ES courses. Objectively they do it in ENGR 610 assignments.	Will also require more rigorous statistical work in final projects.
The student will demonstrate through written exercises and through team projects a clear understanding of the fundamental principles of the importance of people and teamwork in technical projects and effectively working with people in technical situations.	Instructor	Five written essay assignments in EM 660 (Project Management) that deal with interactions with people while working on projects. Through team member evaluations of each other on the final team project in EM 660. Team projects in other ES courses.	Students will average at least 80% for the course.	The average overall score for the course was above 80%,	Continue to work on helping the students to have assignments that require them to apply the principles of working with people in technical situations.

