

Program Review

**Master of Science in Engineering**

**College of Information Technology**

**November 2010**



**MARSHALL UNIVERSITY**

## Program Review Marshall University

Date: November 2010

Program: Master of Science in Engineering  
Degree and Title

Date of Last Review: November 2006

### Recommendation

Marshall University is obligated to recommend continuance or discontinuance of a program and to provide a brief rationale for the recommendation.

Recommendation

Code (#):

1. Continuation of the program at the current level of activity; or
2. Continuation of the program at a reduced level of activity or with **corrective action**: Corrective action will apply to programs that have deficiencies that the program itself can address and correct. **Progress report due by November 1 next academic year**; or
3. Continuation of the program with identification of the program for **resource development**: Resource development will apply to already viable programs that require additional resources from the Administration to help achieve their full potential. This designation is considered an investment in a viable program as opposed to addressing issues of a weak program. **Progress report due by November 1 next academic year**; or
4. Development of a cooperative program with another institution, or sharing of courses, facilities, faculty, and the like; or
5. Discontinuation of the program

**Rationale for Recommendation:** (Deans, please submit the rationale as a separate document. Beyond the College level, any office that disagrees with the previous recommendation must submit a separate rationale and append it to this document with appropriate signature.)

<u>1</u>	<u>Eldon Larsen</u>	<u>October 25, 2010</u>
Recommendation:	Signature of person preparing the report:	Date:
<u>1</u>	<u>William Pierson</u>	<u>10/26/2010</u>
Recommendation:	Signature of Program Chair:	Date:
<u>1</u>	<u>Betsy E. Dulin</u>	<u>11-1-2010</u>
Recommendation:	Signature of Academic Dean:	Date:
Recommendation:	Signature of Chair, Academic Planning Committee: (Baccalaureate pgms only)	Date:
<u>1</u>	<u>Tracy Christofero</u>	<u>1-28-2011</u>
Recommendation:	Signature of President, Faculty Senate/ Chair, Graduate Council:	Date:
Recommendation:	Signature of the Provost and Senior Vice President for Academic Affairs:	Date:
Recommendation:	Signature of the President:	Date:
Recommendation:	Signature of Chair, Board of Governors:	Date:

## College/School Dean's Recommendation

Deans, please indicate your recommendation and submit the rationale.

### Recommendation:

Continue at current level of activity.

### Rationale:

(If you recommend a program for resource development identify all areas for specific development)

The Master of Science in Engineering degree program is an academic offering unique to CITE at Marshall University, and has served a variety of graduate student needs during the review period and previous to that period. With the recent accreditation of the Bachelor of Science in Engineering degree, the MSE is poised to thrive and grow in new ways. For instance, graduates of the MSE program will now have the ability to use the degree as one year's credit toward professional registration since it is affiliated with an accredited undergraduate program. In addition, Marshall is now producing its own graduates who can enter the program. These and other factors, including employer needs in all fields of engineering related to infrastructure maintenance and development, provide opportunities for program growth.

*Betsy E. Dulin*

Signature of the Dean

11-1-2010

Date

## Marshall University Program Review

For purposes of program review, the academic year will begin in summer and end in spring.

**Program:** Master of Science in Engineering (MSE)

**College:** College of Information Technology and Engineering

**Date of Last Review:** November 2006

### I CONSISTENCY WITH UNIVERSITY MISSION

The mission of the M.S.E. degree program, developed in accordance with standards adopted by the Accreditation Board for Engineering and Technology, is to provide multi-disciplinary, graduate level engineering education appropriate for working professionals and others who do not have the option of full-time programs in a traditional university setting.

CITE will continue to provide academic instruction and service to provide life-long learning and career enhancement opportunities to its students in the business, industrial and government communities and to enhance the economic development of the region. The M.S.E. degree program is based in the Charleston-Huntington area, but is offered at other sites as the need arises. Course content and scheduling are designed to serve the needs of a student population that consists primarily of fully employed professionals, and has a slowly growing number of full-time students.

The Master of Science in Engineering (M.S.E.) degree program, offered by Marshall University's College of Information Technology and Engineering (CITE), is a multi-disciplinary engineering program designed to meet the specific needs of engineers employed in industry, government and consulting firms in the region. The program is housed within CITE's Engineering and Computer Science Division, and offers a central core curriculum with opportunities for concentrated study in selected areas of emphasis. Areas of emphasis currently available include Engineering Management, Environmental Engineering, and Transportation and Infrastructure Engineering.

The M.S.E. degree supports the university mission statement in that it provides a multi-campus affordable, high quality graduate education for the state and region using all appropriate modes of delivery and promotes economic development through research, collaboration, and technological innovations needed for our region.

## II ACCREDITATION INFORMATION

ABET has accredited Marshall's undergraduate Bachelor's of Science in Engineering (B.S.E.) degree. Because ABET only accredits *either* an undergraduate or a graduate engineering program, *but not both at the same university*, the M.S.E. degree has not sought and cannot seek ABET accreditation. Therefore, this section is not applicable to the M.S.E degree program.

## III PROGRAM STATEMENT on Adequacy, Viability, Necessity and Consistency with University/College Mission

A. **ADEQUACY** Provide a narrative summary for each of the following in addition to the requested appendices.

### 1. Curriculum:

The Master of Science in Engineering (M.S.E.) degree program, offered by Marshall University's College of Information Technology and Engineering (CITE), is a multi-disciplinary engineering program designed to meet the specific needs of engineers employed in industry, government and consulting firms in the region. The program is housed within CITE's Engineering and Computer Science Division, and offers a central core curriculum with opportunities for concentrated study in selected areas of emphasis. Areas of emphasis currently available include (1) Engineering Management, (2) Environmental Engineering, and (3) Transportation and Infrastructure Engineering.

M.S.E. degree students are required to complete a minimum of 30 graduate credit hours, including 9 hours of core courses and 21 hours specific to the selected area of emphasis. The comprehensive project, which comprises three hours of the core, typically is an applied project that requires a fusion of the knowledge obtained in the course work and its application to a realistic problem from the relevant subject area.

### Core Courses

The core curriculum for the M.S.E. degree consists of three courses: Project Management, Applied Statistics, and Comprehensive Project. Project Management provides students with a practical knowledge of how to integrate effectively the efforts of various employees and associates in

the execution of typical engineering projects and programs. Applied Statistics addresses the acquisition, analysis and interpretation of data, applied in various contexts including design of experiments, forecasting, and modeling. The Comprehensive Project course requires each student to produce an original solution to a realistic engineering problem under the supervision of a project committee and faculty advisor. The student must prepare and defend a detailed, effectively written project report, which must be approved by the project committee prior to successful completion of the course.

### **Areas of Emphases Courses**

*Engineering Management:* This area of emphasis is designed for engineers who hold or wish to move into a management position, and requires nine hours of management courses: Management of Technical Human Resources and Organizations, a study of human relations, personal development, employee development, and personnel functions; Operations Management, an examination of the quantitative and conceptual tools for generating goods and services; and Engineering Economics, a study of the principles of engineering economics and various other financial management issues. Students may take equivalent courses from the Technology Management degree program in order to satisfy these requirements, with advisor approval. These topics provide the foundation for engineering management education. In addition, with advisor approval in a Plan of Study, students complete at least twelve additional hours of electives, which can include technical/design engineering courses or more advanced management courses, depending on the particular student's interests and goals.

*Environmental Engineering:* The emphasis in environmental engineering is designed for those engineers who work or wish to work in such areas as water/wastewater treatment, groundwater and soil remediation, solid and hazardous waste management, air pollution control, and industrial hygiene. Students must complete fifteen required hours, including Environmental Risk Assessment, Environmental Engineering Design, Environmental Chemistry, Environmental Law, and one course in either Air Pollution Design, Air Pollutant Dispersion and Modeling, Environmental Geotechnology, or Groundwater Principles and Monitoring. Students also complete six hours of approved elective courses in a Plan of Study, which relate to their particular environmental interests.

*Transportation and Infrastructure Engineering:* This area of emphasis is designed for those engineers who work or wish to work in the civil engineering related areas of transportation and highway engineering and/or infrastructure engineering having to do with design of bridges, steel, and/or concrete structures. Students must select two required courses in transportation engineering, two required courses in infrastructure engineering, and three approved electives. This is a relatively new area of emphasis in the M.S.E. degree, having been added approximately two years ago.

## **2. Faculty:**

The M.S.E. program utilizes one full-time graduate engineering faculty member (the M.S.E. Program Coordinator) and part time services of five B.S.E. program faculty members in CITE's Engineering and Computer Science Division, as well as part-time services of two full-time faculty members in CITE's Division of Applied Science and Technology. Of these faculty members, five are tenured and three are tenure-track. Several are registered professional engineers. All hold terminal degrees in their fields of expertise.

All full-time faculty were professionally employed in fields relevant to their teaching emphases prior to joining CITE, and continue to be actively involved in their professions through consulting, funded research, professional societies, and other service activities. One of the above faculty members—the M.S.E. Program Coordinator—is involved full-time in the M.S.E., while the other faculty also teach courses in CITE's other degree programs. This full-time faculty member regularly publishes and presents papers at national conferences and is currently working on a book to be published in his area of expertise.

Essentially all of these faculty members are very active in their fields, both academically and professionally, serving on national and local boards, publishing papers and attending conferences regularly. Details may be seen in the faculty data sheets of Appendix II. The program has no graduate teaching assistants.

Several carefully selected and highly qualified adjunct faculty teach courses in the M.S.E. degree program, especially in courses where current, ongoing engineering practice plays an important role in course content.

**3. Students:** NOTE: If your program is accredited, refer to the appropriate page numbers in your accreditation report.

a. Entrance Standards:

Students admitted to the M.S.E. degree program generally should hold an undergraduate engineering degree from an ABET-accredited institution and satisfy two of the following three requirements: undergraduate cumulative GPA of 2.75, score at the mean or above on the Graduate Record Examination areas, successful completion of Fundamentals of Engineering and/or Principles and Practice examinations as administered by NCEES.

In addition to these entrance requirements, foreign nationals must also score at the mean or above on the TOEFL.

Students with undergraduate degrees but who do not fully meet the entrance requirements are admitted on a case-by-case basis, depending on the specific undergraduate program of study and courses completed, as well as relevant work experience and professional achievement. In addition, students may be required to complete foundation coursework in required undergraduate engineering topics.

b. Entrance Abilities

Students admitted to the M.S.E. program possessed the following average scores over the period of assessment for this program review:

Average Undergraduate GPA	2.94
Average GRE quantitative score	688
Average GRE verbal score	426

Please see Appendix III for more details.

c. **Exit Abilities:**

All M.S.E. students are required to complete a final project, which typically is work-related. A committee of faculty oversee and evaluate this work to ensure that the student has successfully mastered key engineering concepts covered in coursework, as well as the ability to apply these principles in a practical engineering context.

The average student's exiting GPA is 3.81, showing excellent achievement. Details may be found in Appendix IV.

Licensing examinations are not part of the exit abilities, but many of these students are already licensed as Professional Engineers, or soon will be. Informal feedback from students and focus group attendees indicates that many students have found the program course content helpful in their pursuit of professional registration and continuing education requirements.

4. **Resources:** NOTE: If your program is accredited, refer to the appropriate page numbers in your accreditation report.

a. **Financial:**

Marshall University supports the M.S.E. degree program through full support for one professor of engineering and a portion of support of five other full-time Engineering and Computer Science Division faculty positions, plus a portion of full-time faculty salaries from the Applied Science and Technology Division, a portion of several administrative secretarial positions, office space, current expense and travel budgets.

The Weisberg Division of Engineering and Computer Science offers two graduate and two undergraduate degrees: MS in Engineering, MS in Information Systems, BS in Computer Science, and BS in Engineering. The average State financial support over a five-year period for the Weisberg Division of Engineering and Computer Science is \$233,550, with approximately 32% annually going towards personnel (Student assistants, Part-Time Faculty, etc.).

If this program were terminated as a major, a savings of one faculty position would be realized. In addition, enrollment in

other CITE courses would be negatively impacted due to the sharing of some courses among majors. Termination of the M.S.E. program would eliminate approximately four to six M.S.E. courses per year taught by adjunct faculty.

**b. Facilities:**

CITE provides its students a variety of modern, technologically advanced facilities designed to support and enhance their studies. New and well-equipped classroom facilities designed especially for adult learners are available in the Robert C. Byrd Academic and Technical Center on the South Charleston campus. All M.S.E. courses are regularly offered from this location. In addition, classes are offered on the Huntington campus, and at other locations according to demand. On the Huntington campus, we have been blessed with the new Arthur Weisburg Family Engineering Laboratories building to aid in our educational opportunities. Occasionally classroom space elsewhere on both campuses and at Hurricane High School is also utilized.

The M.S.E. degree program frequently and regularly makes use of multiple distance learning classrooms, which link the Huntington and South Charleston campuses with innovative and up-to-date class delivery capabilities. State-of-the-art computer facilities and labs are available to students on both campuses. Equipment and software are well-maintained and up-to-date in order to provide full support to M.S.E. students and faculty.

With respect to research and other study needs, M.S.E. students have access to both the John Deaver Drinko library on the Huntington campus and the South Charleston campus library.

**5. Assessment Information:** NOTE: This section is a summary of your yearly assessment reports.

- a. Provide summary information on the following elements. Please include this information in Appendix V.

The M.S.E. degree is divided into three areas of emphasis: Engineering Management, Environmental Engineering, and Transportation and Infrastructure Engineering. Each area of emphasis has different student learning outcomes. Additionally there are several outcomes which overlap with all the areas of emphasis. We have been completely revising our student learning outcomes over the past two years, focusing each year on one of the areas of emphasis.

In the Engineering Management area of emphasis, we are focused heavily on the student's ability to plan and carry out projects, develop and demonstrate teamwork, understand and apply basic tools and concepts of operations management, understand financial and cost/benefit concepts, understand and adequately apply important concepts of communications and ethical behaviors, and be able to apply statistical analysis concepts appropriately.

In the Environmental Engineering area of emphasis, we are focused heavily on the student's ability to plan and carry out projects, develop and demonstrate teamwork, demonstrate ability to apply basic tools and concepts related to environmental chemistry, risk assessment, and environmental law, demonstrate understanding and application of professional, ethical, and legal responsibilities, and appropriately apply statistical concepts and tools.

The Transportation and Infrastructure Engineering area of emphasis is relatively new, and we are still developing the student learning outcomes for that area of emphasis. We hope to have these ready for next year's annual review.

The assessment tools used for the above student learning outcomes consist mainly of writing and computational assignments, team projects, examinations, applied comprehensive projects, and written and oral presentations. Goals have been set for each learning outcome and the results measured. Finally, the results are analyzed and specific actions are planned. All of this information is given in Appendix V.

b. **Other Learning and Service Activities**

None

c. **Plans for Program Improvement**

Based on assessment data, provide a **detailed** plan for program improvement. This plan **must** include a timeline.

1. During the 2011-2012 year, complete a definition of the student learning outcomes for the Transportation and Infrastructure Engineering Area of Emphasis.
2. By the end of 2011, complete an effort to clarify final team project expectations in courses using team projects.
3. By the end of Spring 2012, develop more application-oriented instruction and assignments in operations management coursework.
4. Continue the use of the fifteen written essays in EM 620 regarding human resource management.
5. By the end of the 2011-2012 year, clearly define what needs to be done for and begin to measure the student learning outcome for application of basic tools and concepts related to environmental law.
6. Finally, continue the learning outcomes, measurement tools, and benchmarks that are currently showing success.

For more details, see Appendix V.

d. **Graduate and Employer Satisfaction:**

Because of the relatively small number of students (20-30) in the M.S.E. degree program, graduate and employer satisfaction has been measured informally. Graduate surveys for the M.S.E. program frequently have only one respondent, which makes the survey of little utility. Instead, as thoroughly discussed above, we use focus groups, informal discussions with graduates, course evaluations by current students, suggestions from other faculty and employers, and contacts with other engineers to help us measure the effectiveness of the educational experience of our graduates. Also, over 95% of our graduates are employed full time in their fields, which is an indication of employer satisfaction.

- e. Attached to this report are the previous five years of evaluations of your annual assessment reports provided by the Office of Assessment.

**6. Previous Reviews:** In April 2007, the Marshall University Board of Governors recommended that the MSE Program continue at its current level of activity.

The main concerns of the most recent program review revolved around enrollment. Ten years ago, a very large fraction of our enrollment was from people employed in the chemical industry. Since that time, the chemical industry in West Virginia has dwindled severely, and now we have essentially no students from that industry. Instead, we see a continuing increase in the fraction of our students who are in environmental and civil engineering fields, and this is where we have shifted our focus. As a result, the Fall 2010 semester enrollment in the M.S.E. degree program is 27 students, which is up over 30% from previous years. Some of this is due to the new Transportation and Infrastructure Engineering Area of Emphasis.

**7. Strengths/Weaknesses:**

The principal strengths of the M.S.E. degree program include its versatile, experienced, multi-disciplinary full-time faculty; its group of qualified, expert, adjunct faculty; its mature, committed, and professional students; and a mission that enables CITE and its Engineering and Computer Science Division to serve the region's engineering community in a meaningful and necessary way.

The collective faculty—both full-time and adjunct—have many years of relevant work experience and are oriented toward application. They willingly travel throughout the region to deliver the program, and teach at times convenient to the students. They mentor the part-time faculty, and students feel that they teach useful courses extremely well.

M.S.E. students are a major strength of the program. Almost all the students are working in related fields, and many are using advanced technology and systems required to maintain the viability of their various enterprises. This greatly enriches the learning environment in the classroom – students share their experiences, insight and knowledge with class mates and also put substantial pressure on faculty to remain current and to be relevant in the classroom.

Another strength of CITE's M.S.E. program is location. The Advantage Valley corridor, which includes Charleston and

Huntington, includes a concentrated community of engineering professionals employed by the chemical/ manufacturing industry, consulting firms, and government agencies such as the Department of Transportation and Department of Environmental Protection. Most of these employers encourage life-long learning and career enhancement of their employees by providing tuition reimbursement and other support.

The flexibility of CITE and the M.S.E. program to meet students' needs is a strength identified frequently by students and employers. Within the framework of the required core courses, an engineering field concentration, and electives, plans of study can be tailored to meet the needs of individuals or groups of students. Class hours, class locations, and accessibility of facilities also serve CITE students well.

The weaknesses of the program are related primarily to the unique nature of the program's mission. Meeting the ever-changing demands of the regional engineering community can be a challenge, and faculty can easily become overwhelmed by non-teaching and non-research responsibility, such as setting up off-site programs and working to accommodate the particular, specific needs of part-time, employed students who often experience conflicts between course and work demands.

The current engineering job market has been very favorable for students, but has had the related effect of inflating adjunct salaries in engineering disciplines. However, because adjunct involvement is a crucial and popular component of the program, CITE will continue to attempt to obtain resources to support the increasing expense of adjuncts.

**B. VIABILITY** Provide a narrative summary for each of the following items in addition to requested appendices.

1. **Articulation Agreements:** None
2. **Off-Campus Classes:** None currently
3. **Online Courses:** There has been a continual increase in the number of courses offered online for the M.S.E. degree, particularly in the environmental and technology management courses that overlap or are shared with the M.S.E. degree courses. We expect that this trend will continue. See Appendix VI.
4. **Service Courses:** Generally, most of our M.S.E. graduate courses are open to any graduate student, either within or outside of the

college. We welcome them, as they often provide valuable cross-experience perspectives for our students.

5. **Program Course Enrollment:** See Appendix VI.
6. **Program Enrollment:** Enrollment has been relatively steady over the past five years at roughly an average of 21 M.S.E. students. This fall semester that number increased to 27 students.
7. **Enrollment Projections:** Enrollment has been flat at about 21 students. However, this fall the enrollment jumped to 27 students. We see more and more foreign students enrolling in the program.

### C. NECESSITY

1. **Advisory Committee:** The M.S.E. degree has an excellent advisory committee consisting of people from various engineering companies and organizations in our region. The advisory committee has been focused mainly on the ABET accreditation for the B.S. in Engineering degree for the past three years. Now that the B.S.E. degree has been accredited, we hope to use the committee more to help with the M.S.E. degree program.
2. **Graduates:** As shown in Appendix VIII, over 95% of our graduates are employed in their fields. We do not have salary data.
3. **Job Placement:** Again, over 96% of our students are placed in their fields. We believe that this is due mainly to the desirability of this major field, and the education that our students receive in the degree program.

### IV. RESOURCE DEVELOPMENT (If applicable)

Not applicable

## Appendix I Required/Elective Course Work in the Program

Degree Program: Master of Science in Engineering (M.S.E.) Person responsible for the report: Dr. Eldon R. Larsen

For the *Engineering Management* Area of Emphasis in the M.S.E. degree:

<b>Courses Required in Major (By Course Number and Title)</b>	<b>Total Required Hours</b>	<b>Area of Emphasis Required Courses (By Course Number and Title)</b>	<b>Elective Hours</b>	<b>Related Fields Courses Required</b>	<b>Total Related Hours</b>
EM 660 Project Management	3	EM 620 Management of Technical Human Resources and Orgs.	3	Two courses in the same area or in a related area approved by student's advisor	6
ENGR 610 Applied Statistics	3	EM 668 Operations Management	3		
TE 699 Comprehensive Project	3	EM 670 Seminar in Engineering Management	3		
		EM 675 Engineering Economics (or TM equivalent)	3		
		EM 694 Engineering Law	3		

For the *Environmental Engineering* Area of Emphasis in the M.S.E. degree:

<b>Courses Required in Major (By Course Number and Title)</b>	<b>Total Required Hours</b>	<b>Area of Emphasis Required Courses (By Course Number and Title)</b>	<b>Elective Hours</b>	<b>Related Fields Courses Required</b>	<b>Total Related Hours</b>
EM 660 Project Management	3	ES 614 Risk Assessment	3	Three elective courses in the same area or in a related area approved by student's advisor	9
ENGR 610 Applied Statistics	3	ENVE 681 Environmental Engineering Design	3		
TE 699 Comprehensive Project	3	ENVE 615 Environmental Chemistry	3		
		ES 660 Environmental. Law	3		

For the *Transportation and Infrastructure Engineering* Area of Emphasis in the M.S.E. degree:

<b>Courses Required in Major (By Course Number and Title)</b>	<b>Total Required Hours</b>	<b>Area of Emphasis Required Courses (By Course Number and Title)</b>	<b>Elective Hours</b>	<b>Related Fields Courses Required</b>	<b>Total Related Hours</b>
EM 660 Project Management	3	<u>Two of the following:</u> CE 612 Structural Steel Design and Behavior	3	Three elective courses in the same area or in a related area approved by student's advisor	9
ENGR 610 Applied Statistics	3	CE 614 Advanced Reinforced Concrete Structure Design and Behavior	3		
TE 699 Comprehensive Project	3	CE 616 Prestressed Concrete Design	3		
		CE 618 Bridge Engineering	3		
		<u>Two of the following:</u> CE 634 Traffic Engineering	3		
		CE 635 Evaluation of Transportation Systems	3		
		CE 636 Transportation Planning	3		
		CE 637 Highway Safety Engineering	3		

*Expand table as needed.*

Professional society that may have influenced the program offering and/or requirements: ASEM, WVSPE, PMI, AICHe, ASCE

(No more than two pages; Minimum type 8 point Arial)

## Appendix II Faculty Data Sheet

(Information for the period of this review)

Name: Betsy Ennis Dulin Rank: Professor

Status (Check one): Full-time  Part-time  Adjunct

Current MU Faculty: Yes  No

Highest Degree Earned: J.D. Date Degree Received: 1992

Conferred by: Washington & Lee University

Area of Specialization: Law

Professional Registration/Licensure PE – WV; Atty - OH & WV; USPTO - Patent Atty

Years non-teaching experience 8

Years of employment other than Marshall 9

Years of employment at Marshall 14

Years of employment in higher education 15

Years in service at Marshall during this period of review 4

### Courses Taught Past Two Years

Year/Semester	Alpha Des. & No.	Title	Enrollment
Fall 2007	EM694	Engineering Law	13

- 1) If your degree is not in your area of current assignment, please explain.
- 2) Activities that have enhanced your teaching and or research.
  - Partner, Environmental and Intellectual Property Groups, Bowles, Rice, McDavid Graff & Love, Charleston, WV
  - Associate Professor of Civil Engineering, West Virginia University Institute of Technology, Montgomery, WV
  - Assistant Professor of Engineering and Science, West Virginia Graduate College, South Charleston, WV
  - Attorney, Environmental and Public Finance Practice Groups, Squire Sanders & Dempsey, Cleveland, OH
  - Environmental Engineer, Woolpert Consultants, Dayton, OH
  - Environmental Engineer, CDM, Inc., Washington, D.C.
  - Consulting for various firms in the area of environmental engineering law.
  - Member of ASSE, ASCE, Tau Beta Pi
- 3) Discipline-related books/papers published (provide a full citation).
  - "Report of the Consortium for Undergraduate Research and Engineering, January 2008.
  - "Linking West Virginia's Centers of Research and Development Excellence," Views & Visions Magazine, Spring 2007.
  - "Development of State Water Quality Standards," Environmental Engineering Graduate Seminar, Via Department of Civil Engineering, Virginia Polytechnic Institute and State University, March 2007.
  - "Law and Politics: How Water Policy Affects the Energy Climate in West Virginia," featured speaker, Energy Colloquium, Huntington Chamber of Commerce, October 2006.

- “Developing an Institutional Culture to Support Residential Programs for High School Students Interested in Engineering,” Learning for Life Annual Conference, Orlando, FL October 2004.
  - “Sharpening the Focus: Legal Context of Engineering Ethics,” Journal of Professional Issues in Engineering Education and Practice, American Society of Civil Engineers, July 2003.
  - Anti-degradation Implementation Policy and TMDLs: Legal Background and Implications for Public Utilities,” Rural Water Association, September 2003.
  - “Delivering a Graduate Program in Engineering Management to Working Professionals Utilizing Distance Delivery Methods,” American Society of Engineering Education, June 2003 (with Larsen and Crocket).
  - “Science and Engineering Education: Building the Future Workforce,” West Virginia Experimental Program to Stimulate Competitive Research Annual Conference, May 2003.
- 4) Papers presented at state, regional, national, or international conferences.
- 5) Professional development activities, including professional organizations to which you belong and state, regional, national, and international conferences attended. List any panels on which you chaired or participated. List any offices you hold in professional organizations.
- Board of Directors, West Virginia American Water Company, 2006 to present.
  - Board of Directors, Mid-Atlantic Technology, Research and Innovation Center, 2004 to present
  - Board of Directors, Marshall University Research Corporation, 2005 to present
  - Member, Marshall University Council on Research Commercialization, 2004 to present
  - Board of Directors and Executive Committee, Chemical Alliance Zone, 2002 to present
  - Member, Vision Shared Energy and Environmental Committee , 2008 to present
  - Member, Water Environmental Federation
  - Member, American Society of Engineering Education
  - Member, American Intellectual Property Lawyers Association
  - ASEE, AIPLA, WEF
- 6) Externally funded research grants and contracts you received.
- 7) Awards/honors (including invitations to speak in your area of expertise) or special recognition
- Inducted into Academy of Distinguished Alumni, Via Department of Civil and Environmental Engineering, Virginia Polytechnic Institute and State University, April 2008.
  - Recipient of Spurgeon Award for Exceptional Engineering Outreach Efforts, Learning for Life’s highest national outreach award, presented in Dallas, Texas, March 2006.
  - Selected as one of twenty state “Young Guns” by West Virginia Executive Magazine, October 2003.
  - Graduate first in class of 130 at law school ranked nationally in top 20.
  - John W. Davis Prize for highest class average at Washington & Lee University School of Law
  - Twelve American Jurisprudence Awards, Washington & Lee University School of Law
  - Outstanding Senior Civil Engineer Award, WV Institute of Technology, 1985
  - Tau Beta Pi and Alpha Chi
- 8) Community service as defined in the *Greenbook*.

## Faculty Data Sheet

(for the period of this review: Summer 2005 to Summer 2010)

Name: Dr. Eldon R. Larsen Rank: Professor

Status (Check one): Full-time  Part-time  Adjunct  Current MU Faculty:  yes  no

Highest Degree Earned: Ph. D. Date Degree Received: Spring 1983

Conferred by: The University of California at Berkeley

Area of Specialization: Chemical Engineering

Professional Registration/Licensure: Project Management Professional Agency: Project Management Institute

Years non-teaching experience	16.5
Years of employment other than Marshall	16.5
Years of employment at Marshall	11
Years of employment in higher education	13.5
Years in service at Marshall during this period of review	5

List courses you taught during the final two years of this review. If you participated in a team-taught course, indicate each of them and what percentage of the course you taught. For each course include the year and semester taught, course number, course title and enrollment. (Expand the table as necessary)

Year/Semester	Alpha Des. & No.	Title	Enrollment
2010/Spring	TE 699	Comprehensive Project	4
2009/Fall	EM 660	Project Management	12
2009/Fall	EM 670	Seminar in Engineering Management	5
2009/Fall	TE 699	Comprehensive Project	1
2009/Summer	EM 620	Management of Technical Human Resources and Organizations	21
2009/Spring	EM 660	Project Management	20
2009/Spring	EM 668	Operations Management	5
2009/Spring	TE 699	Comprehensive Project	3
2009/Spring	ENGR 687	Independent Study	2
2008/Fall	EM 660	Project Management	17
2008/Fall	EM 670	Seminar in Engineering Management	6
2008/Fall	EM 661	Advanced Project Management	3
2008/Fall	TE 699	Comprehensive Project	1
2008/Summer	EM 620	Management of Technical Human Resources and Organizations	24
2008/Summer	TE 699	Comprehensive Project	2
2008/Spring	EM 660	Project Management	10
2008/Spring	EM 668	Operations Management	6
2008/Spring	TE 699	Comprehensive Project	3
2008/Spring	TM 699	Capstone Project	1
2007/Fall	EM 660	Project Management	8
2007/Fall	EM 670	Seminary in Engineering Management	4
2007/Fall	TE 699	Comprehensive Project	3
2007/Summer	EM 660	Project Management	9
2007/Summer	EM 620	Management of Technical Human Resources and Organizations	10
2007/Spring	EM 620	Management of Technical Human Resources and Organizations	8
2007/Spring	EM 660	Project Management	14
2007/Spring	IE 670	Operations Management	7
2007/Spring	TE 699	Comprehensive Project	2
2007/Spring	ENGR 687	Independent Study	1
2006/Fall	EM 650	Sp.Tp.: Advanced Project Management	4
2006/Fall	EM 660	Project Management	12
2006/Fall	TE 699	Comprehensive Project	1
2006/Summer	EM 660	Project Management	7
2006/Summer	EM 620	Management of Technical Human Resources and Organizations	13

**NOTE: Part-time adjunct faculty members do not need to fill in the remainder of this document.**

**1 If your degree is not in your area of current assignment, please explain.**

(For each of the following sections, list only events during the period of this review and begin with the most recent activities.)

**2 Activities that have enhanced your teaching and or research.**

- March 2010, AIChE Spring National Meeting
- November 2009, AIChE National Annual Meeting
- November 2008, AIChE National Annual Meeting
- November 2007, AIChE National Annual Meeting
- April 2007, AIChE Spring National Meeting
- November 2006, AIChE National Annual Meeting
- April 2006, AIChE Spring National Meeting

**3 Discipline-related books/papers published (provide a full citation).**

- Larsen, Eldon R., "Making the Team: Teams, Teamwork, and Teambuilding," *Chemical Engineering Progress*, American Institute of Chemical Engineers, New York, June 2010, pp. 41-45.
- Larsen, Eldon R. and Ryland W. Musick, Jr., "Getting to Win-Win," *Chemical Engineering Progress*, invited paper, September 2008, The American Institute of Chemical Engineers, New York, NY.

**4 Papers presented at state, regional, national, or international conferences.**

- Larsen, Eldon R., "T3: Teams, Teamwork, and Teambuilding," *Proceedings of the national AIChE 2010 Spring Meeting*, San Antonio, TX, March 22, 2010.
- Larsen, Eldon R., "Overview of the Project Management Process Groups and Knowledge Areas in the PMI PMBOK Guide, 4th Ed," *Proceedings of the 2009 AIChE National Meeting*, Nashville, TN, November 9, 2009.
- Larsen, Eldon R. and Ryland W. Musick, Jr., "Project Risk Management," *Proceedings of the national AIChE 2008 Annual Meeting*, Philadelphia, Pennsylvania, November 18, 2008.
- Larsen, Eldon R. and Ryland W. Musick, Jr., "Conflict Management," *Proceedings of the national AIChE 2007 Annual Meeting*, Salt Lake City, UT, November 6, 2007.
- Larsen, Eldon R., "Tutorial: Project Management Fundamentals," *Proceeding of the national AIChE 2007 Spring Meeting*, Houston, TX, April 25, 2007.
- Larsen, Eldon R., "Leadership—What is it? Can you do it?" *Proceedings of the national AIChE 2006 Spring National Meeting*, Orlando, FL, April 23-27, 2006.

**5 Professional development activities, including professional organizations to which you belong and state, regional, national, and international conferences attended. List any panels on which you chaired or participated. List any offices you hold in professional organizations.**

- 2009-Present, Director of the national Management Division of the American Institute of Chemical Engineers
- 2009-Present, Secretary of the Charleston Section of the American Institute of Chemical Engineers
- 2007, Past-Chair of the national Management Division of the American Institute of Chemical Engineers
- 2007/2008, Past Chair of the Charleston Section of the American Institute of Chemical Engineers
- 2006 Chair of the national Management Division of the American Institute of Chemical Engineers

**6 Externally funded research grants and contracts you received.**

**7 Awards/honors (including invitations to speak in your area of expertise) or special recognition.**

- Named the 2009-2011 Drinko Fellow at Marshall University
- Received M.U.'s *Distinguished Artist and Scholar's Award*, Senior Division, Spring 2009
- *Distinguished Service Award*, Charleston Section, AIChE, 5/2006
- I regularly receive requests to speak at local meetings of the AIChE section and PMI chapter (approximate yearly for each)
- *Outstanding Graduate Advisor of the Year Award*, Marshall University, 5/2004
- *The 2003 Outstanding Parents of the Year for the State of West Virginia*, with my wife, awarded by the Parents Day Coalition of West Virginia, a project of the American Family Coalition

**8 Community service as defined in the Greenbook.**

- Served the entire period of this report at chair of the M.U. Graduate Council
- Chaired CITE's Personnel Committee, and as such chaired the CITE Promotion and Tenure Committee
- Served on numerous other university and college committees
- 2008-Present, serving as Bishop (lay minister) of the Charleston First Ward of The Church of Jesus Christ of Latter-day Saints in Charleston, WV

## Faculty Data Sheet

(Information for the period of this review)

Name: Richard F. McCormick Rank: Professor

Status (Check one): Full-time  Part-time  Adjunct

Current MU Faculty: Yes  No

Highest Degree Earned: Ph.D. Date Degree Received: 1979

Conferred by: Virginia Polytechnic Institute and State University

Area of Specialization: Civil Engineering

Professional Registration/Licensure	<u>YES, WV PE &amp; WV PS</u>
Years non-teaching experience	<u>1.5</u>
Years of employment other than Marshall	<u>31</u>
Years of employment at Marshall	<u>8</u>
Years of employment in higher education	<u>37.5</u>
Years in service at Marshall during this period of review	<u>5</u>

### Courses Taught Past Two Years

Year/Semester	Alpha Des. & No.	Title	Enrollment
Fall 2008	ENVE615	Environmental Chemistry	14
Fall 2009	ENVE615	Environmental Chemistry	12
Spring 2010	ENVE617	Physiochemical Treatment of Water & Wastewater	6

- 1) If your degree is not in your area of current assignment, please explain.
- 2) Activities that have enhanced your teaching and or research—see #5.
- 3) Discipline-related books/papers published (provide a full citation)--none.
- 4) Papers presented at state, regional, national, or international conferences--none.
- 5) Professional development activities, including professional organizations to which you belong and state, regional, national, and international conferences attended. List any panels on which you chaired or participated. List any offices you hold in professional organizations—From January 2003 through December 2009, I have attended 46 seminars, workshops, and/or conferences to stay current in my field. From January 2003 through December 2009, I gave 34 presentations on various subjects including FE and PE review sessions, professionalism, ethics, ASCE, GPS and surveying. FE and PE review sessions have included fluid mechanics and hydraulics, water and wastewater treatment and surveying..
- 6) Externally funded research grants and contracts you received--none.
- 7) Awards/honors (including invitations to speak in your area of expertise) or special recognition--Have been invited speaker for over 32 presentations on various subjects as noted above.
- 8) Community service as defined in the *Greenbook*. Institutional service has included participating in several division, college and university wide committees including departmental curriculum, tenure and promotion, Yeager Scholar steering, Engineering Academy steering, and seven college search committees, among others. Community service has included serving as an unpaid consultant for my church on building renovation projects.

## Faculty Data Sheet

(Information for the period of this review)

Name: Andrew P. Nichols Rank: Assistant Professor

Status (Check one): Full-time  Part-time  Adjunct

Current MU Faculty: Yes  No

Highest Degree Earned: Ph.D. Date Degree Received: 2004

Conferred by: Purdue University

Area of Specialization: Civil Engineering (Traffic)

Professional Registration/Licensure YES, PE in WV and SC

Years non-teaching experience 0

Years of employment other than Marshall 3

Years of employment at Marshall 3

Years of employment in higher education 6

Years in service at Marshall during this period of review 3

### Courses Taught Past Two Years

Year/Semester	Alpha Des. & No.	Title	Enrollment
Spring 2009	CE634	Traffic Engineering	2

- 1) If your degree is not in your area of current assignment, please explain.
- 2) Activities that have enhanced your teaching and or research.

Active consultant in Traffic Engineering, including Professional Engineering registration in WV and SC.  
This allows me to bring more real-world experience to the classroom.

- 3) Discipline-related books/papers published (provide a full citation).

Nichols, A., D. Bullock. "Automatic Speed Calibration Methodology for Traffic Monitoring Sites," *ASCE J. Transportation Engr.* Volume 132, Issue 1, pp. 30-39, January 2006.

Nichols, A., M. Cetin. "Numerical Characterization of Gross Vehicle Weight Distributions from Weigh-in-Motion Data," *Transportation Research Record; Journal of the Transportation Research Board*, No. 1993, pp. 148-154.

Nichols, A., D. Bullock, W. Schneider. "Detecting Differential Drift in Weigh-in-Motion Wheel Track Sensors," *Transportation Research Record; Journal of the Transportation Research Board*, No. 2121, pp. 135-144, 2009.

Cetin, M. and A.P. Nichols. "Improving the Accuracy of Vehicle Reidentification Algorithms by Solving the Assignment Problem," *Transportation Research Record; Journal of the Transportation Research Board*, No. 2129, pp. 1-8, 2010.

Cetin, M., C. Monsere, A. Nichols. "Bayesian Models for Re-Identification of Trucks over Long Distances on Axle Measurement Data." *Journal of Intelligent Transportation Systems*. (accepted)

- 4) Papers presented at state, regional, national, or international conferences.

Nichols, A. "Evaluation of the Aldis Single Camera Intersection Detection System." Presentation at the ITS Tri-Chapter Information Exchange Summit, Gettysburg, PA, August 19, 2010.

Nichols, A. "Extracting Freight Corridor Performance from Weigh-in-Motion Data." Presentation at the National Rural Intelligent Transportation Systems Conference, Seaside, OR, August 25, 2009.

Nichols, A. "Environments For Fostering Effective Critical Thinking (EFFECT)." Presentation to the Transportation Education Conference, Portland, OR, June 20, 2009.

Nichols, A., D. Bullock, W. Schneider. "Detecting Differential Drift in Weigh-in-Motion Wheeltrack Sensors," Presentation to the 88th Annual Meeting of the Transportation Research Board, Washington D.C., January

11-15, 2009.

Monsere, C., and A. Nichols. "Building a WIM Data Archive for Improved Modeling, Design, and Rating." Presentation at the North American Travel and Monitoring Exposition and Conference (NATMEC), Washington, D.C., August 6, 2008.

- 5) Professional development activities, including professional organizations to which you belong and state, regional, national, and international conferences attended. List any panels on which you chaired or participated. List any offices you hold in professional organizations.

Member of American Society of Civil Engineers, Institute of Transportation Engineers, American Society of Engineering Education, ASTM, Transportation Research Board.

President, ASCE Huntington Branch, 2008-present

Secretary, TRB Committee on Highway Traffic Monitoring, 2004-08

Attend annual meetings of ASCE WV Section and Transportation Research Board.

- 6) Externally funded research grants and contracts you received.

"Exploratory Methods for Truck Re-identification in a Statewide Network Based on Axle Weight and Axle Spacing Data to Enhance Freight Metrics," \$100,000, Oregon Transportation Research and Education Consortium, October 2008, Role: Co-PI. (Complete)

"West Virginia Crash Summaries" \$25,000, West Virginia Department of Transportation, August 2008, Role: PI. (Active)

"Application of WIM Data for Improved Modeling, Design, and Rating" \$138,996, Oregon Transportation Research and Education Consortium, March 2008, Role: Co-PI. (Active)

"Intelligent Transportation Systems in WV – Evaluation, Needs Assessment, and Professional Capacity Building" \$1,250,000, West Virginia Department of Transportation. November 2007-12, Role: PI. (Active)

"Developing an Engineering Environment for Fostering Effective Critical Thinking (EFFECT) through Measurements," \$200,000, NSF-Course, Curriculum, Laboratory Improvement Program, January 2007, Role: Co-PI. (Complete)

"Signing For Preventing End of Queue Accidents", West Virginia Department of Transportation, \$180,000, Role: PI. (Active)

"WV 511 Feasibility Study" \$224,900, West Virginia Department of Transportation, March 2010, Role: PI. (Active)

- 7) Awards/honors (including invitations to speak in your area of expertise) or special recognition.

Invited to serve as one of 6 members of the Long Term Pavement Performance Expert Task Group on Traffic Data, 2010-present.

- 8) Community service as defined in the *Greenbook*.

## Faculty Data Sheet

(Information for the period of this review)

Name: Isaac W. Wait Rank: Assistant Professor

Status (Check one): Full-time  Part-time  Adjunct

Current MU Faculty: Yes  No

Highest Degree Earned: Ph.D. Date Degree Received: 2005

Conferred by: Purdue University

Area of Specialization: Civil Engineering

Professional Registration/Licensure	<u>PE, OH</u>
Years non-teaching experience	<u>1</u>
Years of employment other than Marshall	<u>5</u>
Years of employment at Marshall	<u>2</u>
Years of employment in higher education	<u>6</u>
Years in service at Marshall during this period of review	<u>2</u>

### Courses Taught Past Two Years

Year/Semester	Alpha Des. & No.	Title	Enrollment
Spring 2009	ENVE 616	Principles of Biological Waste Treatment	9

- 1) If your degree is not in your area of current assignment, please explain. Not applicable
- 2) Activities that have enhanced your teaching and or research.
  - Attendance at engineering education conferences as identified below.
  - Participated in Spring 2009 First Year Seminar training course offered by the Marshall University Center for Teaching and Learning.
  - Utilized and mentored three undergraduate research assistants
- 3) Discipline-related books/papers published.
 

Wait, I.W. and Blatchley III, E.R. (2010). "Model of radiation transmittance by inorganic fouling on ultraviolet reactor lamp sleeves." *Water Environment Research*, Accepted February 2010.

Wait, I.W. and Gressel, J.W. (2009). "Relationship between TOEFL score and academic success for international engineering students." *Journal of Engineering Education*, Vol. 98, No.4.

Wait, I.W. (2009). "Lamp Sleeve Fouling in Ultraviolet Disinfection Reactors: The Accumulation of Inorganic Foulants on Potable Water UV Reactor Lamp Sleeves: Composition, Rate, Effects, and Modeling." VDM Verlag Dr. Müller Publishing, ISBN-13: 978-3639120233.

Wait, I.W. (2008) "Multiple-barrier disinfection by chlorination and ultraviolet irradiation for desalinated drinking waters: chlorine photolysis and accelerated lamp sleeve fouling effects." *Water Env. Res.*, Vol. 80, No. 11, 2183-2188.
- 4) Papers presented at state, regional, national, or international conferences.
 

Wait, I.W. and Nichols, A.P. (2009) "Effect of a university-operated Intensive English Program (IEP) on engineering student academic success." (Invited) American Society of Engineering Education Global Colloquium on Engineering Education, October 12-15, 2009, Budapest, Hungary.

Wait, I.W. (2009) "Academic integrity at an American-style university abroad: student attitudes, awareness, and cheating frequency." (Invited) American Society of Engineering Education Global Colloquium on Engineering Education, October 12-15, 2009, Budapest, Hungary.

Wait, I.W. and Nichols, A.P. (2009) "Effect of a university-operated Intensive English Program (IEP) on engineering student academic success." American Society of Engineering Education Annual Conference and Exposition, June 14-17, 2009, Austin, Texas.

Wait, I.W. (2009) "Academic integrity at an American-style university abroad: student attitudes, awareness, and cheating frequency." American Society of Eng. Education Annual Conference and Exposition, June 14-17, 2009, Austin, Texas.

Fonseca, A.C., Singh, I., Wait, I.W. (2008) "Pilot-scale fouling study using MP and LPHO UV systems." *American Water Works Association Water Quality Technology Conference*, November 16-20, 2008, Cincinnati, Ohio.

Wait, I.W. (2008) "Changing perceptions: water quality and demand in the United Arab Emirates." *International Water Resource Association World Water Congress*, September 1-4, 2008, Montpellier, France.

- 5) Professional development activities, including professional organizations to which you belong and state, regional, national, and international conferences attended. List any panels on which you chaired or participated. List any offices you hold in professional organizations.
  - Attended and presented at the 2009 ASEE Global Colloquium and 2009 ASEE Annual Conference
  - Secretary of the Tractive Force Implementation Committee, American Society of Civil Engineers
  - Member: Engineers Without Borders, American Society of Civil Engineers, American Society of for Engineering Education, Association of Environmental Engineering and Science Professors, Environmental Water Resources Institute, International Water Resources Association.
- 6) Externally funded research grants and contracts you received.
  - National Science Foundation, \$110,000, *Collaborative Research: Implementing and Assessing Strategies for Environments for Fostering Effective Critical Thinking (EFFECTs) Development and Implementation*
- 7) Awards/honors (including invitations to speak in your area of expertise) or special recognition
  - None
- 8) Community service as defined in the *Greenbook*.
  - Assisted with Marshall University's MS4 stormwater management plan – BMP 1b

## Faculty Data Sheet

(Information for the period of this review)

Name: Wael Zatar Rank: Professor

Status (Check one): Full-time  Part-time  Adjunct

Current MU Faculty: Yes  No

Highest Degree Earned: Ph.D. Date Degree Received: 1999

Conferred by: Saitama University, Japan

Area of Specialization: Civil Engineering (Structures)

Professional Registration/Licensure

EIT Oregon State

Years non-teaching experience

6

Years of employment other than Marshall

9

Years of employment at Marshall

5

Years of employment in higher education

14

Years in service at Marshall during this period of review

5

### Courses Taught Past Two Years

Year/Semester	Alpha Des. & No.	Title	Enrollment
Spring 2009	CE614	Adv. Reinforced Concrete	4
Spring 2010	CE616	Pre-stressed Concrete Design	6

4) If your degree is not in your area of current assignment, please explain. (It is in my area)

5) Activities that have enhanced your teaching and or research.

#### National Committee Membership

Member of the following Precast/Prestressed Concrete Institute (PCI) Committees:

- a) Student Education    b) Educational Activities    c) Building Code    d) Sustainability
  - e) Bridge    f) Seismic Design Sub-Committee    g) Fiber Reinforced Polymer Composites
  - h) Research (Associate Member)    i) Ad-Hoc Committee for PCI-EAC Task Group on ASCE Policy 465
- Member, Faculty Network Committee E-803, American Concrete Institute (ACI)  
 Member, Historical Preservation Committee, ASCE West Virginia Section  
 Member, Structural Fiber Reinforced Polymer (FRP) *Transportation Research Board (TRB)*  
 Member, Properties of Concrete – AFN-20 Committee, *TRB*  
 Committee Friend, Dynamics and Field Testing of Bridges - AFF-40 Committee, *TRB*

3) Discipline-related books/papers published (provide a full citation).

#### **Journal and Peer Reviewed Papers**

- a) *“Bridge Embankments: Part I – Seismic Risk Assessment and Ranking”*, ASCE Journal of Performance of Constructed Facilities, June 2008.
- b) *“Bridge Embankments: Part II – Seismic Risk for I-24 in Kentucky”*, ASCE Journal of Performance of Constructed Facilities, June 2008.
- c) *“Upgrading of Ductility and Shear Capacity of Girders of Highway Bridge Reinforced Concrete Bents”*, International Journal of Bridge Structures, August 2009.
- d) *“Seismic Risk, Rating, and Assessment for Bridges along I-24 in Western Kentucky”*, the 86<sup>th</sup> Transportation Research Board (TRB), January 2007.
- e) *“Sub-Structured Pseudo-Dynamic and Statically Reversed Cyclic Loading Tests of Prestressed Concrete Viaduct Structures”*, Transportation Research Board, 2006.
- f) *“Seismic Vulnerability of Highway Bridge Embankments”*, Transportation Research Board, 2006.

4) Papers presented at state, regional, national, or international conferences.

- a) "Seismic Risk Assessment of Priority Bridges along I-24 in Western Kentucky", Proceedings of the 6<sup>th</sup> National Seismic Conference (6NSC), Charleston, SC, July 27-30, 2008.
  - b) "Ductile Behavior of Reinforced Concrete Bridges Retrofitted with FRP", NSF International Workshop on the Use of FRP for Sustainable Structures, Cairo, Egypt, May 2008.
  - c) "Ductility Enhancement of Bridge Bents with Continuous Fiber Reinforced Polymer Sheets", 5<sup>th</sup> Middle East Symposium on Structural Composites for Infrastructure Applications, Egypt, 2008.
- 5) Professional development activities, including professional organizations to which you belong and state, regional, national, and international conferences attended. List any panels on which you chaired or participated. List any offices you hold in professional organizations.

**Professional Memberships**

- a) Member, American Society of Civil Engineers (ASCE), National/state (Serves as VP for WV ASCE)
  - b) Affiliate Member, Transportation Research Board (TRB), the National Academics
  - c) Member, American Concrete Institute (ACI)
  - d) Member, Precast/Prestressed Concrete Institute (PCI), both National and Central Region
  - e) Member, American Institute of Steel Construction (AISC)
  - f) Member, Post Tensioning Institute (PTI)
  - g) Fellow, Japan Society for the Promotion of Sciences (JSPS)
- 6) Externally funded research grants and contracts you received.
- Participated in a multi-disciplinary team from WVU and Marshall University to initiate "Center for Transportation Security and Infrastructure Innovations- Trans- $I^2$ ", Research Challenge Grant, WV EPSCoR, 2007-2012, \$1,500,000.
  - PI, "Manual for Assessing the Service Life of Corrosion-Deteriorated Reinforced Concrete Members in Highway Bridges in West Virginia", FHWA/WVDOH, 2007-2010, \$285,000.
  - PI, "Effect of Repeated Heat-Straightening on Behavior of Impacted Highway Bridge Steel Girders", FHWA & WVDOH, 2006-2008, \$120,000.
- 7) Awards/honors (including invitations to speak in your area of expertise) or special recognition

**Honors and Awards:**

- Received the 2009 National Precast/Prestressed concrete Institute (PCI) Distinguished Young Educator Achievement Award
- Nominated for the 2009 Marshall University DASA Award
- Nominated twice for the PCI Distinguished Young Educator Achievement Award, 2007 & 2008
- Leadership PCI Certificate, October 2006

**National Appointments**

- a) Appointed in the Expert Task Group for the Strategic Highway Research Program 2 (SHRP2) of the Transportation Research Board (TRB), the National Academics, 2008.
  - b) Appointed in the Expert Task Group for the SHRP2, R06-G "High Speed Non-destructive Testing Methods for Mapping Voids, Bonding, and Moisture Behind or Within Tunnel Linings," 2009.
  - c) Delegate, NSF Int'l Workshop on the Use of FRP for Sustainable Structures, Cairo, Egypt, 2008.
  - d) Editorial Review Board and Publication Review Committee, ASCE Journal of Constructed Facilities, 2007.
- 8) Community service as defined in the *Greenbook*.

## Faculty Data Sheet

(Information for the period of this review)

Name: Sam Harsh Rank: NA

Status (Check one): Full-time  Part-time  Adjunct

Current MU Faculty: Yes  No

Highest Degree Earned: Ph.D. Date Degree Received: 1989

Conferred by: Purdue

Area of Specialization: University of Kansas

Professional Registration/Licensure PE, WV & KY

Years non-teaching experience 36

Years of employment other than Marshall 36

Years of employment at Marshall 2

Years of employment in higher education 9

Years in service at Marshall during this period of review 2

### Courses Taught Past Two Years

Year/Semester	Alpha Des. & No.	Title	Enrollment
Fall 2009	CE612	Adv. Steel Design	5

## Appendix IIa Teaching Assistant Data Sheet

GTA Name	Course No. (e.g. 101)	Course Name	Year 1 20__ - 20__			Year 2 20__ - 20__			Year 3 20__ - 20__			Year 4 20__ -20__			Year 5 20__ -20__		
			Su	Fa	Sp	Su	Fa	Sp	Su	Fa	Sp	Su	Fa	Sp	Su	Fa	Sp
<b>WE HAVE HAD NO TAs</b>																	

Complete graduate teaching assistant's name; course number and course name taught; indicate enrollment in the semesters taught.

*Expand table as needed.*

**Appendix III**  
**Students' Entrance Abilities (Graduate Programs)**

<b>Year</b>	<b>N</b>	<b>Mean Undergraduate GPA</b>	<b>Mean GRE Verbal</b>	<b>Mean GRE Quantitative</b>	<b>Mean GRE Analytical Writing</b>	<b>GMAT Mean</b>	<b>Miller Analogies Mean</b>
2005	13	3.01	520	670			
2006	4	2.77	480	713.3			
2007	6	2.89	483.3	636.7			
2008	5	3.07	356.7	686.7			
2009	4	2.97	290	733.3			

*Expand table as needed.*

**Appendix IV**  
**Students' Exit Abilities (Graduate Programs)**

<b>Year</b>	<b>N</b>	<b>Mean GPA</b>	<b>Licensure Exam Results</b>	<b>Certification Test Results</b>	<b>Other Standardized Exam Results</b>
2005	13	3.78	None	None	None
2006	4	3.91	None	None	None
2007	6	3.76	None	None	None
2008	5	3.87	None	None	None
2009	4	3.77	None	None	None

*Expand table as needed.*

**Appendix V**  
**Assessment Summary**  
**Marshall University**  
**Assessment of the Program's Student Learning Outcomes**  
5 year summary

**Master of Science in Engineering; Engineering Management Area of Emphasis**

Program's Student Learning Outcomes	Assessment Measures (Tools)	Benchmarks	Results	Analysis/ Planned Actions
1. The student will demonstrate competence in planning technical projects through application of project management principles and tools.	1.A. Final team project in EM 660 (Project Management)	1.A. The students will achieve a mean score (a combined individual and team score) on the final team project report of at least 90%	1.A. Thirteen out of eighteen students received scores above 90%. The remaining five students received scores above 84%. The overall average score for all of the students was 94.5%.	1.A. Because roughly one fourth of the students scored between 84-90%, we will work to make final team project expectations clearer and strive to insure the students have adequate feedback on their progress.
	1.B. The student will plan and execute a comprehensive project	1.B. Each student will demonstrate comprehensive project planning effectiveness by passing the TE 699 Comprehensive Project course.	1.B. All M.S.E. graduating students achieved this level of performance.	1.B. Continue to assess how we can continually improve the TE 699 Comprehensive Project experience for the student.

Program's Student Learning Outcomes	Assessment Measures (Tools)	Benchmarks	Results	Analysis/ Planned Actions
<p>2. 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 engineering situations.</p>	<p>2.A. Five written essay assignments in EM 660 (Project Management) that deal with interactions with people while working on projects</p> <p>2.B. Through team member evaluations of each other on the final team project in EM 660</p> <p>2.C. Final individual project for EM 620, which presents heavily challenging people and individual situations.</p>	<p>2.A. Students will average at least 90% on the five application-oriented people-focused essay assignments.</p> <p>2.B. Students will average at least 90% approval rating by fellow team members on how each student performed in a team environment working toward achieving project objectives</p> <p>2.C. Students will average at least 90% on this very difficult and extensive project.</p>	<p>2.A. Only two out of nineteen students had an average score lower than 90% on the five application-oriented people-focused essay assignments. The overall average of all students combined was greater than 90%.</p> <p>2.B. Out of eighteen students, all performed above the 90% approval rating. In fact, the average approval rating of each student by his/her peers was 98.3%! This would indicate a very high level of both understanding and application of people-interaction principles in a project environment.</p> <p>2.C. Twenty-three out of twenty-four students scored at 90% or higher.</p>	<p>2.A. Continue to work on helping the students to have assignments that require them to apply the principles of working with people in technical situations.</p> <p>2.B. Continue to use the techniques, methods, and principles we are using for this very important quality for success.</p> <p>2.C. Continue to use this difficult self-evaluation and people-interaction exercise to reach this learning outcome.</p>

Program's Student Learning Outcomes	Assessment Measures (Tools)	Benchmarks	Results	Analysis/ Planned Actions
3. The student will demonstrate the ability to apply the basic tools and concepts related to operations management.	3.A. Three application-oriented exams in EM 668 Operations Management.	3.A. Students will average at least 90% on the three application-oriented exams.	3.A. The average overall score for the three exams was 90.4% for the six students who took the exams. However, three of the six students had average scores below 90.4%. These three students each had average scores of 85.6%, 87.4%, and 89.4%. The other three students had average scores of 91.8%, 93.0%, and 95.5%.	3.A. We would like to have higher average exam scores for our engineering students on these operations management exams. To this end, the instructor will focus greater efforts on application-oriented instruction and assignments in order to increase the ability of the students to apply operations management concepts and tools.
4. The student will demonstrate the ability to evaluate a company's financial status.	4.A. TM612/EM 675 – Economic & Financial Analysis assignments, Exam 1 questions, and the Final Project require financial analysis and evaluation of Case Study and real-world companies.	4.A. TM612/EM 675 homework, Exam 1, and the Final Project demonstrate quantifiable knowledge for this Learning Outcome. A Final Report rubrics total of 90% is targeted.	4.A. Homework, Exam 1 and the Final Project support this Outcome for the two semesters it has been in place and the results recorded. Results, however, have not been formally tracked.	Will standardize type of financial analysis questions on Exam 1, implement rubrics for the Final Project, and develop a spreadsheet to track results beginning Spring 2009.

Program's Student Learning Outcomes	Assessment Measures (Tools)	Benchmarks	Results	Analysis/ Planned Actions
5. The student will demonstrate the ability to weigh the cost/benefit of technology decisions.	5.A. TM612/EM 675 – Economic and Financial Analysis assignments and Exam 2 are cost/benefit financial analysis exercises.	5.A. TM612/EM 675 homework assignments and Exam 2 require utilization of time value of money (cost/benefit). A 90% score is targeted.	5.A. In 2006, 40% of the students earned less than 90% on Exam 2. In 2008, 47% earned less than 90%. (no data available for 2007).	5.A. Review and compare Exam 2 questions to assure consistency in testing and measurement. Begin tracking student Exam scores.

Program's Student Learning Outcomes	Assessment Measures (Tools)	Benchmarks	Results	Analysis/ Planned Actions
<p>6. The student will demonstrate the ability to communicate effectively, through written assignments and through public speaking presentations.</p>	<p>6.A. Fifteen written essay assignments in EM 620 (Management of Technical Human Resources, including an additional final comprehensive written personal project.</p> <p>6.B. Written and orally presented Comprehensive Project Report for TE 699 (Comprehensive Project).</p> <p>6.C. Public speaking assignments in EM 620 Seminar in Engineering Management.</p>	<p>6.A. Students will average at least 90% on all written assignments in EM 620.</p> <p>6.B. Students will receive a passing grade on the written and orally presented Comprehensive Project Report for TE 699.</p> <p>6.C. Students will average at least 95% on these presentations.</p>	<p>6.A. Out of 24 students, 21 received overall scores above 90% on the fifteen written assignments.</p> <p>6.B. All students who completed TE 699 received passing grades.</p> <p>6.C. All students received averages above 95%.</p>	<p>6.A. This result is satisfying and we will continue to emphasize good writing skills through these assignments.</p> <p>6.B. This outcome is somewhat subjective in nature. We will look into what possibilities there might be to make this outcome evaluation more objective through rubric development.</p> <p>6.C. The rubric for determining the grading is somewhat subjective; will try to increase objectivity.</p>

Program's Student Learning Outcomes	Assessment Measures (Tools)	Benchmarks	Results	Analysis/ Planned Actions
<p>7. The student will demonstrate awareness and understanding of professional, ethical, and legal responsibilities.</p>	<p>7.A. Performance in</p> <ul style="list-style-type: none"> <li>• EM 620 (Management of Technical Human Resources and Organizations),</li> <li>• EM 660 (Project Management), and</li> <li>• EM 694 (Engineering Law).</li> </ul> <p>7.B. Professional licensure and/or certification; and employer feedback</p>	<p>7.A. Abilities to adequately demonstrate professional understanding and conduct as observed by faculty and fellow students; and through exams.</p> <p>7.B. Professional Engineering Licensure; Project Management Professional Certification</p>	<p>7.A. Students appear to understand the concepts and principles. This is both subjective and objective through the assignments and exams and the classroom discussions in EM 620, EM 660, and EM 694.</p> <p>7.B. Many of our students are already licensed Professional Engineers. Observation and employer feedback through focus groups has indicated that our students understand and apply these concepts—this is subjective.</p>	<p>7.A. Continued emphasis on these important topics. We will attempt to develop more objective measures and rubrics for these important topics.</p> <p>7.B. We will continue to ask for feedback from our Engineering Advisory Board</p>

Program's Student Learning Outcomes	Assessment Measures (Tools)	Benchmarks	Results	Analysis/ Planned Actions
8. The student will apply statistical analysis concepts appropriately	8.A. Assignments in courses which require statistical analysis  8.B. When needed in the TE 699 course (Comprehensive Project)	8.A. Students should demonstrate appropriate use of applied statistics in coursework  8.B. Use ENGR 610 material appropriately as needed	8.A. Subjectively, the students do this in their engineering courses. Objectively they do it in ENGR 610 assignments.  8.B. Subjectively, the students do this. Objectively they do it to pass TE699, as needed.	8.A. Continue to observe and monitor the use of correct applied statistics concepts, tools, and principles in engineering coursework  8.B. Continue to observe and monitor and look for areas in which student learning needs to be better.

## Master of Science in Engineering; Environmental Engineering Area of Emphasis

Program's Student Learning Outcomes	Assessment Measures (Tools)	Benchmarks	Results	Analysis/ Planned Actions
1. The student will demonstrate competence in planning technical projects through application of project management principles and tools.	1.A. Final team project in EM 660 (Project Management)	1.A. The students will achieve a mean score (a combined individual and team score) on the final team project report of at least 90%	1.A. Twenty-six out of thirty-eight students received scores above 90%. The remaining twelve students received scores above 79%.	1.A. Because roughly one third of the students scored between 79-90%, we will work to make final team project expectations clearer and strive to insure the students have adequate feedback on their progress.
	1.B. The student will plan and execute a comprehensive project	1.B. Each student will demonstrate comprehensive project planning effectiveness by passing the TE 699 Comprehensive Project course.	1.B. All M.S.E. graduating students who completed their projects achieved this level of performance.	1.B. Continue to assess how we can continually improve the TE 699 Comprehensive Project experience for the student.

Program's Student Learning Outcomes	Assessment Measures (Tools)	Benchmarks	Results	Analysis/ Planned Actions
<p>2. 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 engineering situations.</p>	<p>2.A. Five written essay assignments in EM 660 (Project Management) that deal with interactions with people while working on projects</p> <p>2.B. Through team member evaluations of each other on the final team project in EM 660</p>	<p>2.A. Students will average at least 90% on the five application-oriented people-focused essay assignments.</p> <p>2.B. Students will average at least 90% approval rating by fellow team members on how each student performed in a team environment working toward achieving project objectives</p>	<p>2.A. Only three out of thirty-eight students had an average score lower than 90% on the five application-oriented people-focused essay assignments. The overall average of all students combined was greater than 90%.</p> <p>2.B. Out of eighteen students, all performed above the 90% approval rating. In fact, the average approval rating of each student by his/her peers was 97%! This would indicate a very high level of both understanding and application of people-interaction principles in a project environment.</p>	<p>2.A. Continue to work on helping the students to have assignments that require them to apply the principles of working with people in technical situations.</p> <p>2.B. Continue to use the techniques, methods, and principles we are using for this very important quality for success.</p>

Program's Student Learning Outcomes	Assessment Measures (Tools)	Benchmarks	Results	Analysis/ Planned Actions
3. The student will demonstrate the ability to apply the basic tools and concepts related to environmental chemistry.	3. A. Three hourly exams, 11 homework assignments, 9 laboratory experiments, and 2 lab exams in ENVE 615 Environmental Chemistry	3. A. Students will average at least 80% for the course.	3. A. The average overall score for the course was 87.2%. No individual MSE student averaged less than 80% for the course. This outcome was met.	3. A. This course is open to both MSE and Masters in Environmental Science students. Engineering students tend to do well in the class as well as the ES students who have a chemistry background. Planned actions include no drastic changes in the course at this time; however, a student assessment of course outcomes will be added for Fall 2009.

Program's Student Learning Outcomes	Assessment Measures (Tools)	Benchmarks	Results	Analysis/ Planned Actions
4. The student will demonstrate the ability to apply the basic tools and concepts related to risk assessment.	4.A 2 take-home exams, 8 homework assignments and 4 quizzes in ES 614, Environmental Risk Assessment	4.A Students will average at least 80% for the course.	No individual in ES or MSE has scored below 80% for the last 2 years the course has been taught. Outcome goal met.	The course is required in the ES and ENVE program, and has been successfully offered as an on-line course and more traditionally as a "live" course. Students from other programs and colleges also take the course. Most students tend to do well in the course as it is a foundation of their general interest in the field and critical in so many aspects of the profession. Other than delivery methods and outcome assessment, no major changes are anticipated for the course.
5. The student will demonstrate the ability to apply the basic tools and concepts related to environmental law.	Not yet developed.	Not yet developed	Not yet developed	We will work on this outcome, as it is not yet sufficiently developed.

Program's Student Learning Outcomes	Assessment Measures (Tools)	Benchmarks	Results	Analysis/ Planned Actions
<p>6. The student will demonstrate the ability to communicate effectively, through written assignments and through public speaking presentations.</p>	<p>6.A. Fifteen written essay assignments in EM 620 (Management of Technical Human Resources, including an additional final comprehensive written personal project.</p> <p>6.B. Written and orally presented Comprehensive Project Report for TE 699 (Comprehensive Project).</p> <p>6.C. Public speaking assignments in EM 620 Seminar in Engineering Management.</p>	<p>6.A. Students will average at least 90% on all written assignments in EM 620.</p> <p>6.B. Students will receive a passing grade on the written and orally presented Comprehensive Project Report for TE 699.</p> <p>6.C. Students will average at least 95% on these presentations.</p>	<p>6.A. Out of 24 students, 21 received overall scores above 90% on the fifteen written assignments.</p> <p>6.B. All students who completed TE 699 received passing grades.</p> <p>6.C. All students received averages above 95%.</p>	<p>6.A. This results is satisfying and we will continue to emphasize good writing skills through these assignments.</p> <p>6.B. This outcome is somewhat subjective in nature. We will look into what possibilities there might be to make this outcome evaluation more objective through rubric development.</p> <p>6.C. The rubric for determining the grading is somewhat subjective; will try to increase objectivity.</p>

Program's Student Learning Outcomes	Assessment Measures (Tools)	Benchmarks	Results	Analysis/ Planned Actions
7. The student will demonstrate awareness and understanding of professional, ethical, and legal responsibilities.	<p>7.A. Performance in</p> <ul style="list-style-type: none"> <li>• EM 620 (Management of Technical Human Resources and Organizations),</li> <li>• EM 660 (Project Management), and</li> <li>• EM 694 (Eng. Law).</li> </ul> <p>7.B. Professional licensure and/or certification; and employer feedback</p>	<p>7.A. Abilities to adequately demonstrate professional understanding and conduct as observed by faculty and fellow students; and through exams.</p> <p>7.B. Professional Engineering Licensure; Project Management Professional Certification</p>	<p>7.A. Students appear to understand the concepts and principles. This is both subjective and objective through the assignments and exams and the classroom discussions in EM 620, EM 660, and EM 694.</p> <p>7.B. Many of our students are already licensed Professional Engineers. Observation and employer feedback through focus groups has indicated that our students understand and apply these concepts—this is subjective.</p>	<p>7.A. Continued emphasis on these important topics. We will attempt to develop more objective measures and rubrics for these important topics.</p> <p>7.B. We will continue to ask for feedback from our Engineering Advisory Board</p>

Program's Student Learning Outcomes	Assessment Measures (Tools)	Benchmarks	Results	Analysis/ Planned Actions
8. The student will apply statistical analysis concepts appropriately	<p>8.A. Assignments in courses which require statistical analysis</p> <p>8.B. When needed in the TE 699 course (Comprehensive Project)</p>	<p>8.A. Students should demonstrate appropriate use of applied statistics in coursework</p> <p>8.B. Use ENGR 610 material appropriately as needed</p>	<p>8.A. Subjectively, the students do this in their engineering courses. Objectively they do it in ENGR 610 assignments.</p> <p>8.B. Subjectively, the students do this. Objectively they do it to pass TE699, as needed.</p>	<p>8.A. Continue to observe and monitor the use of correct applied statistics concepts, tools, and principles in engineering coursework</p> <p>8.B. Continue to observe an monitor and look for areas in which student learning needs to be better.</p>



Course Number	Course Name	Required/ Elective/ Service	Delivery Method	Location	Year 1 2005-2006			Year 2 2006-2007			Year 3 2007-2008			Year 4 2008-2009			Year 5 2009-2010		
					Su	Fa	Sp	Su	Fa	Sp	Su	Fa	Sp	Su	Fa	Sp	Su	Fa	Sp
ENVE 612	Air Pollution Design II: Control of Particulate Emissions	E, S																	
ENVE 615	Environmental Chemistry	R, E, S			4	12			6			20			14			12	
ENVE 616	Principles of Biological Waste Treatment	E, S								3						5			
ENVE 617	Physiochemical Treatment of Water and Wastewater	E, S								7								6	
ENVE 625	Hazardous Waste Management	E, S					8					5			6				
ENVE 650	Sp.Tp.	E, S												5					
ENVE 670	Hydrology and Drainage Control	E, S																	
ENVE 680	Air Pollutant Dispersion and Meteorological Modeling	E, S																	
ENVE 681	Environmental Engineering Design	R, E, S							2									6	
ENVE 682	Environmental Remediation Technologies	E, S				4					3								
ENVE 683	Environmental Geotechnology	E, S									8								
ES 604	Air Pollution	E, S	Td, H						13					12				13	





## Appendix VII Program Enrollment

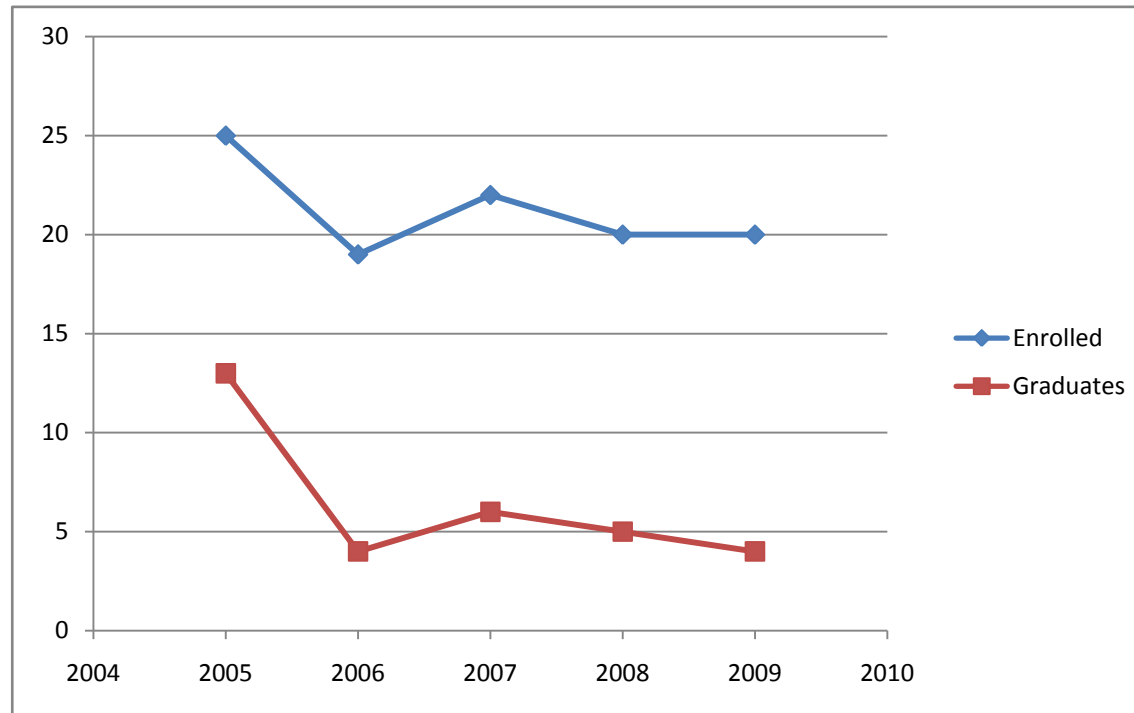
Students	Year 1 2005-2006	Year 2 2006-2007	Year 3 2007-2008	Year 4 2008-2009	Year 5 2009-2010
New Students Admitted	9	7	11	9	9
Principal Majors Enrolled Area of Emphasis 1 (Engineering Mgmt):	13	13	14	9	8
Principal Majors Enrolled Area of Emphasis 2 (Environ. Engr):	8	4	8	9	7
Principal Majors Enrolled Area of Emphasis 3 (Trans. & Infra. Engr):	NA	NA	NA	1	3
Principal Majors Enrolled Additional Areas of Emphasis	4	2	0	1	2
Minors***	0	0	0	0	0
<b>Grand Total of Students Enrolled in the Program</b>	25	19	22	20	20
<b>Graduates of the program</b>	13	4	6	5	4

\*If known. This information is not completely accurate at this time, as students often do not declare a second major until the junior evaluation or the student has her/his primary major in another college.

\*\*On occasion you may have a student enrolled in your program who is declaring your program as a 3<sup>rd</sup> major.

\*\*\*If known. This information is not completely accurate at this time, as students often do not declare minors until the junior evaluation or senior application for graduation.

Figure 1. Trend Line for total Enrollment and Program Graduates



**Appendix VIII  
Job and Graduate School Placement Rates**

<b>Year</b>	<b># of graduates employed in major field</b>	<b># of graduates employed in related fields</b>	<b># of graduates employed outside field</b>	<b># of graduates accepted to further graduate study</b>	<b># of graduates not accounted for</b>
2005-2006	13	0	0	0	0
2006-2007	4	0	0	0	0
2007-2008	6	0	0	0	0
2008-2009	4	0	1	1	0
2009-2010	4	0	0	1	0
Five –Year Total	31 (96%)	0	1	2	0

# Assessment Letters



www.marshall.edu

Office of Assessment & Program Review

April 5, 2010

Dr. Eldon Larsen, Program Coordinator  
MSE  
CITE

Dear Eldon:

I have completed my evaluation of the MSE (Engineering)'s assessment of student learning. This letter will provide my general comments and suggestions for improvement. Although the scoring rubric we used to evaluate assessment reports is attached, I will not include numerical ratings in this letter. The reason for this is that the rubric is still relatively new and, as you will see, it raises the bar for what is considered excellent assessment. However, I ask that you use it for formative purposes to help improve your assessment plan. We also would appreciate your comments concerning this rubric.

Overall, this is a nice assessment report. I have just a few suggestions for improvement. Although your learning outcomes are arguably measurable (e.g. demonstrate), I still recommend that you think more about what students are doing to demonstrate competencies. For example, for outcome 2, what do students do in team projects to demonstrate understanding? Do they explain, analyze, evaluate? All evaluations are appropriate and complementary, but I encourage you to use less holistic benchmarks. Rather than a benchmark of students averaging at least 90% on assignments, what about a benchmark that calls for students to achieve at the level of "meets expectations" on each primary trait in a scoring rubric for each project? This will give you more detailed information to inform improvement. I would be happy to meet with you again to begin the process of developing rubrics if you have not already done this.

Please see the attached rubric. If you have questions or concerns, please let me know.

Sincerely,

*Mary E. Reynolds*

Mary E. Reynolds  
Director of Academic Assessment

C: Dr. Betsy Dulin, Dean, CITE  
Dr. Bill Pierson, Chair, Engineering and Computer Science



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Office of Assessment & Program Review

April 5, 2009

Dr. Eldon Larsen, Program Coordinator  
MSE (Engineering)  
CITE

Dear Eldon:

The Graduate Council and I have completed our evaluation of the MSE (Engineering)'s assessment of student learning. This letter will provide my general comments and suggestions for improvement. Although the scoring rubric we used to evaluate assessment reports is attached, I will not include numerical ratings in this letter. The reason for this is that we used the attached rubric for the first time this year and, as you will see, it has changed considerably from the ones used in previous years. It raises the bar for what is considered excellent assessment considerably and, since it was not shared with programs before this assessment cycle, I'm not comfortable using it to give programs a formal rating this year. However, I ask that you use it for formative purposes to help improve your assessment plan. We also would appreciate your comments concerning this new rubric.

This is an excellent assessment report that shows careful planning, attention to detail, and the use of data to inform program improvement. My only comment for improvement would be to use analytic assessment rubrics rather than overall project grades for assessment. For example, when planning a technical project, I assume the evaluation looks at several areas, e.g. choosing the project, designing the project, choosing the appropriate instruments and tools, etc. The rubric would allow you to determine if students have particular strengths and weaknesses in the various components of the outcome. However, I know that developing these types of assessment rubrics is time consuming and I think you have done an outstanding job with this report!

Please see the attached rubric and letter to Deans, Chairs, and Faculty detailing general suggestions for an effective assessment program. If you have questions or concerns, please let me know.

Sincerely,

*Mary E. Reynolds*

Mary E. Reynolds  
Director of Academic Assessment

C: Dr. Betsy Dulin, Dean, CITE



Office of Assessment & Program Review

April 1, 2008

Dr. William Pierson, Chair  
 Engineering and Computer Science  
 Dr. Eldon Larsen, Program Coordinator  
 MSE Program

Dear Bill and Eldon,

The Graduate Council and I have completed our evaluation of the annual program assessment report for the MSE (Engineering). This letter will provide feedback in the following manner. First, I will comment generally on each section of your report. Second, I will rate the following areas of the report on a four point scale (0 – 3, with 3 being the highest rating): student learning outcomes, assessment measures, and the feedback loop. Although I considered feedback from committee members, I made the final decision on ratings for all reports submitted. Third, I will offer suggestions for your consideration as you plan your assessment for the 2008-2009 academic year. Fourth, I will include my evaluation using the Primary Traits Analysis rubric and will include reviewers' comments for your information.

#### General Comments

Your program goals are appropriate and nicely articulated. In some cases, student learning outcomes are measurable, in other cases, I'd suggest greater specificity. For example, the first outcome states that, "Students meet academic standards and achieve acceptable levels of technical competence." What are the academic standards and what is the level of technical competence required? The second outcome states that, "Graduates are valued by employers." What competencies must students have to be valued by employers? It's helpful to state outcomes in this way: When students complete the MSE, they will be able to (followed by what they will be able to do). Outcomes 3 – 6 are stated in this way, although you might want to consider stating what graduates will do to show they are aware of professional, ethical, and legal responsibilities.

The chart that accompanies your narrative is nicely set up and easy to follow. Your assessment measures are appropriate, but too general in nature. Also, you have not really identified benchmarks. For example, for your third outcome (apply management and socioeconomic concepts to engineering problems) your assessment measures are course-specific exams and other evaluation procedures and a comprehensive project. These are fine, but you need to determine which questions address this outcome and describe the project and how it addresses the outcome. The project should be accompanied by a comprehensive scoring rubric. Benchmarks should be what you expect mean student achievement to be on each of the assessment measures. For example, if you employ a scoring rubric for the comprehensive project, there would be several areas of analysis for the project. Each area would be evaluated on a defined scale, e.g. 4 – 1, with 4 representing master level, 3, proficient level, 2, novice level, etc. You might expect a mean performance across students of at least a 2.5 (this is just a

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MSE

suggestion, of course). Results will be the mean students actually achieved on each part of the project. These scores will allow you to assess your students' relative strengths and weaknesses with regard to this particular outcome. Finally, the action taken (or action planned) should be what you will do to improve student learning in your program based on the results of your assessments.

Ratings for Student Learning Outcomes, Assessment Measures, and the Feedback Loop

Student Learning Outcomes = 3. This rating was given because your student learning outcomes are comprehensive, support Marshall's educational goals and span multiple learning domains.

Assessment Measures = 1. This rating was given because you identified measures that may be appropriate to measure your outcomes. It's difficult to tell, though, because your measures are so vague. For example, for outcome 3 you list course specific exams and other evaluation procedures. Which exams and which other procedures?

Feedback Loop = 2. This rating was given because data are being collected and used in departmental curricular planning. However, data related directly to student learning outcomes are not being collected and used at this time.

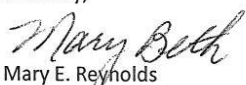
Suggestions to Consider as you plan your assessment strategies for the 2008-2009 academic year

I suggest that you do the following things to improve your assessment program:

1. Re-write student learning outcomes 1 and 2 using suggestions from the earlier part of this letter.
2. Develop detailed scoring rubrics for each project and/or exam used to evaluate student learning outcomes.
3. Develop student, graduate, and employer satisfaction survey questions that specifically address each student learning outcome.
4. Establish appropriate benchmarks for each assessment measure.
5. Formulate a plan where each student learning outcome is assessed on a rotating three-four year cycle. This will allow you to do a more in-depth analysis of fewer student learning outcomes each year which will, I believe, allow for more meaningful program revision based on the outcomes of student learning.

If I can help as you move through this process, please do not hesitate to contact me at 62987 or at [reynoldm@marshall.edu](mailto:reynoldm@marshall.edu).

Sincerely,

  
Mary E. Reynolds  
Interim Director of Assessment

C: Dr. Tony Szwilski, Interim Dean, CITE



Office of Program Review and Assessment  
Academic Affairs  
Marshall University  
Huntington, WV 25755-2003

To: Dr. William Pierson, Chair Engineering  
From: Bob Edmunds, Coordinator for Program Review and Assessment  
Date: June 15, 2006

**Yearly Assessment Report for: MSE Engineering**

Thank you for submitting the Yearly Assessment Report for the program. Please use the information in this report to guide your assessment activities during AY 2006-2007

The Yearly Assessment Report for documenting AY 2005-2006 assessment activities is due by October 3, 2006. If the program is scheduled for a program review during the 2006-7 academic year, the Program Review will suffice as the documentation of assessment activities and no separate report will be due.

**Reviewer summary of yearly assessment report:**

What follows is a brief critique of the report you submitted for the academic year 2004-2005. In most cases the report has been reviewed by members of the University Assessment Committee.

Yearly Assessment Report Critique	
I. a. Program goals:	The program goals were listed.
b. Learning outcomes and data collection:	The learning outcomes were listed, but in their present form, they are difficult to measure. No data were reported as being collected.
c. Results:	Observations and class changes have been made, but these changes do not flow out of reported analysis of data.
II. BOT Initiative #3:	Not applicable to graduate programs.
III. Plans for current year:	College wide assessment model. Use of off campus individuals to enhance the engineering offerings; Informal assessment work in faculty meetings
IV. Assistance needed:	Reassigned time for faculty. Work through the college to achieve this goal.
V. Lessons learned:	Most students in this program have full-time jobs and therefore are not attached to the program in significant ways.

**Review of the Assessment Summary Chart "Marshall University: Assessment of Student Outcomes."**

This chart will help the program and the University Assessment Committee monitor a program's patterns of evidence. Please remember that a program does not have to assess every outcome every year; however, within a 3-4 year period of time all program objectives must be evaluated, results analyzed, and actions taken (feedback loop) documented.

The assessment summary chart was present. The program outcomes/objectives were listed, but in their present state, are rather difficult to measure, and are very broad in their scope. The program would do well to develop a list of competencies for MSE graduates and then devise appropriate outcomes and measuring points for those competencies. No specific data were presented, only general conclusions were offered. The program would do well to develop specific competencies and then use current measuring instruments as tools to assess student competency.

**Efficacy of Assessment:**

Programs are evaluated in terms of the development of measurable learning outcomes, the use of viable assessment measures, and the implementation of an effective feedback loop. The current report has been evaluated based on these categories. This year the report shows program scores from 2000-2001 to the present.

Scores					
Categories	2000-2001	2001-2002	2002-2003	2003-2004	2004-2005
I. Learning Outcomes	2	2	2	2	1
II. Assessment Measures	1	2	3	3	1
III. Feedback Loop	1	2	1	1	1
Total Overall Score:	4	5.7	6	6	3
Level of Implementation (efficacy of assessment)	2	2	2	2	1

Score Ranges	
Score Ranges 0-3 in each of the three categories	A score of 0 indicates minimum activity in the category
	A score of 1 indicates that a program is in the beginning stages of assessment
	A score of 2 indicates that a program is making progress toward implementing a viable assessment program
	A score of 3 indicates that a program is in the maturing stages of its assessment program

Levels of Implementation Efficacy of Assessment	
A total overall score between 0 and 3 indicates	Level 1: the program is in the beginning stages of its assessment of student academic achievement
A total overall score between 4 and 6 indicates	Level 2: the program is making progress toward implementing a viable assessment program
A total overall score between 7 and 9 indicates	Level 3: the program is in the maturing stages of continuous improvement of student academic achievement

**Interpretation:**

The Learning outcomes as stated are difficult to measure. They lack specificity. There are no actual measures listed. The program lists employer and graduate feedback, but does not list a specific instrument that may have been used. There are no specific results listed. If a survey was completed, how many surveys were sent, what was the response rate, and what did the survey indicate? The feedback loop appears to be working, but there are no specifics. What does 'course changes' really mean, what evidence was used to indicate that course changes were necessitated anyway? There is no evidence to support these changes.

**Recommendations:**

The report indicates competencies of graduates, but at this juncture, no specific competencies have been offered, and no evidence has been collected in support of any changes. Specific data need to be reported.

**General Comments:**

The program appears to be involved in the assessment process; however, much of the work should be coming from faculty and classroom assessments and normal program operations as opposed to having vast amounts in data imported from other sources. Certainly it would be advantageous for faculty to have funding to attend conferences, but with current funding levels this would be difficult to achieve. All we can do is ask.

Thanks so much for continuing to aid Marshall in its ongoing assessment efforts.

Enclosures