Program Review

BS in Engineering
(BSE)

College of Information Technology and Engineering

Fall 2010

MARSHALL UNIVERSITY

Program Review
Marshall University

Date: __14-Oct-2010_____

Program: __Bachelor of Science in Engineering (BSE)_____
Degree and Title

Date of Last Review: _None (new program)_____

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.)

1.	William Pierson	10/14/2010
Recommendation:	Signature of person preparing the report:	Date:
1.	William Pierson	10/14/2010
Recommendation:	Signature of Program Chair:	Date:
1.	Betsy Dulin	10/14/2010
Recommendation:	Signature of Academic Dean:	Date:
1	James McIntosh	11/16/2010
Recommendation:	Signature of Chair, Academic Planning Committee: (Baccalaureate pgms only)	Date:
1	Camilla Brammer	1/27/2011
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

Recommendation:
Continue program at current level of activity.
Rationale:

During the period of this program review, the BS in Engineering program has achieved many milestones. After initial implementation in 2006, the program has graduated its first full class of students and continues to be one of the most rapidly growing programs in the university. In addition, the program recently obtained accreditation from the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology, which was retroactive to October 2008, and with a "next general review" scheduled for the 2015/2016 accreditation cycle (see www.abet.org for the program's status).

Marshall's Board of Governors also has approved growth of the program into two additional areas of emphasis, and applications for the program are expected to increase significantly for the next academic year due to the ABET accreditation.

Currently, the program and most of its faculty are housed in the Weisberg Engineering Laboratory building, which has served many purposes in the past two years. However, the building is now functioning at full capacity with respect to student/class load, faculty space, and general laboratory space. Additionally, an area of concern identified in the final statement from ABET is student/faculty ratio in the program. According to the general policies utilized by ABET evaluation teams, the ratio is currently much too high. The program is in the final stages of recruiting for two additional BSE faculty members. This provides a short-term solution to the problem, but the program will remain at the outer edges of ABET faculty/student ratio standards even after filling the positions and even assuming that enrollment will be capped at current levels, with no additional program growth from this point forward. The BSE faculty and advisory board members all strongly believe that full enrollment potential has not been reached, due to the fact that accreditation results only recently became available and additional areas of emphasis are planned.

These issues are related to the strength and utility of the BSE program for students and the professional community, as well as the potential for significant growth in the coming years. Program faculty will be addressing these issues, including plans for new areas of emphasis and potential enrollment limitations, in the next months as part of the development of an academic master plan.

Betsy E. Dulin _____ 10/15/2010 _____

Signature of the Dean Date

Marshall University
Program Review

Program: Bachelor of Science in Engineering (BSE)

College: College of Information Technology and Engineering

Date of Last Review: None (new program)

I CONSISTENCY WITH UNIVERSITY MISSION

The mission of the Bachelor of Science in Engineering (BSE) program has several key components:

1. to provide high quality undergraduate education that leads to the development of well-trained graduates for employment in the engineering profession,
2. to provide opportunities for faculty and students to participate in service-oriented activities through civic and professional organizations, and
3. to provide research opportunities for faculty in areas consistent with the needs and interests of the region.

These program objectives are consistent with the mission of the university; specifically with the following components contained in the *Marshall University Mission Statement*:

Marshall University will

- provide affordable, high quality undergraduate and graduate education appropriate for the state and the region;
- foster faculty, staff, and student outreach through service activities;
- promote economic development through research, collaboration, and technological innovations;

II ACCREDITATION INFORMATION

The Bachelor of Science in Engineering (BSE) degree program is accredited by the Engineering Accreditation Commission (EAC) of the Accreditation Board for Engineering and Technology (ABET). The initial ABET accreditation visit took place during fall 2009. Based upon the information contained in a Self-Study report and data collected during an on-campus interview, the BSE program was awarded accreditation by ABET, retroactive to October, 2008. As noted on the ABET web site, the date of the next general ABET review for the MU BSE program is scheduled for the 2015-16 academic year.

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

A. ADEQUACY

1. Curriculum - There are four major components of the curriculum for the BSE degree: core engineering courses, emphasis courses, technical electives, and the university core curriculum. The core engineering courses are common to most engineering degrees and, along with the math and science courses, provide a fundamentally strong educational foundation. The emphasis courses provide in-depth technical knowledge in a particular engineering discipline. The first emphasis area being offered under the BSE umbrella is civil engineering; however, other emphasis areas will be added as demand justifies and available resources allow. Technical electives offer students some flexibility to tailor their curriculum to fit particular interests and needs. The MU core curriculum provides the opportunity for students to gain the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context.

The BSE program requires a total of 132 credit hours to graduate. The distribution of the four components within these 132 credits is as follows:

- Core engineering courses: 37 credit hours (28%)
  - ENGR: 107, 111, 201, 213, 214, 216, 219, 221, 318, 451, 452, 453
- Math and Science: 35 credit hours (27%)
  - MTH: 229, 230, 231, 335, 345; CHM: 211, 217, 212, 218; PHY: 202, 211
- Emphasis courses: 30 credit hours (23%)
  - CE: 241, 312, 321, 322, 331, 342, 413, 432; GLY: 200
- Technical and design electives: 9 credit hours (7%)
- Core Curriculum: 21 credit hours (16%)

A pattern sheet students can follow to complete the BSE degree requirements in a four-year time frame is included in Appendix 1a.

2. Faculty - The engineering faculty are hard working and highly qualified. With the exception of one faculty member, all BSE faculty members are registered professional engineers. The one individual who is not registered is an Engineering Intern (EI) and is in the processes of becoming a PE. One faculty member is also a registered land surveyor, and another is a licensed attorney and registered patent attorney.

All faculty are student oriented and have extensive, rich academic experience. Currently, there are five full-time professors devoted to the BSE degree program, including the Dean of CITE who is actively involved in teaching courses. As noted in Table 1, as of spring 2010 all full-time BSE faculty possess doctoral degrees.

Table 1 – BSE Faculty as of Spring 2010

Faculty Member	Highest Degree	Rank	Registration Status	Tenure Information
Betsy Dulin (Dean)	J.D.	Professor	PE, Attorney, Patent Attorney	Tenured
Richard McCormick	Ph.D	Professor	PE, PS	Tenured
Andrew Nichols	Ph.D.	Assistant Prof.	PE	Tenure-track
William Pierson (Chair)	Ph.D.	Professor	PE	Tenured
Isaac Wait	Ph.D.	Assistant Prof.	PE	Tenure-Track

Wael Zatar	Ph.D.	Professor	EI	Tenured

The BSE program makes judicious use of adjunct professors who have special skills and expertise. Adjuncts used to teach advanced engineering subjects also are registered professional engineers in addition to having extensive real-world experience. Adjunct faculty used during the period of this review are listed in Table 2.

Table 2 – BSE Adjunct Faculty

Adjunct Faculty Members	Highest Degree	Expertise	Registration Status
Tracy Christofero	Ph.D	Project Management	PPM
Sam Harsh	Ph.D	Structural Engineer	PE
Jeff Huffman	MS+	Geotechnical Engineer	PE
Sydney Wait	MS	Mechanical Engineer	----
Jamie Wolfe	MS	CAD & GIS	----

In addition to teaching duties, BSE faculty members are active in professional organizations such as the American Society of Civil Engineering, the Society of American Military Engineers, and the National Council of Examiners for Engineering and Surveying. Faculty also conduct ongoing research projects for entities such as the Rahall Transportation Institute and the WV Department of Transportation. Faculty bio sheets list the various research efforts and professional activities, some of which have brought national recognition to the faculty.

Faculty are actively involved in outreach efforts to increase interest among high school students in STEM related professions. The most notable effort is the very successful Exploring Engineering: Academy of Excellence (EEAE). Each year for the past ten years the EEAE program has conducted weeklong summer camps for high school students. Over 350 students have participated in the EEAE program, and about one-third of those students have ultimately enrolled at Marshall University either in engineering or some other degree program.

There have been no Graduate Assistants assigned to the BSE program during this review period.

3. Students

a. Entrance Standards

As stated in the MU Catalog, admission to the MU BSE program requires that applicants:

1. Meet Marshall University admission requirements and
2. Have a minimum composite ACT score of 21 with a math score of 24, or a minimum SAT composite of 980 with a math SAT of 560.

Transfer students must have completed MTH 127/130 College Algebra and MTH 132 Pre-Calculus.

Pre-Engineering is offered for those students satisfying the MU admission requirements but who do not have the required ACT math scores. Requirements for Pre-Engineering are a minimum composite ACT score of 19 with a math score of 19-23, or a minimum SAT composite of 900 with a math SAT of 460-550. Students who are admitted to the Pre-Engineering program generally will require an additional calendar year to complete the requirements for the BSE degree. Students transferring into the Pre-engineering program must be eligible to take MTH127/130 College Algebra or MTH132 Pre-Calculus.

In addition to the MU BSE degree and the Pre-Engineering program, students may enter the Engineering Transfer program. The Transfer program, part of a state-wide Engineering Articulation Agreement, is designed to allow students to take courses generally common to the first two years of most engineering disciplines and then transfer to complete a discipline not offered by Marshall, such as mechanical and electrical engineering. Typically, students transfer to WVU or WVU-Tech.

b. Entrance Abilities

As shown in Appendix III, incoming BSE freshmen have a mean high school GPA between 2.92 and 3.80 and a mean ACT score between 21.0 and 26.6. The mean ACT composite score for students entering during the fall semesters of the first four years of the program (2006-2009) is 26.1 (n = 77). These relatively high scores for incoming freshmen indicate that the program has been able to attract students of higher caliber.

The mean high school GPA for freshman entering the Pre-Engineering program has varied between 2.34 and 3.61, with mean ACT scores between 21.4 and 24.3. The mean high school GPA for freshman entering the Engineering Transfer program has varied between 3.12 and 4.14, with mean ACT scores between 24.0 and 27.0.

Detailed entrance information, including the number of students in each category, is given in Appendix III.

c. Exit Abilities

The mean GPA of BSE graduates, as shown in Appendix IV, was 2.68 in 2008-09 (the first graduating classes) and 3.17 in 2009-2010. The average GPA of graduates during the first two graduating classes was approximately 3.09.

All 25 of the first graduating students have taken the nationally-normalized Fundamentals of Engineering (FE) exam, an eight-hour exam that is taken as the first step towards becoming a registered professional engineer. The two-year (2008-09, 2009-10) passage rate for MU BSE students was approximately 83%, significantly higher than the national average passage rate, which is approximately 75%. The high passage rate on the FE exam is a strong indicator of the abilities of MU BSE graduates. Furthermore, the fact that to date 100% of BSE graduates have taken the exam is an indication that the program is meeting one of its primary goals: to prepare graduates to become practicing engineering professionals.

4. Resources

a. Financial

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, five tenure-track faculty positions would be lost. Several of the faculty work on important grants and contracts, and loss of this engineering expertise would negatively impact the region and the university's research capabilities. In addition, the loss of the program would also remove a significant STEM population from the MU student body as well as reducing STEM outreach efforts. The loss of the BSE would also have negative impacts on local agencies, such as the US Army Corps of Engineers, the WV Department of Transportation, the Rahall Transportation institute and companies which employ engineers to support these agencies. There is one administrative support position for the Weisberg Division of Engineering and Computer Science, so the workload would be less but the position would still be needed to support computer science and the two graduate programs also in the division.

b. Facilities

Offices - Faculty offices for the BSE program are located in the Weisberg Engineering Lab, and the CITE lab technician office is also located in this facility. Due to space limitations, the division chair and division secretary are located in another building, Gullickson Hall, rooms GH3F and GH109C, about two blocks away.

Classrooms - CITE currently uses a total of four classrooms on the Huntington campus shared by three undergraduate programs and five graduate programs. However, more dedicated CITE classroom and office space are needed to meet specialized course needs and the increasing program enrollment.

Two CITE classrooms (GH206A and GH211) are set up for dual use. There are tables and chairs in the middle portion of the rooms for lecture seating. Along the periphery of three walls are computers with special engineering software. Wireless access is also provided for students using laptops. GH206A and GH211 are used by both engineering and computer science classes. During times when not in use as a classroom, GH206A is used as a monitored lab where CITE students can use the computers and have access to specialized software during evening hours. Each room can comfortably accommodate twenty-four students, and each has an instructor station and projection capabilities.

The third CITE classroom (GH5) is used primarily for engineering courses. The classroom can seat 24-30 students for lectures, and there are seven benches used for labs in electrical circuits and digital systems. A small computer lab (12 stations) with specialized engineering software is also available in this room.

The fourth CITE classroom is located in the Weisberg Engineering Lab. This classroom, which has an instructor station and projection capabilities, is primarily dedicated to engineering and has a seating capacity of thirty-six students.

The Weisberg Engineering Lab has been designed to include a collaboration area for students. Tables and comfortable chairs are provided in the wide hallway for students to gather and work on homework. The collaboration space also has several PCs for student use.

Laboratories - In August 2008, the Weisberg Engineering lab, a 16,000 square foot one story structure, was completed to meet the critical need of engineering lab space on campus. This is the first building on the Marshall Campus constructed specifically for engineering. The laboratory space is designed for flexible use so that it can accommodate a large lab, or several small labs. A permanent wet lab space is provided on the east end of the building for environmental engineering classes, and this area is also used for a required lab in hydraulics. The west end of the building is used for labs in materials testing and soil mechanics. The middle of the lab space is used for pre-lab lectures and provides some opportunity for expansion. Limited space is also available for storing bulk materials, and there is a “dirty room” that has an independent ventilation system to isolate it from the remainder of the building. Additional lab space will be required when additional engineering emphasis areas are added to the BSE program.

5. Assessment Information:

a. Summary Information

b. Other Learning and Service Activities – two student organizations have been formed since the establishment of the BSE program: a chapter of the Society of American Military Engineers (SAME) and a chapter of Engineers Without Borders (EWB). The student SAME chapter has planned, organized and conducted two very successful Winter Technical Conferences; and planning for a third conference in 2011 is underway. Practicing engineers from around the region attend the conference, providing valuable interaction and networking opportunities for BSE students. Nationally recognized speakers have given presentations at both of the first two conferences, and attendance has exceeded 100 attendees each year.

The EWB chapter has selected a micro-dam project in Zambia as its initial project. Fund-raising efforts are underway to raise funds to pay for a planning trip and, ultimately, a construction trip.

c. Plans for Program Improvement – The BSE program is new and has had only two graduating classes. Consequently, a limited amount of assessment data has been collected. For example, no employer or alumni surveys have been conducted. However, initial FE exam results reported by NCEES, results of graduating senior student surveys, feedback from the ABET accreditation team, and results from locally applied rubrics indicate that the program is meeting its stated outcomes and objectives. However, some changes have already been implemented as a result of early feedback obtained from students and the MU BSE Advisory Board. The most notable of these

improvements are: (1) addition of a required course in thermodynamics (suggested by the BSE Advisory Board); (2) purchase of an annual license of a suite of Bentley software titles (such as Microstation, WaterCAD, Staad, and InRoads) and incorporation of this software throughout the BSE curriculum (in response to student comments); and addition of a required course in project management (suggested by the BSE Advisory Board).

d. Graduate and Employer Satisfaction – No such results are yet available due to the newness of the program. However, senior exit surveys results are included in the 2009-2010 BSE Assessment Report.

e. Attach the previous five years of evaluations of your annual assessment reports – Additional assessment information and evaluations are included in Appendix IX.

6. Previous Reviews – None, first review.

7. Strengths/Weaknesses

The ABET accreditation team that visited the campus during the fall 2009 semester cited the following strengths regarding the MU BSE degree program:

Institutional Strengths

1. *The Division of Engineering has exceptional laboratory and computing facilities in a newly constructed building. Central budget allocations are currently keeping pace with the growth of the program.*
2. *The college and university leadership is supportive of the engineering program. The faculty and administration appear to have an effective, amiable working relationship and are all committed to the success of their students.*
3. *The Division of Engineering enjoys the strong support and involvement of alumni and local and regional industry.*
4. *There is a strong university assessment office, which serves as a resource to the Division of Engineering and has the support of the university administration.*

Program Strengths

1. *While the engineering program is applying for initial accreditation, Marshall University has a long history of engineering education and close ties to industry, government, and other engineering programs providing a strong support framework.*
2. *The small size of the program facilitates a close and frequent interaction between students and faculty members. Students perceive that all program faculty members are good, caring teachers.*
3. *The classroom and building designs support collaboration.*

ABET evaluated the BSE program on eight criteria, with the final accreditation action depending on the program's range of compliance, or non-compliance, with regard to each criterion. The following terms are used to indicate the extent to which a program complies with ABET expectations for each of the eight published criterion:

- *Deficiency: A deficiency indicates that a criterion, policy, or procedure is not satisfied. Therefore, the program is not in compliance with the criterion, policy, or procedure.*
- *Weakness: A weakness indicates that a program lacks the strength of compliance with a criterion, policy, or procedure to ensure that the quality of the program will not be compromised. Therefore, remedial action is required to strengthen compliance with the criterion, policy, or procedure.*
- *Concern: A concern indicates that a program currently satisfies a criterion, policy, or procedure; however, the potential exists for the situation to change such that the criterion, policy, or procedure may not be satisfied.*

The following statements summarize the findings of the ABET visitation team and the BSE program response.

Deficiencies – The ABET team found no deficiencies; the MU BSE program is in compliance with all eight evaluation criteria.

Weaknesses – In its draft report, the ABET team cited two weaknesses, one regarding Criterion 2, Program Educational Objectives, and one regarding Criterion 3, Program Outcomes. However, as described below, after the BSE program response to the draft ABET statement; the final report cited only a single weakness.

The first weakness, Criterion 2, in the draft statement cited terminology used in the BSE program educational objectives. The team felt that, as worded, the statements seem to focus more on student skills and knowledge at the time of graduation rather than longer-term accomplishments of graduates. It was always the intention of the BSE program that the program objectives describe long-term accomplishments of graduates. In response to the ABET team's report, the BSE educational objectives were re-worded by the faculty, approved by the BSE Advisory Board, and re-submitted to ABET. ABET responded by removing the Criterion 2 weakness. The revised BSE educational objectives are:

1. BSE graduates will be recognized for their success in designing engineering systems that promote the health, safety, and welfare of the public.
2. BSE graduates will demonstrate their awareness of an engineer's role in contemporary society and their understanding of the societal and environmental contexts of engineering projects.
3. BSE graduates will practice in specific areas of engineering that are consistent with the needs of the region served by Marshall University.

The weakness cited with regard to Criterion 3 resulted from the MU BSE Assessment Plan not being 100% complete when the team visited campus. The incomplete plan was a result of the newness of the program. However, since the visit, all missing rubrics have been developed and applied, surveys for employers and alumni have been written and will be administered as scheduled in the BSE Assessment Plan; and data from graduating senior surveys have been collected and analyzed. In addition, NCEES has provided initial data for MU BSE students who have taken the Fundamentals of

Engineering exam. All this information will be used to respond to the weakness cited by ABET in a report submitted during the 2010-2011 academic year.

Concerns – ABET Criterion 6 states that faculty must be of sufficient number and competencies to cover all curricular areas of the program. The ABET report states, "Although the criterion is currently met, the potential exists that, at the current rate of growth, the program may be unable to cover all curricular area." In response to this concern, the BSE program has advertised to fill two new positions: one in civil engineering and one in mechanical engineering.

B. VIABILITY

1. Articulation Agreements - Marshall University is part of the WV Engineering Articulation agreement that has been in place since 1983. As stated earlier, this agreement is designed to allow students to take courses generally common to the first two years of most engineering disciplines and then transfer to complete a discipline not offered by Marshall, such as mechanical and electrical engineering. Typically, students transfer to WVU or WVU-Tech. The Articulation Committee meets once or twice a year to discuss curricular issues, provide feedback on performance of transfer students, and discuss other engineering related issues.

2. Off-Campus Classes -The BSE program does not offer off-campus classes.

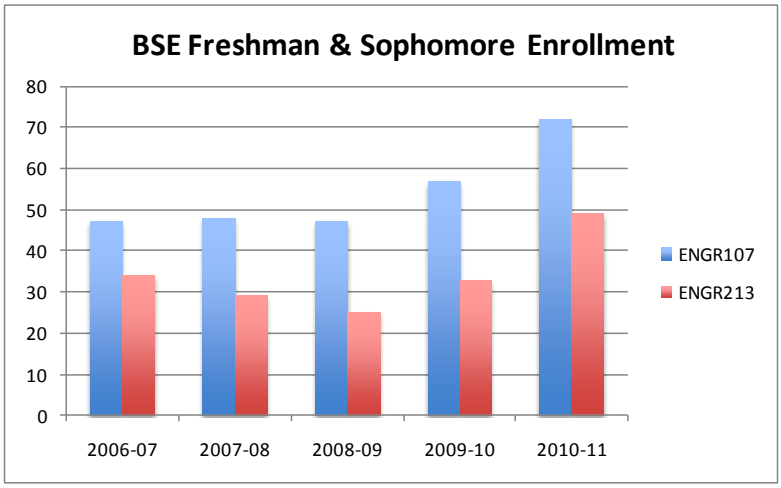
3. Online Courses - The BSE program does not offer online courses.

4. Service Courses - The BSE program does not offer service courses.

5. Program Course Enrollment –Appendix VI has detailed course-by-course enrollment histories. Some of the numbers include enrollments from courses that were originally part of the Marshall/WVU-Tech BSCE agreement that allowed Marshall students to complete the four-year Tech BS in Civil Engineering (BSCE) degree while taking all course work at Marshall. These civil engineering courses, designated as CVLE courses to distinguish them as WVU-Tech courses, have since been transitioned to CE courses and are now part of the MU BSE program.

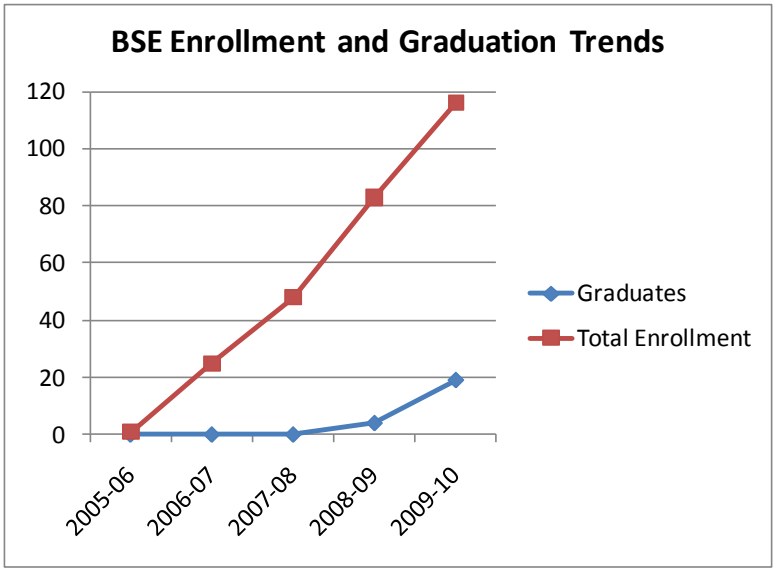
The Figure 1 shows enrollment in two key courses, ENGR107 Introduction to Engineering and ENGR213 Statics, taken by freshmen and sophomores, respectively. There has been a significant increase in enrollment in these key courses, which indicates that junior-level and senior-level courses will likely experience similar growth. As a result of these increased enrollments, additional sections may need to be offered, or some key courses may need to be offered more frequently to keep section sizes at an appropriate level. The increase in enrollment starting in 2009 is probably due to two factors: opening of new dedicated engineering facilities (the Weisberg Family Engineering Laboratory), increased efforts by MU Recruiting.

Figure 1



6. Program Enrollment - The graph in Figure 2 shows the dramatic increase in program enrollment since its first full year of operation (2006-2007) thru 2009-2010. There has been a 360% increase in BSE enrollment (25 – 116), and fall 2010 numbers indicate a 15% increase in BSE enrollment over 2009 levels. When all engineering enrollment is considered (MU BE, Pre-Engineering, and Engineering Transfer, the fall 2009 enrollment was 168 students. Another significant factor is that fewer students are selecting the Engineering Transfer program (40 in 2006 versus 11 in 2009) and are opting to stay at Marshall rather than transfer to another institution to complete an engineering degree. Since student-to-faculty ratio was a concern cited in the recent ABET accreditation visit, BSE enrollment growth must be closely monitored to adhere to accreditation expectations.

Figure 2



7. Enrollment Projections

Interest in the BSE program should remain high, and the enrollment growth described above should continue, especially in light of the recent ABET accreditation status announced in fall 2010. Increases of 10-15% per year are possible if required resources are made available.

C. NECESSITY

1. Advisory Committee – The BSE has a very active and involved advisory committee. In addition to helping set goals and objectives for the MU BSE program, the MU BSE Advisory Board has been involved in MU Assessment Day activities which provided valuable feedback that has resulted in program improvements. The Board has met twice per year since the inception of the BSE program; a list of BSE Advisory Board members is provided below in Table 3.

Table 3 - MU BSE Advisory Board Members

Name, Business	Name, Business
Sam Bonasso, Strategic Business Consulting	Mary Jo Hendricks, DOW (Retired)
Dewey Bocook, Bocook Engineering	Carole McCoy, Dominion Transmission
Bruce Churton, Marathon Petroleum (Retired)	Dave Meadows [1], USACE
Ron Fisher, Special Metals	Paul Mattox, WV DOT
Ron Gilkerson, GRW Associates	John Tinney, Toyota of WV
Keith Hainer, Massey Energy	J. T. Weatherford, CSX Intermodal
Doug Hardman, J.H. Fletcher Manufacturing	Art & Joan Weisberg, State Electric

[1] Board President

2. Graduates

The BSE program has graduated a total of 25 students since fall 2008. This number includes one summer 2010 graduate. There were four graduates in the 2008-09 academic year and 21 graduates in 2009-10 (including summer).

3. Job Placement

Of the 25 BSE graduates to date, eleven (44%) are employed by regional engineering firms and agencies, four (16%) are attending graduate school, two are in the military, and the employment status is unknown of the remaining eight (32%) graduates.

IV. Resource Development (if applicable)

See the dean's recommendation citing the need for additional faculty and space.

Appendix I
Required/Elective Course Work in the Program

Degree Program: Engineering, Civil Emphasis Person responsible for the report: William Pierson

Courses Required in Major (By Course Number and Title)	Total Required Hours	Elective Credit Required by the Major (By Course Number and Title)	Elective Hours	Related Fields Courses Required	Total Related Hours
ENGR107 Intro. to Engineering ENGR111 Engineering Computations ENGR201 Circuits ENGR213 Statics ENGR214 Dynamics ENGR216 Mech. Of Deform. Bodies ENGR219 Thermodynamics ENGR221 Engineering Economy ENGR318 Fluid Mechanics ENGR451 Project Management ENGR452 Engineering Practice ENGR453 Senior Design CE241 Geomatics CE312 Structural Analysis CE321 Civil Engineering Materials CE322 Soil Mechanics CE331 Hydraulics CE342 Transportation Engineering CE413 Reinforced Concrete CE432 Water/Wastewater Treatment	64	• Any 300- or 400-level ENGR or CE course • CHM: 307, 327, 345, 355, 356, 357, 358, 361, 365, 366 • GLY: 313, 314, 325, 427, 455, 456, 457 • MTH: 329, 415, 413 (3 credits must be a CE design course)	9	MTH229 Calculus I MTH230 Calculus II MTH231 Calculus III MTH 335 Differential Equ. MTH345 Applied Statistics CHM211 Chemistry I CHM217 Chem. I Lab CHM212 Chemistry II CHM218 Chem. II Lab PHY211 Physics I PHY202 Physics Lab GLY200 Physical Geology	38

Professional society that may have influenced the program offering and/or requirements: ASEE, ABET

Appendix 1a
BSE Pattern Sheet, Effective Fall 2009
(For Students with ACT Math 27 or Higher)

1st Semester			2nd Semester		
MTH229	Calculus I	5	MTH230	Calculus II	4
ENG101	English I	3	ENG102	English II	3
CHM211	Chemistry I	3	CHM212	Chemistry II	3
CHM217	Chemistry I Lab	2	CHM218	Chemistry II Lab	2
ENGR107	Intro. to Engineering	3	ENGR111	Engineering Computations	3
			FYS	First Year Seminar	3
		16			**18**

3rd Semester			4th Semester		
MTH231	Calculus III	4	MTH345	Applied Statistics	3
ENGR213	Statics	3	ENGR214	Dynamics	3
PHY211	Physics I	4	ENGR216	Mechanics of Materials	3
PHY202	Physics Lab	1	GLY200	Physical Geology	3
CE241	Geomatics	4		Core II, Communications	3
				Core II, Social Science	3
		16			**18**

5th Semester			6th Semester		
MTH335	Differential Equations	4	ENGR221	Engineering Economics	3
ENGR318	Fluid Mechanics	3	CE322	Soil Mechanics	3
CE321	CE Materials	3	CE331	Hydraulics	4
CE312	Structures	3	CE342	Transportation	3
	Core II, Humanities	3	CE413	Reinforced Concrete	3
		16			**16**

7th Semester			8th Semester		
ENGR201	Circuits I	4	ENGR219	Thermodynamics	3
ENGR451	Project Management (WI)	3	ENGR453	Senior Design	3
ENGR452	Engineering Practice	3	CE	Design Elective	3
CE432	Water/Wastewater Treatment	4		Technical Elective	3
	Core II, Fine Arts	3		Technical Elective	3
		17			**15**

Total Credits: 132

Implementation Notes:

1. Two courses must also be designated as Critical Thinking (CT) courses.
2. Two courses must also be designated as Writing Intensive (WI) courses.
3. One course must also be designated as either a Multicultural (M) or International (I) course.

Note: Entering students have an ACT Math score below 27 are required to take an additional five-credit mathematics course, MTH132 Pre-Calculus. Such students will likely need an extra semester or summer session to satisfy the BSE requirements

Appendix II
Faculty Data Sheet

Name: Betsy Ennis Dulin Rank: Professor

Status (Check one): Full-time x Part-time____ Adjunct ___
Current MU Faculty: Yes x 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 2008	CE432	Water/Wastewater Treatment (formerly CVLE432)	12
Spring 2010	ENGR453 (50%)	Senior Design Projects	17

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*.

Appendix II
Faculty Data Sheet
(Information for the period of this review)

Name: Richard F. McCormick Rank: Professor

Status (Check one): Full-time__x__ Part-time____ Adjunct ___
Current MU Faculty: Yes _x_ 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	YES, WV PE & WV PS
Years non-teaching experience	1.5
Years of employment other than Marshall	31
Years of employment at Marshall	8
Years of employment in higher education	37.5
Years in service at Marshall during this period of review	5

Courses Taught Past Two Years

Year/Semester	Alpha Des. & No.	Title	Enrollment
Fall 2008	ENGR213	Statics	25
Fall 2008	ENGR318	Fluid Mechanics (formerly ENGR218)	20
Fall 2008	CE433	Hydrologic Engineering (formerly CVLE433)	14
Fall 2008	ENVE615	Environmental Chemistry	14
Spring 2009	ENGR214	Dynamics	18
Spring 2009	ENGR216	Mechanics of Deformable Bodies	18
Spring 2009	CE453 (50%)	Senior Projects (Formerly CVLE453)	15
Fall 2009	ENGR213	Statics	33
Fall 2009	CE432	Water/Wastewater Treatment	22
Fall 2009	ENVE615	Environmental Chemistry	12
Spring 2010	ENGR214	Dynamics	27
Spring 2010	ENGR216	Mechanics of Deformable Bodies	27
Spring 2010	ENVE617	Physiochemical Treatment of Water & Wastewater	6
Summer 2010	CE241	Introduction to Geomatics	11

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.

Appendix II
Faculty Data Sheet
(Information for the period of this review)

Name: Andrew P. Nichols Rank: Assistant Professor

Status (Check one): Full-time__x__ Part-time____ Adjunct ___
Current MU Faculty: Yes x 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
Fall 2008	ENGR107-101 (50%)	Intro. To Engineering	17
Fall 2008	ENGR221	Engineering Economy	24
Fall 2008	CE241	Geomatics (formerly ENGR241)	18
Spring 2009	ENGR221	Engineering Economy	26
Spring 2009	CE342	Transportation Engineering	19
Spring 2009	CE634	Traffic Engineering	2
Fall 2009	ENGR107-101 (67%)	Intro. To Engineering	20
Fall 2009	ENGR221	Engineering Economy	25
Fall 2009	CE241	Geomatics	29
Spring 2010	ENGR221	Engineering Economy	23
Spring 2010	CE342	Transportation Engineering	20
Spring 2010	CE443	Highway Design	5

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*.

Appendix II
Faculty Data Sheet
(Information for the period of this review)

Name: William E. Pierson Rank: Professor

Status (Check one): Full-time__x__ Part-time____ Adjunct ___
Current MU Faculty: Yes _x_ No ___

Highest Degree Earned: Ph.D. Date Degree Received: 1976

Conferred by: University of Missouri - Rolla

Area of Specialization: Electrical Engineering

Professional Registration/Licensure	YES, WV PE
Years non-teaching experience	2
Years of employment other than Marshall	28.5
Years of employment at Marshall	10.5
Years of employment in higher education	39
Years in service at Marshall during this period of review	5

Courses Taught Past Two Years

Year/Semester	Alpha Des. & No.	Title	Enrollment
Fall 2008	ENGR107-101 (50%)	Intro. To Engineering	17
Fall 2008	ENGR107-102 (50%)	Intro. To Engineering	17
Fall 2008	ENGR107-103	Intro. To Engineering	23
Fall 2008	ENGR201	Circuits I	24
Spring 2009	ENGR111-201	Engineering Computations	29
Spring 2009	ENGR111-202	Engineering Computations	27
Spring 2009	ENGR204	Digital Systems	17
Fall 2009	ENGR107-103 (67%)	Intro. To Engineering	22
Fall 2009	ENGR201	Circuits I	15
Fall 2009	ENGR452	Engineering Practice & Design	13
Spring 2010	ENGR111-201 (50%)	Engineering Computations	30
Spring 2010	ENGR111-202	Engineering Computations	28
Spring 2010	ENGR204	Digital Systems	11
Spring 2010	ENGR453 (50%)	Senior Design Projects	17

1) If your degree is not in your area of current assignment, please explain. My degree, electrical engineering, matches my current assignment.

2) Activities that have enhanced your teaching and or research. I am active in NCEES and the WV PE Board.

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. I am active in NCEES and the WV PE Board. I currently serve as the VP of the WV PE Board, am a member of the NCEES Exams for Professional Engineers (EPE) committee, and have attended regional and national meetings of NCEES.

6) Externally funded research grants and contracts you received. I have helped to secure funding for the summer engineering academy – now in its 11th year of operation.

7) Awards/honors (including invitations to speak in your area of expertise) or special recognition. I was awarded the ENNY of the Northeast Zone of NCES for distinguished service to the organization.

8) Community service as defined in the *Greenbook*. None

Appendix II
Faculty Data Sheet
(Information for the period of this review)

Name: Isaac W. Wait Rank: Assistant Professor

Status (Check one): Full-time__x__ Part-time____ Adjunct ___
Current MU Faculty: Yes _x_ No ___

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

Conferred by: Purdue University

Area of Specialization: Civil Engineering

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

Courses Taught Past Two Years

Year/Semester	Alpha Des. & No.	Title	Enrollment
Spring 2009	CE 331	Hydraulic Engineering	20
Spring 2009	ENVE 616	Principles of Biological Waste Treatment	9
Spring 2009	ENGR111-201 (50%)	Engineering Computations	30
Intersession 2009	ENGR 221	Engineering Economy	9
Fall 2009	ENGR 107-102(50%)	Intro. To Engineering	25
Fall 2009	ENGR 318	Fluid Mechanics	18
Fall 2009	UNI 101	New Student Seminar	15
Fall 2009	CE 433	Adv. Hydraulic Engineering	11
Spring 2010	CE 331	Hydraulic Engineering	13
Spring 2010	CE 434	Adv. Water/Wastewater Treatment	8
Intersession 2010	ENGR 221	Engineering Economy	13
Fall 2010	ENGR 107-101,102,103 (50%)	Introduction to Engineering	71
Fall 2010	ENGR 318	Fluid Mechanics	23
Fall 2010	CE 433	Hydrologic Engineering	3

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

Appendix II
Faculty Data Sheet

(Information for the period of this review)

Name: Wael Zatar Rank: Professor

Status (Check one): Full-time__x__ Part-time____ Adjunct ___
Current MU Faculty: Yes x 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
Fall 2008	CE312	Structural Analysis (Formerly CVLE212)	24
Fall 2008	CE321	Civil Engineering Materials (formerly CVLE321)	23
Fall 2008	ENGR452	Engineering Practice & Design (formerly CVLE452)	12
Spring 2009	CE414	Structural Steel Design (formerly CVLE414)	11
Spring 2009	CE413	Reinforced Concrete	21
Spring 2009	ENGR453 (50%)	Senior Projects (Formerly CVLE453)	15
Spring 2009	CE614	Adv. Reinforced Concrete	4
Fall 2009	CE312	Structural Analysis	16
Fall 2009	CE321	Civil Engineering Materials	13
Spring 2010	CE413	Reinforced Concrete	14
Spring 2010	CE616	Pre-stressed Concrete Design	6

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

2) 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) "S*eismic Risk, Rating, and Assessment for Bridges along I-24 in Western Kentucky*", the 86th 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 6th 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*", 5th 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 initate "*Center for Transportation Security and Infrastructure Innovations- TranS-I2*", 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*.

Appendix II
Faculty Data Sheet
(Information for the period of this review)

Name: Tracy Christofero Rank: Associate Professor

Status (Check one): Full-time____ Part-time____ Adjunct _X__
Current MU Faculty: Yes x No ___

Highest Degree Earned: Ph.D. Date Degree Received: 12/31/2005

Conferred by: Nova Southeastern University

Area of Specialization: Information Science

Professional Registration/Licensure	Certified Project Management Profession
Years non-teaching experience	30
Years of employment other than Marshall	27
Years of employment at Marshall	3
Years of employment in higher education	3
Years in service at Marshall during this period of review	3

Courses Taught Past Two Years

Year/Semester	Alpha Des. & No.	Title	Enrollment
Fall 2009	ENGR451	Introduction to Project Management	19
Fall 2010	ENGR451	Introduction to Project Management	14

Appendix II
Faculty Data Sheet
(Information for the period of this review)

Name: Sam Harsh Rank: NA

Status (Check one): Full-time____ Part-time____ Adjunct _X
Current MU Faculty: Yes _x_ No ___

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

Conferred by: University of Kansas

Area of Specialization: Structural Design

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
Spring 2009	CE425	Foundation Design (formerly CVLE425)	11
Fall 2009	CE612	Adv. Steel Design	5
Spring 2010	CE415	Steel Design	4

Appendix II
Faculty Data Sheet
(Information for the period of this review)

Name: Sydney Wait Rank: NA

Status (Check one): Full-time____ Part-time____ Adjunct _X_
Current MU Faculty: Yes _x_ No ___

Highest Degree Earned: MS. Date Degree Received: 2004

Conferred by: Purdue University

Area of Specialization: Mechanical Engineering

Professional Registration/Licensure	No
Years non-teaching experience	1
Years of employment other than Marshall	2
Years of employment at Marshall	1
Years of employment in higher education	1
Years in service at Marshall during this period of review	1

Courses Taught Past Two Years

Year/Semester	Alpha Des. & No.	Title	Enrollment
Spring 2010	ENGR219	Thermodynamics	26

Appendix II
Faculty Data Sheet
(Information for the period of this review)

Name: Jamie Wolfe Rank: NA

Status (Check one): Full-time____ Part-time____ Adjunct __X
Current MU Faculty: Yes _x_ No ___

Highest Degree Earned: MS Date Degree Received: 1999

Conferred by: Marshall University

Area of Specialization: Environmental Engineering

Professional Registration/Licensure	No
Years non-teaching experience	19
Years of employment other than Marshall	4
Years of employment at Marshall	15
Years of employment in higher education	15
Years in service at Marshall during this period of review	5

Courses Taught Past Two Years

Year/Semester	Alpha Des. & No.	Title	Enrollment
Fall 2008	ENGR107-101 (33%) ENGR107-102 (33%) ENGR107-103 (33%)	Intro. To Engineering (CAD component)	17 17 23
Fall 2009	ENGR107-101 (33%) ENGR107-102 (33%) ENGR107-103 (33%)	Intro. To Engineering (CAD component)	20 25 22

Appendix IIa
Teaching Assistant Data Sheet

GTA Name	Course No.	Course Name	Year 1 20__- 20__			Year 2 20__- 20__			Year 3 20__- 20__			Year 4 20__-20__			Year 5 20__-20__		
	(e.g. 101)		Su	Fa	Sp	Su	Fa	Sp	Su	Fa	Sp	Su	Fa	Sp	Su	Fa	Sp
None																	

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 BSCE (w/WVUIT[1])

Year	*N*	Mean High School GPA	Mean College GPA	Mean ACT	Mean SAT Verbal	Mean SAT Quantitative
Fall 2005	6 Freshmen 4 Transfer	3.39 3.02	--- 2.90	24.7 (*n* = 6) 21.7 (*n* = 3)	615 (*n* = 2) 570 (*n* = 1)	645 (*n* = 2) 520 (*n* = 1)
Spring 2006	--- ---	--- ---	--- ---	--- ---	--- ---	--- ---
Fall 2006	5 Freshmen 6 Transfers	3.41 3.77	--- 3.01	25.2 (*n* = 5) 25.5 (*n* = 6)	570 (*n* = 1) -- (*n* = 0)	510 (*n* = 1) -- (*n* = 0)
Spring 2007	1 Freshmen 0 Transfers	2.43 ---	--- ---	21 (*n* = 1) ---	--- ---	--- ---
Fall 2007	1 Freshmen 0 Transfers	4.00 ---	--- ---	27 (*n* = 1) ---	--- ---	--- ---
Spring 2008	--- ---	--- ---	--- ---	--- ---	--- ---	--- ---
Fall 2008	--- ---	--- ---	--- ---	--- ---	--- ---	--- ---
Spring 2009	--- ---	--- ---	--- ---	--- ---	--- ---	--- ---
Fall 2009	--- ---	--- ---	--- ---	--- ---	--- ---	--- ---
Spring 2010	--- ---	--- ---	--- ---	--- ---	--- ---	--- ---

[1]Program terminated by design; students listed above after Fall 2005 were actually admitted to new MU BSE degree program.

Appendix III
Students' Entrance Abilities BS in Engineering (BSE)[2]

Year	*N*	Mean High School GPA	Mean College GPA	Mean ACT	Mean SAT Verbal	Mean SAT Quantitative
Fall 2005	--- ---	--- ---	--- ---	--- ---	--- ---	--- ---
Spring 2006	--- ---	--- ---	--- ---	--- ---	--- ---	--- ---
Fall 2006	13 Freshmen 2 Transfer	3.68 ---	--- 2.73	26.6 (*n* = 13) ---	576.7 (n = 3) ---	636.7 (n = 3) ---
Spring 2007	1 Freshmen 2 Transfer	---- 3.61	--- 2.52	23 (*n* = 1) 28 (*n* = 2)	500 (*n* = 1) 560 (*n* = 1)	470 (*n* = 1) 590 (*n* = 1)
Fall 2007	13 Freshmen 4 Transfer	3.49 3.38	-- 2.63	25.8 (*n* = 13) 23 (*n* = 4)	560 (*n* = 3) 520 (*n* = 1)	586.7 (*n* = 3) 610 (*n* = 1)
Spring 2008	1 Freshmen 3 Transfer	2.92 3.34	--- 2.73	21 (*n* = 1) 19 (*n* = 1)	--- 520 (*n* = 1)	--- 640 (*n* = 1)
Fall 2008	23 Freshmen 5 Transfers	3.80 3.07	-- 2.60	26.1 (*n* = 22) 21.3 (*n* = 3)	552.9 (n = 7) ---	594.3 (n = 7) ---
Spring 2009	--- 2 Transfers	--- 3.55	-- 3.26	--- 18.5 (n = 2)	--- 455.0 (n = 2)	--- 490.0 (n = 2)
Fall 2009	30 Freshmen 2 Transfers	3.60 3.72	--- 3.26	26.0 (*n* = 29) 28.0 (*n* = 1)	556.3 (*n* = 8) ---	595.0 (*n* = 8) ---
Spring 2010	--- 4 Transfers	--- 3.52	-- 3.13	--- 23.7 (n = 3)	--- ---	--- ---

[2] Program initiated fall 2006

Appendix III
Students' Entrance Abilities Pre-Engineering

Year	*N*	Mean High School GPA	Mean College GPA	Mean ACT	Mean SAT Verbal	Mean SAT Quantitative
Fall 2005	26 Freshmen 3 Transfer	3.61 3.38	--- 3.29	24.3 (*n* = 25) 29.0 (*n* = 2)	542.2 (*n* = 9) 600.0 (*n* = 1)	587.8 (*n* = 9) 660.0 (*n* = 1)
Spring 2006	--- ---	--- ---	--- ---	--- ---	--- ---	--- ---
Fall 2006	19 Freshmen 1 Transfer	3.34 ---	--- 2.48	21.4 (*n* = 16) ---	490.0 (n = 5) ---	486.0 (n = 5) ---
Spring 2007	0 Freshmen 1 Transfer	--- 2.98	--- ---	--- 19 (*n* = 1)	--- ---	--- ---
Fall 2007	17 Freshmen 6 Transfer	2.94 3.07	-- 2.80	21.4 (*n* = 16) 20.6 (*n* = 5)	442.5 (*n* = 4) ---	502.5 (*n* = 4) ---
Spring 2008	1 Freshmen 0 Transfer	2.72 ---	--- ---	25 (*n* = 1) ---	--- ---	--- ---
Fall 2008	8 Freshmen 2 Transfers	3.37 3.37	-- 3.15	22.3 (*n* = 7) 21.5 (*n* = 2)	510 (n = 2) 500 (n = 1)	510 (n = 2) 550 (n = 1)
Spring 2009	1 Freshmen 1 Transfers	2.90 ---	-- 3.07	21 (n = 1) ---	420 (n = 1) ---	480 (n = 1) ---
Fall 2009	25 Freshmen 5Transfers	3.30 2.57	--- 2.09	21.5 (*n* = 24) 21.7 (*n* = 3)	405 (*n* = 2) 390 (n = 1)	500 (*n* = 2) 390 (n = 1)
Spring 2010	1 Freshmen 2Transfers	2.34 ---	-- 3.36	24 (n = 1) ---	--- ---	--- ---

Appendix III
Students' Entrance Abilities Engineering Transfer[1]

Year	*N*	Mean High School GPA	Mean College GPA	Mean ACT	Mean SAT Verbal	Mean SAT Quantitative
Fall 2005	0 Freshmen 0 Transfer	--- ---	--- ---	--- ---	--- ---	--- ---
Spring 2006	--- ---	--- ---	--- ---	--- ---	--- ---	--- ---
Fall 2006	6 Freshmen 0 Transfer	3.31 ---	--- ---	24 (n = 6) ---	--- ---	--- ---
Spring 2007	0 Freshmen 1 Transfer	--- ---	--- 2.56	--- 21 (*n* = 1)	--- 510 (n = 1)	--- 480 (n = 1)
Fall 2007	5 Freshmen 0 Transfer	4.14 ---	--- ---	26.6 (*n* = 5) ---	573.3 (*n* = 3) ---	603.3 (*n* = 3) ---
Spring 2008	0 Freshmen 0 Transfer	--- ---	--- ---	--- ---	--- ---	--- ---
Fall 2008	2 Freshmen 1 Transfers	3.12 3.47	-- ---	27 (*n* = 2) ---	--- ---	--- ---
Spring 2009	0 Freshmen 2 Transfers	--- 3.78	-- 2.20	--- 32 (n = 1)	--- 575 (n = 2)	--- 525 (n = 2)
Fall 2009	1 Freshmen 1Transfers	3.42 3.17	--- ---	25 (*n* = 1) 17 (*n* = 1)	--- ---	--- ---
Spring 2010	0 Freshmen 0Transfers	--- ---	--- ---	--- ---	--- ---	--- ---

[1] Combined with Pre-engineering until spring 2006

Appendix IV
Students' Exit Abilities BS in Engineering[1]

Year	*N*	Mean GPA	Licensure Exam Results[2]	Certification Test Results	Other Standardized Exam Results
2005-06	0	---	NA	NA	NA
2006-07	0	---	NA	NA	NA
2007-08	0	---	NA	NA	NA
2008-09	4	2.68	3/4 = 75%	NA	NA
2009-10	19	3.17	17/19 = 89%	NA	NA

[1] First MU BSE graduates in 2008-2009, three years after initiation of the degree.

[2] The Fundamentals of Engineering (FE) exam is one of two exam requiring passage to become a registered professional engineer (PE). The two-year MU BSE passage rate is 20/23 = 87% compared to the national rate of approximately 75%.

Assessment of the Program's Student Learning Outcomes

1-year summary (Due to newness of program)

Component Area/Program/Discipline: <u>Bachelor of Science in Engineering (2009-2010 Report is Attached)</u>

Program Level				
Program's Student Learning Outcomes	**Assessment Measures (Tools)**	**Standards/Benchmark**	**Results/Analysis**	**Action Taken to improve the program**
The MU BSE program uses the (a) – (k) established by ABET, which states that, "Engineering programs must demonstrate that their students attain the following outcomes:"				
(a) an ability to apply knowledge of mathematics, science, and engineering	Fundamentals of Engineering (FE) exam results	MU BSE students shall perform at or above the national average in 11 of the 12 subjects assessed by the AM component of the FE exam.	April 2009 results: MU BSE students performed at or above in 11 of the 13 AM topics. Exceptions: Mathematics (49% vs 58%) and Dynamics (62% vs 68%)	Continue to monitor to see if trend continues over time.
		MU BSE students shall perform at or above in at least five of the nine subjects assessed by the PM civil engineering module of the FE exam.	April 2009 results: MU BSE students performed at or above in 7 of the 9 AM topics. Exceptions: Construction Mgt. (53% vs 60%) and Materials (55% vs 57%)	Goal was met. Continue to monitor to see if trend continues over time
	Senior Exit Surveys	Average score >= 1.0	1.4	Consisten with FE; continue to monitor; no action at this time.

Assessment of the Program's Student Learning Outcomes

1-year summary (Due to newness of program)

Component Area/Program/Discipline: Bachelor of Science in Engineering (2009-2010 Report & Plan are attached)

Program's Student Learning Outcomes	Assessment Measures (Tools)	Standards/Benchmark	Results/Analysis	Action Taken to improve the program
(b) an ability to design and conduct experiments, as well as to analyze and interpret data	FE exam results.	See statements above for outcome (a).		
	Locally developed rubric applied in CE331 (see BSE 2010 Assessment Report)	The average score on each category should be "Acceptable" or greater.	Goal was met, average cores ranged from 1.0 (Acceptable) tor greater.	Continue to monitor.
	Senior Exit Surveys	Average score > 0	1.5	Cosistent with FE; continue to monitor; no action at this time.
(**c) an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability**	FE exam results.	See statements above for outcome (a).		
	Students must bring real-world engineering project from inception in the senior capstone design course ENGR453.	Students are evaluated by faculty and practicing engineers at the end of their senior design project. Projects are assessed for thoroughness and adherence to engineering standards.	Design projects were brought to successful completion.	A rubric that provides a more objective evaluation (like those used for outcomes b and g) needs to be developed.
	Senior Exit Surveys	Average score >= 1.0	1.5	Cosistent with FE; continue to monitor; no action at this time.
(d) an ability to function on multidisciplinary teams	Performance in ENGR453 evaluated via peer assessment tool.	Average & median scores < 2 (1 is best, 4 is worst)	Avg. = 1.5, Median -1.4 Best = 1.0, Worst = 2.6	Consistent with senior survey, continue to monitor.
	Senior Exit Surveys	Average score >= 1.0	1.4	Cosistent with FE; continue to monitor; no action at this time.

Assessment of the Program's Student Learning Outcomes

1-year summary (Due to newness of program)

Component Area/Program/Discipline: Bachelor of Science in Engineering (2009-2010 Report & Plan are attached)

Program's Student Learning Outcomes	Assessment Measures (Tools)	Standards/Benchmark	Results/Analysis	Action Taken to improve the program
(e) an ability to identify, formulate, and solve engineering problems	FE exam results.	See statements above for outcome (a).		
	Senior Exit Surveys	Average score >= 1.0	1.4	Cosistent with FE; continue to monitor; no action at this time.
(f) an understanding of professional and ethical responsibility	FE exam results.	See statements above for outcome (a).		
	Senior Exit Surveys	Average score >= 1.0	1.3	Cosistent with FE; continue to monitor; no action at this time.
(g) an ability to communicate effectively	Communication rubric applied in ENGR453	Average score should be 2.0 (Acceptable) to 3.0 (Superior)	2.6	Goal achieved; however, continue to monitor.
	Senior Exit Surveys	Average score >= 1.0	1.4	Cosistent with FE; continue to monitor; no action at this time.
(h) the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context	MU Core Curriculum	Established by the university		
(i) a recognition of the need for, and an ability to engage in life-long learning	Senior Exit Surveys	Average score >= 1.0	1.4	Cosistent with FE; continue to monitor; no action at this time.

Assessment of the Program's Student Learning Outcomes

1-year summary (Due to newness of program)

Component Area/Program/Discipline: Bachelor of Science in Engineering (2009-2010 Report & Plan are attached)

Program's Student Learning Outcomes	Assessment Measures (Tools)	Standards/Benchmark	Results/Analysis	Action Taken to improve the program
(j) a knowledge of contemporary issues	Senior Exit Surveys	Average score >= 1.0	1.5	Cosistent with FE; continue to monitor; no action at this time.
(k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice	FE exam results.	See statements above for outcome (a).		
	Successful completion of senior project.	See results for outcome (c) above		
	Senior Exit Surveys	Average score >= 1.0	1.6	Cosistent with FE; continue to monitor; no action at this time.

Appendix VI
Program Course Enrollment – ENGR Courses

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
ENGR																			
107	Intro. To Engineering	R	Td	Huntington		47			48			47			57			67	
111	Engineering Computations	R	Td	Huntington			37			46			41			56			53
201	Circuits I	R	Td	Huntington		11			11			13			24			15	
202	Circuits II	S	Td	Huntington			0			3			1			0			0
204	Digital Systems	S	Td	Huntington															
213	Statics	R	Td	Huntington		21			34			29			25			33	
214	Dynamics	R	Td	Huntington			17			22			21			18			27
216	Mech. Of Deform. Bodies	R	Td	Huntington			12			24			20			18			27
219	Thermodynamics	R	Td	Huntington															
221	Engineering Economics	R/S	Td	Huntington		18	13		14	14		20	22		24	26	9	25	33
318	Fluid Mechanics	R	Td	Huntington		12			7			16			20			18	
451	Project Management	R	Td	Huntington															
452	Engineering Practice	R	Td	Huntington					14			5			12			5	
453	Senior Design	R	Td	Huntington						12			6			15			

Required/Elective: Required = R; Elective = E; Service = S (Please indicate all that apply; e.g. E + S, if the course is both an elective and a service course.
Delivery Method: Traditional = Td, Online = O, Hybrid = H
Location: Huntington, South Charleston, Point Pleasant, etc.

Appendix VI

Program Course Enrollment – CE Courses

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
CE																			
241	Geomatics	R	Td	Huntington		19			18			26			18			29	
312	Structural Analysis	R	Td	Huntington		13			5			13			24			16	
321	Civil Engineering Materials	E	Td	Huntington		12			15			6			12			13	
322	Soil Mechanics	E	Td	Huntington			11			6			11			12			19
331	Hydraulic Engineering	E	Td	Huntington			12			7			14			20			13
342	Transportation Engineering	R	Td	Huntington			12			7			15			19		20	
413	Reinforced Concrete	R	Td	Huntington			11			6			11			21			14
414	Steel Design	E	Td	Huntington						8			5			11			4
425	Foundation Design	E	Td	Huntington					9			9				8		13	
432	Water/Wastewater Treatment	R	Td	Huntington					12			5			12			22	
433	Hydrologic Engineering	E	Td	Huntington					11			7			14			11	
434	Adv. Water/Wastewater Tr.	E	Td	Huntington						11		6				3			8
443	Highway Design	E	Td	Huntington												5			5

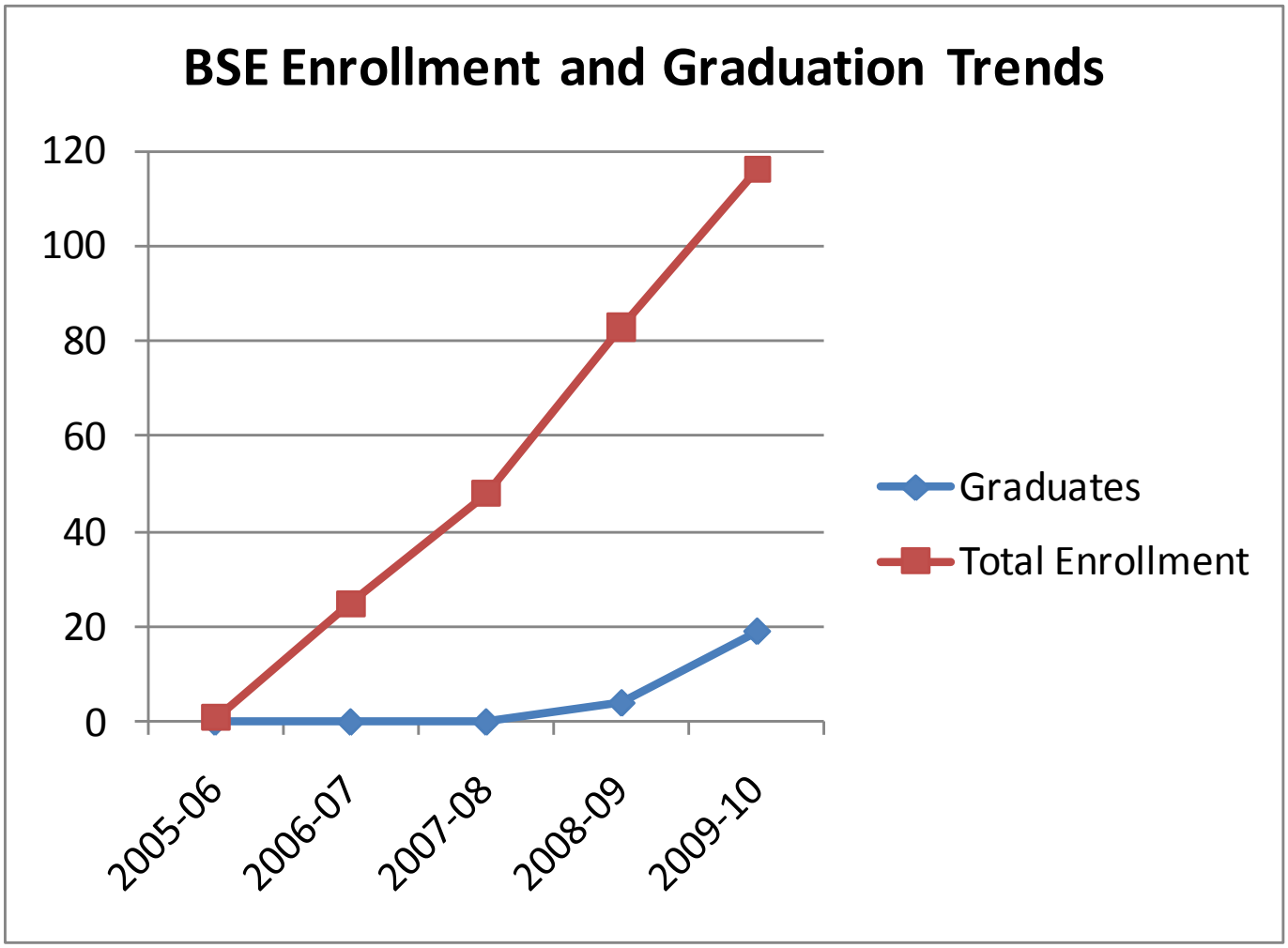
Required/Elective: Required = R; Elective = E; Service = S (Please indicate all that apply; e.g. E + S, if the course is both an elective and a service course.
Delivery Method: Traditional = Td, Online = O, Hybrid = H
Location: Huntington, South Charleston, Point Pleasant, etc.

Appendix VII

Program Enrollment - Engineering

Students	Year 1 2005-2006	Year 2 2006-2007	Year 3 2007-2008	Year 4 2008-2009	Year 5 2009-2010
New Students Admitted (Engineering Transfer)	0	6	5	2	1
New Students Admitted (Pre-Engineering)	26	19	18	9	26
New Students Admitted (BSE, Civil Emphasis)	0	14	14	23	30
Principal Majors Enrolled	1	25	48	83	116
Grand Total of Students Enrolled in the Program	1	25	48	83	116
Graduates of the program	0	0	0	4	21[1]

[1] Includes summer 2010 graduate.


BSE Enrollment and Graduation Trends
120
100
80
60
40
20
0
2005-06
2006-07
2007-08
2008-09
2009-10
Graduates
Total Enrollment

Appendix VIII

Job and Graduate School Placement Rates

Year	# of graduates employed in major field	# of graduates employed in related fields	# of graduates employed outside field	# of graduates accepted to Graduate Programs	# of graduates not accounted for
2005-06	N/A	N/A	N/A	N/A	N/A
2006-07	N/A	N/A	N/A	N/A	N/A
2007-08	N/A	N/A	N/A	N/A	N/A
2008-09	2	0	2[1]	0	0
2009-10	12	0	1	4	4
Five –Year Total [2]	14	0	3	4	4

[1]Both graduates entered the military after graduation

[2] Includes summer 2010 graduate

Appendix IX

BS in Engineering
(BSE)

2009 – 2010
Assessment Activity

A major event occurred in the fall of 2009: the first ever ABET accreditation visit took place for the MU BSE degree program. More precisely, the Engineering Accreditation Commission (EAC) of the Accreditation Board for Engineering and Technology (ABET) reviewed a Self-Study Report and conducted a three-day campus visit to determine if the BSE program satisfied each of the eight ABET criteria for accreditation:

1. Students
2. Program Educational Objectives
3. Program Outcomes
4. Continuous Improvement
5. Curriculum
6. Faculty
7. Facilities
8. Support

As a consequence of preparing for the ABET visit, conducting the visit, and recovering from the visit, a BSE Assessment Report was not filed for the 2009-2010 academic year. However, the following pages document the level of assessment that did, indeed, take place. In addition assessment data, such as senior exit surveys and the first results from the national Fundamentals of Engineering (FE) exam, which was not available until recently due to the newness of the BSE program has now been included.

The following pages contain a description of the BSE assessment activity that have taken place since, and in part, due to the ABET visit. Included are:

- 2009-2010 Assessment Results
- A draft of the 2010-2011 BSE Assessment Plan

Assessment Results for the Marshall University
Bachelor of Science in Engineering (BSE) Program
2009-2010

COVER SHEET

Goals:

- Useful – Assessment results can be used to identify programs strengths and weaknesses, including strengths and weaknesses of the BSE assessment process.
- Accurate – Data collected provide information that paints a realistic picture of the extent to which the BSE program is achieving its published program objectives and learning outcomes.
- Maintainable and sustainable - The BSE assessment process should not be burdensome but relatively easy to update and maintain from year-to-year.

Assessment Results for the Marshall University
Bachelor of Science in Engineering (BSE) Program
2009-2010

I. Background

The MU BSE Assessment Plan describes several instruments that are to be used to measure the degree to which the program is achieving its published educational objectives and learning outcomes. The following pages describe the results obtained using each of these instruments, conclusions that can be drawn from the data, and any suggestions for program changes or modifications to the assessment mechanisms that may be warranted

The BSE educational objectives and learning outcomes are restated below for reference. Data collected using the various tools cited in the BSE Assessment Plan will be discussed in the following pages.

BSE Program Educational Objectives - The Marshall University Bachelor of Science in Engineering (BSE) program goals are:

1. BSE graduates will be recognized for their success in designing engineering systems that promote the health, safety, and welfare of the public.
2. BSE graduates will demonstrate their awareness of an engineer's role in contemporary society and their understanding of the societal and environmental contexts of engineering projects.
3. BSE graduates will practice in specific areas of engineering that are consistent with the needs of the region served by Marshall University.

BSE Program Learning Outcomes - Marshall University BSE graduates shall have:

(a) an ability to apply knowledge of mathematics, science and engineering;
(b) an ability to design and conduct experiments, as well as to analyze and interpret data;
(c) an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability;
(d) an ability to function on multidisciplinary teams;
(e) an ability to identify, formulate, and solve engineering problems;
(f) an understanding of professional and ethical responsibility;
(g) an ability to communicate effectively;
(h) the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context;
(i) a recognition of the need for, and an ability to engage in life-long learning;
(j) a knowledge of contemporary issues;
(k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

II. Summary of 2009-2010 BSE Assessment Results

Detailed data, where available, is provided for each assessment tool identified in the MU BSE Assessment Plan employed during the 2009-2010 academic year. These tools were used to measure published goals for both the BE program educational objectives and the BSE learning outcomes. A

summary of results is provided below, followed by more detailed explanations for the various measures. In addition, observations and suggestion actions are recommended, where appropriate.

Summary of Assessment Results for MU BSE Program Educational Objectives			
Measure	**Objective(s)**	**Goal**	**Met**
FE Exam Participation	1	100% of BSE graduates will take the FE Exam within one year of graduation.	Yes
FE Exam Passage Rate	1	MU BSE FE passage rate will be at or above the national level.	Yes
Senior Exit Interviews	1 & 3	All graduating seniors will participate in an exit interview; overall satisfaction with the BSE program will be 80% or higher.	Yes
Alumni Surveys	1, 2, & 3	BSE Alumni will indicate: • a cumulative satisfaction with their level of technical preparation of 80% or higher; • employment in areas consistent with the needs of the MU service region; • active participation in regional professional organizations; and • successively higher levels of professional responsibility	(1)
Employer Surveys	1, 2, & 3	MU BSE employers will indicate: • a cumulative satisfaction of 80% or higher with the level MU BSE graduates' technical preparation; • a cumulative satisfaction of 80% or higher regarding BSE graduates' communications and non-technical skills; and • BSE graduates are fulfilling the technical needs of regional employers.	(1)
PE Exam Participation	1	75% of MU BSE graduates will take the PE Exam	(1)
PE Passage Rate	1	MU BSE PE passage rates will be at or above the national; average	(1)

(1) Due to the newness of the program, these measures cannot be made until 2012 or later.

The following matrix identifies the mechanisms and courses used to assess the various BSE learning outcomes. With the exception of the senior exit interviews which measure student perception, all the assessment tools provide a direct measure of student achievement. As noted by the shaded boxes, some items will be developed and applied during the 2010-2011 academic year.

Learning Outcomes Assessment Matrix

Outcome	a	b	c	d	e	f	g	h	i	j	k
FE Exam	x	x	x		x	x					x
Senior Exit Interview	x	x	x	x	x	x	x	x	x	x	x
MU Core								x		x	
CE331		x[1]									
ENGR451							x[1]				
ENGR452	x[2]				x[2]	x[2]			x[1]		
ENGR453	x[2]		x[1]	x[2]	x[2]		x[1]				x[1]

[1] Locally developed rubric [2] Assessed using sample FE exam

Summary of Assessment Results for MU BSE Program Learning Outcomes			
Outcome	**Measure**	**Goal**	**Met**
(a)	1 2 3	• MU students perform at or above the national average on the FE exam. • Students shall perceive that this outcome has been attained. • ENGR452 (AM) & ENGR453 (PM) Sample FE exam results	Yes Yes TBD
(b)	1 2 3	• MU students perform at or above the national average on the FE exam. • Students shall perceive that this outcome has been attained. • CE331 Rubric	Yes Yes Yes
(c)	1 2 3	• MU students perform at or above the national average on the FE exam. • Students shall perceive that this outcome has been attained. • ENGR453 Rubric (under development)	Yes Yes TBD
(d)	2 3	• Students shall perceive that this outcome has been attained. • ENGR453 Rubric	Yes Yes
(e)	1 2 3	• MU students perform at or above the national average on the FE exam. • Students shall perceive that this outcome has been attained. • ENGR452 (AM) & ENGR453 (PM) Sample FE exam results	Yes Yes TBD
(f)	1 2 3	• MU students perform at or above the national average on the FE exam. • Students shall perceive that this outcome has been attained. • ENGR452 (AM) Sample FE exam results	Yes Yes TBD
(g)	2 3 3	• Students shall perceive that this outcome has been attained. • ENGR451 Rubric (writing skills, rubric under development) • ENGR453 Rubric	Yes TBD Yes
(h)	2 3	• Students shall perceive that this outcome has been attained. • Results from MU Gen Ed assessment (results pending)	Yes TBD
(i)	2 3	• Students shall perceive that this outcome has been attained. • ENGR452 Rubric (under development)	Yes TBD
(j)	2 3	• Students shall perceive that this outcome has been attained. • Results from MU Gen Ed assessment (results pending)	Yes TBD
(k)	1 2 3	• MU students perform at or above the national average on the FE exam. • Students shall perceive that this outcome has been attained. • ENGR453 Rubric (under development)	Yes Yes TBD

1 – Fundamentals of Engineering exam results.
2 – Senior exit interviews
3 – Locally developed rubric/measures.

III. Observations and Recommendations

Achievement of Education Objectives: While a complete picture cannot be generated until the program has an opportunity to administer and analyze results from alumni and employer surveys and PE exam results, preliminary indications from other assessment tools - the 100% level of participation in the FE exam, FE exam passage rates, and results of the first senior exit satisfaction survey – provide a high level of confidence that the stated MU BSE program objectives will be met.

Achievement of Learning Outcomes: Assessment data indicate that the MU BSE learning outcomes are being satisfied. This conclusion is based upon the following facts:

1. MU BSE seniors taking the Fundamentals of Engineering (FE) exam have a passage rate that is consistently higher than the national average for students taking the same exam.
2. With the exception of mathematics and dynamics, MU BSE seniors taking the FE exam appear to score at or above the national average in each subject matter area of the AM (breadth) component of the exam. Using a range of scores based upon a 95% confidence interval, however, BSE scores are at least equivalent to the national average in all subject matter areas of the AM component of the FE exam.
3. MU BSE seniors taking the FE exam appear to meet the stated goal of scoring "at or above the national average level of performance on at least five of the nine subject matter areas of the FE PM Civil Engineering module". Using a 95% confidence interval, MU BSE student scores are equivalent to the national average in all nine subject matter areas of the FE PM civil engineering module. Using raw scores, MU BSE students scored at or above the national average in four of the nine categories in the April 2009 exam and seven of the nine in the April 2010 exam. The substantial improvement between the 2009 and 2010 exam administrations is a very positive indicator.
4. Results obtained via a senior exit survey are consistent with FE exam results. Graduating seniors indicate a high level of satisfaction that each of the eleven BSE program learning outcomes is being attained.
5. Peer evaluations conducted in ENGR453 during the spring semester indicate that outcome-d (an ability to function on multidisciplinary teams)is being achieved.

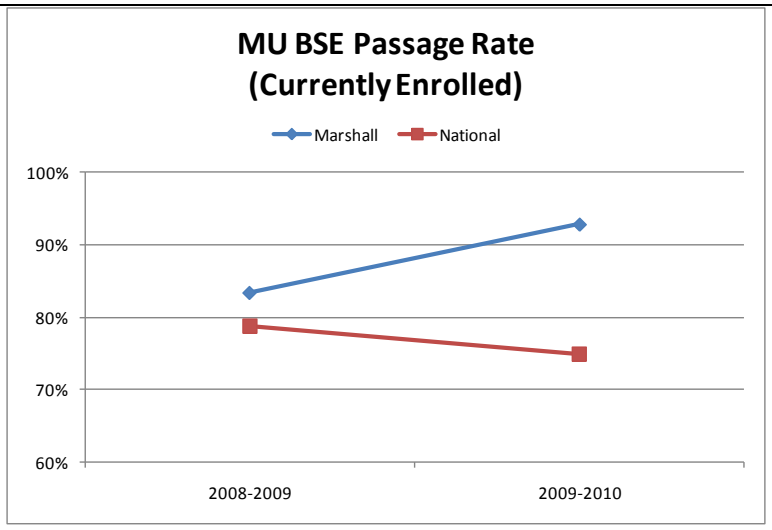
Recommendations: While assessment data provide positive indications regarding attainment of the program's published educational objectives and learning outcomes, there are two specific issues that need special attention.

1. FE exam performance in mathematics and dynamics. While it is somewhat premature to conclude that stated goals are not being met, additional attention needs to be given to these two subject matter areas during the FE review process. Should performance still fall below the established goal, curricular changes may be necessary?
2. Completion of locally developed rubrics. Not all of the eleven BSE learning objectives can be measured using the FE exam. Locally developed rubrics must be used to provide the needed data for assessing BSE learning outcomes not addressed by the FE exam. In addition, locally developed rubrics will provide an additional measurement for the outcomes that are assessed by the FE exam. The rubrics that need to be developed and applied during the 2010-2011 academic year are identified in the Assessment Matrix shown previously.

IV. BSE Assessment Detail

BSE Assessment Detail: Educational Objectives

Tool	Objective(s) Addressed	Rationale	Indicator/Goal	Review Schedule
FE Exam Participation	1	Taking and passing the FE exam is a required step in becoming a licensed professional engineer (PE). The primary purpose of PE licensure is to "protect the health, safety, and welfare of the public".	100% of BSE graduates will take the FE Exam within one year of graduation.	Annually, with participation level and passage rate trends examined over time.
Results: To date, the goal of 100% participation has been met. This level of voluntary participation indicates that the BSE students understand the importance of professional licensure, and that the students have taken the first step to their ultimate goal: professional licensure				
Action Required: None. Continue to monitor participation rate.				

Tool	Objective(s) Addressed	Rationale	Indicator/Goal	Review Schedule
FE Exam Passage Rate	1	Taking and passing the FE exam is a required step in becoming a licensed professional engineer (PE). The primary purpose of PE licensure is to "protect the health, safety, and welfare of the public".	MU BSE FE passage rate will be at or above the national level.	Annually, with participation level and passage rate trends examined over time.
Results: As indicated by the graph below, the passage rate for MU BSE students has been above the national passage rate for both years that MU BSE students have taken the FE exam. Furthermore, the MU passage rate seems to have improved significantly in the most recent exam cycle while the national rate declined over the same period. This improvement may be the result of a better organized exam review process made possible by the increase in credit hours for ENGR452 (from 1 to 3 credits). One component of the newly designed course is dedicated to review for the FE exam.				
				
Action Required: None. Continue to monitor passage rate.				

Tool	Objective(s) Addressed	Rationale	Indicator/Goal	Review Schedule
Senior Exit Interviews	1 & 3	Exit interviews will determine employment and/or additional education plans of BSE graduates. Information regarding student perception of technical preparation, as well as other facets of the BSE program, will also be collected during exit interviews.	Graduating seniors will participate in an exit interview indicating their satisfaction with the BSE program / 100% participation with a cumulative satisfaction of 80% or higher.	Annually, with trends examined over time.
Results: The first senior exit interviews were conducted during the spring semester of 2010; the results of these interviews are attached to this report. It appears that the goals, 100% participation and an 80% or higher satisfaction level, were achieved. The 100% participation level may have been a result of an easy-to-use online format that was developed and applied in the capstone design course, ENGR453.				
Action Required: None. Continue to administer exit interviews and trend responses over time.				

Tool	Objective(s) Addressed	Rationale	Indicator/Goal	Review Schedule
Alumni Surveys	1, 2 & 3	Alumni surveys will provide information regarding professional accomplishments such as passage of the PE exam, graduate education, and the nature of engineering projects alumni have undertaken since graduation. Alumni surveys will also provide alumni perceptions of each of the BSE objectives.	BSE Alumni will indicate: • a cumulative satisfaction with their level of technical preparation of 80% or higher; • employment in areas consistent with the needs of the MU service region; • active participation in regional professional organizations; and • successively higher levels of professional responsibility	Annually, with each alumnus receiving the survey once every three years, starting in June, 2012.
Results: None. First administration of these surveys[1] is scheduled for 2012.				
Action Required: N/A				

Tool	Objective(s) Addressed	Rationale	Indicator/Goal	Review Schedule
Employer Surveys	1, 2 & 3	Employer surveys will provide employer perception regarding each of the BSE objectives.	MU BSE employers will indicate: • a cumulative satisfaction of 80% or higher with the level MU BSE graduates' technical preparation; • a cumulative satisfaction of 80% or higher regarding BSE graduates' communications and non-technical skills; and • BSE graduates are fulfilling the technical needs of regional employers.	Annually, with each employer receiving the survey once every three years, starting in June, 2012.
Results: None. First administration of these surveys[1] is scheduled for 2012.				
Action Required: N/A				

[1]Copies of the proposed alumni and employer surveys are included in the updated BSE Assessment Plan.

Tool	Objective(s) Addressed	Rationale	Indicator/Goal	Review Schedule
PE Exam Participation	1	After acquiring adequate experience, taking and passing the PE exam is a required step in becoming a licensed professional engineer (PE). The primary purpose of PE licensure is to "protect the health, safety, and welfare of the public".	75% of MU BSE graduates will take the PE Exam	Annually, beginning in 2014, with participation level and passage rate trends examined over time.
Results: None. The first MU BSE graduates will not be eligible to take the PE exam until acquiring the required four years of professional experience.				
Action Required: N/A				

Tool	Objective(s) Addressed	Rationale	Indicator/Goal	Review Schedule
PE Exam Passage Rates	1	After acquiring adequate experience, taking and passing the PE exam is a required step in becoming a licensed professional engineer (PE). The primary purpose of PE licensure is to "protect the health, safety, and welfare of the public".	MU BSE PE passage rates will be at or above the national; average.	Annually, beginning in 2014, with participation level and passage rate trends examined over time.
Results: None. The first MU BSE graduates will not be eligible to take the PE exam until acquiring the required four years of professional experience.				
Action Required: N/A				

BSE Assessment Detail: Learning Outcomes

As stated in the NCEES white paper titled *Using the Fundamentals of Engineering (FE) Exam as an Outcomes Assessment Tool*, the FE exam can be used to asses six of the eleven MU BSE learning outcomes:

(a) an ability to apply knowledge of mathematics, science, and engineering;
(b) an ability to design and conduct experiments, as well as to analyze and interpret data;
(c) an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability;
(e) an ability to identify, formulate, and solve engineering problems;
(f) an understanding of professional and ethical responsibility; and
(k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice

By analyzing the performance over time of MU students in the subject matter areas of the general (AM) component of the exam and the discipline-specific (PM) component of the exam, areas of needed improvement can be identified. Below are the performance goals established by the BSE faculty for the various subject matter areas of the FE exam (civil discipline). An evaluation of whether the established

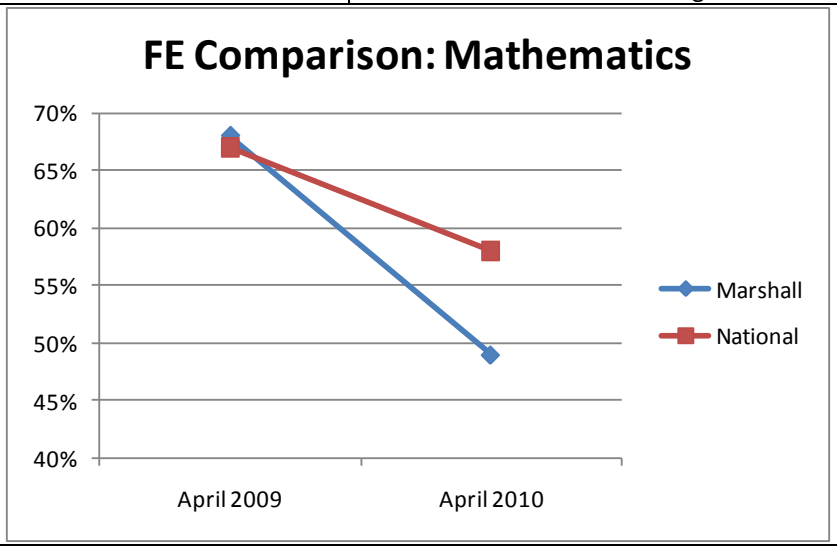
goals have been met is also given. It must be noted, however, that two years' of data are not sufficient to identify any significant performance trends.

Detailed two-year (April 2009 and April 2010) performance results are also shown for each subject matter area for both the AM and PM components of the FE exam. While the FE exam is administered nationally twice per year, in October and April, the data presented are from only the April exams. Nationally, there is fluctuation in results in the exam given in the fall compared to the exam given in the spring semesters. Greater consistency will be attained by using only April exam results. Furthermore, a greater number of MU students take the exam in April, after they have taken most of their required professional courses. For example, in reports obtained from NCEES, three "currently enrolled" students took the exam in October 2009, while 13 "currently enrolled" students took the exam in April 2010. Using the larger sample size from the April exam administration will also provide greater statistical reliability.

FE AM Subject Matter Area	**MU BSE Target Performance**	**Goal Achieved?**
Mathematics	At or above the national average	No
Engineering Probability and Statistics	At or above the national average	Yes
Chemistry	At or above the national average	Yes
Computers	At or above the national average	Yes
Ethics and Business Practices	At or above the national average	Yes
Engineering Economics	At or above the national average	Yes
Engineering Mechanics: Statics	At or above the national average	Perhaps
Engineering Mechanics: Dynamics	At or above the national average	No
Strength of Materials	At or above the national average	Yes
Material Properties	None	N/A
Fluid Mechanics	At or above the national average	Yes
Electricity and Magnetism	At or above the national average	Yes
Thermodynamics	At or above the national average	Perhaps

Two potential problem areas may have been identified: mathematics and dynamics. Greater attention may need to be given to these subject matter areas, depending on future exam results. Also, the BSE faculty may need to reconsider its decision to not establish a performance goal in the area of Material Properties. The original rationale assumed that performance of MU BSE students should be lower than the national average since there is no general, dedicated course required in the BSE curriculum. Over the last two exam administrations, however, the performance of MU BSE students has been statistically equivalent or higher than the national performance. This result may be due to the fact that MU BSE students are being compared to not all FE exam takers, but only those examinees who have opted to take the civil engineering module. It is likely that most of these students would not have had a general, dedicated course courses either.

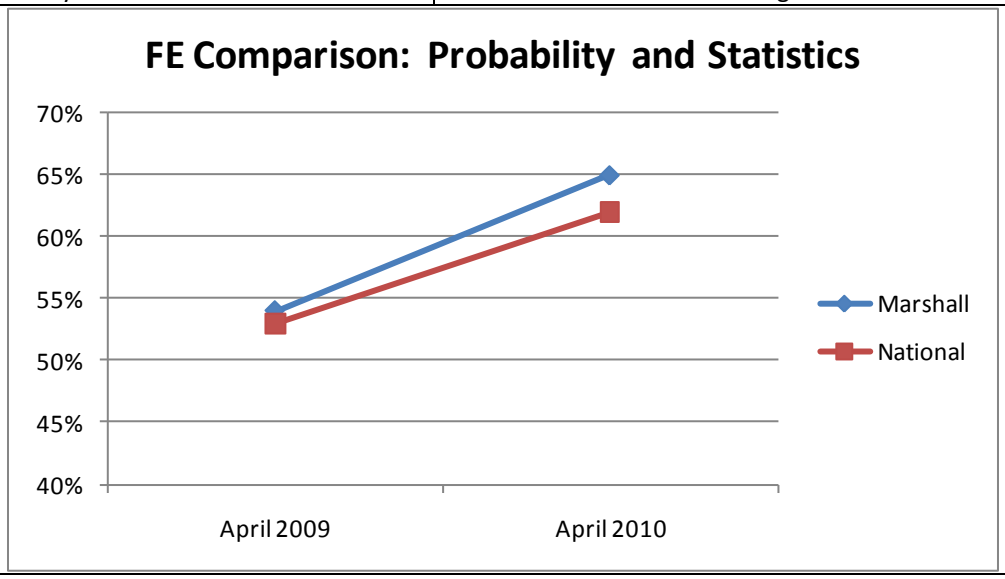
FE AM Subject Matter Area	MU BSE Target Performance
Mathematics	At or above the national average



Observations: MU student performance was statistically equivalent to the national level (68% compared to 67%) for the 2009 exam, but was significantly lower (49% compared to 56%) in 2010.

Action: Continue to monitor; more emphasis will be given to this area during the FE exam reviews.

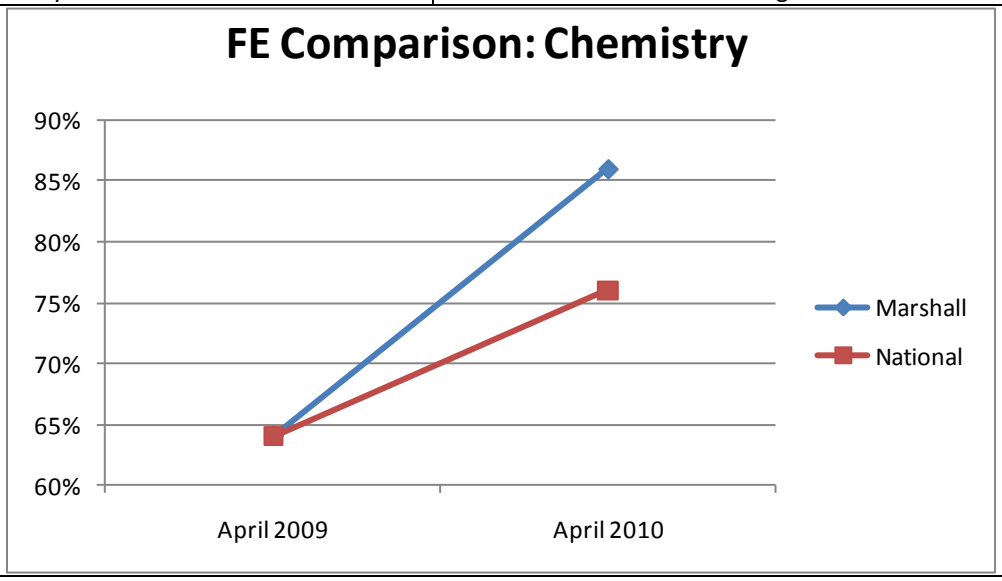
FE AM Subject Matter Area	MU BSE Target Performance
Probability and Statistics	At or above the national average



Observations: Over the two-year period MU student performance appears to be statistically equivalent to the national level of performance.

Action: Continue to monitor; no action at this time.

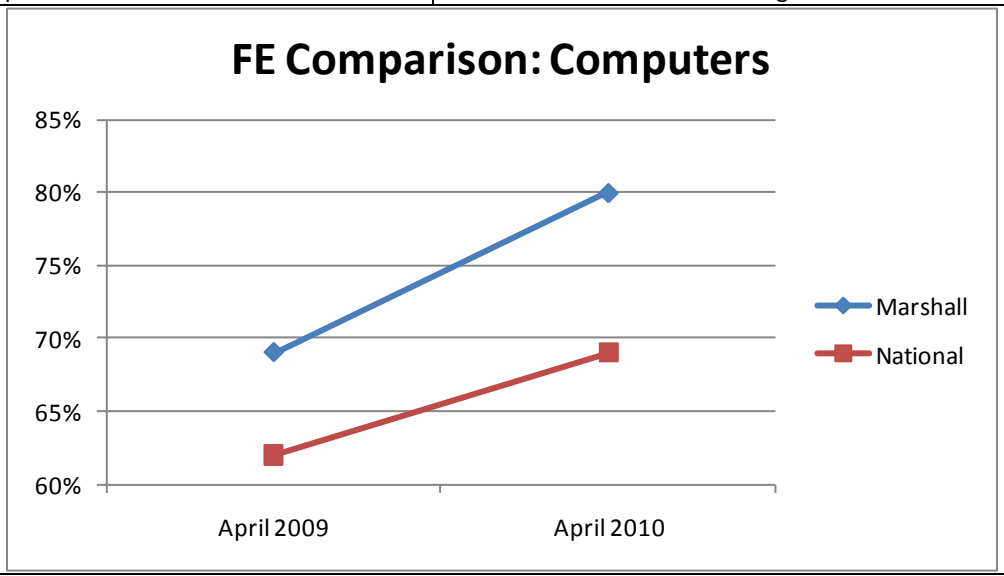
FE AM Subject Matter Area	MU BSE Target Performance
Chemistry	At or above the national average



Observations: Over the two-year period MU student performance appears to be statistically equivalent to or higher than the national level of performance.

Action: Continue to monitor; no action at this time.

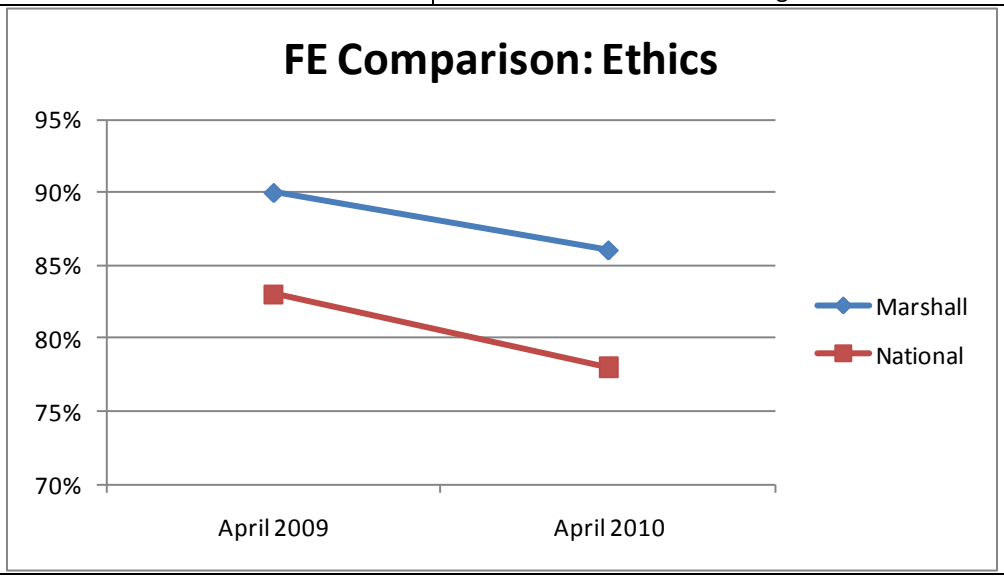
FE AM Subject Matter Area	MU BSE Target Performance
Computers	At or above the national average



Observations: Over the two-year period MU student performance appears to be higher than the national level of performance.

Action: Continue to monitor; no action at this time.

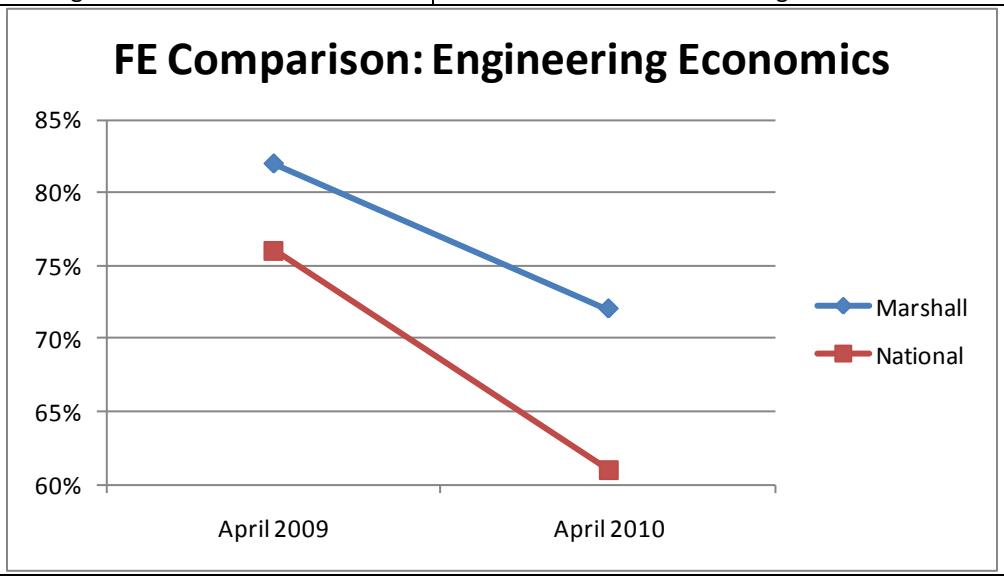
FE AM Subject Matter Area	MU BSE Target Performance
Ethics	At or above the national average



Observations: Over the two-year period MU student performance appears to be higher than the national level of performance.

Action: Continue to monitor; no action at this time.

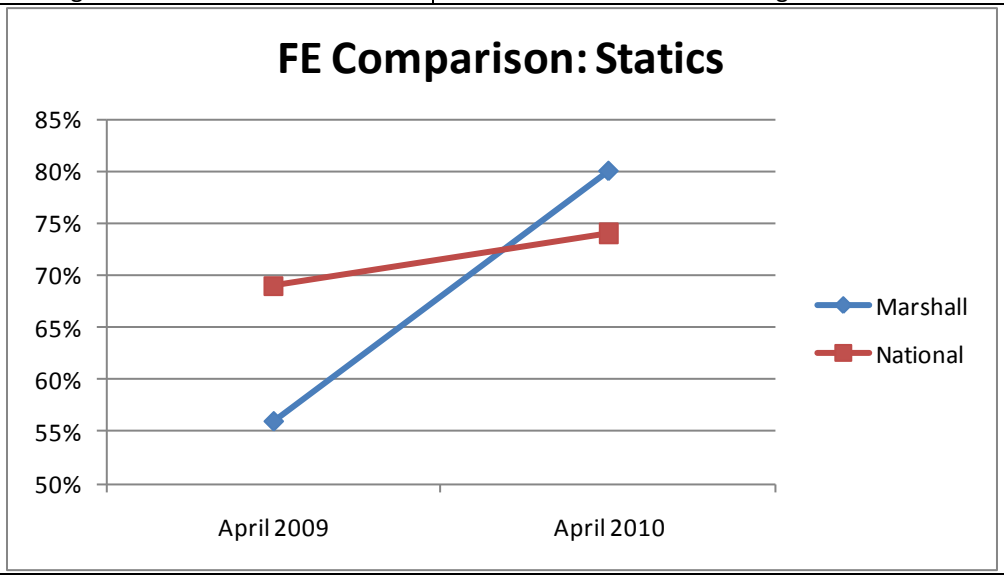
FE AM Subject Matter Area	MU BSE Target Performance
Engineering Economics	At or above the national average



Observations: Over the two-year period MU student performance appears to be higher than the national level of performance.

Action: Continue to monitor; no action at this time.

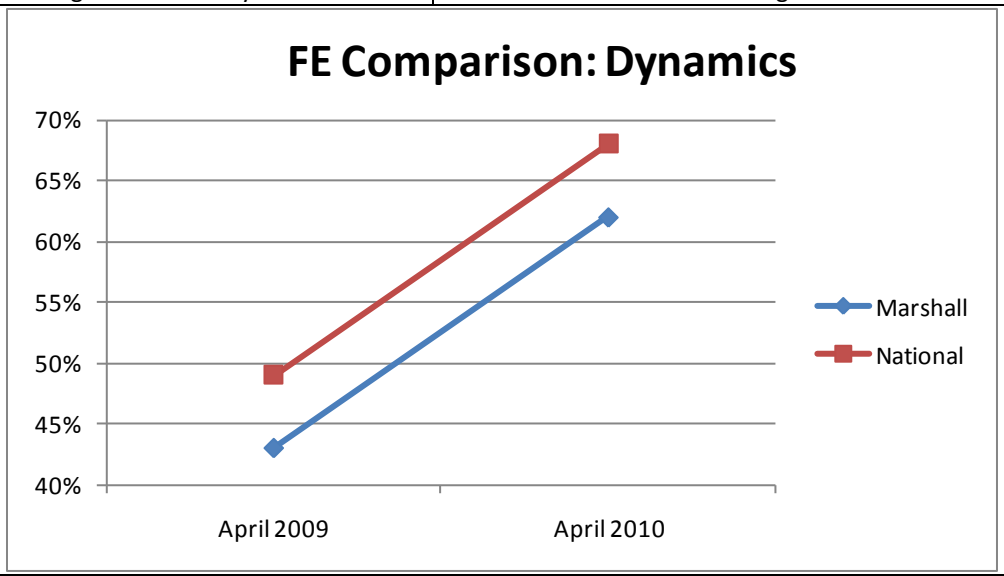
FE AM Subject Matter Area	MU BSE Target Performance
Engineering Mechanics: Statics	At or above the national average



Observations: While MU student performance was lower in 2009 (56% compared to 69%), significant improvement occurred in 2010 and MU students performed at a higher level (80% versus 74%).

Action: Continue to monitor; no action at this time.

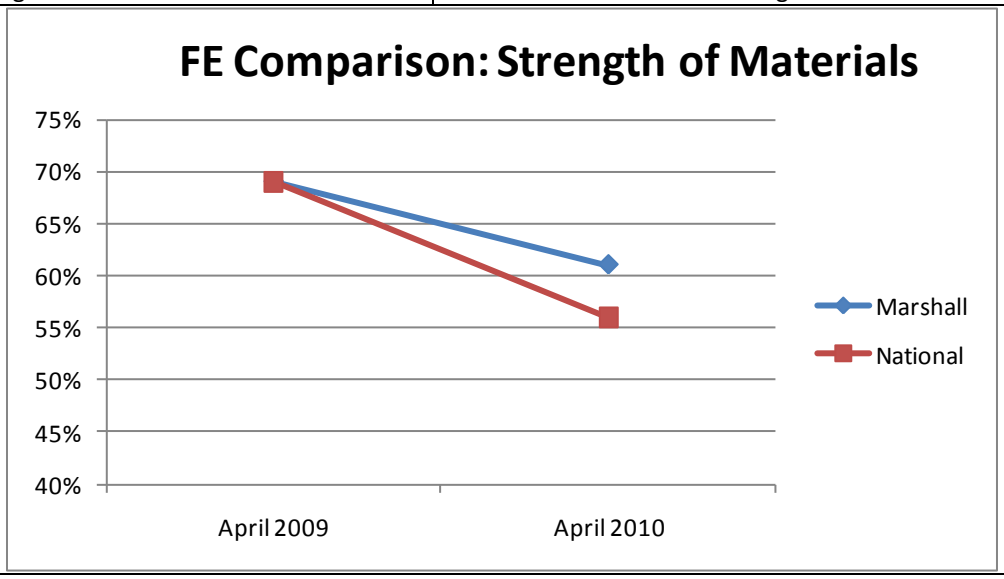
FE AM Subject Matter Area	MU BSE Target Performance
Engineering Mechanics: Dynamics	At or above the national average



Observations: Over the two-year period MU student performance appears to be about 6% lower than the national level of performance.

Action: Continue to monitor; add additionalemphasis during the FE review sessions.

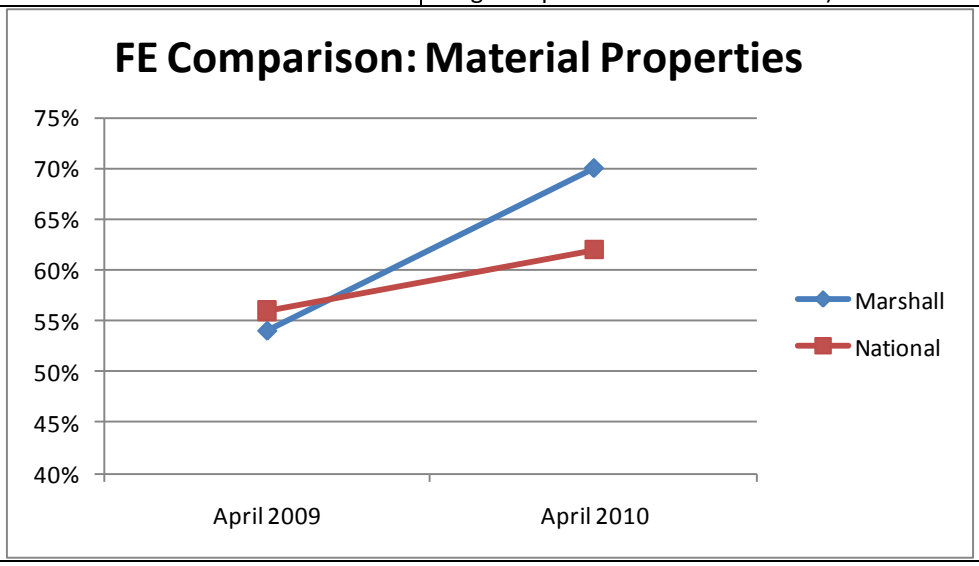
FE AM Subject Matter Area	MU BSE Target Performance
Strength of Materials	At or above the national average



Observations: MU student performance was statistically equivalent in 2009, but appeared to improve relative to the national level in 2010 (61% versus 56%).

Action: Continue to monitor; no action at this time.

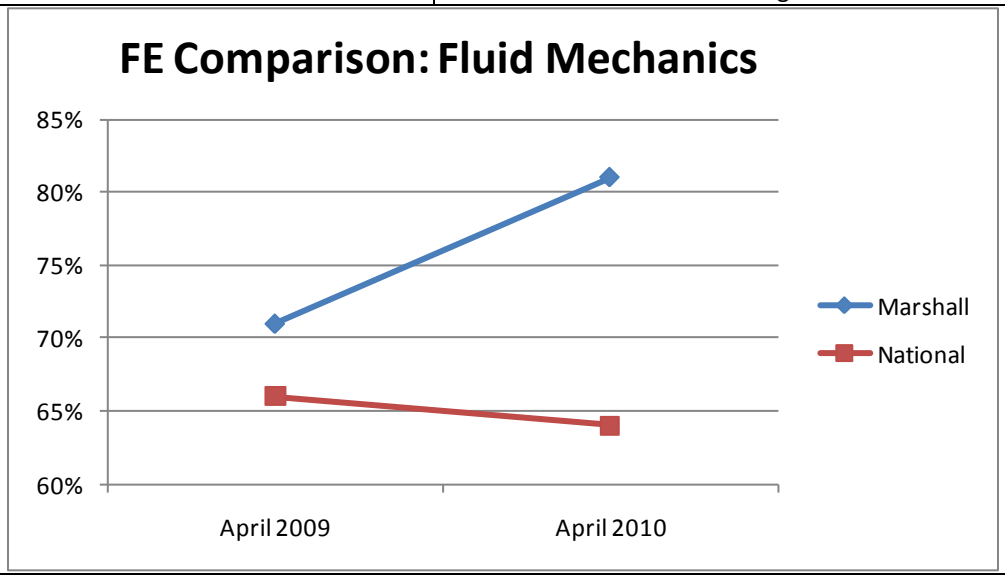
FE AM Subject Matter Area	MU BSE Target Performance
Engineering Materials	No goal established (no general materials course is taught as part of the BSE curriculum)



Observations: MU performance appears to be statistically equivalent or higher than the national level of performance.

Action: Continue to monitor; no action at this time.

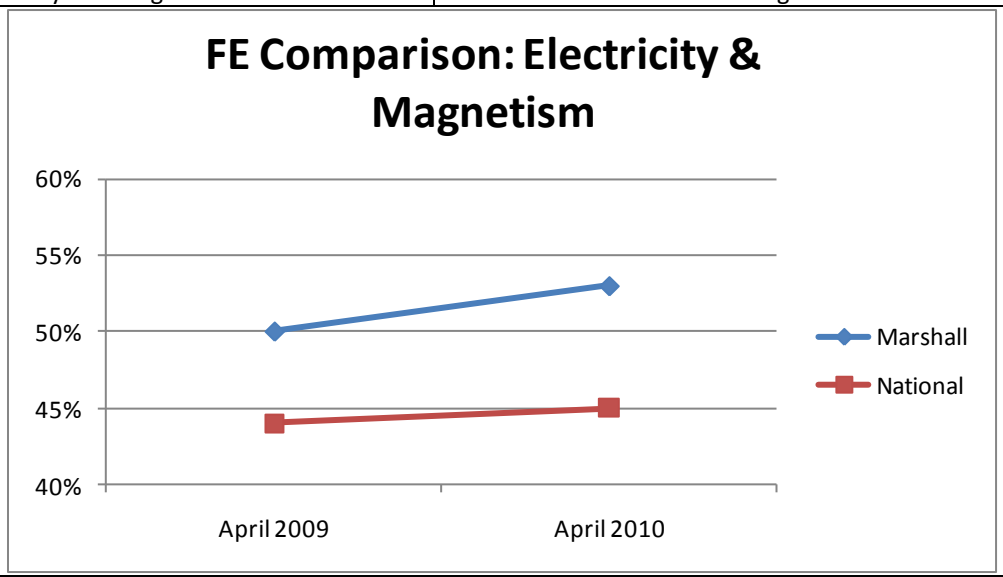
FE AM Subject Matter Area	MU BSE Target Performance
Fluid Mechanics	At or above the national average



Observations: MU student performance appears to be higher than the national level.

Action: Continue to monitor; no action at this time.

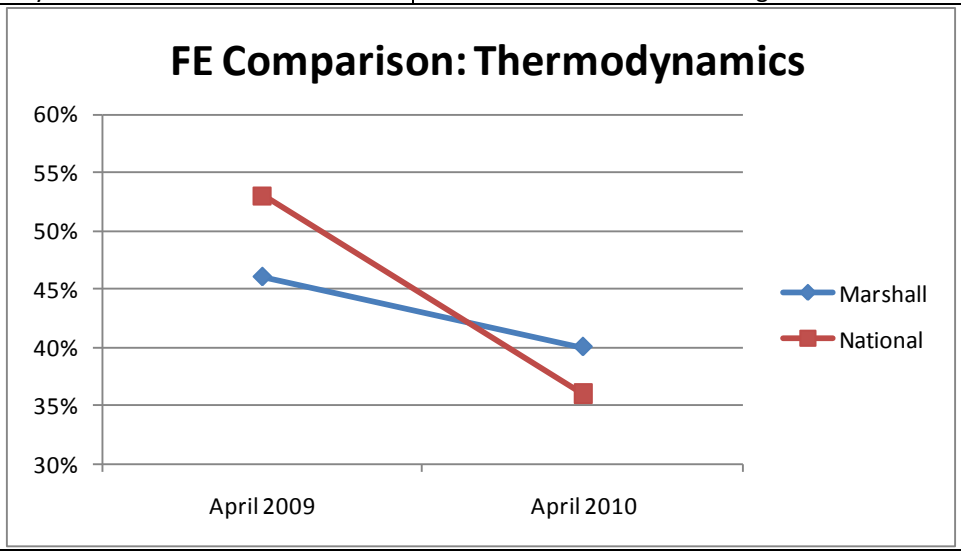
FE AM Subject Matter Area	MU BSE Target Performance
Electricity and Magnetism	At or above the national average



Observations: MU student performance appears to be higher than the national level.

Action: Continue to monitor; no action at this time.

FE AM Subject Matter Area	MU BSE Target Performance
Thermodynamics	At or above the national average



Observations: Relative to the national performance**,** MU student performance appears to be improving. This may be due to the introduction of a required course in the subject.

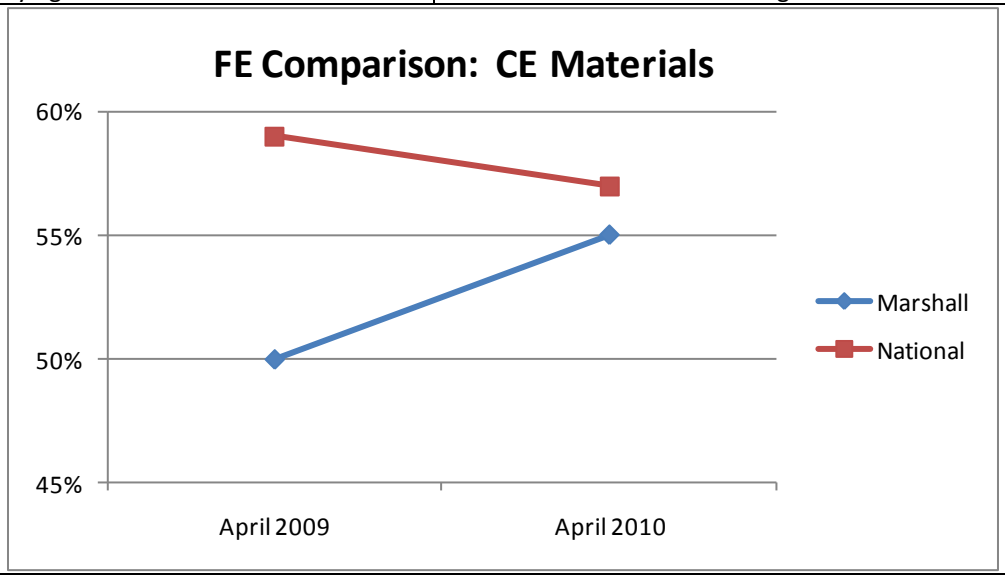
Action: Continue to monitor; no action at this time.

Because the MU BSE program is a general engineering degree with a civil engineering emphasis, MU students are not required to take multiple courses in as many civil engineering disciplines as students are typically required to take as part of a BS in Civil Engineering (BSCE). Consequently, the following goal has been established for MU BSE students for the FE exam with civil (PM) module: *MU BSE graduates who select the civil engineering area of emphasis shall perform at or above the national average level of performance on at least five of the nine subject matter areas of the FE PM Civil Engineering module.*

The subject matter areas of the FE Civil module are listed below, showing with the performance of MU BSE students for each of the two previous exam administrations. The conclusion is that the established goal was met in 2010, showing a definite improvement over 2009. More detailed results for each subject matter area in the PM exam are provided on the following pages.

	2009	2010	
FE Civil PM Subject Matter Areas	**MU/National**	**MU/National**	**Goal Met**
Surveying	45% / 51%	57% / 49%	No / Yes
Hydraulics and Hydrologic Systems	74% / 62%	58% / 57%	Yes / Yes
Soil Mechanics and Foundations	39% / 45%	60% / 56%	No / Yes
Environmental Engineering	69% / 73%	67% / 66%	No / Yes
Transportation	60% / 53%	61% / 59%	Yes / Yes
Structural Analysis	47% / 48%	63% / 62%	Yes / Yes
Structural Design	36% / 51%	55% / 53%	No / Yes
Construction Management	75% / 72%	53% / 60%	Yes / No
Civil Materials	50% / 59%	55% / 57%	No / No
Goal Met:	**4 of 9**	**7 of 9**	**No / Yes**

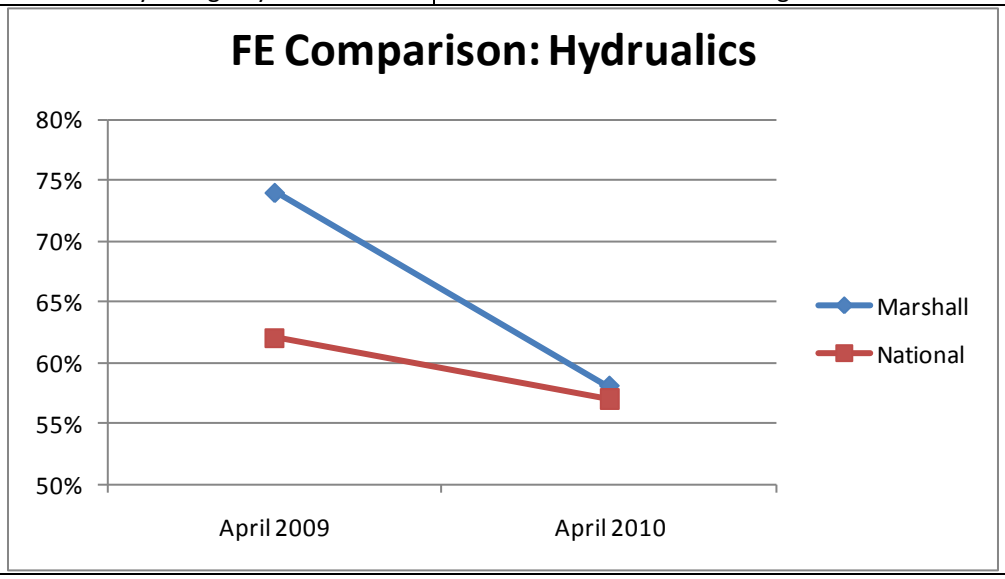
FE PM Subject Matter Area	MU BSE Target Performance
Surveying	At or above the national average



Observations: MU student performance seems to be improving in this area and is statistically equivalent in to the national averages in 2009 and 2010.

Action: Continue to monitor; no action at this time.

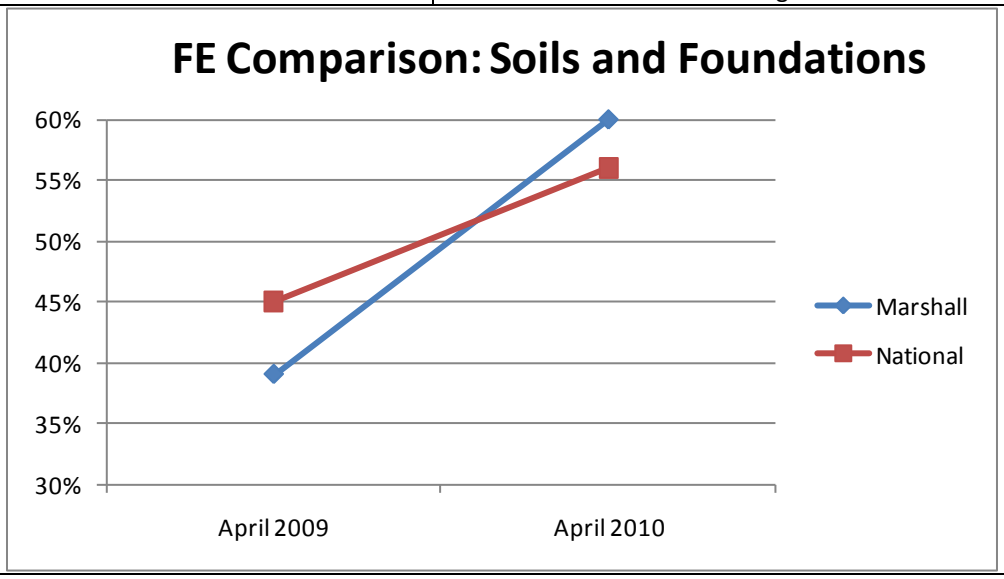
FE AM Subject Matter Area	MU BSE Target Performance
Hydraulics and Hydrologic Systems	At or above the national average



Observations: MU student performance appears to be equal to or higher than the national level.

Action: Continue to monitor; no action at this time.

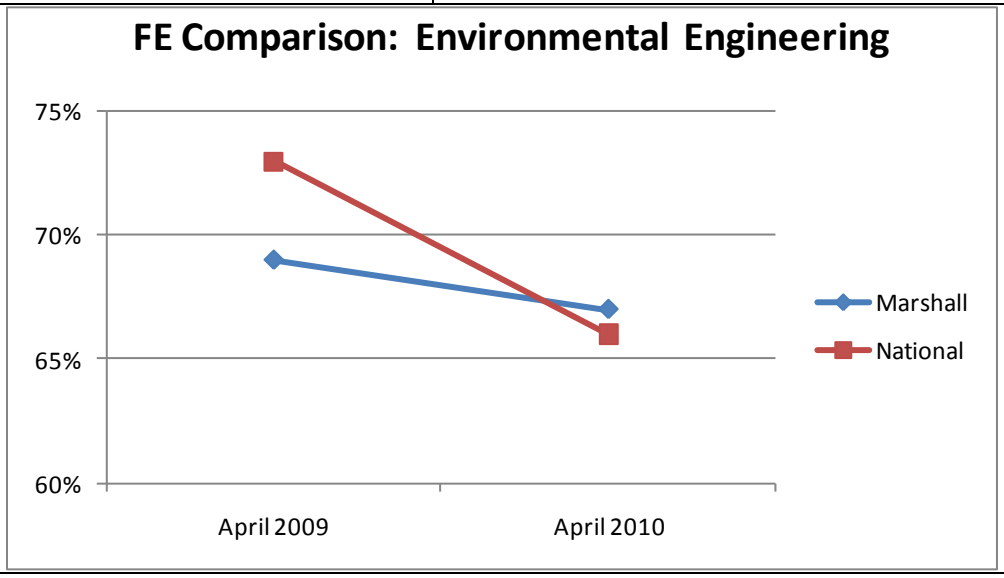
FE PM Subject Matter Area	MU BSE Target Performance
Soil Mechanics and Foundations	At or above the national average



Observations: MU student performance seems to be improving in this area.

Action: Continue to monitor; no action at this time.

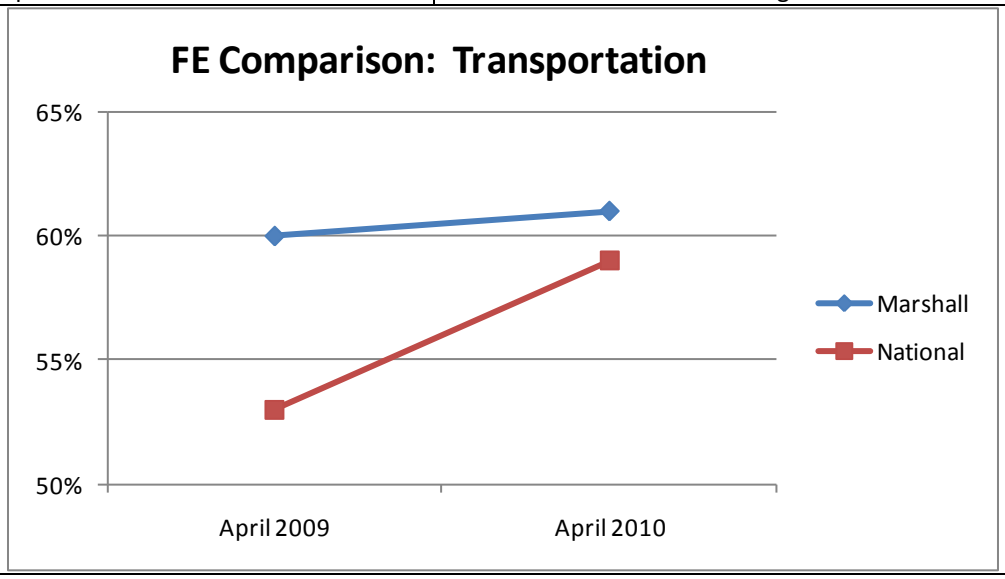
FE AM Subject Matter Area	MU BSE Target Performance
Environmental Engineering	At or above the national average



Observations: Relative to the national level of performance, MU student performance appears to be improving.

Action: Continue to monitor; no action at this time.

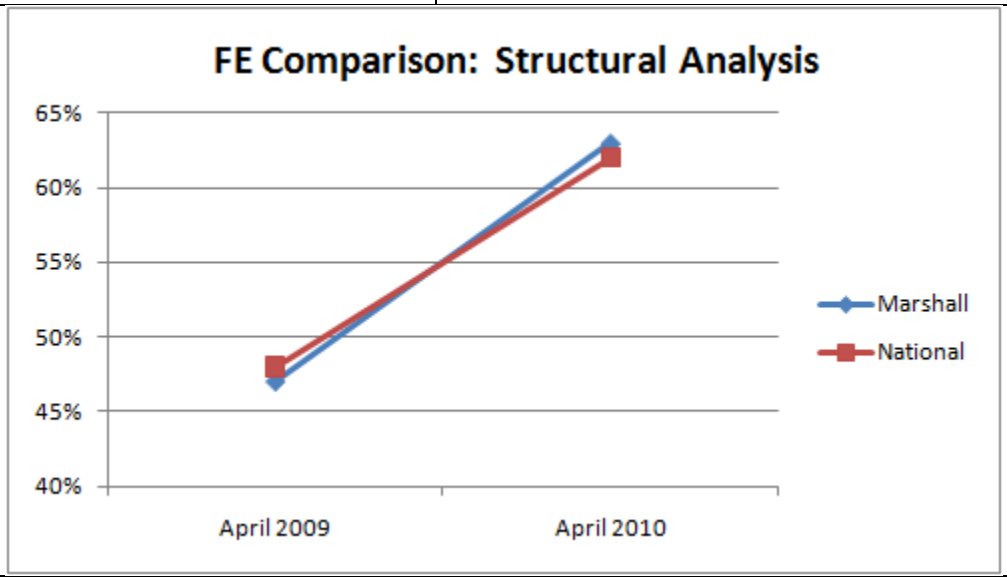
FE PM Subject Matter Area	MU BSE Target Performance
Transportation	At or above the national average



Observations: MU student performance appears to be above the national level.

Action: Continue to monitor; no action at this time.

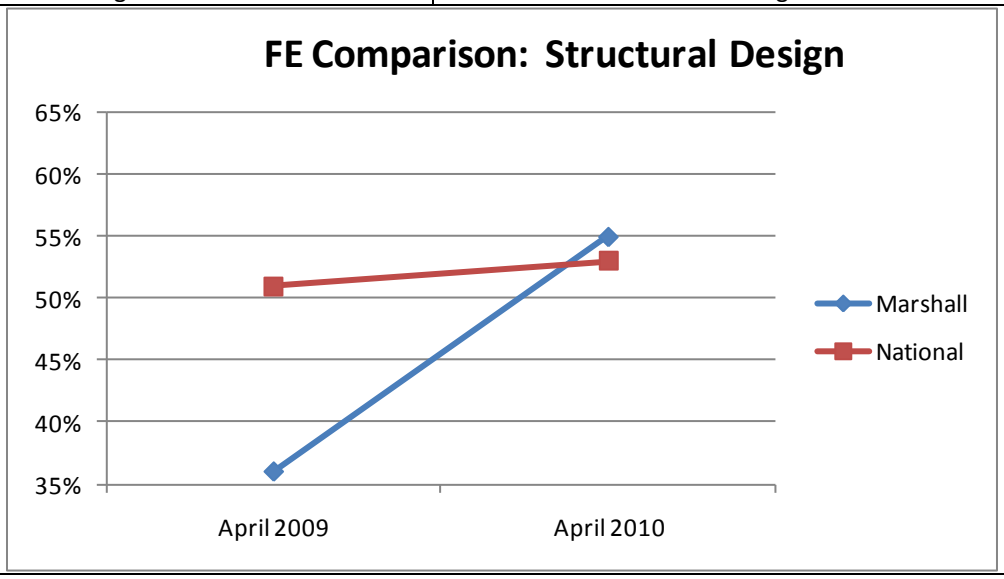
FE AM Subject Matter Area	MU BSE Target Performance
Structural Analysis	At or above the national average



Observations: MU student performance appears to be equivalent to the national level.

Action: Continue to monitor; no action at this time.

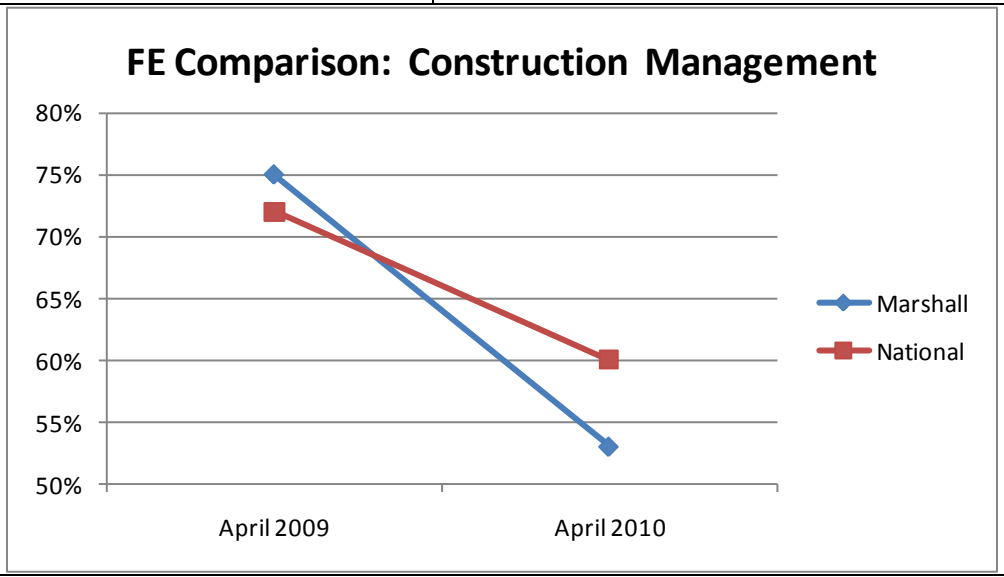
FE PM Subject Matter Area	MU BSE Target Performance
Structural Design	At or above the national average



Observations: MU student performance appears to be improving relative to the national level of performance.

Action: Continue to monitor; no action at this time.

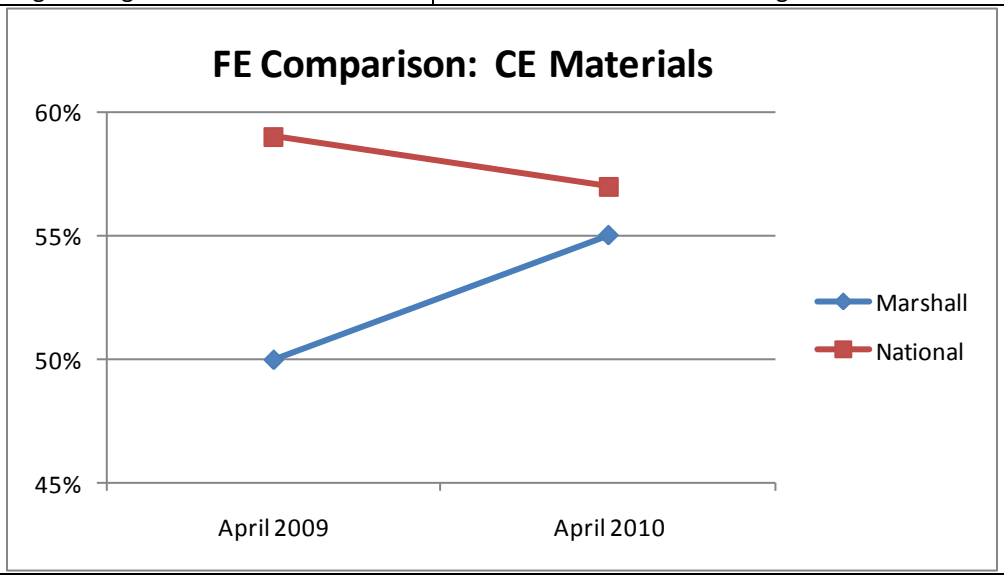
FE AM Subject Matter Area	MU BSE Target Performance
Construction Management	At or above the national average



Observations: MU student performance appears to be descreasing relative to the national level. A new required course in Project Management may reverse this trend.

Action: Continue to monitor; no action at this time.

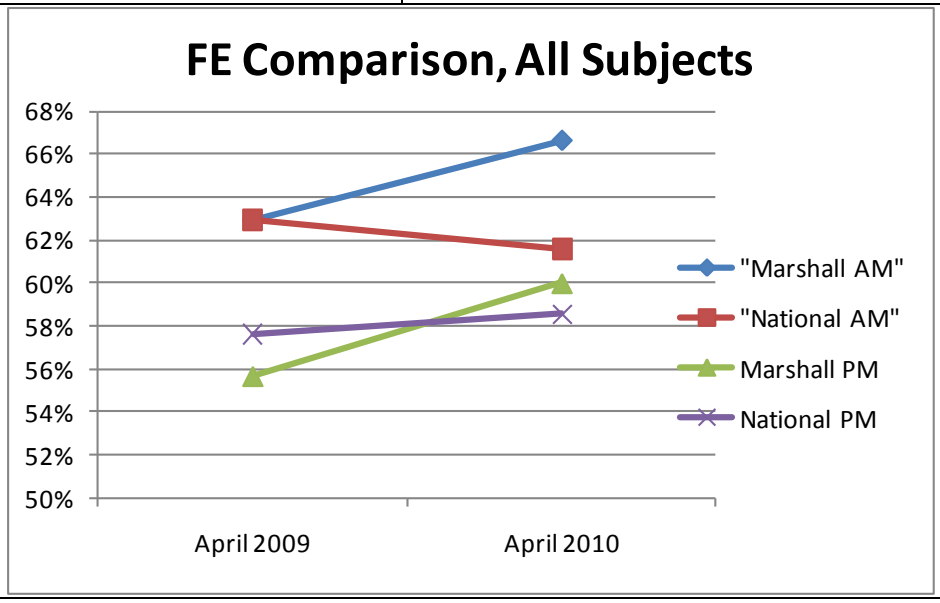
FE PM Subject Matter Area	MU BSE Target Performance
Civil Engineering Materials	At or above the national average



Observations: MU student performance appears to be improving relative to the national level of performance.

Action: Continue to monitor; no action at this time.

FE Exam Overall Performance	MU BSE Target Performance
All AM and PM Subjects	No goal established



Observations: On all AM subjects**,** MU student performance appears to have improved significantly from 2009 to 2010. This may be due to a better review process implemented between the administration of the two exams. Overall performance on the PM exam has improved, as well.

Action: Continue to monitor; no action at this time.

Senior Exit Interviews – 2010

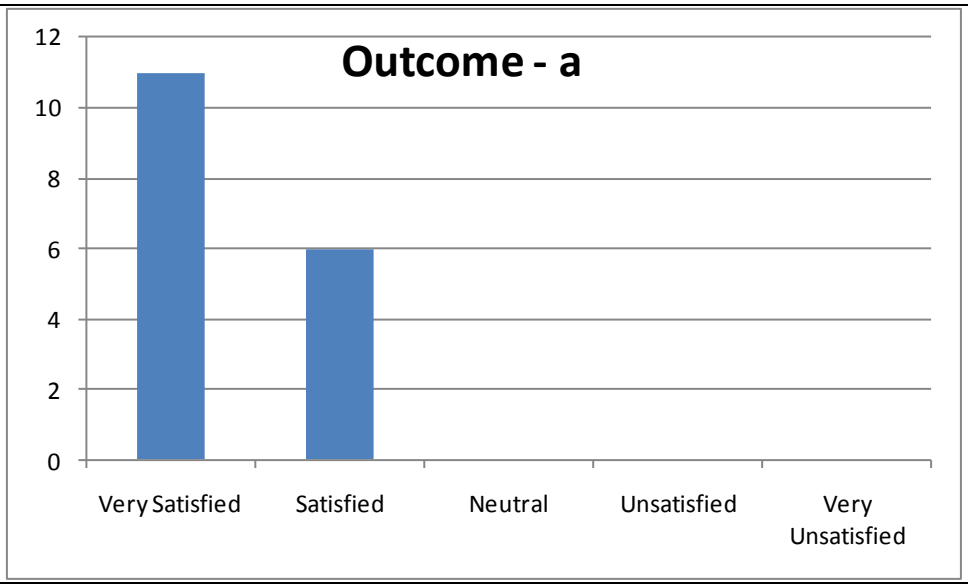
Starting in 2010, all graduating BSE students are required to take an anonymous online survey that gathers student perception/opinion regarding various aspects of the MU BSE program. One area of the exit interview is designed to collect student perception about the level of achievement attained in each of the eleven (a-k) learning outcomes established for the program. Seventeen students took the survey and were to provide one of five responses indicating the degree to which the program is achieving each of its learning outcomes: Very Satisfied, Satisfied, Neutral, Unsatisfied, or Very Unsatisfied. The results from the initial survey are provided in the following pages. Overall, there seems to be a high level of satisfaction from the students that the published learning outcomes are being achieved.

For analysis purposes, the following weights were assigned to each response:

2 = Very Satisfied
1 = Satisfied
0 = Neutral
-1 = Unsatisfied
-2 = Very Unsatisfied

A score of 2 would indicate that all students were "Very Satisfied" that that an outcome was being achieved, while a score of 1 would indicate "Satisfied". The mean score for each outcome varied between 1.3 and 1.6; the median score was 1.4. The results are shown in the following charts.

(a) MU BSE graduates shall have an ability to apply knowledge of mathematics, science and engineering.

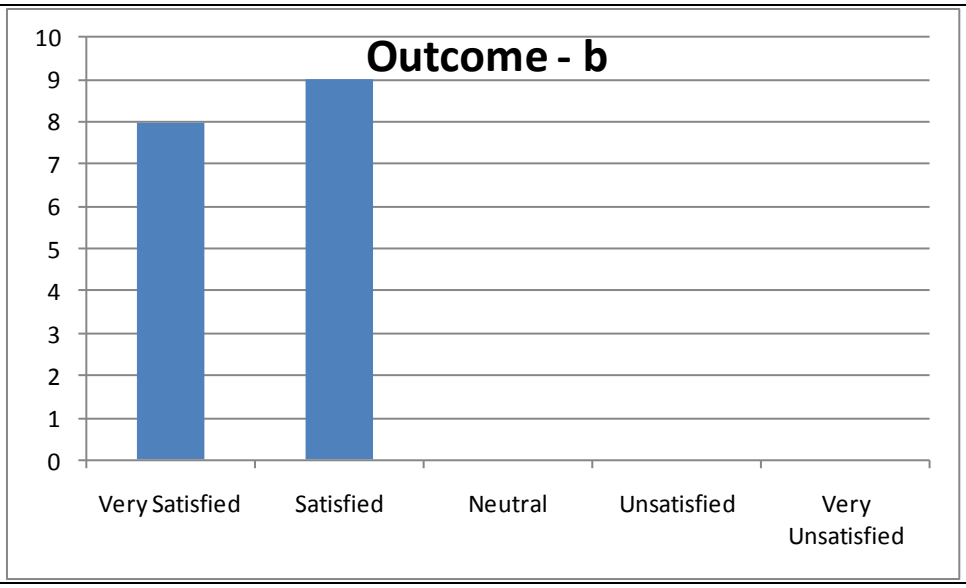


Score: 1.4

Observations: Student perception seems to be consistent with FE exam results

Action: Continue to monitor; no action at this time.

(b) MU BSE graduates shall have an ability to design and conduct experiments as well as analyze and interpret data.

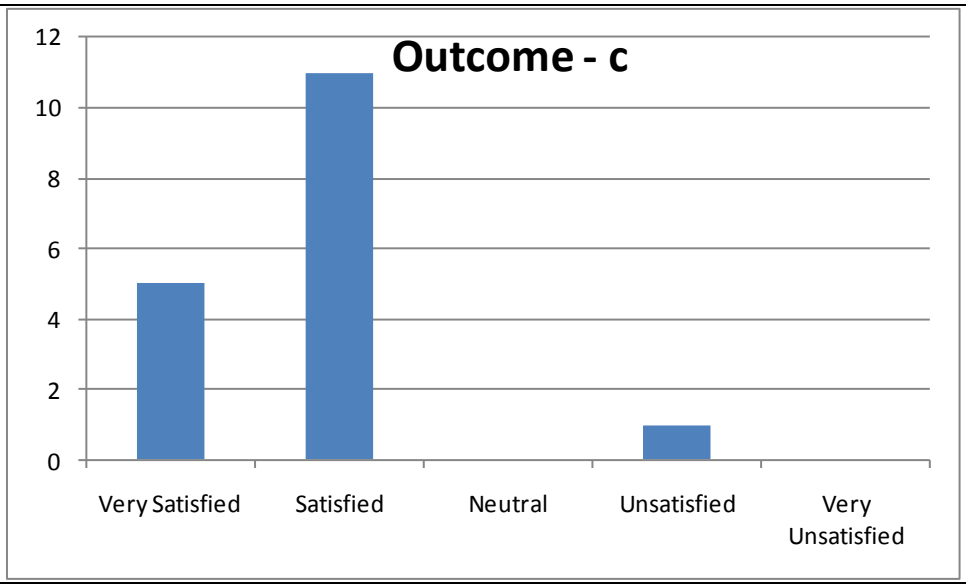


Score: 1.5

Observations: Student perception seems to be consistent with FE exam results.

Action: Continue to monitor; no action at this time.

(c) MU BSE graduates shall an ability to design a system, component, or process to meet desired needs.

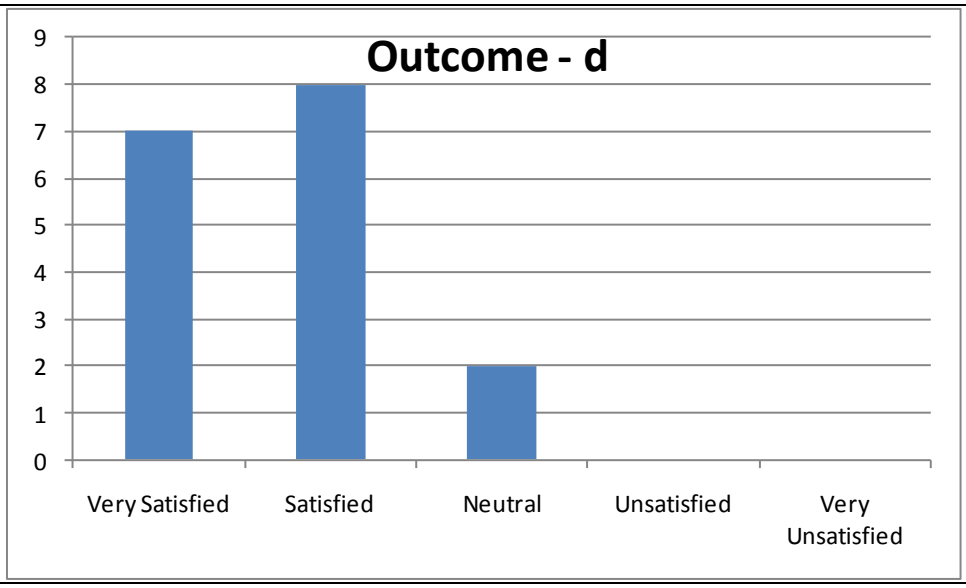


Score: 1.5

Observations: While the level of satisfaction is not as strong as for other outcomes, the overall perception is positive.

Action: Discuss and continue to monitor; no action at this time.

(d) MU BSE graduates shall have an ability to function on multidisciplinary teams.

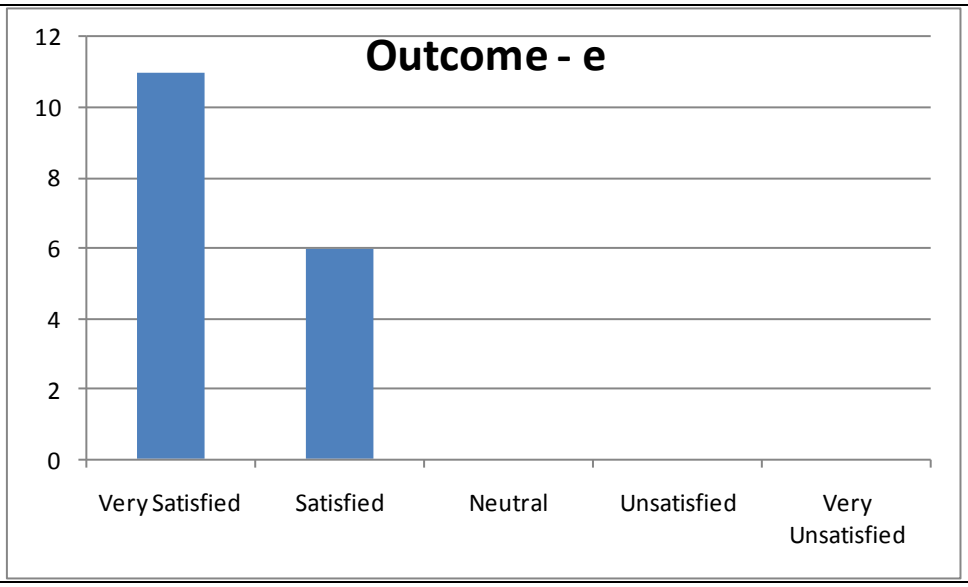


Score: 1.4

Observations: The student perception seems to be positive. However, the perception is not as positive as some of the other outcomes.

Action: Discuss and continue to monitor; no action at this time.

(e) MU BSE graduates shall an ability to identify, formulate, and solve engineering problems.

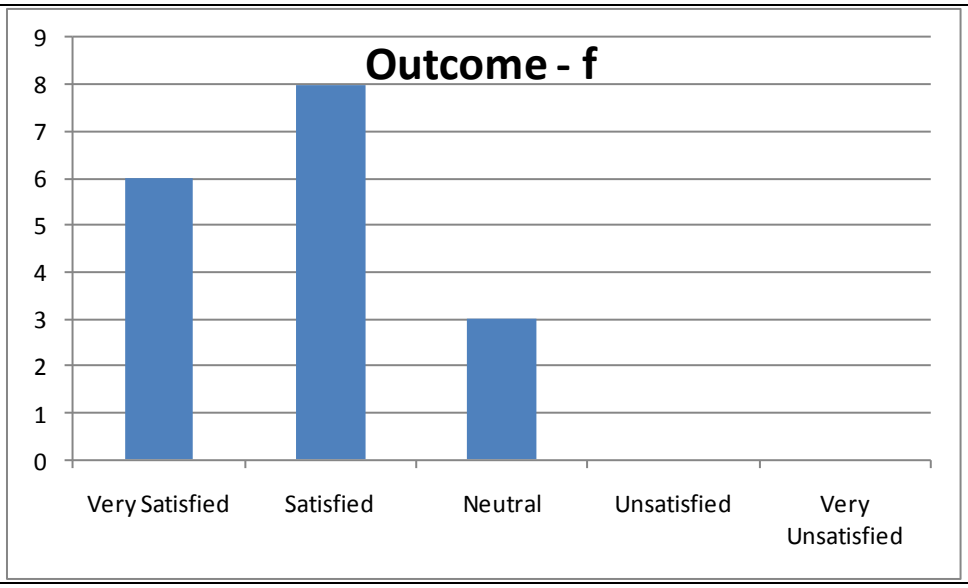


Score: 1.4

Observations: Student perception seems to be consistent with FE exam results.

Action: Continue to monitor; no action at this time.

(f) MU BSE graduates shall have an understanding of professional and ethical responsibility.

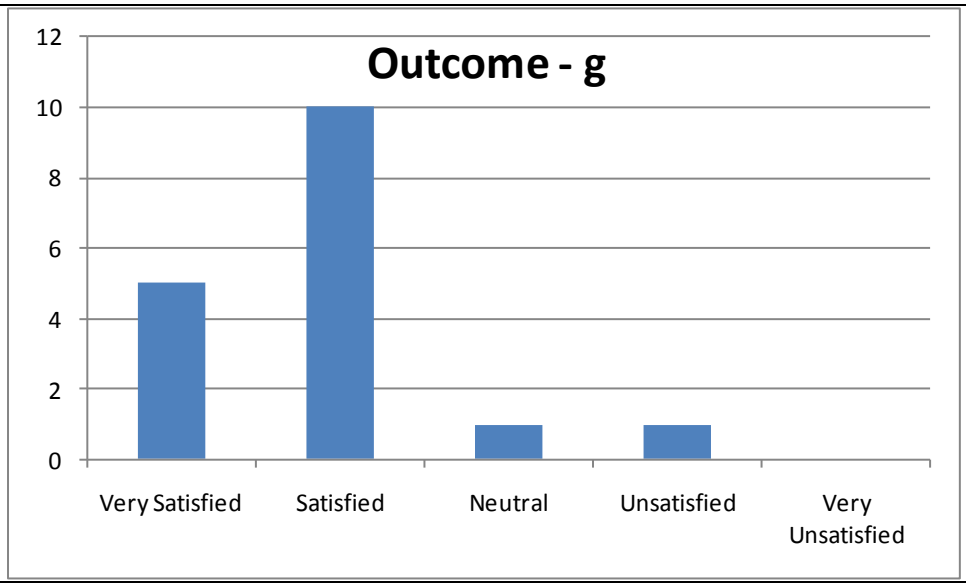


Score: 1.3

Observations: Student perception seems to be consistent with FE exam results.

Action: Discuss and continue to monitor; no action at this time.

(g) MU BSE graduates shall an ability to communicate effectively.

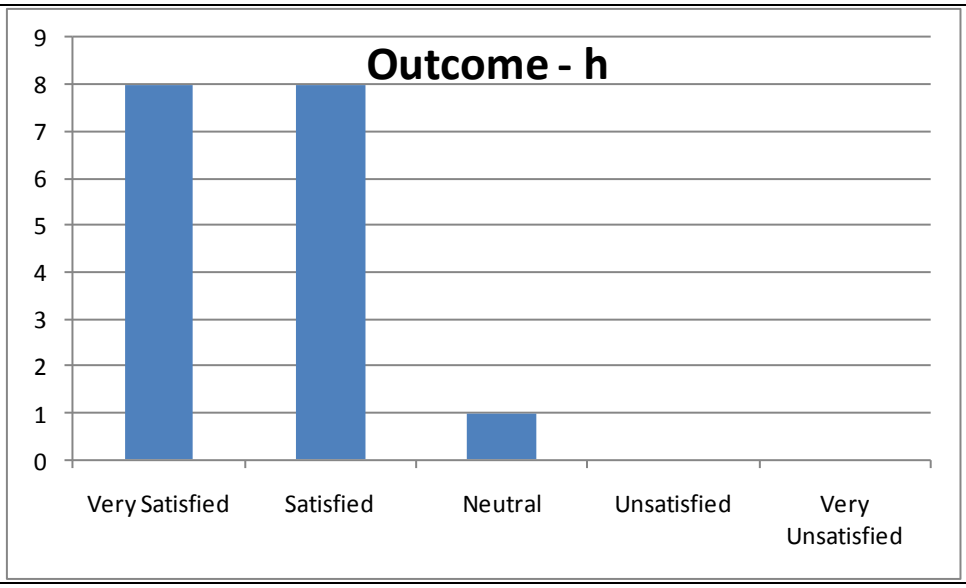


Score: 1.4

Observations: While the level of satisfaction is not as strong as for other outcomes, the overall perception is positive.

Action: Discuss and continue to monitor; no action at this time.

(h) MU BSE graduates shall have the broad education necessary to understand the impact of engineering solutions.

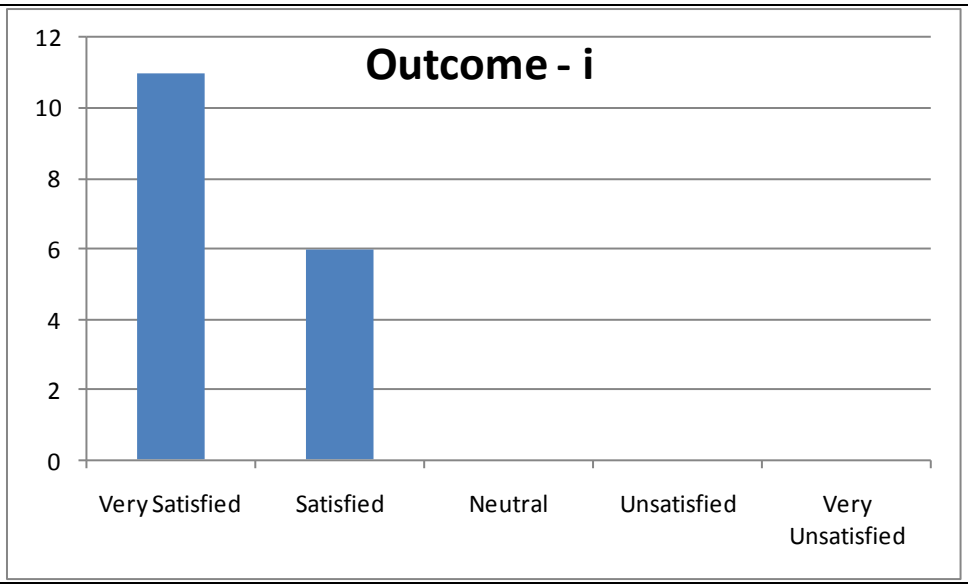


Score: 1.4

Observations: Student perception seems to be positive.

Action: Discuss and continue to monitor; no action at this time.

(i) MU BSE graduates shall a recognition of the need for, and an ability to engage in, life-long learning.

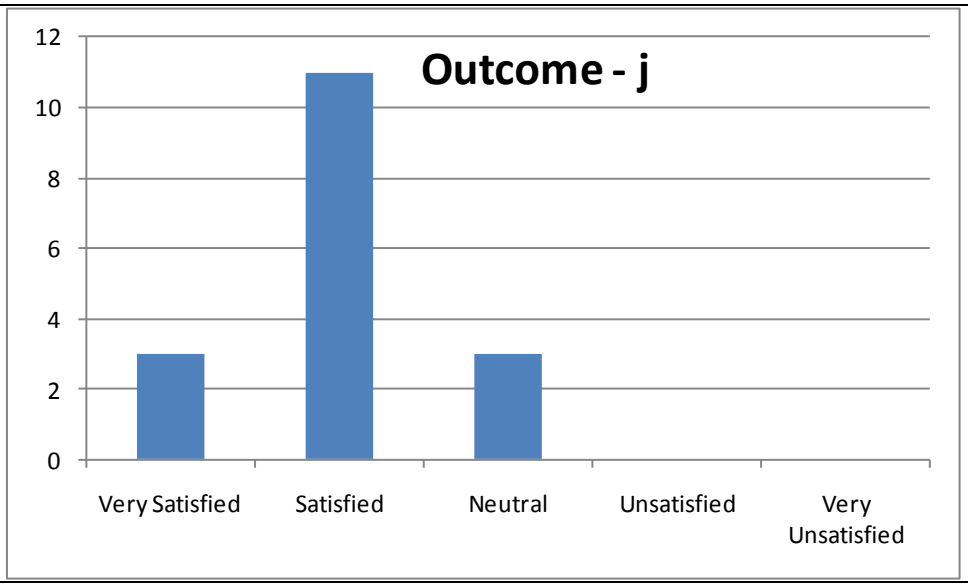


Score: 1.4

Observations: Student satisfaction is positive.

Action: Discuss and continue to monitor; no action at this time.

(j) MU BSE graduates shall have a knowledge of contemporary issues.

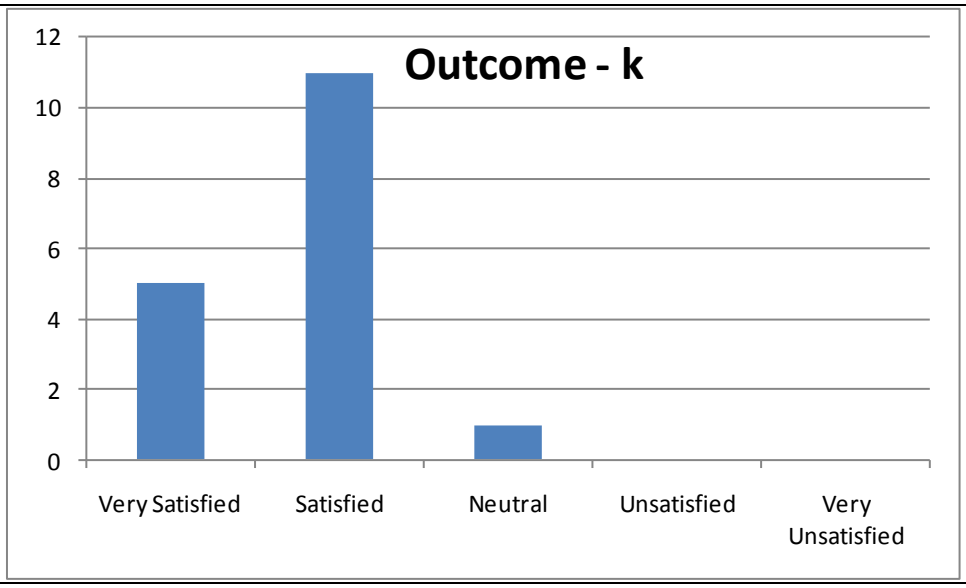


Score: 1.5

Observations: While the level of satisfaction is not as strong as for other outcomes, the overall perception is positive.

Action: Discuss and continue to monitor; no action at this time.

(k) MU BSE graduates shall have an ability to use the techniques, skills, and modern engineering tools.

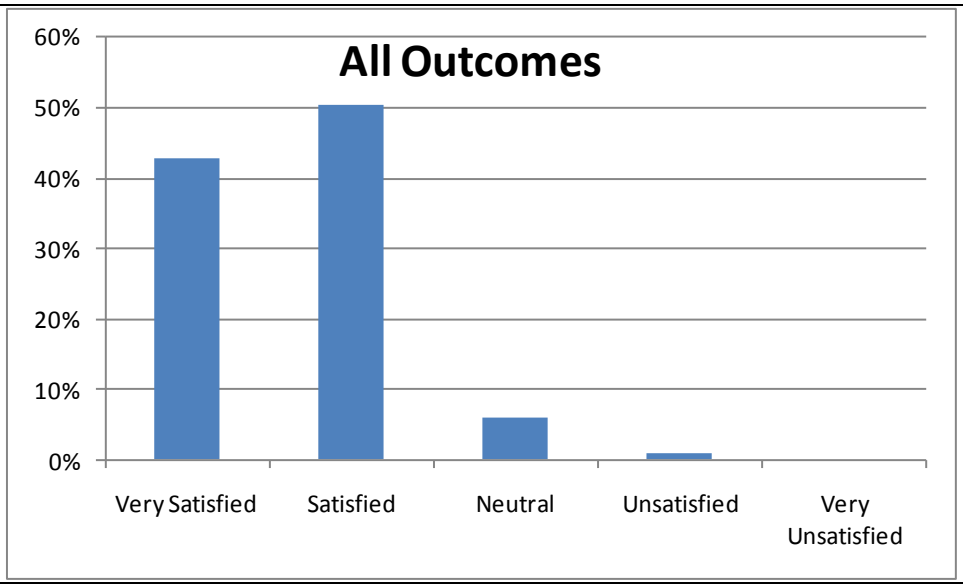


Score: 1.6

Observations: While the level of satisfaction is not as strong as for other outcomes, the overall perception is positive and consistent wit FE exam results.

Action: Discuss and continue to monitor; no action at this time.

Aggregate Response to all Outcomes



Score: 1.4

Observations: On average, the responses indicate that graduating seniors are satisfied to "very satisfied" that the published learning outcomes are being attained.

Action: Discuss and continue to monitor; no action at this time.

Results From Locally Administered Rubrics

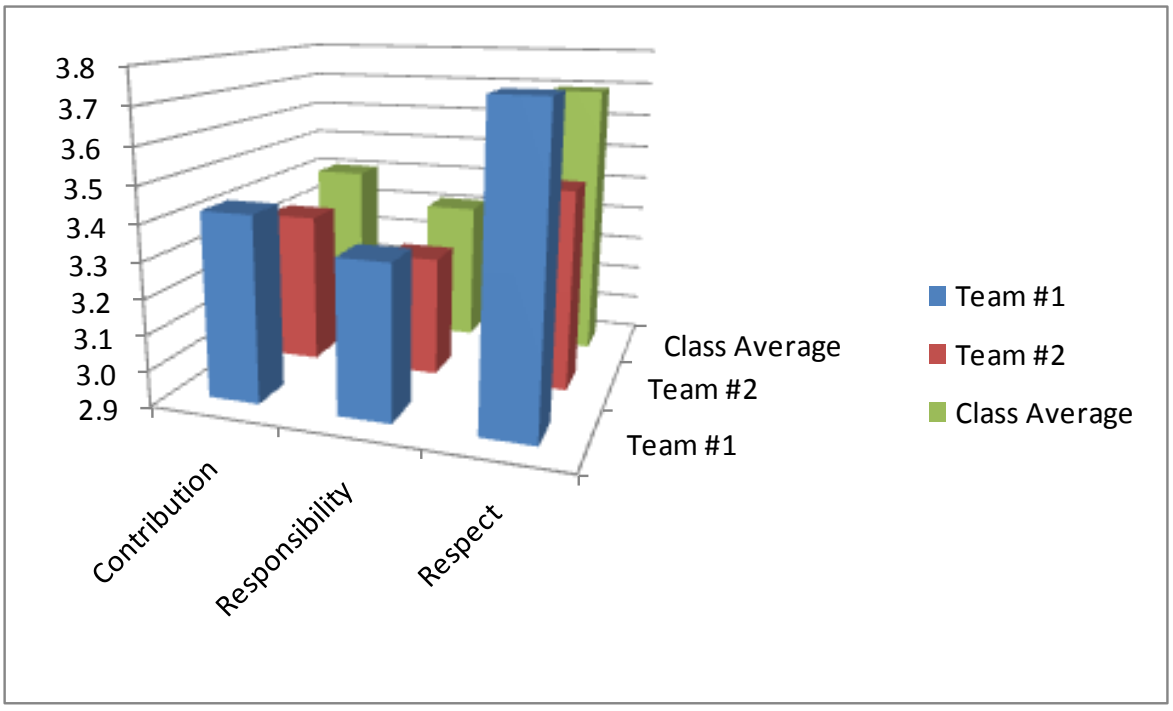
All BSE graduates are required to take a capstone design course, ENGR453. During this course, several rubrics are administered to assess several of the BSE learning outcomes. Results from each of these rubrics are described below.

Outcome-c: an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability;

The rubric for this outcome is under development. When finished, the rubric will include evaluative input from faculty and outside technical experts. However, during the spring 2010 semester, two separate groups did bring two different projects to successful completion. Each project required a variety of skills, effective communication and teamwork, the use of modern engineering tools, and significant technical ability.

Outcome-d: an ability to function on multidisciplinary teams

All students in ENGR453 were required to complete an anonymous evaluation of their peers. The evaluation required students to rate their teammates on three critical aspects of being an effective team member: overall contribution to the team effort, responsibility, and respectfulness. The rubric used to provide the rating is attached to this report, and the results summarized in the bar graph below. The overall results indicate that outcome-d is being attained.



Outcome-g: an ability to communicate effectively;

A rubric for this outcome has been developed and will be applied in two courses during the 2010-2011 academic year: ENGR451 Project Management and ENGR453 Senior Projects. This rubric was "test driven" during the 2010 semester, but data was not collected.

Outcome-k: an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice

A rubric is under development for this outcome and will be applied during the spring semester in ENGR453.

BS in Engineering
(BSE)

Letters from the Office of Assessment

MARSHALL UNIVERSITY

www.marshall.edu

Office of Assessment & Program Review

May 18, 2010

Dr. Bill Pierson, Division Chair
Engineering and Computer Science
CITE

Dear Bill,

This letter will document that the Office of Assessment did not receive an annual assessment report for the BSE (Engineering) Program for the academic year 2008 – 2009 (report was due December 1, 2009). I will contact you at the beginning of the fall 2010 semester to discuss the report due December 1, 2010.

Sincerely,

Mary E. Reynolds

Mary E. Reynolds
Director of Academic Assessment

C: Dr. Betsy Dulin, Dean, CITE

MARSHALL UNIVERSITY

www.marshall.edu

Office of Assessment & Program Review

April 6, 2009

Dr. Bill Pierson, Division Chair
Engineering
CITE

Dear Bill:

The University Assessment Committee and I have completed our evaluation of the BSE (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.

As I have shared with you before, I think you have done a nice job with this assessment plan. Your program goals clearly relate to the mission of Marshall University and your student learning outcomes support those goals. Although I would prefer that student learning outcomes not include words like "understand," I know that some accrediting bodies use this language. I would ask you to consider, though, how students will show you that they "understand professional and ethical responsibility" or how they will show you that they "understand the impact of engineering solutions……."

I like the fact that the Fundamentals of Engineering Exam is one of your assessment measures. It appears that this exam will not only allow you to compare your students' performance with the performance of students in other universities across the country, but will enable you to determine strengths and weaknesses based on specified subject areas. Can these areas be related to specified learning outcomes?

Although the performance of students who transfer to WVU can be used to evaluate the overall effectiveness of your program, I think the measures you are using for this purpose are too global to assess specific student learning outcomes.

The project based rubrics you are in the process of developing will be excellent complements to performance on your engineering exam. Benchmarks would be the mean acceptable score on each component of each scoring rubric across students. So, if you use a 4-point scale, with 4 being "exceeds

expectations" and 3 being "meets expectations," you might want to see a mean of 3.5 in each area of the scoring rubrics across students. Then, you would report results for each assessment in each area and should be able to aggregate results to see if there are trends in the data that will suggest program improvement. I suggest assessing only ¼ of the outcomes each year to allow for an in-depth assessment of each outcome. I like the charts on page 7 that link outcomes to courses and indicate the level of assessment that will be completed in each, i.e. knowledge, comprehension, application, synthesis.

In conclusion, you have an excellent assessment plan. 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

MARSHALL UNIVERSITY®
www.marshall.edu

Office of Assessment & Program Review

April 8, 2008

Dr. Bill Pierson, Division Chair
Engineering and Computer Science
CITE

Dear Bill,

This letter will document that the Office of Assessment did not receive an annual assessment report for the BSE (Engineering) for the academic year 2006 – 2007. Our understanding is that this degree program is relatively new. I would be happy to work with you as you develop your assessment plan. I can be reached at 62987 or at reynoldm@marshall.edu

Sincerely,

Mary Beth

Mary E. Reynolds
Interim Director of Assessment

C: Dr. Anthony Szwilski, Interim Dean, CITE

WE ARE... MARSHALL™
One John Marshall Drive • Huntington, West Virginia 25755-2003 • Tel 304/696-2206 • Fax 304/696-2261
A State University of West Virginia • An Affirmative Action/Equal Opportunity Employer

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

File

June 15, 2006

Dr. William Pierson, Chair
Computer Science & Engineering
College of Information Technology

Dear Bill:

Congratulations on the new BSE Engineering program at Marshall.

As this program gets up and running an assessment plan must be submitted to the Office of Program Review and Assessment. As you know, all degree granting programs must have a functioning assessment plan in place as soon as possible. You will need to submit yearly assessment reports for this program beginning with the October 2007 report period. Between now and December 31, 2006 the program will need to submit its assessment plan.

The program will need to begin plans now for a program review which will be due November 2011.

If this office can be of any help, please contact us at 6-2494.

Sincerely,

Bob Edmunds

Robert Edmunds, Coordinator
Program Review and Assessment

PC: Betsy Dulin, Dean, CITE
Frances Hensley, Associate VPAA