2006-2007 ANNUAL REPORT

GRADUATE SAFETY TECHNOLOGY PROGRAM

Division of Applied Science & Technology

College of Information Technology and Engineering

December 1, 2007

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Introduction

Marshall University's Graduate Program in Safety Technology has been in existence since 1973. There are approximately twenty-four (24) students enrolled in this program Approximately eight percent (8%) of the graduate students are women and four percent (4%) are minority.

Masters degree program in Safety Technology is not accredited by the Accreditation Board for Engineering and Technology (ABET), however, much of the curriculum course content is devised on a duel graduate/undergraduate level with Marshall University's ABET accredited undergraduate program. Consequently, the technical content of the Masters Degree in Safety Technology is derived from many of the learning outcomes (program objectives) prescribed by ABET for undergraduate program in safety technology.

I. Assessment Activities

I a. Program Goal

The goal of this program is to prepare graduates of the Masters Degree in Safety Technology with technical competencies necessary for superior job performance in all of the ABET Program Criteria areas, along with management skills and writing ability necessary to function effectively as senior level safety professionals in both business and industry.

I b. Learning Outcomes & Data Collection

Learning outcomes for Marshall University's Master's Degree in Safety Technology are those which have been developed by ABET. Extensive research and deliberation has been done by ABET with input and direction from safety professionals in the field of safety technology to determine the learning outcomes (program objectives) necessary to prepare students for successful job performance in the field of Safety Technology. The Learning Outcomes and Assessment Measures (See Illustration #1*)* which have been incorporated into the various specialty areas of Marshall University's Safety Technology Program includes:

- Technical competency & mastery of communication skills in analysis & design for safety

- Technical competency & mastery of communication skills in industrial hygiene & toxicology
- Technical competency & mastery of communication skills in systems safety
- Technical competency & mastery of communication skills in measurement of safety performance
- Technical competency & mastery of communication skills in safety & heath program management
- Technical competency & mastery of communication skills in fire prevention and control
- Technical competency & mastery of communication skills in ergonomics
- Technical competency & mastery of communication skills in environmental safety & health
- Technical competency & mastery of communication skills in accident investigation
- Technical competency & mastery of communication skills in psychology of accident prevention
- Technical competency & mastery of communication skills e in training methods
- Technical competency & mastery of communication skills in manufacturing processes
- Technical competency & mastery of communication skills in applied mechanics for safety

Data Collection - The learning outcomes data collection process occurs at the end of each student's coursework, when the student takes the Master's of Safety Technology Comprehensive Exam. The exam utilizes essay questions to evaluate the students writing ability, in combination with the student's ability to integrate safety management theory and safety administration ability into situational scenario's and conceptual development.

These comprehensive final exams are graded by respective faculty members within the safety technology curriculum to determine if the standards / benchmarks are being met. The results are then audited and analyzed by the Safety Technology Occupational Advisory Committee to assess student achievement in the areas of technical competency, application of management skills and writing ability.

I c. Results

Our Safety Technology faculty has reviewed Comprehensive Final Exams for 2006-2007 academic year. This review process has raised concerns about the validity of the current exam's ability to measure learning outcomes in the area of technical competencies listed in *Section I b* of this report.

II. BOT Initiative #3: No national test

III. Current Plans

During the next academic year graduate faculty in the Safety Technology Program plan to revise the Comprehensive Final Exam to more closely measure learning outcomes defined in *Section I b* of this report.

IV. Assistance Needed

- Financial support for conducting a Safety Technology Advisory Committee meeting.

V. What have we learned?

We cannot uncover learning outcome deficiencies within our graduate program without first developing a valid and reliable Comprehensive Final Exam.

Illustration #1 - Learning Outcomes and Assessment Measures
Graduate Safety Technology Program @ Marshall University

Learning Outcomes (Program Objectives)	*Assessment Measures Standards & Benchmarks*
PO-1: The student will be able to successfully complete two (2) competency examinations encompassing safety engineering terms and regulatory standards. PO-2: The student will be able to successfully apply safety engineering principles to the evaluation of a specific machine guarding situation. PO-3: The student will be able to utilize problem solving skills to propose a solution to the specific machine guarding problem that meet all regulatory standards and safety engineering principles.	Assessment measures for this course is based upon an analysis of classroom assignments, out-of-class assignments, examination questions, and written reports The performance criterion for all outcomes is based on the class average scores for the course activity. Performance is deemed acceptable at an average score of 70% or above. If class average scores are between 50% and 70% then there is course outcome concern. If class average score below 50% then course outcome is considered a weakness. The student will be able to clearly express the conceptual aspects of these Program Objectives in the format of a comprehensive final examination. The minimum success level for this assessment benchmark is seventy percent.
PO-4: The student will be able to develop a safety data information system that includes a data collection sheet and routing logic diagram. PO-5: The student will be able to evaluate measurements of safety performance utilizing a Safety Management Simulation Game entitled "The Huntington Toaster Company".	The student will satisfactory present the data collection system to the class explaining the logic of how the data will flow through the organization. The student will satisfactory prepare a report which analyzes the data and provides recommendations for needed corrections to the safety management system The student will be able to clearly express the conceptual aspects of these Program Objectives in the format of a comprehensive final examination. The minimum success level for this assessment benchmark is seventy percent.
PO-6: The student will be able to explain how the economic aspects of accidents crosses all political and social barriers between peoples and cultures PO-7: The student will be able to explain how history has played a part in accident prevention.	The standard of attainment for this course is based upon an analysis of classroom assignments, out-of-class assignments, and examination questions. The performance criterion for all outcomes is based on the class average score of 70% or above. The student will be able to clearly express the conceptual aspects of these Program Objectives in the format of a comprehensive final examination. The minimum success level for this assessment benchmark is seventy percent.
PO-8: The student will be able to successfully complete two (2) competency examinations encompassing Safety & Health Program Management Principles. PO-9: The student will be able to evaluate Safety & Health Program Management techniques through interview evaluations with employees detailed in a Safety Simulation Game entitled "The Huntington Toaster Company	The standard of attainment for this course is based upon an analysis of classroom assignments, out-of-class assignments, examination questions, written reports, and PowerPoint presentations. The performance criterion for all outcomes is based on the class average scores for the course activity. Performance is deemed acceptable at an average score of 70% or above. If class average scores are between 50% and 70% then there is course outcome concern. If class average score below 50% then course outcome is considered a weakness. The student will be able to clearly express the conceptual aspects of these Program Objectives in the format of a comprehensive final examination. The minimum success level for this assessment benchmark is seventy percent.

Illustration #1 - Learning Outcomes and Assessment Measures
Graduate Safety Technology Program @ Marshall University

Learning Outcomes (Program Objectives)	*Assessment Measures Standards & Benchmarks*
PO-10: The student will be able to successfully complete two (2) competency examinations encompassing fire protection principles, fire prevention principles, fire inspection techniques, fixed suppression equipment application and fire detection integration. PO-11: The student will be able to utilize problem solving skills to evaluate life safety features in a building structure and provide a report detailing deficiencies identified. PO-12: The student will be able to successfully apply fire prevention and protection principles to the evaluation of a building structure and complete a comprehensive fire inspection report of their findings.	The standard of attainment for this course is based upon an analysis of classroom assignments, out-of-class assignments, examination questions, written reports, and PowerPoint presentations. The performance criterion for all outcomes is based on the class average scores for the course activity. Performance is deemed acceptable at an average score of 70% or above. If class average scores are between 50% and 70% then there is course outcome concern. If class average score below 50% then course outcome is considered a weakness. The student will be able to clearly express the conceptual aspects of these Program Objectives in the format of a comprehensive final examination. The minimum success level for this assessment benchmark is seventy percent.
PO-13 The student will be able to complete two competency examinations on the anticipation, recognition, evaluation and control of ergonomic hazards. PO- 14 The student will be able to apply ergonomic design principles to workplace design problems. PO-15 The student will be able to use ergonomic assessment methods to solve an ergonomic problem. PO-16The student will be able to prepare a report on an ergonomic problem using standard technical writing format. PO-17 The student will use a variety of ergonomic qualitative assessment tools and discuss the utility of each tool. PO-18 The student will prepare a minimum of 4 laboratory field reports that outline the problems, methods, data collection, results and analysis and a redesign to reduce ergonomic stress.	The standard of attainment for satisfactory completion of this course will be based on an analysis of assignments, examination s and quizzes. Performance will be acceptable if the average score is 70% or above. The standard attainment for satisfactory completion will be an analysis of 4 field reports. These reports will be graded based on quantitative and problem solving criteria. Acceptable performance will be 70% or above. The student will be able to clearly express the conceptual aspects of these Program Objectives in the format of a comprehensive final examination. The minimum success level for this assessment benchmark is seventy percent.

Illustration #1 - Learning Outcomes and Assessment Measures
Graduate Safety Technology Program @ Marshall University

Learning Outcomes (Program Objectives)	*Assessment Measures Standards & Benchmarks*
PO-19: The student will be able to successfully complete two (2) competency examinations encompassing legal terminology, product safety principles, OSHA regulatory standards, and EPA regulatory standards. PO-20: The student will be able to successfully research a safety & health related legal decision and provide a summary report.	The standard of attainment for this course is based upon an analysis of classroom assignments, out-of-class assignments, examination questions, written reports, and PowerPoint presentations. The performance criterion for all outcomes is based on the class average scores for the course activity. Performance is deemed acceptable at an average score of 70% or above. If class average scores are between 50% and 70% then there is course outcome concern. If class average score below 50% then course outcome is considered a weakness. The student will be able to clearly express the conceptual aspects of these Program Objectives in the format of a comprehensive final examination. The minimum success level for this assessment benchmark is seventy percent.
PO-21: The student will be able to identify basic causal factors that contribute directly or indirectly to an accident. PO-22: The student will be able to identify weaknesses in the management system. PO-23: The student will be able to suggest methods to correct and eliminate future accidents. PO-24: The student will be able to write a concise, accurate accident report.	The standard of attainment for this objective is to be able to successfully pass three hourly quizzes on text book materials obtaining at least a 70% grade. Satisfactorily pass a final examination pulling together all aspects of the course again achieving at least a 70%. Finally writing a term paper on a major accident. The student will be able to clearly express the conceptual aspects of these Program Objectives in the format of a comprehensive final examination. The minimum success level for this assessment benchmark is seventy percent.
PO-25: The student will be able to understand and apply the basic psychological factors that cause people to be involved in accidents.	The standard of attainment for this objective is to be able to (1) in SFT 235 answer an essay question as to "why" people have accidents; (2) SFT 465 understand by analysis of accident reports as to which psychological factors may cause humans to have accidents. The standard of performance achievement is 70%. The student will be able to clearly express the conceptual aspects of this Program Objective in the format of a comprehensive final examination. The minimum success level for this assessment benchmark is seventy percent.
PO-26: The student in SFT 235 will be able to demonstrate a basic understanding of how the CPSC operates and the roll and function of the agency. PO-27: The student will be able to successfully apply product safety principles to the evaluation of a specific consumer product.	The class is given a lecture on the consumer product safety commission and the role and function this agency plays in protecting consumers and the various governmental acts it oversees. Several questions are used in the mid-term examination and a quiz on the chapter dealing with home safety. The student will be able to clearly express the conceptual aspects of these Program Objectives in the format of a comprehensive final examination. The minimum success level for this assessment benchmark is seventy percent.

Illustration #1 - Learning Outcomes and Assessment Measures
Graduate Safety Technology Program @ Marshall University

Learning Outcomes (Program Objectives)	*Assessment Measures Standards & Benchmarks*
CO-28: The student will be able to successfully complete one (1) competency examination encompassing manufacturing processes.	Performance is deemed acceptable at an average score of 70% or above. If class average scores are between 50% and 70% then there is course outcome concern. If class average score below 50% then course outcome is considered a weakness. The student will be able to clearly express the conceptual aspects of these Program Objectives in the format of a comprehensive final examination. The minimum success level for this assessment benchmark is seventy percent.
CO-29: The student will be able to successfully complete a competency mathematical examination testing their ability to apply trigonometry and algebraic formulas to solving of safety engineering problem sets.	Performance is deemed acceptable at an average score of 70% or above. If class average scores are between 50% and 70% then there is course outcome concern. If class average score below 50% then course outcome is considered a weakness. The student will be able to clearly express the conceptual aspects of these Program Objectives in the format of a comprehensive final examination. The minimum success level for this assessment benchmark is seventy percent.