

**Miami University
School of Engineering and Applied
Science**

**Department of Engineering
Technology**

**Assessment and Continuous
Improvement Plan**

Revised/Updated September 25, 2007

**Department of Engineering Technology
Assessment and Continuous Improvement Plan**

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Introduction

Assessment is the process of evaluation leading to the improvement of quality in performing a mission. Assessment of how well a mission is being accomplished provides a stimulus for continuous quality improvement. The purpose of this assessment plan is to document the process by which we establish and verify educational objectives and outcomes for our programs; ways we measure and assess program objectives and outcomes; and the processes we have in place to facilitate continuous improvement. Educational Objectives are the general characteristics our graduates demonstrate to the workplace, graduate school, the military, or their endeavors after they leave Miami. Program Outcomes are achievements by students as a result of the education process. Student outcomes should represent value added to the student and this value added should increase continuously over time throughout the academic program. Outcomes should be demonstrable by the time of graduation. This assessment plan is consistent with the assessment plan developed and approved by the Executive Council of the School of Engineering and Applied Science (SEAS).

Mission of the Department

The Department of Engineering Technology (ENT) shares in the mission of Miami University, the School of Engineering and Applied Science, and the Hamilton and Middletown campuses. The department focuses on meeting the technical education needs of Hamilton, Middletown, and surrounding communities by offering high quality, technically relevant courses, workshops, and programs. We provide our students the foundation for contextual life-long learning in a nurturing and caring environment free from all forms of prejudice and bias. We give them the breadth and depth of competencies necessary to: analyze, synthesize, and solve technical problems; work in teams; value differences; and understand the impact of their solutions, decisions, and actions in a broader societal context. The department is dedicated to the continuous improvement of our faculty, staff, students, and the programs we offer.

Vision of the Department

Engineering Technology strives to be a statewide leader in Engineering Technology education and recognized locally for its leadership and commitment to delivering high-quality, technically relevant courses and workshops for area businesses and industry.

Values

The faculty and staff of Engineering Technology value and are committed to:

- promoting a learning environment that is invigorating, challenging, rewarding, and free from prejudice and bias.
- engaging students in the process of imaginative, creative, and critical thinking in the solution of technical problems.
- encouraging students to examine and reflect on the contexts of their knowledge base and the solutions to problems they derive.
- diversity of staff, students, and faculty.
- mutual respect for others and teamwork.

The department's primary concern is its students' learning. The department develops in students professional competencies that are necessary to analyze, synthesize and solve complex problems inherent in a modern, dynamic society. These competencies involve high levels of technical and cognitive skills that must be combined with intellectual maturity and social responsibility for graduates to be successful in their chosen fields. The balance of professional and liberal education within the department's programs enables students to: view problems in a larger societal context; understand the impact of their decisions on their own as well as others' cultures; refine their personal value system; and to practice their profession in a manner consistent with the standards of professional ethics.

Programs Offered

Electrical and Computer Engineering Technology (AD)

The Electrical and Computer Engineering Technology (ECET) program exists to foster student growth and development through the use of courses utilizing hands-on laboratory exercises, relating to application and methodology of current engineering principles and techniques. In particular, the ECET program seeks to

provide a working knowledge of contemporary technology applicable to electrical, electronic, and computing systems.

Integral to this is the aim to assist the student in learning to think critically (observe phenomena, discern relationships, collect and evaluate data, develop problem-solving skills, communicate ideas), understanding contexts (knowledge of the global societal change directed towards microprocessor controls and industrial computer control systems), engaging with other learners (reflecting on information researched or assimilated from the instructor, restating ideas and concepts, encouraging team participation), and reflecting and acting (make informed and thoughtful decisions, observe and research information outside of the classroom environment).

Electro-Mechanical Baccalaureate Completion Program (BS)

The Electro-Mechanical BS Completion program exists to prepare graduates of associate degree programs in Engineering Technology to work in the field of instrumentation and process control. The program provides a high-quality curriculum to the Hamilton and Middletown communities as well as other communities in Ohio which lack a baccalaureate degree program in Engineering Technology. The Plus Two program emphasizes analysis and design of automated systems.

Mechanical Engineering Technology (AD and BS Completion)

The Mechanical Engineering Technology (MET) program exists to foster student growth and development, through the use of laboratory-based courses, in the areas of application and methodology of current engineering principles and techniques. Critical thinking, contextual understanding, social interaction, and individual efforts are recognized as key elements of this growth and development. Within this format students are encouraged to observe phenomena, discern relationships, collect and evaluate data, develop problem-solving skills, and communicate ideas. Understanding how scientific and technological achievements relate to global society is facilitated throughout the program and social interaction is encouraged through team project participation.

Constituents (Service Communities)

The primary constituents of the Department's education are our students, our advisory council, business and industry, graduate schools, and K-12/TechPrep. Constituents of faculty scholarship are professional peers, professional societies, and the profession. Note that our advisory council consists of representatives of business and industry, current students, graduates, and college partners.

Our constituents, and especially advisory council, help us formulate program educational objects and outcomes then assess and improve the same. We periodically review program objectives and outcomes with our constituents, using the advisory council as their representative voice, and seek corroboration that we are still doing the "right thing" and solicit their ideas for changes and improvement.

Several components of this plan depend on these constituents' evaluation of how well the Department is meeting their needs. Students' self-assessment of growth and degree of satisfaction are sought as they progress through the program, upon graduation, and as alumni. Employer comments are sought in assessing student performance in co-op assignment and ultimately as full-time employees and graduates of the department. Employers and the department's advisory council provide feedback on whether the department's graduates and programs are meeting the needs of business and industry.

An important measure of academic and professional growth comes from direct examination of the students' work by qualified individuals. The assessment plan attempts to record and preserve evidence of the students' progress for evaluation by the faculty (department) as well as external reviewers. Accreditation agencies judge whether the program is meeting acceptable standards.

Other departments at Miami help design service courses to meet students' needs and are involved in periodic assessment of those courses. Liberal education courses offered by the department will be assessed in accordance with the plans of the University Liberal Education Council.

Characteristics of Quality Graduates from All Programs in the School of Engineering and Applied

Science (SEAS)

The broad characteristics we (SEAS) expect of our graduates include the ability to:

- Define and solve problems
- Design creative solutions to problems
- Make ethical choices and act responsibly
- Critically evaluate information
- Work effectively in a team
- Exercise initiative
- Assume leadership
- Recognize broad societal contexts and interests
- Serve customers with sensitivity and accountability
- Deal effectively with diverse cultures
- Adapt to change
- Recognize the value of lifelong learning
- Act as a responsible citizen
- Pursue further formal education
- Write effectively
- Speak and listen effectively
- Understand and apply mathematics and science
- Understand and apply the concepts of continuous quality improvement

Department Educational Objectives

(Greater detail regarding objectives is included at the end of this document)

We consider program educational objectives as the general characteristics our graduates demonstrate to the workplace, graduate school, the military, or their endeavors after they leave Miami. We typically measure these characteristics initially at graduation by asking graduates if they feel they have achieved these characteristics then periodically thereafter through employer surveys, letters from graduates, advisory council, graduate school accomplishments, and surveys of graduates who have been out for awhile. These characteristics should become most evident within their first few years after graduation.

The Engineering Technology Department's graduates are able to:

- Apply math and physics principles to the solution of engineering technical problems.
- Use applied skills to identify, evaluate, and solve complex technical problems.
- Use engineering computer software to facilitate engineering problem solving.
- Function effectively in team-oriented activities.
- Demonstrate the knowledge of expected standards of ethical and professional conduct.
- Verbally communicate ideas.
- Prepare well-written technical reports.

In addition, our graduates will have the necessary fundamentals to pursue life-long learning.

Program-specific Educational Objectives:

Electrical and Computer Engineering Technology (AD)—The ECET program produces graduates who:

- Analyze digital and analog electrical and electronic circuits, identify problem areas, and maintain these systems.
- Function effectively as electrical and computer engineering technicians in state and regional industries.

Electro-Mechanical Engineering Technology (BS Completion Program)—The EMET program produces graduates who:

- Possess the ability to apply theoretical knowledge to solve engineering technology problems associated with instrumentation and control systems.
- Are knowledgeable of modern applications in process control systems.

Mechanical Engineering Technology (AD & BS)—The MET program produces graduates who:

- Are able to analyze and design complex mechanical components and systems.
- Are able to set-up experimental testing procedures and selectively utilize data to reinforce

- engineering concepts.
- Have a basic understanding of modern manufacturing methods used to facilitate the production of consumer products.
- Are able to effectively and efficiently manage engineering projects. (BS Only)

Program Outcomes

We define program outcomes as the knowledge, skills, behaviors, and aptitudes expected of our students by the time of graduation. We list program outcomes in the individual program assessment plans and in these plans we relate program outcomes to educational objectives. In addition, these outcomes relate directly to the eleven (a) through (k) requirements of Criterion 2 defined by TAC/ABET. Each program area defines how they assess these outcomes. Examples of assessing outcomes include course portfolios, student evaluations, surveys, and more. Faculty aligned with each program review these assessment tools and establish action items for improvement. The details are in each plan.

Process Characteristics

In addition to student outcomes, there are certain educational process characteristics that will be assessed for the programs in the department. Students and graduates will be asked to assess the following process characteristics within their program:

- Intellectual environment
- Rigor of the program
- Overall teaching
- Laboratory experience
- Curricular advising
- Career advising
- Accessibility of faculty
- Student-faculty intellectual interaction outside the classroom
- Faculty helpfulness in dealing with class work
- Quality of entire learning experience

Students and alumni will be asked whether:

- Students were treated fairly, politely, and with respect
- The learning environment in the department is free from all types of prejudice
- They would choose the same major in retrospect

Suggestions for improvement will be elicited. We will analyze the responses and implement actions for continuous improvement.

Assessment Methods

The proposed plan assumes that the primary purpose of assessment is to provide information that will be used to alter and improve our existing programs. Therefore, the plan contains elements for frequent assessment and adjustment, as well as regular, but less frequent, assessment activities.

Our assessment plan includes direct and indirect as well as formative or summative tools, methods, and processes. Direct assessment tools provide specific data to our courses and programs regarding student learning. An example of a direct assessment tool is a pre-test. Indirect assessment tools are less tangible than direct and provide a perceived assessment of student learning. An example is student self assessment on course/faculty/student evaluation forms (SEAS student evaluation form) used in nearly all of our courses. Although less specific, these data are still valued and used. Formative assessment methods provide feedback during a course or throughout our programs. This information is used to make immediate adjustments. An example is one minute papers or class tests. Summative assessment methods provide a broader assessment of an entire course or program and are done at the end of the activity. Two examples of summative assessment methods are graduate surveys and comprehensive final exams.

Since a variety of components are involved in a complete description of student outcomes at various stages in the academic program, it is essential that multiple measures of quality be employed. The following

shows the assessment methods typically employed by the department and the frequency with which the assessment is done.

Assessment tools

The primary assessment tools used to evaluate departmental outcomes are:

- A. Portfolios—these are our TAC/ABET course notebooks.
 - A.1. Student tests and exams
 - A.2. Student reports
 - A.3. Student presentations
- B. Program Outcomes Verification form (formerly Instructor course evaluation form)
- C. Graduate and Alumni surveys
- D. Graduating seniors exit interview/survey
- E. SEAS student evaluation form
- F. Employer survey
- G. Pre and Post Tests (no longer active)
- H. Judge's evaluation in ENT 498

In addition to these specific tools and methods, the department also uses the feedback received from several other regular and periodic assessment processes including: advisory council, University Program Review, consultants, TAC/ABET accreditation visits, North Central Accreditation visits, and anecdotal letters, testimonials, accolades, and criticisms from students, graduates, and employers.

The following is an explanation of each tool listed above.

A. Portfolios

For each course in the major, a course notebook will be prepared and analyzed by the faculty. The notebook will contain the course syllabus, all handouts, tests and assignments to students, and a stratified sample of student work that demonstrates the spectrum of student levels of performance on each assignment and test. The quality of courses within the major will be analyzed. TAC/ABET guidelines for the collection and maintenance of the course notebooks (portfolios) will be followed so that they can be used as examples of student work during accreditation visits. Type of assessment: Direct and Summative. Recommended frequency: annually.

B. Program Outcomes Verification form

Instructors evaluate the degree to which students have achieved desired course outcomes through routine tests, laboratory performance, class participation, and final examinations. They then prepare a course evaluation form/report to be used by the program team to make improvements. Type of assessment: Direct and Summative. Recommended frequency: every semester.

C. Graduate and Alumni surveys

Surveys are taken of seniors/current graduates every semester and about every five years for alumni. The survey addresses the desired characteristics of graduates, process characteristics, strengths and weaknesses of the program, and suggestions for improvement. This information is reviewed by program coordinators and the chair and fed directly back into our programs for continual improvement. This survey is coordinated by the School of Engineering and Applied Science. The results are summarized in the dean's office and the data are discussed and analyzed by SEAS Executive Council. The summary report is kept on file in the department office and periodically reviewed by program coordinators, faculty, and the chair. Type of assessment: Direct and Summative. (Recommended frequency: every semester for graduates and every five years for alumni)

D. Graduating seniors exit interviews/surveys

The department chair or his designee holds an exit interview with a sample of graduating students and documents the results. Students are encouraged to discuss those aspects of the program about which they feel most strongly. In particular, they are encouraged to talk about the most positive aspects of the program and any problems (or suggestions for improvement) they perceived with the program. Exit interviews are

maintained in a folder and periodically reviewed by program coordinators and the chair. Type of assessment: Indirect and Summative. (Recommended frequency: annually or more often)

E. Student evaluations of courses, facilities, and faculty

The SEAS student evaluation form includes student self-assessment, course assessment, and instructor assessment. These student evaluations are summarized by the computer center in Oxford. The original forms along with the summary results are returned to the faculty member. The chair receives a copy of the summaries and prepares a department summary for the faculty to be used for comparison. Type of assessment: Indirect and Formative. (Recommended frequency: every semester)

F. Employer survey

A survey of employers of a critical number of graduates will be conducted. The purpose of this survey is to evaluate student outcomes and the strengths and weaknesses of the program in an absolute and relative sense (i.e., relative to graduates from other comparable programs). Employers who hire our graduates and co-ops will be surveyed. There are two forms used: Employer Assessment Form and Co-Op Assessment Report. Employer surveys are maintained in a folder and periodically reviewed by program coordinators and the chair. Type of assessment: The Employer Assessment Form serves as a Direct and Summative tool and the Co-Op Assessment Report serves as an Indirect and Formative tool. (Recommended frequency: Every semester for co-op employers and at least annually for employers in general)

G. Pre and Post Tests (no longer used)

These tests are designed by faculty and include some questions from the Fundamentals of Engineering Exam. They are given in selected courses and are regularly used by faculty and program coordinators to assess the incoming preparation of all students to our BS completion program. Type of assessment: Direct and Formative. (Recommended frequency: Annually)

H. Judge’s evaluation in ENT 498

Judge’s assessment of senior design projects are performed annually in April during senior design presentation day. This feedback, which is reviewed by the program coordinators and faculty, provides assessment of the BS students’ liberal education, oral and written communication skills, team work, and technical skills. Type of assessment: Direct and Formative. (Recommended frequency: Annually)

Summary of Department Assessment Plan Implementation

What is being assessed?	Who is Responsible?	Frequency	Assessment Tools typically utilized
Program Educational Objectives	Department Chair collects data. Program coordinators evaluate.	Annually for base line.	D, F
Program Educational Objectives	Department Chair collects data and prepares summary. Program coordinators evaluate	Every three to five years	D,F
Program Educational Outcomes	Program coordinators and faculty	Data collected every semester. Analysis done annually.	A, B, D, E, F, G, H
Senior Design Outcomes	Faculty	Annually	A, B, E,, G, H
Process Characteristics: Teaching and Learning effectiveness	Faculty	Every semester/course	A, B, E
SEAS Characteristics of a Quality Graduate	Chair/Dean’s Office	Three times a year.	D

*TAC/ABET Criteria

An engineering technology program must demonstrate that graduates have:

- a. an appropriate mastery of the knowledge, techniques, skills and modern tools of their disciplines,
- b. an ability to apply current knowledge and adapt to emerging applications of mathematics, science, engineering and technology,
- c. an ability to conduct, analyze and interpret experiments and apply experimental results to improve processes,
- d. an ability to apply creativity in the design of systems, components or processes appropriate to program objectives,
- e. an ability to function effectively on teams,
- f. an ability to identify, analyze and solve technical problems,
- g. an ability to communicate effectively,
- h. a recognition of the need for, and an ability to engage in lifelong learning,
- i. an ability to understand professional, ethical and social responsibilities,
- j. a respect for diversity and a knowledge of contemporary professional, societal and global issues, and
- k. a commitment to quality, timeliness, and continuous improvement.

In general, the following summarizes the process we use to determine if students are meeting outcomes and graduates are meeting objectives:

Programs use at least three tools to assess each Outcome. The tools typically used are:

1. Portfolios (course notebooks)
2. Outcomes Verification Form (formerly Instructor Course evaluation form) completely by instructor.
3. plus one other tool (e.g., student evaluations, judges' assessment, pre and post tests, etc.)

The Department uses three tools to assess Objectives. The tools typically used are:

1. Alumni surveys (conducted at least every five years and sent to ALL graduates.)
2. Employer surveys (conducted regularly during co-op visits, connections with graduates then we ask them to have their employer complete the assessment, and periodically through mailing.)
3. plus one other tool (advisory council, anecdotes, letters, graduate schools, SEAS assessment data, University assessment data, FE exam results, etc.)

Continuous Improvement Plans

The department collects a number of data points about program educational objectives. This information is collected, summarized, and analyzed by the faculty, program coordinators, chair, and/or Executive Council of the School of Engineering and Applied Science (SEAS). At least annually, Executive Council reviews the senior/alumni survey data and we document (and sometimes decide) areas for improvement that most affect the expected characteristics of quality graduates from all programs in SEAS. The department chair takes this information back to the department for consideration along with the data collected by the department and programs. Program coordinators and the chair review the summarized data for each program and develop an action plan for areas of improvement. Beginning in 2005, the department is dedicating a block of a department meeting to discussing and examining the summary assessment reports and action plans prepared by each program coordinator. Prior to 2005, several department meetings involved discussions of assessment data which did not always result in a specific action plan for improvement.

Our assessment data and action plans for improvement are also shared with advisory council during our regularly scheduled meetings and occasionally during special sessions. We seek their input about ideas. We document the ideas for improvement generated by our faculty and advisory council, and report back to the council at each meeting on changes made resulting from their input. Our advisory council is quite active and a valued resource for our continuous improvement program.

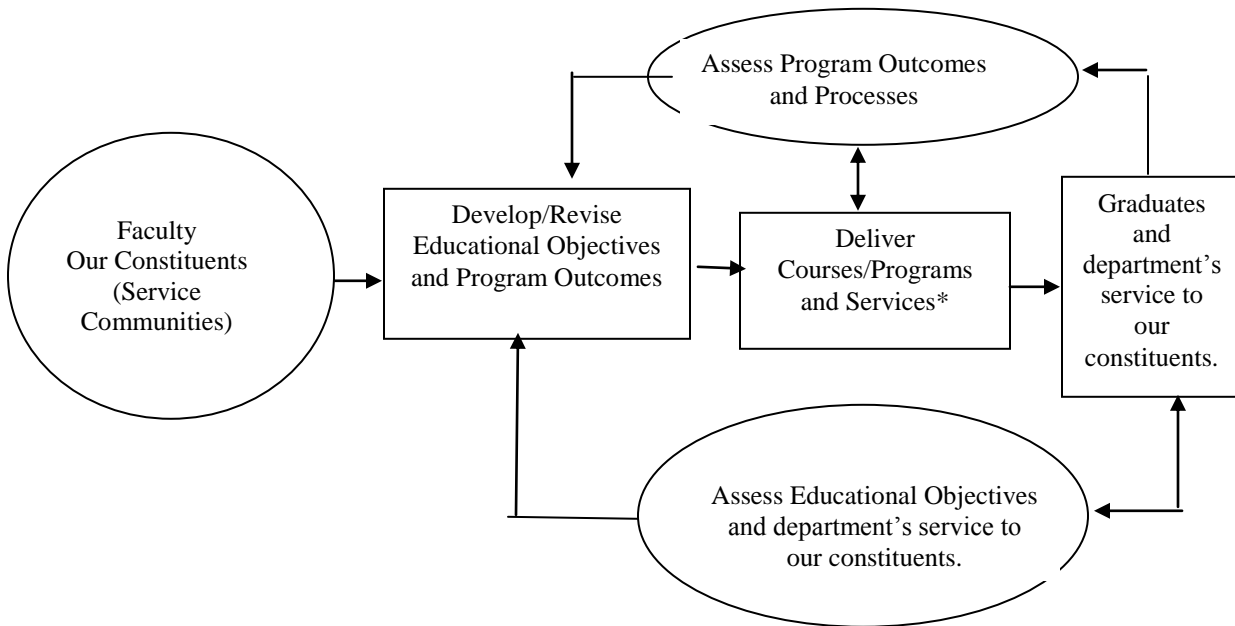
Program coordinators and faculty collect more detailed and specific data about program outcomes. Usually these data are fed back into courses on a more frequent basis and in shorter time than the data affecting program educational objectives. To accomplish this, each program coordinator, along with their respective faculty, has developed a program specific assessment and continuous improvement plan.

Program-Specific Assessment and Continuous Improvement Plans

Each program has a specific plan that includes much of what is here as well as detailed processes, tools, and methods of assessing specific program outcomes and ways in which these assessment data are used for continuous improvement. These plans are available through each program coordinator or on the web.

This plan and all ENT program assessment/continuous improvement plans are available at: <http://ent.ham.muohio.edu> click on department documents.

A map summarizing our Assessment and Continuous Improvement Processes



* Department services include faculty scholarship, consulting, service to K-12, and more. Although this plan focuses on assessing academic programs, the total activity of the department affects our ability to deliver high-quality programs. And although our assessment processes are much more focused on academic programs, all of what we do is interrelated and affects our continuous improvement efforts.

Program Educational Objectives: Assessment and Continuous Improvement

This section provides further detail about how we establish, assess, and validate program educational objectives.

Department Educational Objectives

We consider program educational objectives as the general characteristics our graduates demonstrate to the workplace, graduate school, the military, or their endeavors after they leave Miami. We typically measure these characteristics initially at graduation by asking graduates if they feel they have achieved these characteristics then systematically thereafter through employer surveys, letters from graduates, advisory council, graduate school accomplishments, and surveys of graduates who have been out for awhile. These characteristics should become most evident within their first few years after graduation.

The Engineering Technology Department's graduates are able to:

Apply math and physics principles to the solution of engineering technical problems.

Use applied skills to identify, evaluate, and solve complex technical problems.

Use engineering computer software to facilitate engineering problem solving.

Function effectively in team-oriented activities.

Demonstrate the knowledge of expected standards of ethical and professional conduct.

Verbally communicate ideas.

Prepare well-written technical reports.

In addition, our graduates will have the necessary fundamentals to pursue life-long learning.

Program-specific Educational Objectives:

Electrical and Computer Engineering Technology (AD)—The ECET program produces graduates who:
Analyze digital and analog electrical and electronic circuits, identify problem areas, and maintain these systems.

Function effectively as electrical and computer engineering technicians in state and regional industries.

Electro-Mechanical Engineering Technology (BS Completion Program)—The EMET program produces graduates who:

Possess the ability to apply theoretical knowledge to solve engineering technology problems associated with instrumentation and control systems.

Are knowledgeable of modern applications in process control systems.

Mechanical Engineering Technology (AD & BS)—The MET program produces graduates who:

Are able to analyze and design complex mechanical components and systems.

Are able to set-up experimental testing procedures and selectively utilize data to reinforce engineering concepts.

Have a basic understanding of modern manufacturing methods used to facilitate the production of consumer products.

Are able to effectively and efficiently manage engineering projects. (BS Only)

Establishing Program Educational Objectives:

Program educational objectives are established upon initial development of a degree program. To develop these objectives, we seek input from our constituents including: advisory council, employers, and accreditation bodies. These objectives must meet the needs of our constituents and be consistent with the mission of Miami, SEAS, the regional campuses, and our department. We collect ideas by brainstorming or other methods of seeking thoughtful input. Once the input has been tabulated, we collectively synthesize the input into meaningful and measurable objectives. These objectives are then used as a guide in developing curriculum and processes to assure our graduates meet these objectives.

Assessing and Continuous Improvement of Education Objectives:

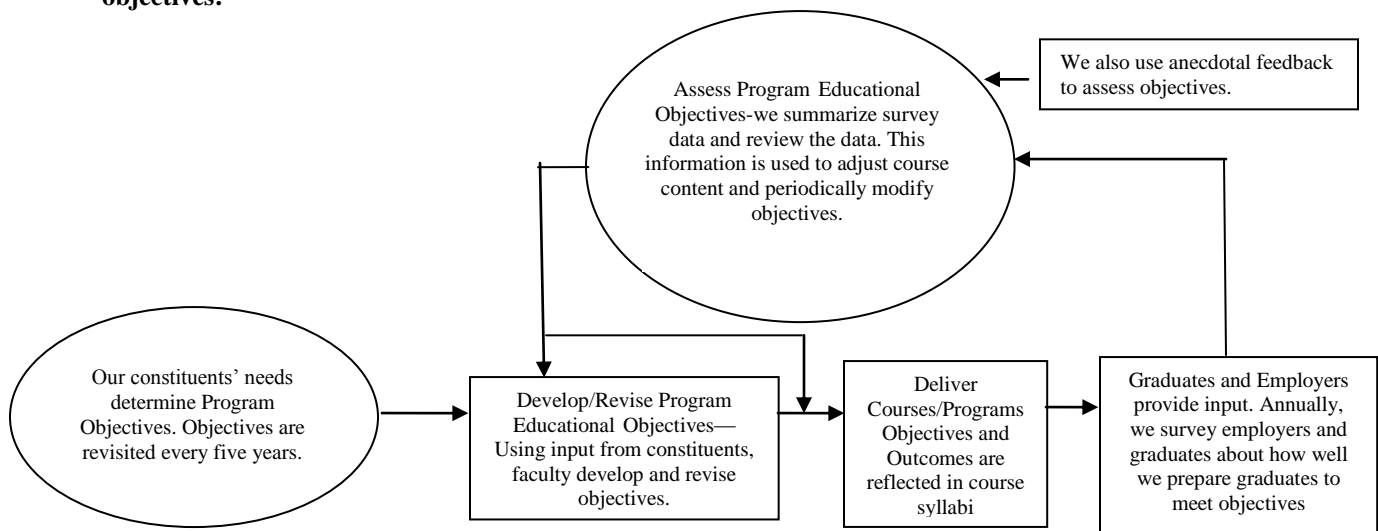
Assessment data for program educational objectives is collected by the department using graduate surveys, employer surveys, and anecdotal feedback from employers, advisory council, graduates, and others. This data is summarized annually and discussed at department meetings, program area meetings, and advisory council meetings. Based on the analysis and discussion of these data, we decide on one or two areas for

improvement and develop an action plan to make improvements. We document these action items through minutes of the respective meetings and track the progress toward improvements resulting from the changes we have made.

Corroboration and Continuous Improvement of Education Objectives:

Every five (5) years, we thoroughly review our educational objectives to determine if these objectives are still correct, how well our graduates have been meeting the objectives, and what changes might be needed in the actual list of objectives to better meet the needs of our constituents. This process is normally done during advisory council meetings and typically includes a lively discussion and thorough examination of the objectives. Occasionally, objectives are added, removed, or changes and, on occasion, this process may result in a change in the mission statement for our program or department.

Diagram of the assessment and continuous improvement process used with program educational objectives:



Data collection (surveys) and analysis:

Graduate surveys are administered by the department as follows: In May and December of every year, current graduates are surveyed about a variety of elements relative to their Miami experience including how well they feel they are prepared regarding Program Educational Objectives. The data is summarized and analyzed. We use this information as a baseline. This information is typically collected in ENT 278 for MET-AD, ENT 297 for ECET-AD, and ENT 498 for BS both concentrations.

Every year, during the summer, the department mails the Program Educational Objectives survey to those graduates who have been out for three years and five years. This data is tabulated then analyzed by the Chair, Assistant Chair, and program coordinators. The data is also discussed with our advisory council. From these discussions and analyses, action items for improvement are developed. The results are tracked and monitored to determine impact. Every five years, we survey ALL graduates instead of just those out three and five years.

We seek input from employers on an ongoing basis, through our co-op/placement offices, faculty, and the Chair. We use essentially the same questionnaire for employers as we use for graduates. This data is tabulated, analyzed, and discussed annually by program coordinators. From these discussions and analysis, action items for improvement are developed. The results are tracked and monitored to determine impact.

Periodically, faculty and the Chair receive letters, e-mails phone calls, cards, etc. form graduates and employers providing comments about our program. We keep these documents in an accolades notebook and review them annually. No formal analysis is prepared but through these comments we get a sense of how well our graduates are doing in the market place.

Documenting and Maintaining the Assessment Data:

When we develop a new program or major, one of the first things we do is survey industry about the need for such a program (or prospective graduates) and, if there is a need, what are the characteristics a graduate must possess. This information is maintained in our program development file. This information is used to formulate outcomes and curriculum.

Annual survey data and summaries of the data are filed in our assessment notebook. Analysis of the data and the impact on program objectives is reflected in meeting minutes of program area meetings, department meetings, and advisory council meetings. In addition, we maintain an accolades notebook of informal (anecdotal) feedback we receive about graduates.

Summary:

Program Educational Objectives are established with input from our constituents (primarily employers, advisory council, and accreditation bodies). These objectives must be consistent with the mission of our organization. This same set of constituents is used to periodically review the objectives to determine if changes are needed. Annually, data is collected and analyzed to determine how well our graduates are doing at meeting these objectives. Based on this analysis, improvement plans are developed and results recorded. On occasion, this process may result in a change in the mission statement for our program or department.

Department of Engineering Technology—Rubrics for Assessing Objectives

Departmental Objectives	Beginning 1 Description of identifiable performance characteristics reflecting a beginning level of performance	Developing 3 Description of identifiable performance characteristics reflecting development and movement toward mastery of performance.	Accomplished 5 Description of identifiable performance characteristics reflecting mastery of performance
Apply math and physics principles to the solution of engineering technical problems.	Able to solve rudimentary math and physics problems if well defined. Not yet able to synthesize open-ended problems.	Applies principles of math and physics to solve basic problems. Shows some ability to synthesize open-ended problems.	Interprets problems and formulates solutions using math and physics principles. Extrapolates on understanding of principles of math and physics and is able to solve complex, open-ended problems using these tools.
Use applied skills to identify, evaluate, and solve complex technical problems.	Able to solve rudimentary technical problems if well defined.	Can identify problems and formulate solutions to basic technical problems.	Identifies, evaluates, and solves complex problems. Applies problem solving knowledge and skills to the solution of complex, multifaceted, and even abstract problems
Use engineering computer software to facilitate engineering problem solving.	Able to use computer software to solve rudimentary technical problems if well defined.	Can identify problems and formulate solutions utilizing computer software.	Identifies, evaluates, and solves complex problems using computer software. Applies engineering software to the solution of complex, multifaceted, and even abstract problems
Function effectively in team-oriented activities.	<p>Is absent from team meetings or work sessions >50% of the time</p> <p>Does not contribute to group work at all or submits own work as the group's</p> <p>Routinely fails to prepare for meetings</p> <p>Does work on his/her own; does not value team work</p> <p>Claims work of group as own or</p>	<p>Absent occasionally, but does not inconvenience group</p> <p>Sometimes depends on others to complete the work; contributes less than fair share</p> <p>Prepares somewhat for group meetings, but ideas are not clearly formulated</p> <p>Occasionally works as a loner or interacts to a minor extent with extra-disciplinary team members</p>	<p>Routinely present at team meetings or work sessions</p> <p>Contributes a fair share to the project workload</p> <p>Is prepared for the group meeting with clearly formulated ideas</p> <p>Cooperates with others (outside of the discipline)</p> <p>Shares credit for success with others and accountability for team</p>

	<p>frequently blames others</p> <p>Hides in the background; only participates if strongly encouraged</p> <p>Does not willingly assume team roles</p> <p>Does not consider the ideas of others</p> <p>Is openly critical of the performance of others</p> <p>Is discourteous to other group members</p>	<p>Makes subtle references to other's poor performance or sometimes does not identify contributions of other team members</p> <p>Sometimes keeps information to himself/herself; not very willing to share</p> <p>Takes charge when not in the position to lead</p> <p>Persuades others to adopt only his/her ideas or grudgingly accepts the ideas of others</p> <p>Sometimes criticizes ideas of other team members or blames others for errors</p> <p>Is not always considerate or courteous towards team members</p> <p>Has some knowledge of other disciplines, but gets lost in discussions with extra-disciplinary team members</p>	<p>results</p> <p>Shares information with others and provides assistance to others</p> <p>Demonstrates the ability to assume a designated role in the group</p> <p>Values alternative perspectives and encourages participation among all team members</p> <p>Remains non-judgmental when disagreeing with others/seeking conflict resolution; does not "point fingers" or blame others when things go wrong</p> <p>Is courteous group member</p> <p>Has knowledge of technical skills, issues and approaches germane to disciplines outside of civil engineering</p>
<p>Demonstrate the knowledge of expected standards of ethical and professional conduct.</p>	<p>Student is not aware of any codes for ethical behavior</p> <p>Does not participate in or contribute to discussions of ethics; does not accept the need for professional ethics</p> <p>Student has been caught cheating or plagiarizing the work of others</p> <p>Blames others for own issues and problems</p>	<p>Student is aware of the existence of the Engineering Code of Ethics and other bases for ethical behavior</p> <p>Does not take the discussion of ethics seriously but is willing to accept its existence</p> <p>Does not model ethical behavior among peers and faculty</p> <p>Doesn't recognize the need to take personal responsibility for his/her</p>	<p>Student understands and abides by the Engineering Code of Ethics and the Miami Students' Code of Conduct</p> <p>Participates in class discussions and exercises on ethics and professionalism</p> <p>Demonstrates ethical behavior among peers and faculty</p> <p>Takes personal responsibility for</p>

	<p>Is frequently absent from class and is generally not collegial to fellow students, staff, and faculty</p> <p>Evaluates and judges a situation in practice or as a case study using a biased perspective without objectivity</p> <p>Uses personal value system to support actions to the exclusion of all other ethical standards</p>	<p>actions</p> <p>Sometimes exhibits unprofessional behavior; is sometimes absent from class without reason</p> <p>Evaluates and judges a situation in practice or as a case study using personal understanding of the situation, possibly applying a personal value system</p> <p>Uses personal value system to support actions, but confuses personal ethics with professional ethics</p>	<p>his/her actions</p> <p>Is punctual, professional, and collegial; attends classes regularly</p> <p>Evaluates and judges a situation in practice or as a case study, using facts and a professional code of ethics</p> <p>Uses personal value system to support actions, but understands the role of professional ethical standards for corporate decisions</p>
Verbally communicate ideas.	<p>Idea seeds have not yet <i>germinated</i>; ideas may not be focused or developed; the main purpose is not clear. The introduction is undeveloped or irrelevant. Main points are difficult to identify. Inaccurate, generalized, or inappropriate supporting material may be used. Transitions may be needed. The conclusion is abrupt or limited. Language choices may be limited, peppered with slang or jargon, too complex or too dull.</p>	<p>The main idea is evident, but the organizational structure may need to be strengthened; ideas may not always flow smoothly. The introduction may not be well-developed. Main points are not always clear. Supporting material may lack in originality or adequate development. Transitions may be awkward. The conclusion may need additional development. Language is appropriate, but word choices are not particularly vivid or precise.</p>	<p>Ideas are clearly organized, developed, and supported to achieve a purpose; the purpose is clear. The introduction gets the attention of the audience. Main points are clear and organized effectively. Supporting material is original, logical, and relevant (facts, examples, etc.). Smooth transitions are used. The conclusion is satisfying. Language choices are vivid and precise. Material is developed for an oral rather than a written presentation</p>
Prepare well-written technical reports.	<p>Grammar is inaccurate Content and concepts are only partially covered/ Incomplete. Applications of concepts are difficult to follow. Lacks clarity. Sequence/chronology is partial and</p>	<p>Grammar is generally Accurate. Content and concepts are covered substantially. Application of concepts are generally clear. Sequence/chronology is</p>	<p>Grammar is completely accurate Content and Concepts are covered thoroughly and application of concepts are exceptionally clear. Sequence and chronology are</p>

	incomplete. Technical content lacks completeness and accuracy.	substantial. Technical content is mostly complete, accurate, and detailed.	thorough and complete. Technical content is complete, accurate, and detailed.
In addition, our graduates will have the necessary fundamentals to pursue life-long learning.	<p>Requires detailed or step-by-step instructions to complete a task</p> <p>Has trouble completing even the minimum required tasks</p> <p>Is unable to recognize own shortcomings or deficiencies</p> <p>Assumes that all learning takes place within the confines of the class</p> <p>Shows little or no interest in outside learning resources</p> <p>Cannot use materials outside of what is explained in class</p> <p>Does not show any interest in professional and/or technical societies</p>	<p>Requires guidance as to expected outcome of task or project Completes only what is required</p> <p>Sometimes is able to avoid repeating the same mistakes</p> <p>Does not always take responsibility for own learning</p> <p>Seldom brings information from outside sources to assignments</p> <p>Has some trouble using materials and concepts that are in a different format from that taught in class</p> <p>Occasionally participates in the activities of local professional and technical societies</p>	<p>Demonstrates ability to learn independently Goes beyond what is required in completing an assignment and brings information from outside sources into assignments</p> <p>Learns from mistakes and practices continuous improvement</p> <p>Demonstrates capability to think for one's self</p> <p>Demonstrates responsibility for creating one's own learning opportunities</p> <p>Is able to understand, interpret, and apply learned materials and concepts in a format different from that taught in class (e.g. different nomenclature, understand equation from different textbook)</p> <p>Participates and takes a leadership role in professional and technical societies available to the student body</p>

ECET Specific			
Analyze digital and analog electrical and electronic circuits, identify problem areas, and maintain these systems.	Able to analyze and maintain familiar and common electrical /electronic circuits.	Able to analyze and troubleshoot unfamiliar, more advanced electrical/electronic circuits and maintain the same.	Able to analyze and troubleshoot nearly any electrical/electronic circuit and maintain the same.
Function effectively as electrical and computer engineering technicians in state and regional industries	Able to fulfill many of the duties expected of electrical and computer engineering technicians.	Able to fulfill most of the duties expected of electrical and computer engineering technicians.	Able to fulfill all or nearly all of the duties expected of electrical and computer engineering technicians.
EMET Specific			
Possess the ability to apply theoretical knowledge to solve engineering technology problems associated with instrumentation and control systems.	Able to analyze and solve routine engineering technology problems associated with instrumentation and control systems.	Able to analyze and solve more complex engineering technology problems associated with instrumentation and control systems.	Able to analyze and solve any or nearly any engineering technology problems associated with instrumentation and control systems.
Are knowledgeable of modern applications in process control systems.	Demonstrates knowledge of basic process control systems.	Has understanding of more advanced process control systems.	Is considered very knowledgeable and competent in understanding process control systems.
MET Specific			
Are able to effectively and efficiently manage engineering projects. (BS Only)	Able to manage routine engineering projects.	Able to manage more complex engineering projects.	Is considered extremely capable of managing complex engineering projects.
Are able to set-up experimental testing procedures and selectively utilize data to reinforce engineering concepts.	Able to utilize fundamental data to reinforce routine engineering concepts.	Able to gather, synthesize, and utilize data to reinforce engineering concepts.	Able to gather, synthesize, analyze, and utilize data to reinforce complex engineering concepts.
Have a basic understanding of modern manufacturing methods used to facilitate the production of consumer products.	Demonstrates a basic understanding of modern manufacturing concepts.	Able to utilize knowledge of modern manufacturing concepts to facilitate production of basic products.	Able to apply knowledge of modern manufacturing concepts to facilitate production of a wide range of products.