

Engineering & Science Technology

Electronic Engineering Technology

Strategic Plan

June 17, 2008

Electronic Engineering Technology Vision:

"The vision of the Electronics Engineering Technology Program is to be amongst the best of Electronics Engineering Technology Programs in the State of Ohio and comparable to any of the top Electronics Engineering Technology programs in the United States."

Electronic Engineering Technology Mission:

The Electronics Engineering Technology Program at University of Akron has as its mission to:

- Provide a recognized and meaningful undergraduate educational program with an emphasis in electronic engineering technology;
- Conduct professional development and other activities to meet the needs of the local community including both the private and the public sectors.
- Encourage faculty and students to seek out and participate in applied scholarship activities designed to support both educational, and business and industry initiatives.

A. Objectives, Strategies and Plans outlined below provide details for the continuous quality management of the Electronic Engineering Technology Program within the following areas:

1. Credit Program **Management** and Accreditation
2. **Documentation** and verification
3. Marketing, **Enrollment**, Retention, and Graduation
4. **Placement**
5. **Non-traditional** EET offerings
6. **Faculty** and other instructors
7. **Budget**, Grants and Gifts
8. Student **extra-curricular** activities

B. Electronic Engineering Technology Program Objectives:

1. Provide **well-managed**, appropriately accredited associate and bachelor degree credit programs in Electronic Engineering Technology. An essential component of this objective is specifically the set of program's **educational objectives** which are discussed under Program Assessment.
2. Monitor and **document** the success of the EET program through the use of continuous input from all stakeholders.
3. Follow a well-managed marketing, **enrollment** and retention plan to increase enrollment and maintain student progress through to graduation.
4. **Placement**. Maintain quality contact with relevant employers and companies in Northeast Ohio to support meaningful career placement.
5. **Non-traditional offerings**. Provide additional EET credit and non-credit educational opportunities to a variety of stakeholders in Northeast Ohio.
6. **Faculty**. Attract, retain and develop well qualified faculty and instructors for all EET courses. Realizing that other instructors, typically those with full-time employment in industry, can provide meaningful input to courses and the program, highly qualified professionals will be sought for this important role.
7. **Budget**. Follow a well-managed budget plan to up-date, maintain and grow program holdings. Acquire budget resources through traditional and non-traditional sources.
8. **Extra-curricular**. Provide appropriate extra-curricular activities for EET students to broaden their professional and cultural experience.

C. Electronic Engineering Technology Program Strategies:

1. **Management** and Accreditation

- a. Continuously satisfy TAC of ABET guidelines regarding EET Program requirements.
- b. Wisely manage the operation of the EET program, including:
 - i. Program requirements
 - ii. Organization of subject matter and of course requirements
 - iii. Selection of textbooks and other support items
 - iv. Scheduling courses to best meet student needs
 - v. Direct EET financial resources in support of courses and labs,
 - vi. Assign and monitor EET instructors
 - vii. Direct and monitor EET data collection, analysis, and assessment initiatives
 - viii. Direct EET-specific initiatives aimed at; marketing, enrollment,

- retention, and student progress through to graduation
- ix. Direct EET-specific initiatives aimed at securing grants and gifts and other alternate revenue sources.
 - x. Direct EET articulation initiatives.
 - xi. Manage additional EET functions listed elsewhere in this document,
 - xii. Manage EET program-related activities as requested by the department, college, or university.
2. Continuously **document** and verify the progress and success of the EET program through the use of various direct and indirect measures with stakeholders, and other groups and individuals with an interest in the success of the program. An integral part of this is the continual assessment and evaluation of the program's educational objectives and learning outcomes. Gather appropriate reference data such as national statistics.
 3. Develop and manage plans specific to EET to promote; marketing, EET **enrollment**, student retention, and student progress toward graduation.
 4. **Placement.** Promote use of University resources and contacts with potential employers to encourage students in their career plans.
 5. **Non-traditional offerings.** Identify, prepare and deliver non-traditional educational courses to satisfy the needs of the Northeast Ohio technical community.
 6. **Faculty.** Develop and manage EET program faculty and instructors. This includes the use of hiring plans and procedures, and well defined responsibilities.
 7. **Budget.** Develop and manage an annual EET program budget.
 8. **Extra-curricular.** Develop and maintain EET-related student clubs and other professional relationships for EET students.

D. Electronic Engineering Technology Program Plans:

1. **Manage.** With appropriate university support provide an EET Program Director with appropriate compensation to manage all the items listed in Strategy section 1.
2. **Document.** With appropriate university support, perform the following data analysis and collection activities:
 - a. Use the standard evaluations of instruction as specified by the Summit College
 - b. Each faculty member must collect other course and or instruction improvement data for each course taught.

- c. Collect data using direct and indirect metrics relevant to the performance of the whole program (in terms of meeting its educational objectives and learning outcomes), organize this data, evaluate it and adjust the program to alleviate any shortcomings and deficiencies that are observed.
 - d. Manage at least one current-student focus group per academic year,
 - e. Manage at least one EET Advisory Committee meeting per academic year.
 - f. Manage at least two phone/letter/e-mail-based EET Advisory Committee meetings per academic year.
 - g. Manage at least one EET graduate survey per year.
 - h. Manage informal or unsolicited program-improvement data,
 - i. Organize and analyze all University of Akron statistical sources regarding the EET program.
 - j. Organize and analyze at least one national data source regarding EET programs,
 - k. Organize and collect the minutes from monthly departmental faculty meetings for each academic year,
 - l. Organize and collect the minutes from monthly program director's meetings for each academic year.
- 3. Enrollment.** With appropriate university support increase EET enrollment and degree production.
- a. Increase EET enrollment by 3% per academic year, measuring head-count of majors.
 - i. An EET Program member will actively serve on the appropriate Engineering & Science Technology Department marketing, enrollment, retention committee each academic year.
 - ii. An EET Program member will actively serve on the appropriate Summit College marketing, enrollment, retention committee each academic year,
 - iii. Develop and manage a marketing plan for local high school students, parents, and teachers. Visit at least one high school per academic year,
 - iv. Develop and manage a marketing plan for local industry,
 - v. Participate in college and university marketing programs that benefit EET and Department, especially in the area of increasing the percentage of under-enrolled students. A member of the EET Program will actively attend at least one enrollment event per year,
 - vi. Increase enrollment via student transfers from other programs

and other

colleges with appropriate technology based programs,

vi. Build partnerships with area high school science and mathematics teachers to assist in recruiting students from underrepresented groups,

viii. Seek grant funding to address recruiting students from underrepresented groups.

b. Increase total EET degree (AAS degrees plus BS degrees) production by 3% per academic year starting with the 2008-2009 academic year.

i. By June 2008, an EET Program member will have secured a grant to provide funds to hire an EET tutor and or to carefully review methods of instruction with an aim to increase student success.

4. Placement. With appropriate university support assist students in gaining awareness of the opportunities available,

a. Reach out to local industry representatives to maintain contact and awareness of our graduates

b. Encourage regular visitations of The University Center for Career Management to EET classes, especially the sophomore and senior classes.

5. Non-traditional offerings. With appropriate university support, investigate the possibility of offering EET-related courses in any or all of the following ways:

a. Develop working relationships with Summit College Workforce Development and Continuing Education Center,

b. Provide continuing education for area professionals in engineering and engineering technology including upgrading of skills and continuing education units needed for professional licensure

6. Faculty. With appropriate university support manage all EET Program faculty through the following:

a. Maintain an annually updated list of qualified potential EET instructors,

b. Monitor the performance of all EET faculty each term,

c. Address the faculty staffing issues posed by a potentially significant number of faculty retirements possible in the next 2 years,

d. Where applicable, faculty will pursue additional professional involvement and professional development.

7. Budget. With appropriate university support, manage an annual dedicated EET Program budget,

a. Obtain industry and/or grant support that provides funds that

specifically benefit EET and department programs,

b. Based on current and clearly defined business and industry information, continually improve and update equipment

8. Extra-curricular. With appropriate university support:

a. Encourage student membership in appropriate EET professional activities and societies,

b. Advise and maintain the Electronic Engineering Technology Association, the student club for the EET students.

c. Encourage student participation in all appropriate career activities, like career fairs, use of the Center for Career Management, possibilities of internships and co-ops.

PROGRAM EDUCATIONAL ASSESSMENT

Several times in the above, educational objectives and assessment have been mentioned. One of the Program Objectives refers to Educational objectives. The details of the educational aspect follow.

THE ASSESSEMENT PROCESS

Assessment Philosophy:

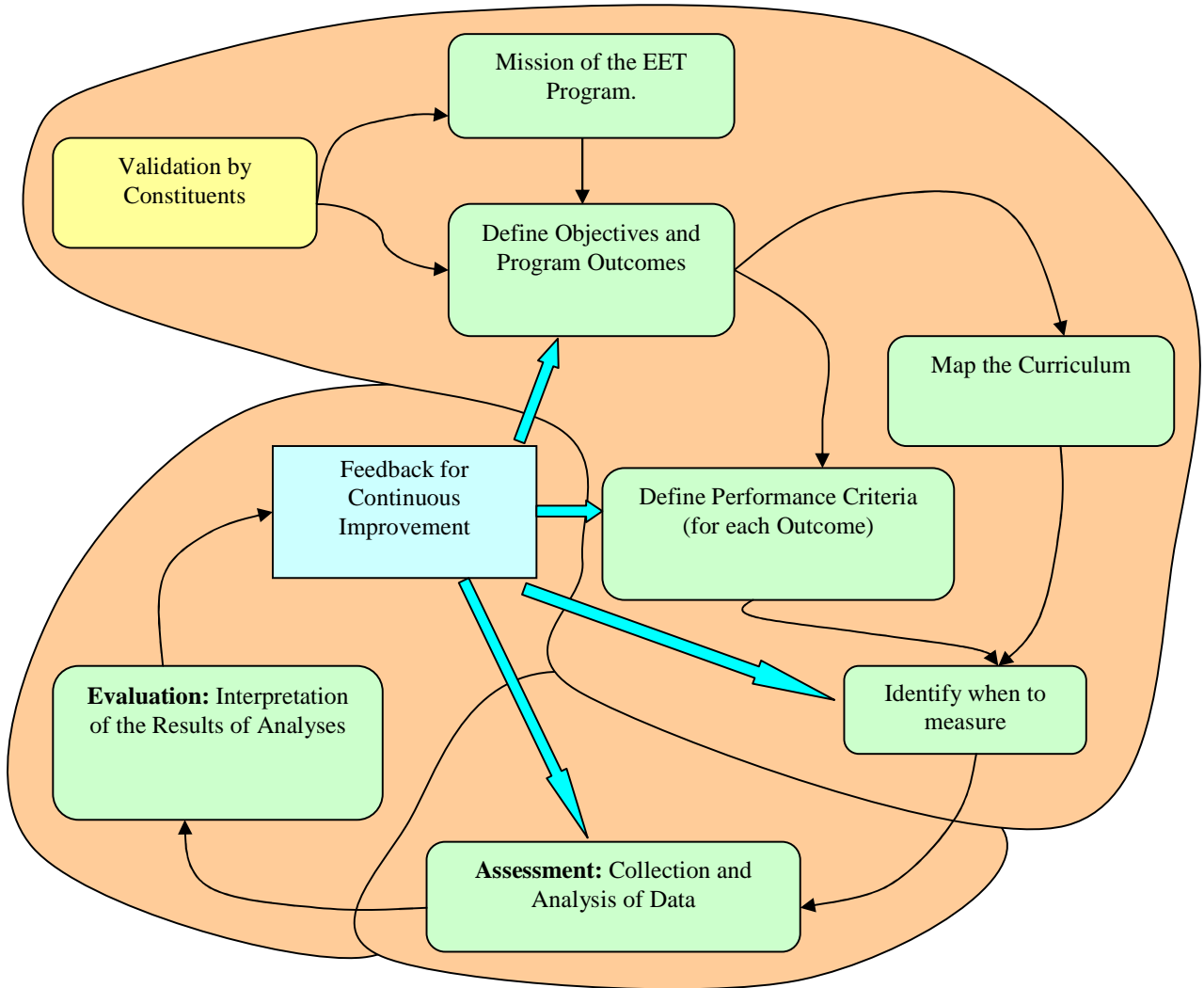
At the program level the assessment effort in part reflects on the efforts at the University level and in part by what is required by ABET, Inc. The assessment philosophy of EET is based on the idea that teaching and learning need a process of quality control and that student learning and improvement in student learning are two distinct measurements, the former having to do primarily with course learning outcomes and the later primarily with program outcomes and the quality and integration of the program. Since it is quality control of the program it is a continuous and an active process in which monitoring and adjustment are an integral part of the process. Where possible multiple measures will be used and also whenever possible direct measures will be preferred.

Assessment Plan:

The EET faculty has worked on an assessment process which is summarized in Figure 1 on the next page . In the figure boxes with light green background are the tasks in the assessment and evaluation process. The cyan box and arrows indicate the process of “closing the loop” without which there would be no improvement in the program.

Every semester program outcomes will be measured in different courses using the performance criteria. The program faculty will discuss the results of the measured outcomes at the end of the academic year. When an outcome is found not to be adequately met, appropriate step will be discussed and implemented to address the weakness(es) that would lead to improvement in the particular program outcome. These recommendations will be implemented in the Fall semester. All the steps taken during the assessment and evaluation cycle will be documented.

Figure 1: Assessment Plan



This plan views the program educational objectives and outcomes to be as follows.

Educational Objectives:

The Electronics Engineering Technology Program at University of Akron has as its primary educational objectives to produce graduates who:

- 1) possess the technical skills to be immediately productive and have successful careers in regional, state or national electronics, test, and systems integration industries.
- 2) demonstrate increasing levels of leadership and responsibility during their careers.
- 3) exhibit a commitment to professional ethics and social awareness in their professional career.
- 4) display a desire for life-long learning through continued education, technical training, and/or professional development.

Program Outcomes:

Students who graduate with an A.S. or a B.S. degree in Electronics Engineering Technology from the University of Akron will demonstrate technical expertise, teamwork and communication skills and professionalism.

The specific outcomes follow:

General Student Learning Outcomes

A graduating student will have:

- 1) an ability to apply current knowledge and adapt to emerging applications of mathematics, science, engineering, and technology,
- 2) an appropriate mastery of the knowledge techniques, skills, and modern tools of their disciplines,
- 3) an ability to conduct, analyze and interpret experiments and apply experimental results to improve processes,
- 4) an ability to apply creativity in the design of systems, components or processes appropriate to program objectives,
- 5) an ability to identify, analyze and solve technical problems,
- 6) an ability to function effectively on teams,
- 7) an ability to communicate effectively,
- 8) a commitment to quality, timeliness, and continuous improvement.
- 9) an ability to understand professional, ethical, and social responsibilities,

- 10) a respect for diversity and a knowledge of contemporary professional, societal and global issues, and
- 11) a recognition of the need for, and an ability to engage in, lifelong learning,

EET Program Specific Student Outcomes

A graduating student will be able to demonstrate:

a) For Associate's degree students:

- 12) the application of circuit analysis and design, computer programming, associated software, analog and digital electronics, and microcomputers to the building, testing operation, and maintenance of electrical/electronic systems.
- 13) the applications of physics or chemistry to electrical/electronic(s) circuits in a rigorous mathematical environment at or above the level of algebra and trigonometry.

A graduating student will demonstrate:

b) For Bachelor's degree students (in addition to 12 and 13):

- 14) the ability to analyze, design, and implement control systems, instrumentation systems, communications systems, computer systems, or power systems.
- 15) the ability to apply project management techniques to electrical/electronic(s) systems.
- 16) the ability to utilize statistics/probability, transform methods, discrete mathematics, or applied differential equations in support of electrical/electronic(s) systems.

Performance Criteria

For each outcome a set of manageable number of performance criteria have been identified that define the program outcomes more precisely. Rubrics have been developed to measure the different criteria. The performance criteria will be used as direct measures of the outcomes. Surveys and similar measures will be used as indirect measures of the program outcomes. Wherever possible direct measures will be preferred in the assessment process.

Program Constituencies/Stakeholders

These are the groups that are considered the primary stakeholders in the EET Program. It is primarily through their review and input, that the performance of the program will be evaluated and improved.

1. Alumni
2. Advisory Committee (Industry Employers)

3. Faculty
4. Current Students

Mapping of objectives and outcomes and course the program.

The EET Program has four Program Objectives and sixteen Program Outcomes. The sixteen program outcomes can be grouped into four major categories as 1) Broad-Based Technical Skills, 2) Teamwork and Communication skills, 3) Professionalism and Personal Development, and 4) EET-specific technical skills. The details are in Table 2. Table 1 shows how the broad outcome categories map on to the objectives.

Table 1. Mapping of Program Outcome Group on to Program Objectives

	Program Educational Objective	Program Learning Outcomes Groups
1	Possess the technical skills to be immediately productive and have successful careers in regional, state or national electronics, test, and systems integration industries.	Group 1, Broad-Based Technical Skills, and Group 4, EET specific skills
2	Demonstrate increasing levels of leadership and responsibility during their careers.	Group 2, Teamwork and Communication, and Group 3, Professionalism and Personal Development
3	Exhibit a commitment to professional ethics and social awareness in their professional career.	Group 2, Teamwork and Communication, and Group 3, Professionalism and Personal Development

4	Display a desire for life-long learning through continued education, technical training, and/or professional development	Group 2, Teamwork and Communication, and Group 3, Professionalism and Personal Development
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Table 2. ALIGNMENT OF COURSES WITH PROGRAM OUTCOMES & ABET OUTCOMES

I. BROAD BASED TECHNICAL EXPERTISE			
	UA EET Program Outcomes <i>By the time of graduation, our students will have:</i>	ABET	Courses
1	<i>(Scientific and Mathematical foundations and application)</i> an ability to apply current knowledge and adapt to emerging applications of mathematics, science, engineering and technology	b	2820: 111, 161, 162, & 164 2860: 400
2	<i>(Engineering Technology foundations)</i> an appropriate mastery of the knowledge, techniques, skills and modern tools of EET	a	2030: 152, 153, 154, 255, 356
3	<i>(Experimentation)</i> an ability to conduct, analyze and interpret experiments and apply experimental results to improve processes	c	All courses listed in 2. above; 2860: 260
4	<i>(Basics of Technical design)</i> an ability to apply creativity in the design of systems, components or processes appropriate to program objectives	d	2860: 260, 352, 400, 430, & 497
5	<i>(Diagnostic skills)</i> an ability to identify, analyze and solve technical problems	f	2820: 310, 2860: 260, 420, 430, 490, & 497

II. TEAMWORK AND COMMUNICATIONS			
	UA EET Program Outcomes <i>By the time of graduation, our students will have:</i>	ABET	Courses:
6	(<i>Teamwork</i>) an ability to function effectively on teams	e	2860: 260, 354,. & 400
7	(<i>Communication</i>) an ability to communicate effectively (both oral and written)	g	2020: 121, 222; 2030: 345; 2860: 237, 238, 260, 400, 420, 451; 2940: 210; 3300: 112; 7600: 106.

III. PROFESSIONALISM AND PERSONAL DEVELOPMENT			
	UA EET Program Outcomes <i>By the time of graduation, our students will have:</i>	ABET	Courses
8	(<i>Professionalism</i>) a commitment to quality, timeliness, and continuous improvement	k	2860: 451, 452; 2920: 310
9	(<i>Ethics and morals</i>) an ability to understand professional, ethical and social responsibilities	i	5540:xxx; 2040:240, 242, 247; & Cultural Diversity Electives
10	(<i>Social issues</i>) a respect for diversity and a knowledge of contemporary professional, societal and global issues	j	5540:xxx; 2040:240, 242, 247; & Cultural Diversity Electives
11	(<i>Lifelong learning</i>) a recognition of the need for, and an ability to engage in lifelong learning	h	2920:245, 347, 402, & 405

IV. LEARNING OUTCOMES FOR TECHNOLOGY SKILLS SPECIFIC TO EET			
	UA EET Program Outcomes <i>By the time of graduation, our students will have:</i>	ABET	Courses
	At A.S. level:		
12	the application of circuit analysis and design, computer programming, associated software, analog and digital electronics, and microcomputers to the building, testing, operation, and maintenance of electrical/electronic(s) systems.		2860: 120, 121, 123, 136 225, 237, 238, 242, 251, 260; 2870: 301
13	the applications of physics or chemistry to electrical/electronic(s) circuits in a rigorous mathematical environment at or above the level of algebra and trigonometry		2860: 120, 121, 123, 136 225, 237, 238, 242, 251, 260; 2870: 301
	At B.S. level: (In addition to the outcomes expected of associate degree graduates, graduates of baccalaureate degree programs must demonstrate these)		
14	the ability to analyze, design, and implement control systems, instrumentation systems, communications systems, computer systems, or power systems.		2860: 350, 352, 354, 400, 406, 420, 451, & 453 2820: 161, 162, 164
15	the ability to apply project management techniques to electrical/electronic(s) systems		2860: 350, 352, 354, 400, 406, 420, 451, & 453 2820: 161, 162, 164
16	the ability to utilize statistics/probability, transform methods, discrete mathematics, or applied differential equations in support of electrical/electronic(s) systems		2860: 350, 352, 354, 400, 406, 420, 451, & 453 2820: 161, 162, 164