

Academic Program Review: A Guide for Accredited Programs

Program Information

Program name(s)

Welding Technology - Associate in Applied Science degree
Welding Engineering Technology – Bachelor of Science degree

Name of accrediting agency

Accreditation Board for Engineering and Technology (ABET)

Date accreditation expires

September 30, 2016

Evidence of Accreditation in Good Standing

Current evaluation of program standing from the accrediting body including identified program strengths and opportunities for improvement.

ABET “Summary of Accreditation Actions for the 2008-2009 Accreditation Cycle” letter dated August 14, 2009 can be found on pages 1 - 11

ABET, Inc.
111 Market Place, Suite 1050
Baltimore, MD 21202
Phone: 410-347-7700
Fax: 410-625-2238
www.abet.org accreditation@abet.org

Applied Science Accreditation Commission Computing Accreditation Commission Engineering Accreditation Commission
Technology Accreditation Commission

August 14, 2009

Thomas Oldfield
Dean, College of Engineering Technology
Ferris State University
Johnson Hall 200
1009 Campus Drive
Big Rapids MI 49307 United States

Dear Dr. Oldfield:

Technology Accreditation Commission (TAC) of ABET recently held its 2009 summer Meeting to act on the program evaluations conducted during 2008-2009. Each evaluation was summarized in a report to the Commission and was considered by the full Commission before a vote was taken on the accreditation action. The results of the evaluation for Ferris State University are included in the enclosed Summary of Accreditation Actions. The Final Statement to your institution that discusses the findings on which each action was based is also enclosed.

The policy of ABET is to grant accreditation for a limited number of years, not to exceed six, in all cases. The period of accreditation is not an indication of program quality. Any restriction of the period of accreditation is based upon conditions indicating that compliance with the applicable accreditation criteria must be strengthened. Continuation of accreditation beyond the time specified requires a reevaluation of the program at the request of the institution as noted in the accreditation action. ABET policy prohibits public disclosure of the period for which a program is accredited. For further guidance concerning the public release of accreditation information, please refer to Section ILL of the 2008-2009 Accreditation Policy and Procedure Manual (available at www.abet.org).

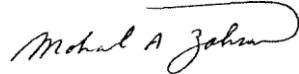
A list of accredited programs is published annually by ABET. Information about ABET accredited programs at your institution will be listed in the forthcoming ABET Accreditation Yearbook and on the ABET web site (www.abet.org).

Leadership and Quality Assurance in Applied Science, Computing, Engineering, and Technology Education

It is the obligation of the officer responsible for ABET accredited programs at your institution to notify ABET of any significant changes in program title, personnel, curriculum, or other factors which could affect the accreditation status of a program during the period of accreditation.

Please note that appeals are allowed only in the case of Not to Accredit actions. Also, such appeals may be based only on the conditions stated in Section II.G. of the 2008-2009 Accreditation Policy and Procedure Manual (available at www.abet.org).

Sincerely,



Mohammad A. Zahraee, Chair
Technology Accreditation Commission

Enclosure: Summary of Accreditation Action
Final Statement

cc: David Eisler, President
Ron McKean, Associate Dean, College of Engineering Technology
Steven E. Wendel, Visit Team Chair

A BET, Inc.

Technology Accreditation Commission
Summary of Accreditation Actions
for the
2008-2009 Accreditation Cycle

Ferris State
University Big Rapids,
MI

Welding Engineering Technology (BS)

Accredit to September 30, 2016. A request to ABET by January 31, 2015 will be required to initiate a reaccreditation evaluation visit. In preparation for the visit, a Self-Study Report must be submitted to ABET by July 01, 2015. The reaccreditation evaluation will be a comprehensive general review.

This is a newly accredited program. Please note that this accreditation action extends retroactively from October 01, 2007.

ABET, Inc.
111 Market Place, Suite 1050
Baltimore, MD 21202
Phone: 410-347-7700
Fax: 410-625-2238
www.abet.org

August 14, 2009

David Eisler
President
Ferris State University
Johnson Hall 200
1201 Campus Drive
Big Rapids MI
49307

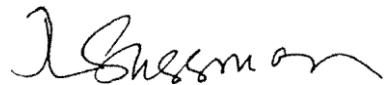
Dear Dr. Eisler:

I am pleased to transmit to you the findings of the Technology Accreditation Commission (TAC) of ABET with respect to the evaluation conducted for Ferris State University during 2008-2009. Each of ABET's Commissions is fully authorized to take

the actions described in the accompanying letter under the policies of the ABET Board of Directors.

We are pleased that your institution has elected to participate in this accreditation process. This process, which is conducted by approximately 1,500 ABET volunteers from the professional community, is designed to advance and assure the quality of professional education. We look forward to our continuing shared efforts toward this common goal.

Sincerely,



Joseph L. Sussman President

Enclosure: Commission letter and attachments

Leadership and Quality Assurance in Applied Science, Computing, Engineering, and Technology Education

FERRIS STATE UNIVERSITY

ABET, Inc.

TECHNOLOGY ACCREDITATION COMMISSION

FINAL STATEMENT

on

FERRIS STATE UNIVERSITY

Big Rapids, Michigan

Dates of Visit:
November 2 - 4, 2008

-I-

FERRIS STATE UNIVERSITY

The statement that follows consists of two parts: the first addresses the overall institution and its engineering technology operation, and the second addresses the individual engineering technology programs. Accreditation actions taken by TAC of ABET will be based upon the

findings summarized in this statement and will depend on the range of compliance or non-compliance with ABET criteria, policies, and procedures. The range can be construed from the following definitions for findings:

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 prior to the next evaluation.

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.

Observation: An Observation is a comment or suggestion which does not relate directly to the accreditation action but is offered to assist the institution in its continuing efforts to improve its programs.

FERRIS STATE UNIVERSITY

FERRIS STATE UNIVERSITY

Big Rapids, Michigan

INSTITUTIONAL FACTORS AFFECTING
THE ENGINEERING TECHNOLOGY UNIT

Introduction

The Technology Accreditation Commission of ABET, Inc. (TAC of ABET) has evaluated the baccalaureate degree program in Welding Engineering Technology of Ferris State University.

The visit findings were evaluated using the 2008-09 ABET *Criteria for Accrediting Engineering Technology Programs* and the 2008-09 ABET *Accreditation Policy and Procedure Manual*.

Ferris State University is a public college serving Big Rapids, Michigan and its surrounding region. The institution has been accredited by the Commission on Higher Education of the North Central Association of Colleges and Schools since 1959. Ferris State University offers degrees through several colleges, including the College of Engineering Technology. The College of Engineering Technology has several associate and baccalaureate degree programs that are accredited by TAC of ABET including Automotive Engineering Technology, Electrical/Electronic(s) Engineering Technology, and Mechanical Engineering Technology. Established in 1984, Ferris State University's Welding Engineering Technology program is the largest of its kind in the United States. The Welding Engineering Technology program is being submitted for initial TAC of ABET accreditation.

PROGRAM EVALUATION

WELDING ENGINEERING TECHNOLOGY

Baccalaureate Degree

Introduction

The mission statement of the Department of Welding Engineering Technology is "To continuously define the profession by producing Welding Technology and Welding Engineering Technology graduates whose knowledge, skills, and attitudes are nationally recognized." The program educational objectives are to:

- provide an educational experience that prepares students for the challenges of the welding engineering technology profession that they will encounter during their professional life,
- provide opportunities for students to exhibit creativity, leadership and team-building abilities, and an understanding of global and social issues,
- employ state-of-the-art technologies in the curriculum,
- provide a broad educational experience including communication skills, mathematics and basic science, preparing students for life-long learning,
- provide the education needed for the graduates to become plant-level welding engineers, and
- provide the skill set and knowledge required to pass the American Welding Society Certified Welding Inspector examination.

Graduates of the Welding Engineering Technology Program hold a wide variety of position titles including welding engineer, manufacturing engineer, application engineer, sales

engineer and project engineer or manager. The most common industry employers include automotive, agricultural and construction equipment producers, oil and gas industry suppliers, welding equipment manufacturers and robotics and welding automation firms. Employment has been procured in more than 30 states across the country, with Michigan, Wisconsin, Illinois, Indiana, Ohio, and Iowa having the highest concentrations.

There are no program criteria for the discipline of welding engineering technology, so the General Criteria published in the 2008-09 TAC criteria document were used to evaluate this program. Findings in meeting the provisions of ABET criteria and policies are described below.

Program Weaknesses

1. Criteria: Criterion 4. Continuous Improvement states, "The program must use a documented process incorporating relevant data to regularly assess its program educational objectives and program outcomes, and to evaluate the extent to which they are being met. The results of these evaluations of program educational objectives and program outcomes must be used to effect continuous improvement of the program through a documented plan." The program has a system for assessing program outcomes and objectives. However, it does not appear that the program has a specific and formal procedure for using results of assessment to improve the program. Although the program is being improved through the assessment and outcome process, this is not being accomplished through a formal plan. Without a well defined improvement procedure it will be difficult to continually improve the program and keep abreast of developments in the industry. Therefore, it is required that the program demonstrate that it is using the results of the evaluations of program educational objectives and program outcomes to effect continuous improvement of the program through a documented plan.

Due Process Response: The program responded that a formal continuous improvement plan is being developed and will be implemented in the 2009-10 academic year. Components of the plan and a detailed implementation timeline were included. A formal procedure for using results of assessment has been drafted and is accompanied by an appropriate implementation schedule.

Status after Due process: This finding is reduced to a Concern until the program demonstrates that it is using results from the plan to improve the program.

2. Criteria and Policy: Criterions 2. Program Educational Objectives states, "Each program must have in place: a. published program educational objectives that are consistent with the mission of the institution and applicable ABET criteria, b. a documented process by which the program educational objectives are determined and periodically evaluated based on the needs of constituencies served by the program, and c. an educational program, including a curriculum, that enables graduates to achieve the program educational objectives." ABET Policy II.D.1.a. states, "Program educational objectives are broad statements that describe the career and professional accomplishments that the program is preparing graduates to achieve." The current program educational objectives are broad in nature, but they reflect what the student knows at the time of graduation rather than the career and professional accomplishments that the program is preparing graduates to achieve. Program educational objectives need to reflect the advice of program constituents and need to define what the program is preparing graduates to accomplish in the near-term of three to five years after graduation. Program educational objectives need to

provide guidance in designing the curriculum, nature, and focus of the program. Therefore, it is required that the program develop program educational objectives that describe the career and professional accomplishments that the program is preparing graduates to achieve, and that these program educational objectives be based on the needs of the constituencies being served by the program.

Due Process Response: The program responded by documenting that revised program educational objectives are in place. Additionally, an annual review has been established for verifying that the needs of constituencies continue to be met by the program.

Status after Due Process: This finding has been resolved.

Program Concerns

1. Criteria: Criterion 3. Program Outcomes states, "Each program must demonstrate that graduates have:... h. a recognition of the need for, and an ability to engage in lifelong learning,... 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. The program recognizes and implements the need for lifelong learning, respect for diversity and knowledge of professional, societal global issues as well as a commitment of quality, timeliness and continuous improvement. However, the criteria for these outcomes are not clearly defined within the program. Graduates of the program will be working in a diverse work force, and they will be expected to stay abreast of technological advancements in the welding industry. Additionally, graduates will be expected to perform quality control and quality assurance procedures in a timely process. This finding remains a Concern until the

program formally defines levels of achievement for lifelong learning, respect for diversity, and commitments to quality, timeliness and continuous improvement so that more objective measures can be used to assess student achievement and show that these Criterion 2 attributes are integrated into the curriculum.

Due Process Response: The program responded that an exit survey is being developed.

Status after Due Process: This finding remains a Concern until levels of achievement are defined, the exit survey is administered, and Criterion 2[h], [j], and [k] components are integrated into the curriculum.

Observations for Improvement

1. Despite growth in the program, financial support for the Welding Engineering Technology program has remained the same for the last three years. Although the program faculty members are working with alumni and industry to meet the needs of the program and its constituencies, it is not clear whether adequate financial support will continue. It is suggested that the program find ways to ensure adequate funding that address the needs of its growing students while maintaining high quality instruction.

Current program response and plan for action addressing identified opportunities for improvement.

Below is the response provided by the WELE program for the July 1, 2015 ABET Self-Study report pertaining to “identified opportunities for improvement”. *NOTE: Hyperlinks are not active in this document.*

A. Deficiencies, Weaknesses or Concerns from Previous Review(s) and the Actions Taken to Address Them

Summarize the Deficiencies, Weaknesses, or Concerns remaining from the most recent ABET Final Statement. Describe the actions taken to address them,

including effective dates of actions, if applicable. If this is an initial accreditation, it should be so indicated.

The ABET Accreditation Statement can be found at the following link:

[WET ABET Accreditation Statement – August, 2009](#)

The following Concerns were identified during the most recent ABET visit and remained open after Due Process.

Program Weaknesses

None

Program Concerns

1. Criteria: Criterion 4. Continuous Improvement states, "The program must use a documented process incorporating relevant data to regularly assess its program educational objectives and program outcomes, and to evaluate the extent to which they are being met. The results of these evaluations of program educational objectives and program outcomes must be used to effect continuous improvement of the program through a documented plan." The program has a system for assessing program outcomes and objectives. However, it does not appear that the program has a specific and formal procedure for using results of assessment to improve the program.

Although the program is being improved through the assessment and outcome process, this is not being accomplished through a formal plan. Without a well-defined improvement procedure it will be difficult to continually improve the program and keep abreast of developments in the industry. Therefore, it is required that the program demonstrate that it is using the results of the evaluations of program educational objectives and program outcomes to effect continuous improvement of the program through a documented plan.

Due Process Response: The program responded that a formal continuous improvement plan is being developed and will be implemented in the 2009-10 academic year. Components of the plan and a detailed implementation timeline were included. A formal procedure for using results of assessment has been drafted and is accompanied by an appropriate implementation schedule.

Status after Due process: This finding is reduced to a Concern until the program demonstrates that it is using results from the plan to improve the program.

Actions Taken: The program implemented a formal Continuous Improvement Plan in 2014. This plan describes the steps and procedures for continually monitoring and improving its Program Educational Objectives and Student Outcomes and can be found at the following link:

[Continuous Improvement Plan](#)

Examples of how the program is using the continuous improvement plan to improve the program are discussed in the [Criterion 4](#) section of this document.

2. **Criteria:** Criterion 3. Program Outcomes states, "Each program must demonstrate that graduates have: h. a recognition of the need for, and an ability to engage in lifelong learning,... 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. The program recognizes and implements the need for lifelong learning, respect for diversity and knowledge of professional, societal global issues as well as a commitment of quality, timeliness and continuous improvement. However, the criteria for these outcomes are not clearly defined within the program. Graduates of the program will be working in a diverse work force, and they will be expected to stay abreast of technological advancements in the welding industry. Additionally, graduates will be expected to perform quality control and quality assurance procedures in a timely process. This finding remains a Concern until the program formally defines levels of achievement for lifelong learning, respect for diversity, and commitments to quality, timeliness and continuous improvement so that more objective measures can be used to assess student achievement and show that these Criterion 2 attributes are integrated into the curriculum.

Due Process Response: The program responded that an exit survey is being developed.

Status after Due Process: This finding remains a Concern until levels of achievement are defined, the exit survey is administered, and Criterion 2[h], [j], and [k] components are integrated into the curriculum.

Actions Taken: A Welding Engineering Technology program exit survey was instituted in 2015. The 2015 results are available at the following link:

[2015 Welding Eng. Exit Survey Results](#)

According to the WET Program Continuous Improvement Plan:

“At least 75% of graduating students taking the exit survey will either strongly agree or somewhat agree that the program prepared them for each program student outcome or an action item for improvement will be generated.”

In regards to item h, results of the 2015 exit survey showed that 76% of the respondents strongly agreed that they were given “the understanding of the need for/ability to engage in self-directed continuing professional development” and the remaining 24% somewhat agreed. Furthermore, 65% of alumni responding to the alumni survey had earned a professional certification or additional degree. Additionally, the alumni results do not include continuing education classes that alumni may have taken.

In regards to item j, results of the 2015 exit survey showed that 86% of the respondents strongly agreed that they were given an understanding of “the impact of welding engineering technology solutions in a societal and global context” and the remaining 14% somewhat agreed. Furthermore, 100% of BSWET program graduates are required to take classes dealing with global consciousness, race, ethnicity and/or gender. Class requirements in these areas are explained at the following links:

[Basic Elements of FSU General Education](#)

[General Education Global Consciousness Course Criteria](#)

[General Education Race Ethnicity and/or Gender Course Criteria](#)

In regards to item k, results of the 2015 exit survey (see link above) showed that 90% of the respondents strongly agreed that they felt a “commitment to quality, timeliness and continuous improvement” and an additional 5% somewhat agreed. Furthermore, 100% of BSWET degree program graduates are required to take MFGE 353 “Statistical Quality Control” or complete the MFGE Quality Certificate both of which deal with statistical quality methods in manufacturing.

Enrollment Trends

Program enrollment numbers covering the most recent five year period.

	10/11	11/12	12/13	13/14	14/15
Welding Technology (WELT)	116	108	97	86	91
Welding Engineering Technology (WELE)	71	61	88	98	77

Source: Ferris State 2013/14 and 2014/15 Fact Book.

Program response and plan for action addressing enrollment trends.

Enrollment management is a task that takes a substantial amount of time and resources to properly plan and manage. Both the WELT and WELE programs are at enrollment capacity for the 2015/16 academic year. Currently the “wait list” for WELT program has 90+ candidates. The WELT/WELE official enrollment capacity is 125 students. In an effort to service both students and industry, the WELD faculty have developed course schedules to effectively service these enrollment levels. Currently the university is engaged in a facility expansion that will allow the program capacity to be increased to assist in the reduction of the program wait list. This facility expansion is in the planning stages and has not received formal funding approval as of this document writing.

Graduation rates covering the most recent five year period.

	09/10	10/11	11/12	12/13	13/14
Welding Technology (WELT)	67%	93%	82%	80%	100
Welding Engineering Technology (WELE)	97%	79%	157%*	103%	95%

Source: Professor Kenneth A. Kuk, Ferris State University

*The high 2012% includes the first summer WELE BS degree summer cohort graduation numbers

Program response and plan for action addressing graduation rates.

WELT and WELE program growth has been planned in detail over the years with the idea of providing as many qualified industry-ready graduate as possible. The number of program graduates is at an acceptable level. Currently the university is engaged in a facility expansion that will allow the program to increase the number of program graduates. This facility expansion is in the planning stages and has not received formal funding approval as of this document writing.

Certification exam pass rates compared with regional, state, and national averages

Welding Technology (WELT) AAS degree students take a NOCTI Job Ready Welding Assessment test. Results from the 4/27/2015 assessment are below.

Ferris State Students:

- Average = 82%
- Students = 44
- Pass = 44
- Pass Rate = 100%

Regional Data:

- None available

State of Michigan Data:

- Average = 80.1%

National Data:

- Average = 69.6%

Welding Engineering Technology BS degree students do not take any certification exams prior to leaving Ferris State University.

Program response and plan for action addressing certification exam pass rates

The FSU student pass rate exceed the state and national assessment average levels. At the time of the assessment the student score results were not part of their FSU course grade. It is being considered by the welding faculty to make the assessment result a course gradable exercise to encourage the students to take a more serious approach to the assessment.

Strategic Plan

Program's short and long-term strategic plans for continuous program improvement.

The formal Welding Engineering Technology Continuous Improvement Plan can be found on the following pages 16 – 30.

Continuous Improvement Plan Welding Engineering Technology Program



FERRIS STATE
UNIVERSITY

December, 2014

Prepared by Jeffrey Hardesty, PE, CWI
Program Coordinator, Welding Engineering Technology Program
College of Engineering Technology

Introduction

Ferris State University offers a Bachelor of Science degree in Welding Engineering Technology (WET). In order to facilitate continuous improvement of the WET program, a process has been implemented to continually review the program educational objectives and desired student outcomes. This document describes the way in which the objectives and outcomes will be assessed, the assessments reviewed and changes implemented for the purpose of improving the program. The Engineering Technology Accreditation Commission (ETAC) of the Accrediting Board of Engineering and Technology (ABET) has outlined the relationship between program objectives and student outcomes in its publication:

http://www.abet.org/uploadedFiles/Accreditation/Accreditation_Step_by_Step/Accreditation_Documents/Current/2015-2016/T001%2015-16%20ETAC%20Criteria%2011-7-14.pdf

According to the 2015-16 ETAC Criteria, the following definitions will be used (ABET Engineering Technology Accreditation Commission, 2014).

“While ABET recognizes and supports the prerogative of institutions to adopt and use the terminology of their choice, it is necessary for ABET volunteers and staff to have a consistent understanding of terminology. With that purpose in mind, the Commissions will use the following basic definitions:

Program Educational Objectives – Program educational objectives are broad statements that describe what graduates are expected to attain within a few years of graduation. Program educational objectives are based on the needs of the program’s constituencies.

Student Outcomes – Student outcomes describe what students are expected to know and be able to do by the time of graduation. These relate to the skills, knowledge, and behaviors that students attain as they progress through the program.

Assessment – Assessment is one or more processes that identify, collect, and prepare data to evaluate the attainment of student outcomes. Effective assessment uses relevant direct, indirect, quantitative and qualitative measures as appropriate to the outcome being measured. Appropriate sampling methods may be used as part of an assessment process.

Evaluation – Evaluation is one or more processes for interpreting the data and evidence accumulated through assessment processes. Evaluation determines the extent to which student outcomes are being attained. Evaluation results in decisions and actions regarding program improvement.”

Program Educational Objectives

In 3-5 years after graduation, welding engineering technology program alumni will:

1. be active members in professional societies at the Section, District and/or National level(s);
2. apply project management, leadership and teambuilding skills;
3. demonstrate lifelong learning by pursuing continuing education, professional society certification(s), and/or graduate studies; and,
4. be involved in welding engineering technology in such areas as:
 - weldment design,
 - material selection,
 - welding procedure development and qualification,
 - welding process selection and implementation,
 - welding capital equipment development and system integration and
 - welding quality systems.

Student Outcomes

In accordance with ABET Criterion 3, the welding engineering technology program has developed the following 11 student outcomes that students in the program should achieve upon graduation. (ABET Engineering Technology Accreditation Commission, 2014):

- a. an ability to select and apply the knowledge, techniques, skills, and modern tools of the discipline to broadly-defined welding engineering technology activities;
- b. an ability to select and apply a knowledge of mathematics, science, engineering, and technology to welding engineering technology problems that require the application of principles and applied procedures or methodologies;
- c. an ability to conduct standard tests and measurements; to conduct, analyze, and interpret experiments; and to apply experimental results to improve processes;
- d. an ability to design systems, components, or processes for broadly-defined welding engineering technology problems appropriate to program educational objectives;
- e. an ability to function effectively as a member or leader on a technical team;
- f. an ability to identify, analyze, and solve broadly-defined welding engineering technology problems;
- g. an ability to apply written, oral, and graphical communication in both technical and non-technical environments; and an ability to identify and use appropriate technical literature;
- h. an understanding of the need for and an ability to engage in self-directed continuing professional development;
- i. an understanding of and a commitment to address professional and ethical responsibilities including a respect for diversity;
- j. a knowledge of the impact of welding engineering technology solutions in a societal and global context;
- k. a commitment to quality, timeliness, and continuous improvement.

Table 1. Relationship between Program Educational Objectives and Student Outcomes

		Program Educational Objectives			
	Student Outcomes (a-k)	1	2	3	4
a	An ability to select and apply the knowledge, techniques, skills, and modern tools of the discipline to broadly-defined welding engineering technology activities discipline to broadly-defined engineering technology activities.				X
b	An ability to select and apply a knowledge of mathematics, science, engineering, and technology to welding engineering technology problems that require the application of principles and applied procedures or methodologies				X
c	An ability to conduct standard tests and measurements; to conduct, analyze, and interpret experiments; and to apply experimental results to improve processes				X
d	An ability to design systems, components, or processes for broadly-defined welding engineering technology problems appropriate to program educational objectives <i>(ADMET 2D - d)</i>				X
e	An ability to function effectively as a member or leader on a technical team		X		X
f	An ability to identify, analyze, and solve broadly-defined welding engineering technology problems				X
g	An ability to apply written, oral, and graphical communication in both technical and nontechnical environments; and an ability to identify and use appropriate technical literature				X
h	An understanding of the need for and an ability to engage in self-directed continuing professional development			X	
i	An understanding of and a commitment to address professional and ethical responsibilities including a respect for diversity)	X			
j	A knowledge of the impact of welding engineering technology solutions in a societal and global context	X			X
k	A commitment to quality, timeliness, and continuous improvement			X	X

Table 2. Required welding technology courses and their relationship to student outcomes.

Course	cr	Student Outcomes										
		a	b	c	d	e	f	g	h	i	j	k
ENGL 150- English 1	3							X				
ENGL 250- English 2	3							X				
MATH 115- Intermediate Algebra	3		X									
MATH 120- Trigonometry	3		X									
PHYS 211- Introductory Physics	4		X	X								
Cultural Enrichment Elective	3									X	X	
Social Awareness Elective	3									X	X	
FSUS 100- FSU Seminar	1							X		X		
EEET 201- Electrical Fundamentals	3		X	X								
MATL 240- Introduction to Material Science	4	X		X	X							
MFGT 150- Manufacturing Processes	2	X										
WELD 111- Welding Processes 1 Lecture	3	X	X		X		X	X				
WELD 112-Welding Graphics	3	X	X		X			X				
WELD 113- Welding Processes 1 Lab	4		X	X	X		X		X			X
WELD 121- Welding Processes 2 Lecture	3	X	X		X		X	X				
WELD 123- Welding Processes 2 Lab	4		X	X	X		X		X			X
WELD 211- Welding Fabrication 1	5	X	X	X	X	X	X					X
WELD 212- Quality Testing	4			X		X						X
WELD 221- Welding Fabrication 2	4	X	X	X	X	X	X	X		X		X
WELD 222- Introduction to Welding Automation	3		X	X	X	X	X					X

Table 3. Required welding engineering technology courses and their relationship to student outcomes.

Review of Program Educational Objectives and Student Outcomes

The Welding Engineering Technology program educational objectives and student outcomes will be reviewed every other year by the WET faculty and discussed with the WET industrial advisory board. ABET guidelines for student outcomes (ABET a-k) will be monitored by the program coordinator on a yearly basis and changes to WET student outcomes will be considered in the event of ABET guideline changes. When changes are made to program educational objectives and/or student outcomes, the effect on assessment instruments such as surveys, post-tests and in-class assessments will be evaluated.

The relationship between student outcomes and the curriculum is shown in Tables 2 and 3.

Program Educational Objective Assessment Methods

Welding Engineering Technology program alumni will be surveyed every three to four years. Program alumni will be surveyed to evaluate the relevance of WET program educational objectives and their relationship to student outcomes.

The WET Industrial Advisory Board (IAB) will meet at least once per year. They will provide input regarding industry trends, program educational objectives and program-specific issues as appropriate.

WET program graduate employment placement will be surveyed every year. This survey will include such information and employer, location, job title and pay rate.

WET Employers will be surveyed every 3-4 years. Employers will be asked to provide feedback concerning the relevance of WET program educational objectives and industry trends.

The WET faculty members will conduct informal discussions with program alumni and industry representatives regarding program educational objectives throughout the year. Each year the WET faculty members will summarize their discussions in regards to program objectives.

Table 3. Assessment of program educational objectives

Assessment Method	Program Educational Objective				Assessment Frequency
	1	2	3	4	
Alumni Survey	X	X	X	X	3-4 Years
Industrial Advisory Board Review	X	X	X	X	Annually
Graduate Employment Survey			X	X	Annually
Employer Survey	X	X	X	X	3-4 Years
Faculty Review	X	X	X	X	Annually

Student Outcomes Assessment Methods

A portion of the WET Program Alumni Survey described previously, will address each alumni's perception of how well they achieved the WET program's student outcomes.

A portion of the Employer Survey described previously, will address the employers' perception of how well graduating students have achieved the desired student outcomes.

An Exit Survey will be given during the WELD 499 capstone class each year. This survey will assess the students' perception of how well they have achieved the WET program's student outcomes.

A post-test will be given as part of the grade for the WELD 221 and 499 capstone classes. These post-tests are designed to assess students' understanding of welding engineering technology fundamentals across all of the WET courses throughout the curricula.

Many WET classes have student outcomes assessments embedded. Every class does not address every student outcome. However each outcome is assessed multiple times across the curriculum (see Tables 2 and 3). These embedded assessments take the form of exams, quizzes, homework, labs, projects, presentations, etc...

Table 4. Assessment of student outcomes

Embedded Assessments	X X X X	X X	Annually
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Desired Results

At least 60% of WET alumni will be active members in professional societies at the Section, District and/or National level(s).

At least 60% of WET alumni will demonstrate lifelong learning by pursuing continuing education, professional society certification(s), and/or graduate studies.

The average score on the WET Post-Tests will be at least 65%, or an action item for improvement will be generated.

Students will perform at the ‘satisfactory’ level on embedded assessments. Embedded assessments vary from instructor to instructor and class to class. Therefore, it is up to the instructor to determine what is ‘satisfactory’ for their particular assessment.

At least 75% of graduating students taking the exit survey will either strongly agree or somewhat agree that the program prepared them for each program student outcome or an action item for improvement will be generated.

Responsibilities for Assessment, Evaluation, and Continuous Improvement Process

The WET faculty members are responsible for preparing and analyzing the WET Post-Test and embedded assessments within the WET program. Faculty members will determine satisfactory performance levels, and track the results for their courses and assigned areas including the reporting of results within TracDat or other Ferris State University approved system. The WET faculty are responsible for implementing changes to the program based on the results of their evaluation of the various assessments. This may or may not require action by the School, College and University Curriculum committees depending on the nature of the change. The WET program coordinator, is responsible for data collection of all other assessments and for correspondence with the WET program IAB.

The WET faculty will conduct a yearly audit of the continuous improvement process as outlined in this document. This meeting will occur after the completion of the spring semester each year. Action plans that result from this audit will be reviewed with the WET program IAB. When curriculum changes are of sufficient magnitude, they must be reviewed and approved by the School, College and University Curriculum committees. The program coordinator is responsible for seeing that these major proposed changes are implemented through the proper University procedures.

Data Collection and Analysis

Embedded Assessments:

- The results of embedded assessments will be collected during each semester and evaluated by the responsible faculty member.
- WET faculty will suggest and implement minor corrective actions as necessary.
- WET Faculty will report on corrective actions taken during the year as part of the yearly continuous improvement audit.
- Major corrective actions will be implemented through the University Curriculum Committee process as required, and will also be reviewed by the WET program IAB.

Post-Test:

- The results of the Post-Test assessment will be collected during the capstone courses and evaluated by the WET faculty.
- WET faculty will suggest and implement minor corrective actions as necessary.
- WET Faculty will report on corrective actions taken during the year as part of the yearly continuous improvement audit.
- Major corrective actions will be implemented through the University Curriculum Committee process as required, and will also be reviewed by the WET program IAB.

Survey/Indirect Assessments:

- Surveys will be conducted by the WET program coordinator based on the frequency in Table 3, and the results analyzed during the yearly continuous improvement audit.
- Evaluation of the survey results will be done by the WET faculty.
- WET faculty will suggest and implement minor corrective actions as necessary.
- Major corrective actions will be implemented through the University Curriculum Committee process as required, and will also be reviewed by the WET program IAB.

Corrective actions may take one of the following courses:

- Minor corrective actions to a course.
 - Make minor adjustments to the weighting of specific topics included in the course outline and/or
 - Add or remove additional topics not included on the course outline and/or
 - Add, modify, or remove experiments or projects and/or
 - Add, modify, or remove specific assignments.

- Major corrective actions to a course or curriculum requiring the University Curriculum Committee process.
 - Modify course content in a major way such that the course outline is changed
 - Change course prerequisites
 - Add or remove required courses
 - Change program requirements

Dissemination

Whenever a corrective action is taken, the action will be assessed with the most appropriate assessment tools listed previously. The results of the action will be evaluated by the WET faculty during the yearly continuous improvement audit and discussed with the IAB. The results and evaluation will be discussed with the WET students where appropriate.

Corrective actions that are approved by the University Curriculum Committee will require changes to the Ferris Catalog and/or curriculum check sheets. These changes are included as part of the curriculum change process and will be communicated throughout the program as appropriate.

The WET Industrial Advisory Board will have at least one face-to-face meeting per year. When necessary, additional communication will be done by mail, email and conference calls.

The WET faculty will be part of the continuous improvement process through faculty meetings, emails, phone calls and memos.

WET program alumni and employers will be informed of changes to the program and Program Educational Objectives through mail and email.

A schematic of the continuous improvement process is shown in Figures 1 and 2.

Figure 1. The continuous improvement process for Program Educational Objectives.

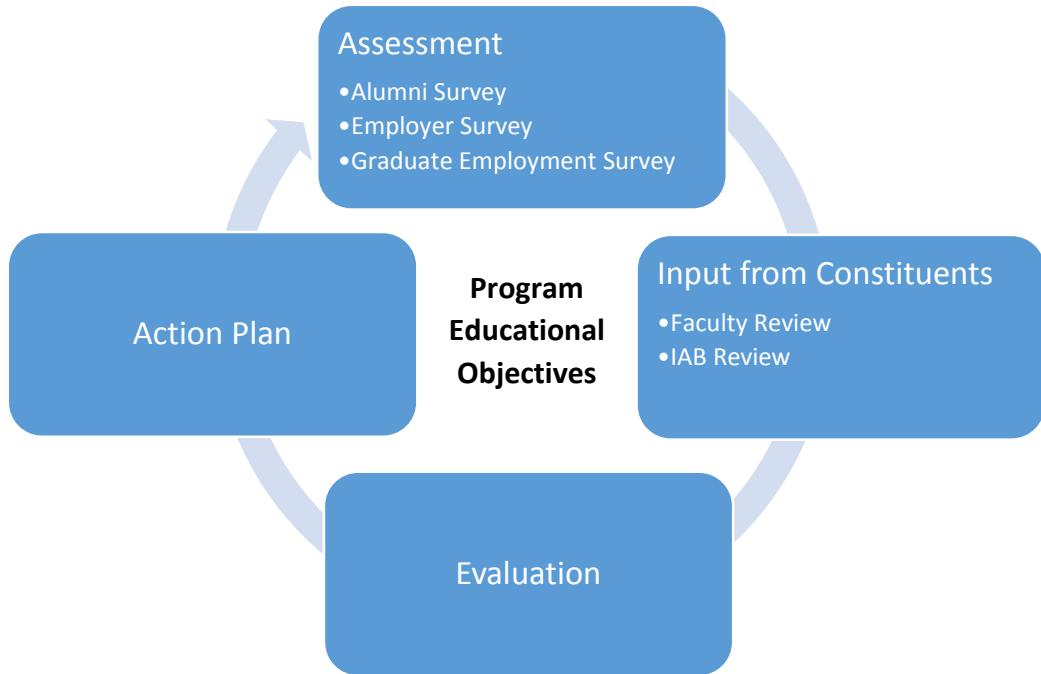
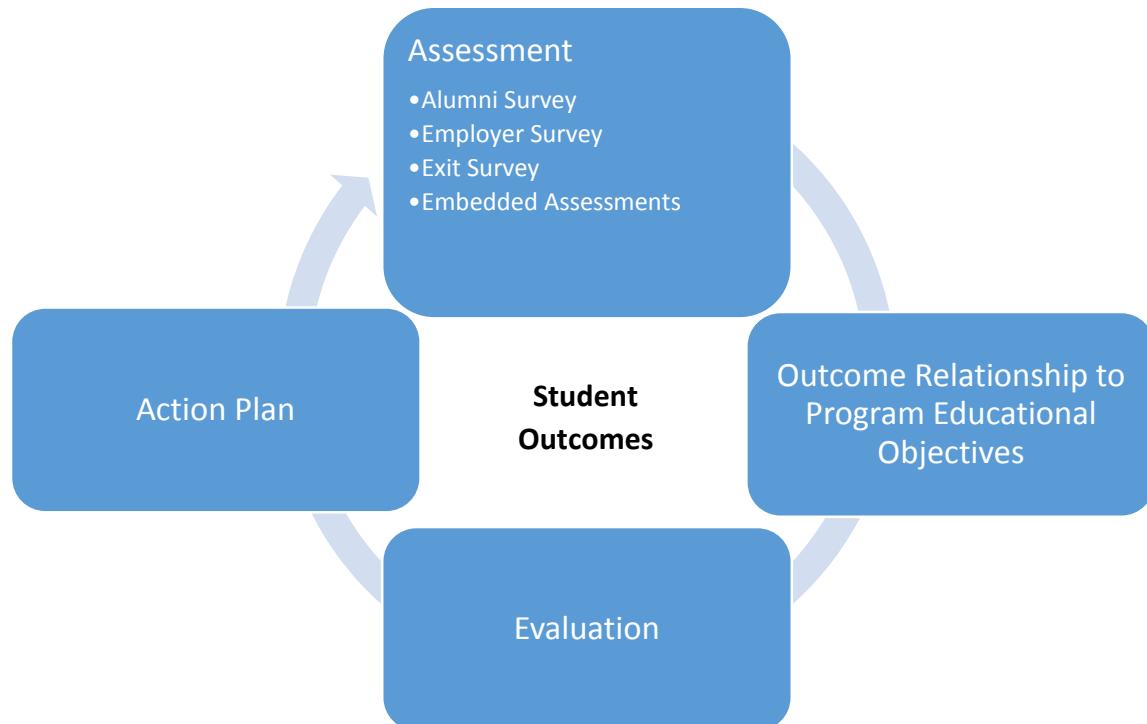


Figure 2. The continuous improvement process for Student Outcomes.



References

ABET Engineering Technology Accreditation Commission. (2014, December 11). *Criteria for Accrediting Engineering Technology Programs 2015-16*. Retrieved from ABET.org: http://www.abet.org/uploadedFiles/Accreditation/Accreditation_Step_by_Step/Accreditation_Documents/Current/2015-2016/T001%2015-16%20ETAC%20Criteria%2011-7-14.pdf

Program-Level Student Learning Outcomes

Program-level student learning outcomes

The Welding Engineering Technology program has adopted student outcomes which align with ABET Criterion 3 (ABET Engineering Technology Accreditation Commission, 2014). Students must achieve the following 11 outcomes:

- a. an ability to select and apply the knowledge, techniques, skills, and modern tools of the discipline to broadly-defined welding engineering technology activities;
- b. an ability to select and apply a knowledge of mathematics, science, engineering, and technology to welding engineering technology problems that require the application of principles and applied procedures or methodologies;
- c. an ability to conduct standard tests and measurements; to conduct, analyze, and interpret experiments; and to apply experimental results to improve processes;
- d. an ability to design systems, components, or processes for broadly-defined welding engineering technology problems appropriate to program educational objectives;
- e. an ability to function effectively as a member or leader on a technical team;
- f. an ability to identify, analyze, and solve broadly-defined welding engineering technology problems;
- g. an ability to apply written, oral, and graphical communication in both technical and non-technical environments; and an ability to identify and use appropriate technical literature;
- h. an understanding of the need for and an ability to engage in self-directed continuing professional development;
- i. an understanding of and a commitment to address professional and ethical responsibilities including a respect for diversity;
- j. a knowledge of the impact of welding engineering technology solutions in a societal and global context;
- k. a commitment to quality, timeliness, and continuous improvement.

Assessment methods designed to measure the outcomes

Below is the response provided by the WELE program for the July 1, 2015 ABET Self-Study report pertaining to assessment methods for student outcomes. *NOTE: Hyperlinks are not active in this document.*

Student Outcomes Assessment Methods

A portion of the WET Program Alumni Survey described previously, will address each alumni's perception of how well they achieved the WET program's student outcomes.

A portion of the Employer Survey described previously, will address the employers' perception of how well graduating students have achieved the desired student outcomes.

An Exit Survey will be given during the WELD 499 capstone class each year. This survey will assess the students' perception of how well they have achieved the WET program's student outcomes.

A post-test will be given as part of the grade for the WELD 221 and 499 capstone classes. These post-tests are designed to assess students' understanding of welding engineering technology fundamentals across all of the WET courses throughout the curricula.

Many WET classes have student outcomes assessments embedded. Every class does not address every student outcome. However each outcome is assessed multiple times across the curriculum (see Tables 2 and 3). These embedded assessments take the form of exams, quizzes, homework, labs, projects, presentations, etc...

Table 4. Assessment of student outcomes

Assessment Method	Student Outcomes										Assessment Frequency
	a	b	c	d	e	f	g	h	i	j	
Alumni Survey	X	X	X	X	X	X	X	X	X	X	3-4 years
Employer Survey	X	X	X	X	X	X	X	X	X	X	3-4 years
Exit Survey	X	X	X	X	X	X	X	X	X	X	Annually
Embedded Assessments	X	X	X	X			X	X			Annually

Procedures for establishing, implementing, and monitoring learning outcomes

Review of Program Educational Objectives and Student Outcomes

The Welding Engineering Technology program educational objectives and student outcomes will be reviewed every other year by the WET faculty and discussed with the WET industrial advisory board. ABET guidelines for student outcomes (ABET a-k) will be monitored by the program coordinator on a yearly basis and changes to WET student outcomes will be considered in the event of ABET guideline changes. When changes are made to program educational objectives and/or student outcomes, the effect on assessment instruments such as surveys, post-tests and in-class assessments will be evaluated.

The relationship between student outcomes and the curriculum is shown in Tables 2 and 3.

Program Educational Objective Assessment Methods

Welding Engineering Technology program alumni will be surveyed every three to four years. Program alumni will be surveyed to evaluate the relevance of WET program educational objectives and their relationship to student outcomes.

The WET Industrial Advisory Board (IAB) will meet at least once per year. They will provide input regarding industry trends, program educational objectives and program-specific issues as appropriate.

WET program graduate employment placement will be surveyed every year. This survey will include such information and employer, location, job title and pay rate.

WET Employers will be surveyed every 3-4 years. Employers will be asked to provide feedback concerning the relevance of WET program educational objectives and industry trends.

The WET faculty members will conduct informal discussions with program alumni and industry representatives regarding program educational objectives throughout the year. Each year the WET faculty members will summarize their discussions in regards to program objectives.

Table 3. Assessment of program educational objectives

Assessment Method	Program Educational Objective				Assessment Frequency
	1	2	3	4	
Alumni Survey	X	X	X	X	3-4 Years
Industrial Advisory Board Review	X	X	X	X	Annually
Graduate Employment Survey			X	X	Annually
Employer Survey	X	X	X	X	3-4 Years
Faculty Review	X	X	X	X	Annually

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Table 4. Assessment of student outcomes

Assessment Method	Student Outcomes										Assessment Frequency
	a	b	c	d	e	f	g	h	i	j	
Alumni Survey	X	X	X	X	X	X	X	X	X	X	3-4 years
Employer Survey	X	X	X	X	X	X	X	X	X	X	3-4 years
Exit Survey	X	X	X	X	X	X	X	X	X	X	Annually
Embedded Assessments	X	X	X	X		X	X				Annually

Perceptions of Overall Quality

The process of program review is one element in a program's plan for continuous quality improvement. The overall rating assigned should be in consideration of the program as it relates to the following: relationship of the program's mission to its department, college, and the university; program visibility and distinctiveness; enrollment; the characteristics, quality, and employability of students; the quality of the curriculum and assessment; the composition and quality of faculty; the composition and quality of program administration; and the overall value of the program to stakeholders, including Ferris State University. Academic Program Review: A Guide for Accredited Programs

7

To be completed by:

Dean

Larry Schult, Dean

College of Engineering Technology

Ferris State University

Dean Rating – 97%

Rationale:

- The program is a model for the mission of the College of Engineering Technology as well as the university. Student placement after graduation in high paying and high performance level positions is the measurable for career oriented education. This program's placement and salary history is superior.
- This program is the only one of its kind in Michigan, and the best one of only six within the United States. Its uniqueness is exhibited by the number of students who seek admission into the program. Currently, there is a two academic year waiting list. This will be addressed with a pending facility expansion which will near doubling the capacity and output of the program. The relationship with industry (as supported by equipment and dollar donations) is another model for the college.
- The graduates from this program have numerous job offerings immediately. The companies that pursue them are among the leaders in a wide range of industries. This includes automotive, equipment, infrastructure, machinery, defense, etc.
- The program curriculum is diverse. It covers all of the processes and key applications within the Welding Industry. All of the faculty have industry experience and have made their living in the industry they teach. Faculty currency is kept by attendance to seminars and membership to professional societies, such as the American Welding Society. Companies within the industry also readily take program interns, which is a degree requirement. Faculty visit and monitor the interns which also aids in the currency of their knowledge base. Annual new and state-of-the art equipment (along with supplier training) add to the quality of both faculty and the program.

- The program uses the TracDat tool to create, house, monitor and manage the curriculum outcomes and assessment methods. The program is administered through a system of rotating coordinators. The coordinator is a current tenured faculty member. In rotating faculty through this position, they share in program administrative duties and issues. This assists in understanding and consensus gaining with decisions that support program quality and keep it student focused.
- This program demonstrates its value to the university through attracting an abundance of students who represent the highest level of student academic ability. The program has, in fact, raised its entrance requirements in both GPA and SAT scoring which has resulted in an even higher enrollment rate, as well as a higher student retention rate.

Improvement Recommendation:

- As with any program that has a current entry wait list of students, an additional group of coursework (such as for a certificate program) should be implemented to retain students until they begin degree core classes.
- Continue to modify and increase the level of entrance requirements to attract high level academic students.

Director / Department Head;

Richard F. Goosen PE, PhD

Director

School of Design & Manufacturing
College of Engineering Technology
Ferris State University

Evaluation of Overall Quality

August 4, 2015

Welding Technology (AS) and Welding Engineering Technology (BS) Programs

Evaluation. My evaluation of the Welding degree programs on a 1- 100 scale with 100 representing the highest quality achievable would be 95.

Basis of Evaluation. The Welding program evaluated as part of this Academic Program Review (APR) process provides an excellent model for the other degree programs in the College of Engineering Technology. The Welding programs fit well into the mission of the College of Engineering Technology and Ferris State University in that they provide a high quality, career focused education. The primary indication of the quality of the Welding program is that virtually all program graduates are employed at high compensation levels immediately after graduation and enjoy ample opportunities for paid internships while they are completing the program. There are very few similar Bachelor's degree level programs in the U.S. and admission is highly competitive. The unique nature of the program and its reputation has produced a current admissions backlog of more than a year to enter the program.

The faculty of the Welding program are unique in their level of dedication to their program. They have been willing to make program changes to maintain the productivity of the program to a level above both the university and college averages. The program faculty has been successful in integrating community service into the curriculum, allowing students to reinforce technical skills while completing a variety of service projects. The faculty has also developed and actively supported an annual welding competition which has increased in size each year in terms of the number of secondary schools and students attending. Strong relationships with industry partners have been maintained by the program faculty and have been critical in obtaining scholarship, financial and equipment support that have allowed Welding program students to learn using the very best equipment available at minimum cost.

The continuous quality improvement implemented in the Welding program is evidenced by the relatively recent successful effort to become nationally accredited (ABET-TAC) and the program is currently the only accredited welding engineering technology degree program in

the nation. For many years the program has used a comprehensive testing program developed by the program faculty to monitor program quality and direct curriculum change. Supplementing this systematic review of program effectiveness is a very active and engaged Industrial Advisory Board which annually reviews program metrics and recommends changes when appropriate.

Recommendations for Improvement. It is difficult to identify areas for improvement within the Welding programs. It is possible that some areas identified for possible improvement may be determined to be the very program aspects that are providing its current high level of success. Some areas that could be considered to improve the program however are;

1. Facility Improvement – The current facilities used by the Welding program are not a positive or accurate reflection on the program or the profession. In many cases, excellent equipment is being used in areas with limited space, producing instructional difficulties. With a fairly recent improvements in ventilation, there are no additional facility improvements practical within the current program area. In recognition of the Welding program's success and reputation there is currently a major renovation project for the Swan Building Annex nearing final approval by the State of Michigan. It is vitally important to the future of the program that this project be successfully completed.
2. Faculty Diversification – The current program faculty are predominantly graduates of the program and have graduate degrees from Ferris State University. This provides solid continuity with respect to program history and past practice but also is limiting in terms of a diversity of educational experience. While this linkage with the past can be positive in reinforcing current successful practices, it can also be limiting to curriculum change and growth necessary when current practices no longer are effective. The program is encouraged to hire and promote faculty with academic experience beyond FSU to facilitate future program flexibility.
3. Improved Waiting List Policy – The success of the welding program has created a large unfulfilled enrollment demand. Currently the program uses a first come – first served approach that has a number of students enrolled at FSU but waiting to enter the program. While this is a fair and reasonable way to manage the demand for a few students, the large numbers of students currently seeking admission would be better served by a strictly competitive admissions process. This would improve the program by admitting the best applicants rather than those who happen to apply early. This type of competitive admission is typical of the most selective academic programs nationwide and would raise the stature of the welding program while still providing an admission process that is fair to all.
4. Curriculum Diversification – The current program curriculum has a minimum of related technical courses. In some cases this is the result of inadequate service provided by supporting departments, making it appropriate for the Welding program to develop its own

courses for subject areas outside their primary area of expertise. While this has been a means to provide reliable critical content, once related content has been incorporated into the program, there is a reluctance to return this curriculum content to related program faculty better qualified in the subject area. The program is encouraged to work more effectively with the faculty of related areas to develop the supporting classes that they need. This would allow the Welding faculty to focus on developing improved expertise in welding education and would provide welding students with a greater diversity of educational experience.

Chair / Coordinator/Faculty teaching within the program

Jeffrey B. Hardesty PE
Professor of Welding Engineering Technology
Welding Engineering Technology Program Coordinator

The letter above is intended to express the thoughts and concerns of the entire Welding Engineering Technology faculty.

On a scale of 1 – 100 (with 100 representing the highest program quality achievable) rate the overall quality of the program.

Score: 93

Summarize the reason(s) for the rating assigned.

The Welding Engineering Technology (WET) program a quality rating score of 93 based on good performance for program stakeholders such as the students, the university and employers. The program monitors stakeholders as part of its continuous improvement efforts and consistently has received high marks from all three. Student get an education that makes them valuable to employers and thus they are highly sought after and receive excellent starting salary offers. Employers report that students meet or exceed their requirements and perform well on the job. The benefit of the WET program to Ferris State University (FSU) is that the WET program is one of the top two of its kind in the country and is at full enrollment with a 1-2 year long waiting list to get in. The program has earned TAC-ABET accreditation, so an external team of experts has evaluated program quality and given it the maximum period of accreditation. The WET program provides local, state and national visibility to the College of Engineering Technology (CET) and FSU and is very much what Woodbridge Ferris envisioned as career oriented education. The program's mission is in line with the CET and University mission statements as well. This is supported by the fact the university has been heavily investing in a plan for the proposed renovation of the Swan Annex to better house the Welding Engineering Technology program.

While we feel that the WET has a high overall quality, we feel that there are some serious challenges to maintaining that quality level:

- Funding- The supply and expenditure budget provided by the CET is not adequate to operate the program. The program has outspent its S&E budget every year and covered it with donated materials to keep program quality high. Program faculty members work very hard to obtain donations of material and equipment to keep the program operating at its high level. A

downturn in the economy could jeopardize the ability to provide for the students educational needs while in the program.

- Facilities- The current Swan Annex is undersized and overburdened for the number of WET students that use it each year. The university is in the planning stages of an expansion, but history has shown that State of Michigan funding may be many years in coming. In the meantime, the program faculty will be forced to work extra hard to provide a high quality and safe education in very cramped quarters.
- Faculty- Several WET faculty members will most likely be retiring in the next several years. It will be a challenge to recruit faculty members who have the desired skill set to fill these positions because the field is so small and an advanced degree is not required to have a long and successful career. The individuals that do have the desired experience and education are highly compensated by their employers. Students who leave the program are starting between \$65-75,000 per year with no experience. Hence, attracting qualified new faculty members at what FSU is willing to pay will be extremely difficult. Some serious discussions will need to take place.
- Since the inception of the WELE BS degree program in 1984, the administrative leadership change within the CET and the University has been excessive. In spite of the constant administrative changes the welding program has continued to move forward with the focus on the education of the students attending the programs.

In conclusion, the Welding Engineering Technology program is doing a good job of delivering a high quality education that meets the needs of students and industry while being in line with Ferris State University's mission. However there are challenges that need to be addressed to maintain this high level.

Outline recommended next steps to improve program quality.

The formal Welding Engineering Technology Continuous Improvement Plan can be found on pages 16 – 30 under the APR document heading noted below.

Strategic Plan

Program's short and long-term strategic plans for continuous program improvement.

Signature Page

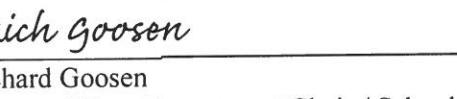
The submitted report is to include a signature page signed by program representatives attesting to the completeness and soundness of the information presented. Example Signature Page

Welding Engineering Technology (WELE) – BS
Welding Technology (WELT) - AAS
915 Campus Drive - 108 Swan Building
Big Rapids, MI 49307
231.591-2511

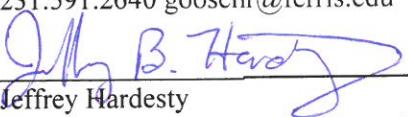
My signature below indicates that I have reviewed the Academic Program Review report submitted for review by the Academic Program Review Council, Academic Senate, Provost, and President of Ferris State University and attest to its completeness and soundness:



Larry Schult
Signature and Date Dean
231.591.2890 schultl@ferris.edu



Dr. Richard Goosen
Signature and Date Department Chair / School Director
231.591.2640 goosenr@ferris.edu



Jeffrey Hardesty
Signature and Date Program Coordinator
231.591.2511 hardesj@ferris.edu

Additional Information (optional)

Programs have an opportunity to provide additional information that speaks to continued program quality and improvement.

Additional Information (optional)

Programs have an opportunity to provide additional information that speaks to continued program quality and improvement.

- \$1,386,000 in American Welding Society scholarships awarded to Ferris State WELT and WELE students since 1986.
- ACT Composite score of 21.3 for WELT students aligns with the University, State of Michigan and US National averages. This the 57th percentile nationally. More than 400 student test scores have been compiled.
- Students from approximately 25 states have attended the WELE program
- Nearly 40 states, and District of Columbia, have WELE program alumni as residents
- Pre/Post Tests instruments have been utilized to measure the increase in student knowledge upon graduation in both the WELT and WELE programs since fall 1997.
 - WELT AAS (17 Student Cohorts): Average post test score increased by 67%
 - WELE BS (19 Student Cohorts): Average post test score increased by 50%
- The average number of WELE BS degrees conferred per decade shows consistent, well-planned program growth:
 - 1980's: 9.3 1990's: 14.0 2000's: 24.2 2010's: 37.7 Since 1986: 21.5
- Largest employers by state of WELE graduates:

Michigan: 317	Wisconsin: 47	Iowa: 45	Illinois: 38
Texas: 24	Colorado: 8	Virginia: 8	S. Carolina: 7
- Largest employers of WELE graduates by industry:

Automotive: 173	Welding Equipment: 94	Ag/Const Equipment: 76
Manufacturing: 64	Consulting: 60	Automation: 44
Construction: 22	Energy: 26	Higher Ed.: 10

- Upon graduation, the WELE employment placement rates are typically 100% with the average starting base salary by indicated year:

1986: \$26K 1990: \$29K 2000: \$49K 2010: \$61K 2013: \$66K

- State Secondary Welding Competition
 - Approximately 131 competitors, since the first competition held in May, 2003, have enrolled in the WELT AAS degree program
 - Based on tuition and room & board, it is estimated these students have contributed more than \$5,000,000 in revenue to the university.
 - Approximately 50 past competitors have graduated with a WELE BS degree
 - The May 2015 competition was the 13th time the event was held. More than 130 competitors from 34 Michigan high schools and career centers competed for nearly \$60,000 in gifts, prizes and scholarships provided by University administration, industry and private donors.
 - The welding competition event has been the most effective programmatic marketing activity for the Ferris welding programs
 - State Secondary Welding Competition weblink is below:
 - <http://www.ferris.edu/HTMLS/colleges/technolo/design-mfg/welding/Secondary-Welding-Competition.htm>