Academic Program Review
Associate in Applied Science Degree in Welding Technology / Bachelor of Science Degree in Welding Engineering Technology
May 2002 – May 2003

Panel Membership

Chair

Jeffrey Carney, Associate Professor, Welding Engineering Technology

Department Chair

Kenneth Kuk, Professor, Welding Engineering Technology

Program Review Panel

Bradley Brew, Assistant Professor, Welding Engineering Technology
Jeffrey Carney, Associate Professor, Welding Engineering Technology
Jonathan Cox, Assistant Professor, Welding Engineering Technology
Kenneth Kuk, Professor, Welding Engineering Technology
David Murray, Associate Professor, Welding Engineering Technology

Associates

Kurt Hoffman, Alumnus, President, Roman Manufacturing Incorporated
Linda Travis, Associate Professor, Computer Information Services

MEMORANDUM

DATE: November 21, 2002

TO: Academic Senate

FROM: Academic Program Review Council

RE: Recommendations for:
Associate in Applied Science Degree in Welding Technology
Bachelor of Science Degree in Welding Engineering Technology

CC: Jeffrey Carney, Kenneth Kuk, Weilin Chang, Laurie Chesley, Thomas Oldfield, Barbara Chapman

DESCRIPTION OF PROGRAMS:

BS Degree in Welding Engineering Technology

Established in 1984, the nationally recognized welding engineering technology degree is one of just a few of its kind in the United States. The program is designed to produce plant level welding engineering technology graduates who are involved in the concept, design, and engineering of weldments and implementation of welding processes.

This overall knowledge of weldments and the ability to engineer welding and joining systems produces graduates that are in great demand and highly compensated. Welding engineering technology graduates hold job titles as welding, manufacturing, and project engineers and are employed in all sectors of the economy including the automotive, aerospace, equipment and automation industries in locations across the United States and around the world.

To assist the welding students, Ferris provides several welding instructional areas including laboratories dedicated to: inspection, mechanical testing, robotics, laser processing, resistance welding and material preparation-fabrication and others. In addition to welding courses, metallurgy, computer-aided design, electronics, and manufacturing courses are required and are taught by faculty specialists in those departments.

Entry into the bachelors program requires an associates degree in welding technology, a 2.75 GPA in welding courses, a 2.5 overall GPA, and math skills eligible for pre-calculus. Students transferring from other colleges with an associates degree in welding technology are evaluated similarly.

Graduates must complete all Ferris general education requirements as outlined in the General Education section of the University catalog.

Why Choose Welding Engineering Technology?

Established in 1984, the nationally recognized Welding Engineering Technology program is the largest of its kind in the United States. The program is designed to produce plant-level welding engineering technology graduates who are involved in the concept, design and engineering of weldments and implementation of welding

processes. This overall knowledge of weldments and the ability to engineer welding and joining systems produces graduates who are in great demand and highly compensated.

Ferris provides several welding instructional areas including laboratories dedicated to joining processes, inspection, mechanical testing, material preparation/fabrication and robotic, laser and resistance welding. In addition to welding courses, material science, computer-aided design, electronics and manufacturing courses are required and are taught by faculty specialists in those departments.

Enter a Great Profession

With one out of two products that comprise the gross domestic product containing a weld, the welding profession is prevalent in all areas of our economy. Graduates of the Welding Engineering Technology program currently hold over fifty different job titles. The most common include welding engineer, manufacturing engineer, application engineer, sales engineer and project engineer or manager. Graduates find employment opportunities in all sectors of the construction, fabrication and manufacturing economy. The most common employers include the automotive industry, agricultural and construction equipment producers, welding equipment manufacturers and robotics and welding automation firms. Employment opportunities are located in more than 30 states across the country, with Michigan, Wisconsin, Illinois, Indiana, Ohio and Iowa having the highest concentrations. Alumni have enjoyed international assignments ranging from a few weeks to five years in over 20 countries on six different continents around the world. Average starting salaries are approximately $49,000 per year.

Admission Requirements

To be eligible for Welding Engineering Technology, students must complete the two-year associate degree program at Ferris in Welding Technology or an equivalent associate degree from another institution. Students also must have a minimum 3.0 GPA overall and be ready for pre-calculus math.

AAS Degree in Welding Technology

Established in 1974, the welding technology degree produces welding technicians and prepares students for admission into the BS program in welding engineering technology.

Students receive hands-on laboratory experience in welding processes, metallurgy, mechanical testing, inspection, and fabrication of weldments. Graduates become technicians involved in testing and improving welding processes, procedures, and equipment. Welding technology graduates hold job titles as welding technicians, welding supervisors, inspectors, and sales engineers.

To assist the welding students, Ferris provides several welding instructional areas including laboratories dedicated to: inspection, mechanical testing, robotics, laser processing, resistance welding and material preparation-fabrication and others. In addition to welding courses, metallurgy, computer aided design, electronics, and machine tool courses are required and are taught by faculty specialists in those departments.

Entry into the associates program requires a high school diploma or equivalent and a 2.0 GPA overall. Exposure to welding is considered a plus but is not required for admission. An ACT math score of 15 (19 recommended) is the minimum required to enroll in the technology sequence.

Graduates must complete all Ferris general education requirements as outlined in the General Education section of the University catalog.

COST INFORMATION:

According to the office of Institutional research, the 1999-2000 cost data is as follows:

	Total cost per SCH
B.S. in Welding Engineering Technology	$210.74
AAS in Welding Technology	$206.96
	Total program cost
B.S. in Welding Engineering Technology	$15,383.69
AAS in Welding Technology	$13,866.38

RECOMMENDATIONS:

We recommend that the programs be continued.

(1) The program has a number of important strengths:

- It is central to Ferris' mission.
- The B.S. program is unique (1 of 5 in the country). The B.S. is the largest program in the country and A.A.S. program is one of, if not the largest programs in the country. These programs are highly visible to industry.
- Through the placement of graduates, these programs provide an essential service to the state and nation.
- The students and alumni rate the quality of instruction as high.
- A demand exists for the program by students as is demonstrated by an almost capacity enrollment.
- There is a very high demand for graduates of the program as is evidenced by the almost 100% placement rate of students. There is every indication that for the immediate future the demand will increase.
- The average starting salary of 2001 graduates was $50,160.
- The faculty is experienced and well qualified.
- The faculty is very involved in continuing education and consulting activities.
- The faculty is invested in these programs and is continually updating the curriculum to meet the needs of industry.
- The faculty has aggressively and successfully pursued the acquisition of extensive equipment from industry.
- The faculty has made an extensive and effective effort at recruiting students.

(2) We recommend that the following steps need to be taken to maintain the quality of these program:

- The program faculty and the administration of the College of Technology should work with University Advancement and Marketing and continue to explore ways to enhance recruitment.
- The administration of the College of Technology should maintain the Department status of these programs.
- The Administration of the College of Technology should consider reassigning the material science faculty member to this department. The Council believes that there is a great potential for the development of a synergistic relationship, which would enhance instruction in both areas.
- The faculty of these programs should continue to investigate the feasibility of offering certificate programs.
- The administration of the College of Technology should consider establishing a designated computer applications classroom for this program.
- The administration of the College of Technology should consider establishing an annual capital equipment budget for these programs.

Criteria Summary for:
BS Degree in Welding Engineering Technology
AAS Degree in Welding Technology

BS Degree in Welding Engineering Technology

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This overall knowledge of weldments and the ability to engineer welding and joining systems produces graduates that are in great demand and highly compensated. Welding engineering technology graduates hold job titles as welding, manufacturing, and project engineers and are employed in all sectors of the economy including the automotive, aerospace, equipment and automation industries in locations across the United States and around the world.

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Graduates must complete all Ferris general education requirements as outlined in the General Education section of the University catalog.

- **CENTRALITY TO FSU MISSION:**

  AAS Degree in Welding Technology and the BS Degree in Welding Engineering Technology are central to the mission of Ferris State University. The emphasis on preparation for a career clearly reflects the historic roots of the University.

- **UNIQUENESS AND VISIBILITY OF PROGRAM:**

  The BS program is unique. It is the only such program in the state and one of five in the nation. It is the largest undergraduate Welding BS program in the U.S. The A.A.S. is one of 126 two-year programs in the country and is one of, if not the largest of these programs. These programs are highly visible to industry.

- **SERVICE TO STATE, NATION, WORLD:**

  Through the placement of graduates, these programs provide an essential service to the state and nation. Approximately 60% of the BS graduates were placed in the state of Michigan.

- **DEMAND BY STUDENTS:**

  A demand exists for the program by students as is demonstrated by an almost capacity enrollment.

- **DEMAND FOR GRADUATES:**

  The demand for graduates is high.

- **PLACEMENT RATE AND AVERAGE SALARY OF GRADUATES:**

  Placement of graduates of the BS program approaches 100%. The 2001 graduates received an average annual starting salary of $50,166 per year. The associate program graduates typically ladder into the BS program in Welding Engineering Technology or BS programs in education or business.

- **SERVICE TO NON-MAJORS:**

  The department delivers welding instruction to approximately 120 different students in three different departments per year.

- **QUALITY OF INSTRUCTION**

  The quality of instruction as measured by the surveys of students and graduates is high.

- **FACILITIES AND EQUIPMENT:**

  The Welding programs occupy a consolidated laboratory area, which is subdivided into four specialized training facilities. The program has state of the art welding, cutting and automation equipment, most of which is donated or consigned by industry.

- **LIBRARY INFORMATION RESOURCES:**

  The library resources are adequate for the needs of the program.

- **COST:**

According to the office of Institutional research, the 1999-2000 cost data is as follows:

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AAS in Welding Technology	$13,866.38
B.S. in Welding Engineering Technology	$15,383.69

- **FACULTY:**
  - **QUALIFICATIONS:**

    The full time faculty is qualified and has considerable experience in industry.

  - **PROFESSIONAL AND SCHOLARLY ACTIVITIES:**

    The full time faculty is active in professional organizations and does extensive consulting.

  - **QUANTITY:**

    Adjuncts and overloads have been used for the last six years to service the course work of the students.

- **ADMINISTRATION EFFECTIVENESS:**

The turn over in higher administrative positions and changes in departmental assignment has had some impact on the operation of the program. In general, the college administration over the last five years has been supportive of the programs goals and objectives.

MEMORANDUM

DATE: November 21, 2002

TO: Academic Senate

FROM: Academic Program Review Council

RE: General Recommendations for Programs reviewed in the 2002-2003 review cycle

CC: Vice-Presidents Chapman, Oldfield, and Chesley; All Deans

Approximately one year ago 12 panels charged with reviewing a total of 18 programs were formed. These panels were composed of program faculty and friends of the program. The panels collected information, analyzed that information, and wrote thorough and rigorous reports that detailed the status of the programs. These reports also identified needs of the programs. Based upon the written documents submitted to the Academic Program Review Council, the answers to written questions generated by the Council, and discussion with panel members and program administrators, the APRC has generated specific recommendations for each program reviewed. These recommendations have been submitted as separate memos. On behalf of the entire University, the APRC extends its appreciation and gratitude for the work done by the program review panels.

GENERAL RECOMMENDATIONS

The following recommendations are derived from our collective review of the programs and represent our suggestions for addressing concerns that affect more than one program in the University. A review of general recommendations from previous Academic Program Review Council reports reveals that, although progress has been made, some programs still encounter the same or similar difficulties observed in previous years. It is clear many of these problems must be solved at the institutional level. If a similar recommendation was made previously, the years are indicated in parentheses.

THERE SHOULD BE A MORE THOROUGH PROOFREADING OF THE UNIVERSITY CATALOG BEFORE IT IS PUBLISHED.

At the beginning of each recommendation memo, under the section titled program description, a statement concerning each program is reproduced exactly as it appears in the online catalog. Often, the first impression of the University that is gained by prospective students and the general public is obtained through the Catalog. Therefore, it is a matter of concern when there are misspellings and examples of poor use of language in one of the most visible documents of the University.

THE ANNUAL REPORT ON THE CUMULATIVE IMPACT OF ACADEMIC PROGRAM REVIEW RECOMMENDATIONS SHOULD LIST THE RECOMMENDATIONS MADE BY THE COUNCIL AND THE SPECIFIC ADMINISTRATIVE RESPONSE TO THEM.

The Academic Program Review Council would like to thank Vice-President Chapman for providing the Senate and the Council with an Annual Report on the Cumulative Impact of Academic Program Review, which was in the form of a memo dated August 5, 2002. The Council recognizes that it may not be possible for the University to completely address all of the recommendations made by the Council in a calendar year and appreciates the efforts of the administration to follow up on the issues that are raised. The Council notes, however, that some of the actions taken do not directly correspond to the actual recommendations of previous Councils. For the sake of clarity of communication, the Council requests that in future updates, starting with the current review cycle, there be a list of the specific recommendations of the Council and the administrative response to them (2001-2002). There is a precedent for this in the memo from Teshome Abebe, former Provost and Vice-President for Academic Affairs dated July 30, 1996 in which he provided a status report on the progress that had been made concerning the Senate-approved APRC recommendations for programs reviewed in 1995-1996.

OTHER DIVISIONS OF THE UNIVERSITY SHOULD BE REVIEWED WITH RESPECT TO THE QUALITY OF SERVICE THAT THEY PROVIDE TO ACADEMIC PROGRAMS AND THE EDUCATIONAL MISSION OF THE UNIVERSITY. FEED BACK CONCERNING THE OUTCOME OF THESE REVIEWS SHOULD BE SUPPLIED TO THE ACADEMIC SENATE AND THE ACADEMIC PROGRAM REVIEW COUNCIL.

The Council appreciates the decision by the administration to develop a review process for University Advancement and Marketing and the computer consortia. The council would like to point out, however, that the focus of these reviews as described in the memo from Dr. Chapman dated August 5, 2002 does not completely address the concerns of previous Academic Program Review Councils. Hopefully the QI2000+ Committee mentioned in the document will establish a thorough process of review of divisions in the University that support and serve academic programs so that, when problems arise because of policy or implementation of policy, a mechanism will be in place to correct the problems and allow affected programs input in the development of new policies. The purpose of this request is to ultimately improve the quality of academic programs (2000-2001, 2001-2002).

THE UNIVERSITY SHOULD REVIEW THE POLICIES ASSOCIATED WITH THE ISSUING OF STUDENT ID CARDS AND THE PROCEDURES FOR ASSIGNING STUDENT BARCODES.

Students still have trouble accessing library databases from off-campus. Barcode numbers needed for database login are not tracked when ID's are issued so students must call the library to have their barcode entered before they can access the databases from off-campus. The FLITE staff has worked diligently to alleviate some of these problems, however, much of the difficulty could be avoided by coordination between Telcommunications and FLITE.

THE UNIVERSITY AND, IN PARTICULAR, THE COLLEGE OF ARTS AND SCIENCES, SHOULD ENSURE THAT AN ADEQUATE NUMBERS OF COURSES, OFFERED IN AN APPROPRIATE FORMAT (12 WEEKS), ARE OFFERED DURING THE SUMMER SEMESTER.

The curricular design in several of the colleges (particularly Allied Health and Business) requires that students build a full load schedule during the summer. While offering courses of varying lengths during the summer may be convenient for faculty, such an arrangement makes it extremely difficult for students to achieve a full load of classes. That in turn may cause the student to choose a course based on the timeframe in which it is offered rather than the its educational value.

THE UNIVERSITY SHOULD REQUIRE THAT THE ADMINISTRATIVE PROGRAM REVIEW FORMS SHOULD BE FILLED OUT ACCURATELY AND COMPLETELY.

The Administrative Program Review documents provided to the council by the program panels varied significantly with respect to their completeness and reliability. In several cases, questions on the form were not answered and data related to enrollment according to class standing and the number of graduates in a given year was not listed. The Council relies heavily on this document in assessing the status and viability of each program.

THE DESIGN AND DISTRIBUTION OF SURVEYS FOR ACADEMIC PROGRAM REVIEW SHOULD BE PROCESSED THROUGH A CENTRAL UNIVERSITY OFFICE WITH INPUT FROM THE PROGRAM REVIEW PANEL.

The academic program review process relies extensively on information gathered through surveys. It is apparent to the council that this type of activity should be coordinated through a central office, which provides services to panels for programs undergoing review. Most program faculty are not trained or experienced in survey methodology. This often results in poorly designed surveys, low response rate, and information of dubious validity. This problem is compounded by the fact that other divisions within the University are sending out different surveys, in many cases to some of the same individuals. It is true that different divisions within the University may be interested in obtaining different kinds of information, however there is certainly a basic core of information that is important to all units within the University. A standardized survey form should be designed and distributed utilizing established survey methodology. This form should allow individual programs or units in the University to ask additional specific questions related to information unique for their needs. The staff of this central office should provide support for follow up procedures to ensure adequate response rates. They should also assist the program review panels in the use of applicable statistical procedures to insure proper interpretation of the data.

THE UNIVERSITY NEEDS TO HAVE A CENTRAL DATABANK THROUGH WHICH ALUMNI AND GRADUATES OF PROGRAMS ARE TRACKED.

Most panels reported that significant numbers of surveys were returned due to an incorrect address. There is no question that in this mobile society it is difficult to keep track of individuals, however, if there is a cooperative approach to collecting data from various sources on campus, it should be possible to increase the reliability of existing databases.

INSTITUTIONAL RESEARCH SHOULD COMPILE THE INFORMATION REQUIRED BY PROGRAM FACULTY AND ADMINISTRATORS FOR THE PROGRAMS UNDERGOING THE ACADEMIC PROGRAM REVIEW PROCESS.

The document titled Academic Program Review: A Guide for Participants lists some specific types of information that are required for the review process. Currently, the seeking out and collecting of relevant programmatic information on an individual basis is an inefficient process and is an inordinately consuming use of program faculty and administrator's time. The previous Academic Program Review Council did meet with a representative from Institutional Research last spring to discuss their methods of data collection and how they arrived at their interpretation of the data. At that time, this individual expressed a willingness to work with the Panels in obtaining the information that they need. The current Academic Program Council should develop a specific list of the information that is required and communicate this to the staff in Institutional Research. The council requests administrative approval for this expansion of duties by the staff of Institutional Research (2001-2002).

THE UNIVERSITY SHOULD CONTINUE TO EXPLORE WAYS IN WHICH IT CAN HELP PROGRAMS MAINTAIN AND ACQUIRE NEW EQUIPMENT AS THE NEEDS OF INDUSTRY CHANGE.

The Council appreciates the response of the administration documented in Dr. Chapman's August 5, 2002 memo to previous recommendations concerning maintenance and acquisition of equipment. The Council also recognizes there is no way that the University can fund all of the equipment requirements of all of the programs at the University. With a few exceptions, most of the programs reviewed this cycle had adequate facilities and equipment. However, concern was expressed by several program panels related to funding for maintenance, replacement of equipment items, and the purchase of new equipment. Updating of computers to handle increasingly sophisticated software continues to be a problem. The University should continue to provide support for the maintenance of equipment and establish funds the upgrading of equipment. The procedures for requesting such funds should be widely communicated throughout the campus. In addition, the University should continue to encourage and support the efforts of faculty and program administrators as they seek off campus sources of equipment and resources. (1995-1996, 1997-1998, 1998-1999, 1999-2000, 2001-2002)

THE UNIVERSITY SHOULD INVEST IN PROGRAM SPECIFIC ENROLLMENT AND RECRUITING EFFORTS:

The current guidelines for the academic program review process require the APRC to evaluate enrollment in programs as a part of the review process. Low enrollment in a program does have a direct impact on program cost and faculty productivity (as defined by the business operations of the University), particularly in programs that are laboratory and technology intense. Low enrollment does not necessarily have a direct relationship to the quality of education that is delivered to students.

As far as the Academic Program Review Council was able to determine, at least with respect to the programs that were reviewed this year, low enrollment levels were unrelated to the quality of instruction, the availability of jobs in the field, the potential salaries of employees in the field, and even the availability of financial aid in the form of scholarships to students. Some of the under-enrolled programs that were reviewed this year have few or no competitors in the state of Michigan and in some cases in the country. The faculty in several

of these under-enrolled programs has made an intensive recruiting effort, which seems to have had only a limited impact on increasing student numbers. On the other hand, new degree initiatives in the College of Education and Human Services and in the College of Arts and Sciences have resulted in programs with rapidly increasing enrollments but limited opportunities in the job market. The difference seems to be the visibility of programs to prospective students.

It has become apparent to the members of the Council, particularly those who have served several years, that allocating a few marketing dollars to a program with enrollment difficulties and creating an attractive brochure does little to increase student numbers. Asking faculty to spend increasingly more time in recruitment efforts is not a particularly productive or effective approach to solving the problem. Typically faculty members have had little, if any, training in marketing techniques, demographic analysis, and brochure design. Most faculty members choose teaching because of their love of their subject area and their desire to share their knowledge with students, not because of an interest in the marketing of their program to prospective students.

If the University is truly committed to its historic mission of preparing students for a career and wishes to continue to serve the state of Michigan by providing graduates who are prepared to work in vital areas of our economy such as heavy industry or health care and yet maintain the fiscal viability of the University, it must address the issues related to the marketing low enrollment programs at an institutional level. It must supplement the efforts of faculty and administrators in programs with low enrollment through the use of institutional resources for focused marketing that increases the visibility of low enrollment programs and increases the awareness on the part of prospective students that many of the programs at Ferris State University lead to career options in vital industries in which high paying jobs are going unfilled.

THE ACADEMIC SENATE SHOULD REVIEW ITS CHARGE TO THE ACADEMIC PROGRAM REVIEW COUNCIL.

The Academic Program Review Council has begun the second round of program review. It is time to review and to reevaluate the criteria that are utilized as the basis for recommendations that are listed in the document Academic Program Review: A Guide for Participants. The academic program review process should focus on the quality of instruction offered in each program. Some of the criteria mentioned previously seem to have a marginal relationship to that goal, at best. For example, the focus on enrollment, productivity, cost of instruction, demand for graduates and the salaries they achieve are certainly of interest and importance to the administration. The question that arises is whether the academic program review process is the appropriate medium to collect and tabulate that data. Perhaps the academic program review process should focus more directly on what skills or competencies are required of graduates, how effectively programs deliver instruction that provides students with those skills and competencies, how the programs assess the skills and competencies of their students and graduates, and what hinders the programs in their attempts to fulfill their responsibilities to their students.

The Academic Program Review Council, 2002-2003

Jack Buss, Arts and Sciences , Chair
Douglas Fonner, Arts and Sciences
Carrie Forbes, Library and Information Services
Michael P Keating, Optometry
Richard Kowalkoski, University College
Jim Mayhew, Allied Health Sciences
Connie L Morcom, Education and Human Services
Norwood "Woody" Neumann, Pharmacy
Dan Skurski, Technology
William Smith, Business
Randy Stein, Technology

Questions for APR Panel
Associate in Applied Science Degree in Welding Technology
Bachelor of Science Degree in Welding Engineering Technology

Please list the primary skills, abilities, and knowledge base that you expect that a graduate of your program would possess.

B.S., The program is designed to produce plant-level welding engineering technology graduates who are involved in the concept, design and engineering of weldments and implementation of welding processes.

A.A.S., The program produces welding technicians and prepares students for admission into the Bachelor of Science program in Welding Engineering Technology.

For each skill, ability or knowledge base listed above, identify the major component(s) of your curriculum that are designed to develop that characteristic in your graduate.

B.S., Welding Automation and Robotics, Design of Weldments, Laser Welding, Cutting and Processing, Advanced Resistance Welding, Internship, Advanced Welding Processes, Computer Aided Weldment Design, Material Science, Project Engineering & Management

A.A.S., Welding Processes, Electrical Fundamentals, Welding Fabrication, Quality Testing, Welding Automation, Electrical Fundamentals, Manufacturing Processes, Material Science, Engineering Graphics.

Would you briefly summarize for us what an AAS welding graduate does in a job vs. a BS graduate?

B.S., Graduates of the Welding Engineering Technology program currently hold over fifty different job titles. The most common include welding engineer, manufacturing engineer, application engineer, sales engineer and project engineer or manager. Graduates find employment opportunities in all sectors of the construction, fabrication and manufacturing economy. The most common employers include the automotive industry, agricultural and construction equipment producers, welding equipment manufacturers and robotics and welding automation firms.

A.A.S., Welding Technology graduates hold job titles as welding technicians, welding supervisors, inspectors and sales representatives. A wide variety of employment positions are found in the manufacturing and construction industries.

On page 6, in the administrative report, it is indicated that conditions attached to donations, at least in some cases, has affected curriculum. Could you please elaborate?

Occasionally manufacturers want the university to sell their equipment; sometimes they want to install equipment that is not a match with the curriculum needs. Sometimes equipment is replaced at inappropriate times. It takes a lot of skill and energy to make it work for the benefit of the program and manufacturer.

In the administrative report on page 7, the data shows that the AAS program received Voc. Ed. Funds for only one of the five years listed. Do you have any insights why this was the case?

The process is really unpredictable for planning. The external rules seem change on program eligibility and special populations. In addition the university uses a pooling strategy to fund larger amounts at different area every year. Cannot be counted on as an annual source of funding.

Do you have an ongoing budget for the maintenance of equipment? If not, why not?

Yes, Part of our annual department Supply and Expense (S&E) is used for maintenance.

The data on pages 7 and 8 in Academic year 2000-2001 suggests that there were 40 seniors and 28 graduates. In academic year 2001-1002 there were 27 seniors and 14 graduates. On page 95 you indicate that the average for AAS graduates is 18 and 21 for BS graduates. Why these numbers so much lower than enrollment data on page 83?
Your interpretation of the data is incorrect. The APR data for enrollment by level is from the REGR 5 report produced by the university. It classifies students by level based on credits completed not by progression in the curriculum. This particular statistic at the program level has little to no value and has been brought to the administrations attention for years. Please note that the numbers match pages 7&8 to 83. Degrees awarded in the B.S. program is 85%+ of class size.

Is faculty overload and supplemental instruction a serious problem for your department? If so, what impact does it have on instruction? See page 8. of report

This is a complex question that needs to be addressed at our 9/24/02 meeting.

Internships are mentioned on page 8. Please describe, in general, the location of internships, how they are supervised, and if they are paid or not.

Students in the Welding Engineering Technology program have a mandatory program requirement to successfully complete WELD 393 (Internship). You will find this course to be valuable. To conduct this type of an Internship requires time and effort, not only by the students, but also by the faculty and the employer. The internship experience is a three-way street (students, faculty and employer) and all three must be willing to do their part if the internship is to be successful experience. The ultimate responsibility of finding employment for the internship rests with the individual student. The faculty coordinator will make every attempt to assist the student, but the student is responsible for obtaining employment. The student, employer, and faculty, as well as Ferris State University have much to gain from this internship.

Why an Internship Requirement

- *To gain a sound orientation to the world of work.*
- *Apply theory, principles, and concepts to real problems.*
- *Gain experience required to obtain a meaningful position after graduation.*
- *Work with and understand people.*
- *Develop new skills and specialized training.*
- *Evaluate a potential full-time employer and make professional contacts.*
- *Offer potential full-time employers valuable work experience.*

The Value of an Intern For an Employer

- *Reduce recruiting and training cost of full-time professional employees.*
- *Free high salaried professionals from some of their more routine tasks.*
- *Preview potential full-time professionals without commitment.*
- *Procure high caliber personnel for special projects.*
- *Acquire an "experienced" professional employee after the intern graduates.*

Benefits to Ferris State University

- *Offer a better course of instruction, utilizing the facilities and personnel of many employers.*
- *Produce a Welding Engineer with hands-on experience, who is much better prepared to take a place in society.*

To successfully complete the internship course WELD-393, you must demonstrate the ability to work in a welding engineering position out in industry. The following are requirements of the course and all must successfull completed.

- *The student will:*
  - *Be employed in a welding engineering capacity for 10 weeks or 400 hours.*
  - *As part of his/her internship, solve a welding engineering type problem for his/her employer.*
  - *Submit consecutive, weekly status reports to the university.*
  - *Make a presentation of his/her special project to his/her peers at Ferris.*
- *The employer will:*
  - *Provide meaningful work assignments in welding engineering.*
  - *Evaluate the intern twice during his/her internship.*
- *The Ferris Internship Coordinator will:*
  - *Visit the intern at his/her work site.*
  - *Review weekly status reports from interns.*
  - *Act as liaison between intern and employers.*
  - *Evaluate the intern on his/her internship.*
  - *Review employer evaluations.*
  - *Assign student grade upon semester completion.*

Location of interns 2000-2002

MI 40, IA 8, WI 5, OH 2, FL 2, MO 1, TX 1, IL 1, MN 1, NY 1

Average Compensation

Summer 2000	*$15.46 per Hour*
Summer 2001	*$15.68 per Hour*
Summer 2002	*$16.65 per Hour*

What is your interpretation of the results reported on pages 9 and 10, which indicates that the results of the post-test in the AAS program is 65% and in the BS is 58%.

The post-test is given the last week of classes in the respective programs. The tests are a comprehensive final covering two years of course work. The tests are designed to measure long-term retention and application of the major points of the curriculum. The scores listed above demonstrate an incredible level of retention and improvement of subject matter expertise.

On page 9 in the administrative report Question 7b concerning strategies that could lead to (greater) recognition was left blank. Is there a reason for this? *Yes*

Within the Welding Engineering Industry we are industry Ferris is very well known. We are one of two major players in the nation. The question becomes internal. Is Ferris committed to growing the department or is it comfortable with its current size.

On pages 21-35 survey data is reported. How many survey forms were sent out to each group?

Advisory Board = 12, A.A.S., B.S. Graduates, and Employers = 225

In the surveys on pages 21-35 there appears to be a discrepancy between some of the views of the advisory board and those of the employers. Do you have any insight into why this might be so?

We disagree with the above statement. A review of the responses between the advisory board and employers indicate a high correlation of agreement.

The survey on pages 39-42 suggests that aluminum welding is becoming increasingly important. To what extent is instruction in this area already in the curriculum and are there plans to increase the emphasis in this area?

Aluminum welding has been taught in the A.A.S. degree for over 25 years on selected processes but it appears to be an emerging material in the automotive industry. In 2000, 2001 and 2002 we sent 3 faculty members to get specialized training in Aluminum welding and design. In 2000-2001 we brought 3 industry leading experts in as guest lectures to the departments students. Aluminum Weldment design has been taught in senior level courses for three years. An aluminum design project was part of the senior capstone experience in 2002. In 2002 we added a representative from an Aluminum consumable manufacturer to our advisory board.

On page 47, question 5, the response of the students to the question about internships appears to be less positive then it is in some other areas. Do you have any ideas as to why this might be the case?

Yes, There is not an internship requirement in the A.A.S. Welding Technology program.

Which students are included in the student survey data on pages 51 -52?

It is indicated on top of page 51. Welding Engineering Technology (B.S.)

On pages 59-74 you provide internal labor market analysis - What does the Michigan Occupational Information System say about the potential need for individuals with Welding degrees?

In reviewing the Michigan Occupational data as a source, it covers Welders, but not Welding Technicians and Welding Engineers and Engineering Technologist occupations, which our department produces.

On pages 30 and 72, the data seems to suggest that graduates with an AAS degree have a higher salary than graduates with a BS degree. Is that the case? If so, why would it be beneficial for a student to pursue a BS degree?

We disagree with the statement above. The numbers statistically are the same. The committee should also recognize other factors A.A.S. may not be the highest degree level held, years in market place, overtime, etc.

Clarify criteria used for evaluation of facilities on pages 75-76. Who did the evaluation?

Department Faculty.

Two of your competitors are accredited for their BS programs. See page 88. - Do you have plans to become accredited? Why or why not?

The department has reviewed this question for five years at it's annual advisory board meeting. Because the department has enjoyed outstanding enrollment, industrial support, placement, and career progression for graduates the plan has been not pursue TAC/ABET Accreditation. The strategy has been to make decisions that position the program for accreditation should it be beneficial at some point in the future.

What is the status of the enclosure of the Welding yard? See p 8 and recommendation 4 on 98.

The office of the University Architect is currently working on design plans for it.

On page 98, recommendation 6, you request the addition of a full time faculty member if growth is desired. Is there a need for growth in your program? What indications do you have that you could successfully increase the size of the program? What are the costs vs. the benefits of growth?

This is a complex question that needs to be addressed at our 9/24/02 meeting.

What is the basis for the recommendation of reassigning the material sciences faculty to the Welding Department? See page 9 of the administrative report and recommendation 7 on p 98.

A long standing request by the Welding Engineering Technology department that has been turned down by the last dean without explanation. Given the relationship of Material Science and Welding it is a natural fit. The practical side for the university is that the Welding Engineering Technology department has an outstanding proven ability to obtain state of the art equipment from industry. New equipment is badly needed in the Ferris Material Science laboratories.

What are the implications of designating Swan 104 as a computer applications classroom? See recommendation 8 on p 98.

The Welding Engineering Technology and Manufacturing departments are the only 2 of the 12 departments that don't have their own computer applications lab. They share one facility. This has limited applications in welding such as simulation, off-line robotic programming etc. which is part of the increased welding automation concept. This has been part of our request in planning process for several years. Swan 104 is a lecture room that is already pre-wired for computer applications.

What was the basis of the recommendation of imbedding a welding certificate in a COB marketing degree? See recommendation 9 on p 98. What steps have been taken to implement this recommendation?

Industry request. The concept is very preliminary but has been discussed with industry leading equipment manufacturers and distributors, the advisory board, and the FSU Marketing Department Head.

What would you consider to be an adequate annual capital budget? See recommendation 10 on p 98.

$20,000 per year annually adjusted for inflation. We would anticipate parlaying the dollars into much more valuable equipment with pay/donation/consignment strategies.

On page 9 in the administrative report a recommendation was made to increase welding automation content. Why was this not in the recommendations on page 98?

The recommendations on page 99 do not address it because it is now underway. Please see page 78 activity #2.

Has any consideration been given to offering continuing education such as certificate programs?

Yes, The department has looked at it many times. Please see response to imbedding a welding certificate in a COB marketing degree.

Academic Program Review
Associate in Applied Science Degree in Welding Technology / Bachelor of Science Degree in Welding Engineering Technology
May 2002 – May 2003

Panel Membership

Chair

Jeffrey Carney, Associate Professor, Welding Engineering Technology

Department Chair

Kenneth Kuk, Professor, Welding Engineering Technology

Program Review Panel

Bradley Brew, Assistant Professor, Welding Engineering Technology
Jeffrey Carney, Associate Professor, Welding Engineering Technology
Jonathan Cox, Assistant Professor, Welding Engineering Technology
Kenneth Kuk, Professor, Welding Engineering Technology
David Murray, Associate Professor, Welding Engineering Technology

Associates

Kurt Hoffman, Alumnus, President, Roman Manufacturing Incorporated
Linda Travis, Associate Professor, Computer Information Services

Table of Contents

Programs: Welding Technology / Welding Engineering Technology
Degrees: Associate in Applied Science Degree in Welding Technology and Bachelor of Science Degree in Welding Engineering Technology
Department: Welding Engineering Technology
College: Technology

Section #1: Program Overview

Programs: Welding Technology / Welding Engineering Technology
Degrees: Associate in Applied Science Degree in Welding Technology and Bachelor of Science Degree in Welding Engineering Technology
Department: Welding Engineering Technology
College: Technology

MISSION:

STATEMENT OF MISSION

To continuously define the profession by producing Welding Technology and Welding Engineering Technology graduates whose knowledge, skills, and attitudes are nationally recognized.

Adopted
2000

HISTORY:

1955.....Welding Started as a Related Subject
1956.....One Year Welding Certificate Added
1958.....Metallurgy Added
1965.....Submerged Arc Welding Added
1965.....Destructive Testing Added
1972.....A.A.S. Welding Technology Program Started
1974.....Plasma Welding and Cutting Added
1976.....American Welding Society Student Chapter Chartered
1984.....B.S. Welding Engineering Technology Program Started
1986.....Computer Aided Design Added
1986.....Internships Required in B.S. Degree Program
1986.....1st B.S. Welding Engineering Technology Graduating Class
1990.....Resistance Welding Added
1990.....5th B.S. Welding Engineering Technology Graduating Class
1991.....Laser Welding, Cutting, and Processing Added
1993.....100th Anniversary of Campus World Structure Added
1995.....10th B.S. Welding Engineering Technology Graduating Class
1996.....Pulsed Gas Metal Arc Welding Added
1997.....Industrial Organizational Psychology Added
1998.....High School Welding Articulation Program Initiated
2000.....15th B.S. Welding Engineering Technology Graduating Class
2000.....200th B.S. Welding Engineering Technology Graduate
2000.....Welding Engineering Technology Department Established
2003.....Exceeded $500,000 in Private Student Scholarships since 1986
2002.....250th B.S. Welding Engineering Technology Graduate
2003.....FSU High School Welding Contest

WELDING ENGINEERING TECHNOLOGY DEPARTMENT IMPACT:

Program Goals and Objectives

The Welding Technology degree is designed to prepare students to enter the welding industry as technicians who support engineering and manufacturing activities and to provide them with technical foundation course work to enter the Welding Engineering Technology program. The Welding Engineering Technology degree is designed to allow graduates the opportunity to enter the workforce as plant-level engineers with both theoretical and practical technical skills. ***(Please see Section #7 for Labor Market Analysis and Graduate Employment information)***

Program Compatibility Role and Mission FSU

The Nationally recognized welding program(s) are compatible with the University mission by providing hands-on, laboratory based career education and training. ***(Please see Mission statement in this section)***

Coordination of Program with Other FSU Programs

In addition to serving its majors, the welding programs provide courses for Auto Body, Heavy Equipment, and Manufacturing Engineering Technology majors. ***(Please see Section #10 for Enrollment Information)***

Coordination of Program with Other Institutions

The B.S. Welding Engineering Technology program accepts Welding Technology Associate degree transfers from community colleges in/outside Michigan. During the past fifteen years, over 20 colleges have transferred students into the program. 12% of B.S. graduates have attained a Masters degree.

Program Service to the Community, State, Nation, and World

The Welding Engineering Technology program is one of only five (5) four-year programs in the country. Graduates are 100% placed in their field every year with 60% working in Michigan. Alumni have enjoyed the highest average starting salary of all four-year programs at Ferris State University (2000/2001 approximately $50,166.00/yr.) the last four years. The B.S. program is the largest of its kind in the country. The A.A.S. program consistently graduates more people per year than any of the 120 programs that exist nationally. ***(Please see Section #7 for Employment and Demographic Information)***

II. HUMAN RESOURCES:

Faculty:

Bradley Brew, Assistant Professor, 1981, Tenured
B.S. Trade and Technical Education, Ferris State University
A.A.S. Welding Technology, Ferris State University

Jeffrey Carney, Associate Professor, 1996, Tenured
M.S. Occupational Education, Ferris State University
B.S. Welding Engineering Technology, Ferris State University
A.A.S. Welding Technology, Ferris State University

Jonathan Cox, Assistant Professor, 2000,
B.S. Welding Engineering Technology, Ferris State University
A.A.S. Welding Technology, Ferris State University
Certified Welding Inspector, American Welding Society

Kenneth Kuk, Professor/Department Chair,1985, Tenured
M.S. Engineering Management, Western Michigan University
M.S. Occupational Education, Ferris State University
B.E.T. Manufacturing Engineering Technology, Wayne State University
A.A.S. Welding Technology, Ferris State University
Certified Manufacturing Engineer

David Murray, Associate Professor, 1981, Tenured
B.S. Trade and Technical Education, Ferris State University
A.A.S. Welding Technology, Ferris State University

Administration:

Dr. Weilin Chang, Dean, College of Technology
Ph.D., Engineering Science, State University of New York
M.S., Civil Engineering, State University of New York
B.S., Civil Engineering, National Taiwan University

Charles Matrosic, Assistant Dean, College of Technology
B.S., M.S.C.E., Michigan Technological University
Professional Engineer (Michigan)
Certified Professional Constructor

Support Staff:

Support staff

One clerical and one technical support staff person is shared with one other program and 12 other faculty

Student assistants

Student assistants and laboratory aids are hired as required to support laboratory activities

ADVISORY BOARD

Members:

Advisory committee: names, positions, affiliations, and locations:

Bill Eggleston, Professor - Welding Technology, Lansing Community College, Lansing, MI

- **Kevin Foster**, Senior Welding Engineer, Steelcase, Inc., Grand Rapids, MI

Jeff Grossman, Welding Technology Instructor, Capitol Area Career Center, Mason, MI

- **Harlon Neumann** , Director-Light Industrial Focus Group, Genesis Systems Group, Davenport, IA

- **Kurt Hofman,** Consultant, Roman Manufacturing, Inc., Grand Rapids, MI

James Dolfi, Retire, Ford Motor Company, Dearborn, MI

Glen Knight, Welding Training Services, DaimlerChrysler Corp., Auburn Hills, MI

David Snider, District Sales Manager, The Lincoln Electric Co., Grand Rapids, MI

- **Eric Young,** Account Manager, Miller Electric Mfg. Co., Appleton, WI

- **James Ward,** Senior Welding Engineer, General Motors, Warren, MI

- **David Williamson,** Welding Engineer, Livingston Companies, Auburn Hills, MI

Tony Anderson, Technical Services Manager, AlcoTec Wire Corporation, Traverse City, MI

- ***Designates Alumni***

Advisory Board Activities

Advisory Board meeting are held on an annual basis on the Ferris State University campus. Attendance over the past ten years of advisory board members at the annual meeting has exceeded 95%. The members of the board come from a variety of industrial areas including: welding education, furniture manufacturing, robotic/automation integration, resistance welding manufacturing, automotive manufacturing, automotive training, welding equipment manufacturing, automotive parts suppliers, and welding consumable manufacturing. This broad array of backgrounds provides the faculty with tremendous input as how to keep our Welding programs current with the needs and wants of the welding, manufacturing, and fabrication industry. Their time and efforts are greatly appreciated by all!

INSTRUCTIONAL RESOURCES

Program Facilities and Equipment

The welding programs utilize four laboratory areas: the major laboratory for associate course work, destructive and non-destructive test laboratory for associate course work, automation laboratory for bachelors course work, and related laboratory. Classrooms and computer laboratories are shared resources with various programs in the College of Technology.

Program Quality

The Welding Engineering Technology program enjoys the best placement rate and highest average starting salary of all 5-four year programs at Ferris State University for the past five years. The three largest welding equipment manufacturers in the United States provide the program with approximately $300,000.00 of equipment per year.

Quality of Instruction Enhancement

Constant pursuit by the faculty of additional degrees and attendance at workshops, seminars, and expositions is an ongoing process. Professional society memberships, including officer and committee positions.

Assessment of Student Performance

Examinations, quizzes, term papers, laboratory projects, reports, oral presentations, results outcomes assessment, pre/post tests for both A.A.S. and B.S. programs, and sophomore/senior capstone projects are examples of assessment tools used.

Quality of Instruction Measurement

Student, Peer, Alumni, and Employer Evaluations

Course Content Updates

Annual Advisory Board program review, industry input, annual alumni surveys, employer feed back, and industrial training seminars.

Success of Graduates

Initial employment in their field and annual Alumni surveys.

PROGRAM STRENGTHS AND WEAKNESSES

Advantages

1. A unique program with little to no competition ***(See Program Comparison in Section #10 Enrollment)***
2. Very high demand vs. supply of graduates.
3. Strategic asset to the Michigan and Great Lakes regional economy, including automotive, appliance, furniture, construction, etc.
4. A very high level of industrial support.
5. A very high level of scholarship support form the American Welding Society and Resistance Welder Manufacturers Association.
6. A high level of laboratory content, which is the competitive advantage.

Disadvantages

The WET department, like all other COT departments, does not have an annual capital equipment budget. The program is at risk because of its extreme dependence on the private sector. With a lack of funding for capital equipment the faculty solicits the private sector for donations and consignments. The program has been very successful in obtaining support from industry, but conditions are usually attached. The curriculum has been affected from time to time. Revised budgets for equipment, supplies and faculty development; along with a formalized gift and consignment strategy, need to be developed and nurtured internally and externally to the University (formal long-term partnerships). Due to the fact that the welding industry is involved in over half the products that comprise the gross national product, and only six universities produce B.S. graduates, the enrollment and placement potential of the FSU WET program is virtually unlimited. The most significant factor inhibiting program growth is the existing faculty resources. A national program based advertisement campaign would have a high probability of increased enrollment.

ADMINISTRATIVE PROGRAM REVIEW: 2001

(final version – 10/24)

Program/Department: *Welding Technology/Welding Engineering Technology* Date Submitted: *11/15/01*

Please provide the following information:

Enrollment

	Fall 1997	Fall 1998	Fall 1999	Fall 2000	Fall 2001
Tenure Track FTE	*4.50*	*4.50*	*5.00*	*4.25*	*4.25*
Overload/Supplemental FTEF	*.50*	*.16*	*0*	*.28*	*.11***
Adjunct/Clinical FTEF (unpaid)	*N/A*	*N/A*	*N/A*	*N/A*	*.50*
Enrollment on-campus total*	*43/43*	*53/46*	*55/55*	*73/52*	*65/50*
Freshman	*19/0*	*34/0*	*23/0*	*41/0*	*23/0*
Sophomore	*18/0*	*11/1*	*29/3*	*25/1*	*33/0*
Junior	*4/18*	*5/19*	*0/12*	*5/24*	*9/16*
Senior	*2/25*	*3/26*	*3/40*	*2/27*	*0/34*
Masters	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*
Doctoral	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*
Pre-Technical Students	*0/0*	*2/0*	*1/0*	*6/2*	*2/2*
Enrollment off-campus*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*
Traverse City	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*
Grand Rapids	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*
Southwest	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*
Southeast	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*

*Use official count (7-day)

** *Estimated*

If there has been a change in enrollment, explain why: *Program Based Marketing*

Capacity:

Estimate program capacity considering current number of faculty, laboratory capacity, current equipment, and current levels of S&E.

70/50 students

What factors limit program capacity? *Number of faculty*

Financial

Expenditures*	FY 97	FY 98	FY 99	FY 00	FY 01
Supply & Expense	*40,800*	*51,184*	*43,189*	*54,384*	*53,548*
Faculty Prof. Development					
General Fund					*949*
Non-General Fund					*0*
UCEL Incentives	*0*	*0*	*0*	*0*	*0*
FSU-GR Incentives	*0*	*0*	*0*	*0*	*0*
Equipment					
Voc. Ed. Funds	*0*	*0*	*0*	*6,500*	*0*
General Fund	*0*	*6,805*	*29,840*	*0*	*2,789*
Non-General Fund	*3,849*	*5,626*	*7,520*	*7,317*	*3,633*
UCEL Incentives	*N/A*	*N/A*	*N/A*	*N/A*	*0*
FSU-GR Incentives	*N/A*	*N/A*	*N/A*	*N/A*	*0*

*Use end of fiscal year expenditures.

ADMINISTRATIVE PROGRAM REVIEW: 2001

If you spent UCEL and FSU-GR incentive money for initiatives/items other than faculty professional development and equipment, what were they? Explain briefly. Please also include amounts spent on each initiative/item.

Revenues	FY 97	FY 98	FY 99	FY 00	FY 01
Net Clinic Revenue	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*
Scholarship Donations	*31,400*	*37,400*	*43,500*	*45,500*	*49,250*
Gifts, Grants, & Cash Donations	*0*	*0*	*0*	*0*	*0*
Endowment Earnings	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*
Institute Programs/Services	*0*	*0*	*1392*	*800*	*0*
In-Kind	*40,395*	*53,653*	*112,606*	*160,851*	*76,990*

Other

	AY 96/97	AY 97/98	AY 98/99	AY 99/00	AY 00/01
Number of Graduates* - Total	*14/16*	*22/22*	*10/18*	*22/28*	*15/14*
- On campus	*14/16*	*22/22*	*10/18*	*22/28*	*15/14*
- Off campus	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*
Placement of Graduates	*100%*	*100%*	*100%*	*100%*	*100%*
Average Starting Salary	*41,233*	*44,559*	*45,500*	*48,955*	*50,166*
Productivity - Academic Year Average	*298*	*277*	*318*	*349*	*361*
- Summer		*160*	*113*	*170*	*131*
Summer Enrollment**	*19*	*24*	*19*	*28*	*22*

* Use total for full year (S, F, W)

** Internships

1. a) Areas of Strength:

100% placement rate, high demand for graduates, high salaries ($50,166 per year in 2001)
Nationally known programs-largest of their kind in the nation based on the number of graduate
Experienced faculty
Industry support - $126,000 in FY 2001
35% enrollment increase since 97/98 from 86 to 116 majors
Enrollment is at 97% of theoretical capacity, 116 majors out of 120 capacity

b) Areas of Concern and Proposed Action to Address Them:

Constrained program growth: The department programs have high demand for graduates. The programs have utilized overloads and adjuncts for the past six years to service the coursework of the students. The department programs could be expanded with 1-2 additional full time tenure track faculty.

2. Future goals (please give time frame)

Welding Engineering Technology Department three-year plan 2003-2005
Goal 1
Perform Longitudinal Student Outcomes Assessment.
Objectives
Administer annual Welding Technology and Welding Engineering Technology Pre/Post Test to measure student outcomes.
Goal 2
Obtain an annual department enrollment of 120 students in the major.
(70 AAS & 50 BS program)
Objectives
Annually produce and distribute 1000 copies of the department annual report.
Annually attend the AWS National Exposition.
Annually promote and attend FSU autumn adventure.
Hire a full-time tenure track faculty member during FY 2003
Increase Laboratory space via enclosing the welding yard during FY 2003.

Goal 3
Increase Welding Automation Content in the Department by Academic year 2002/2003
Objectives
Revise the Welding Automation and Laser Processing course sequence during academic year 2002/2003.
Complete the Welding Engineering Technology Computer Application Media Classroom/Laboratory FY 2003.

3. Other Recommendations: *Transfer the Material Science coursework and faculty to the department.*

4. Does the program have an advisory committee? *Yes*
   a) If yes, when did it last meet? *March 18, 2002*
   b) If no, why not? By what other means do faculty receive advice from employers and outside professionals?
   c) When were new members last appointed? *June 2001*
   d) Are there non-alumni/ae on the committee? How many? *Yes, Six*

5. Does the program have an internship or other cooperative or experiential learning course? *Yes*
   a) If yes, is the internship required or recommended? *Required*
   b) If no, what is the reason for not requiring such an experience?

6. Does the program offer courses through the web? *No*
   a) Please list the web-based (fully delivered through the internet) courses the program offered last year?
   b) Please list the web-assisted (e.g., WebCT) courses the program offered last year.

7. What is unique about this program? *Largest of their type in the country*
   a) For what distinctive characteristics is it known in the state or nation?
      Both the Welding Technology and Welding Engineering Technology programs consistently graduate more students per year than any other institution in the nation that offers these types of programs. (Source: Department of Education, Center for Educational Statistics)
      B.S. degree is one of five in the country with national graduate placement.
   b) What are some strategies that could lead to (greater) recognition?

8. Questions about Program Outcomes Assessment (attach additional sheets, if necessary):
   a) What are the program's learning outcomes?
      To assess student success in meeting the expectations of the Welding Engineering Technology Department course work. To include long-term retention and demonstrated ability to apply program subject matter.
   b) What assessment measures are used, both direct and indirect?
      1.Incoming freshman students will take a curriculum pre-test in order to baseline their knowledge, comprehension, and skill prior to starting the Welding Technology program.
      2.Sophomores will take a curriculum post-test in the Welding 221 course to measure the knowledge, comprehension, and skill level that was obtained and retained.
      3. Incoming junior students will take a curriculum pre-test in order to baseline their knowledge, comprehension, and skill prior to starting the Welding Engineering Technology program.
      4.Seniors will take a curriculum post-test in the Welding 499 course to measure the knowledge, comprehension, and skill level that was obtained and retained.
   c) What are the standards for assessment results?
      The program pre/post test concept yields results every spring and fall. Pre/post test evaluations will take 2 academic years each. The following results are analyzed:
      1.Post-test scores, achievement level
      2.Pre vs. post-test score changes, improvement

d) What were the assessment results for 2000-01?

Welding Technology Pre-Test Average Score NA
Welding Technology Post Test Average Score 65%
Welding Engineering Technology Pre-Test Average Score 35%
Welding Engineering Technology Post Test Average Score 58%
Welding Engineering Technology Post Test percent gain 66%

e) How will / how have the results been used for pedagogical or curricular change?

Results will be reviewed with:
Department Faculty
Advisory Board
Change instructional emphasis or teaching methodology as required

9. Questions about Course Outcomes Assessment:

a) Do all multi-sectioned courses have common outcomes? *Yes, Common Exams and Lab Projects.*
b) If not, how do you plan to address discrepancies?
c) Do you keep all course syllabi on file in a central location? *Yes, Department office*

*If you have questions about the outcomes assessment portions of this survey, please contact Laurie Chesley (x2713).

Form Completed by: *Kenneth A. Kuk, Professor/Chair Welding Engineering Technology Department*
Name and Title

Reviewed by Dean:

Name and Date

Section #2: Graduate Follow-Up Survey Information

Programs: Welding Technology / Welding Engineering Technology
Degrees: Associate in Applied Science Degree in Welding Technology and Bachelor of Science Degree in Welding Engineering Technology
Department: Welding Engineering Technology
College: Technology

November 6, 2001

Welding Program Alumni, Employer, Advisory Board Member

The continuous monitoring of educational programs at any level is essential to insure that the content is current and up to date with the expectations of students and industry. Since the 1980's, on a mandate from the North Central Association site team visit, Ferris State University has conducted audits of individual programs through the Academic Program Review (APR) process. To date every program in existence since the mandate has performed this study at least one time.

The goal of APR is to insure that the academic programs of the University achieve and maintain the highest possible standards of academic excellence. Based on a schedule that spans six years, each academic program embraces the opportunity to examine itself using a variety of survey instruments and other measures. While this study is an opportunity for programs to showcase their individual highlights, it is also an opportunity for them to request and justify issues pertaining to areas that can be improved.

The result of the self-study is a faculty created, formal report which is submitted to the APR Council. This report in then used by the department, college, Office of Academic Affairs, and the University to make informed decisions pertaining to curricular issues and resource allocations.

During the 2001/2002 academic year, the Welding Technology and Welding Engineering Technology programs at Ferris will be reviewed. Your input is a vital component of the review process! Enclosed please find a survey that we request you complete. Please return the NCS answer sheet and your written responses in the self-addressed stamped envelop by December 7, 2001. Your individual responses are confidential, but the overall all responses will be compiled and analyzed to help determine the status, trend, and future of the welding programs at Ferris State University.

Your participation in this survey is critical in order for us to conduct an accurate review of our programs. Your time and effort are greatly appreciated by the faculty of the Welding Engineering Technology department.

If you have any questions, or comments, please do not hesitate to contact me at 231-591-2952.

Sincerely,

Jeffrey N. Carney
APR Chair/Assistant Professor

Encl.

Using the answer sheet: Skip "name, birthdate and identification number" sections. Complete "special codes" section as follows:

		Yes=	No=
1.	Are you a Ferris Welding Technology Graduate (mark in col. K)? Also, please answer questions 1-15 and 35-56	1	2
2.	Are you a Ferris Welding Engineering Technology Graduate (mark in col. L)? Also, please answer questions 16-34 and 35-56	1	2
3.	Are you an Employer of Ferris Welding Graduates (mark in col. M)? Also, please answer questions 1-34.	1	2
4.	Are you a Welding Engineering Technology Advisory Board Member (mark in col. N)? Also, please answer questions 1-34.	1	2

BEGINNING OF A.A.S. PROGRAM

Please fill in the appropriate response to the following questions.

To what extent does a graduate require the course knowledge?
Please circle appropriate rating

Courses	To a Great Extent	Somewhat	Neutral	Very Little	Not at All
1. Welding Processes 1 Lecture (WELD 111, 3 credits) Initial lecture environment for students enrolled in associate degree program in Welding Technology. Theory and techniques pertaining to shielded metal arc welding, oxy-fuel welding/cutting, brazing and soldering methods and applications are discussed. Equipment and consumable requirements for specific welding processes and applications. Requirements for use of industrial welding codes to develop Welding Procedures and Welder Qualifications are discussed. Introduction to gas metal welding process.	A	B	C	D	E
2. Welding Graphics (WELD 112, 2 credits) Print reading and drafting of common welded products; generating multiview drawings, interpreting welding drawings, calculating weld and part weights and an introduction to welding symbols. Develop templates for optically guided cutting equipment, calculate plate utilization, and calculate bend allowance.	A	B	C	D	E
3. Welding Processes 1 Lab (WELD 113, 5 credits) Practical experience in the use and application of shielded metal arc welding on various joint configurations in all positions on plate. Oxyacetylene welding, brazing and cutting applications. Introduction to the process of gas metal arc welding in the flat and horizontal positions. Destructive testing methods of weldments to develop Welding Procedure Qualification and Welder Certification records.	A	B	C	D	E
4. Engineering Graphics (ETEC 140, 3 credits) Comprehensive introductory course. Basic manual drafting, descriptive geometry and computer aided drafting. Exposure to the creating and reading of engineering drawings: lettering, line types, drafting instruments, geometric construction, pictorial representation, orthographic projection, auxiliary views, sectional views, dimensioning and tolerancing. Descriptive geometry involves solving of complex true size and shape problems. Computer aided drafting permits the creating of drafting and design related geometry via CAD hardware and software.	A	B	C	D	E

5. Welding Processes 2 Lecture (WELD 121 , 3 credits) Theory and techniques in application of shielded metal arc welding (SMAW) out-of positions. Theory and techniques of gas metal arc welding (GMAW) and flux cored arc welding out-of-position. Theory and techniques of gas tungsten arc welding of ferrous and non-ferrous alloys and material identification. Continued emphasis on qualification testing of the above process used in preparing certificate graduates for entry into the welding field.	A	B	C	D	E
6. Welding Processes 2 Lab (WELD 123, 5 credits) Practical experience in the use and application of shielded metal arc welding. Practical experience in the use and application of gas metal arc welding in all positions. Practical experience in gas tungsten arc welding of ferrous and non-ferrous alloys and flux cored arc welding. Continuation of destructive testing methods of weldments to develop Welding Procedure Specification and Welder Qualification records.	A	B	C	D	E
7. Introduction to Material Science (MATL 240, 4 credits) Engineering materials: metals, polymers, and ceramics: atomic structure and bonding, properties selection, and testing of materials, failure modes, methods of production and fabrication, methods of changing properties including heat treatment of metals, alloying and surface treatments, mechanical working, composites and compound bonding. Common classification systems used to identify the various engineering materials.	A	B	C	D	E
8. Welding Fabrication 1 (WELD 211, 5 credits) Non-traditional or advanced welding and processing procedures. Resistance welding, plasma arc welding and cutting, submerged arc welding, automated shape cutting and stud welding. Design of a weldment, cost estimating of the design, material processing, welding procedure development, and fabrication of the design. Customer repairs with cost analysis.	A	B	C	D	E
9. Quality Testing (WELD 212, 4 credits) Non-destructive testing methods: magnetic particle (wet, dry, and fluorescent), dye penetrant, eddy current, radiographic, and ultrasonic testing in compliance with the flowing codes: A.W.S., D.1-1-91, A.P.I. 1104, and ASME section #IX. Much of the information necessary to satisfactorily complete the American Welding Society's certified welding inspectors test.	A	B	C	D	E
10. Welding Fabrication 2 (WELD 221, 4 credits) The capstone course in the two-year A.A.S. degree. Assorted construction projects, dealing with the realities of process selection, joint design, cost estimating, and design of welded products. Students will also complete a research paper dealing with various forms of welding and joining. Students will be required to complete two written semester projects, which will be entered in a national welding contest.	A	B	C	D	E

WELDING ENGINEERING TECHNOLOGY EMPLOYERS

Kuka Robot Systems Corporation, Sterling Heights, MI
L & W Engineering Corporation, Various Locations
Laser Processing Corporation, Morgantown, WV
Lear Corporation, Various Locations
Lenawee Stamping Corporation, Tecumseh, MI
Lewis & Saunders Incorporated, Laconia, NH
Liberty Engineering Company, Troy, MI
Lift Tech International, Incorporated, Muskegon, MI
Lockheed-Martin, Various Locations
Lob Dell Emery Corporation, Alma, MI
Mark One Corporation, Gaylord, MI
Mascoetech Stamping Technologies, Rochester Hills, MI
Mazda Motors Corporation, Flat Rock, MI
Means Industries, Incorporated, Saginaw, MI
Metal Standard Corporation, Holland MI
Michigan Arc Products, Troy, MI
MicroAlloying International Incorporated, Houston, TX
Miller Electric Manufacturing Company, Various Locations
Miller Welding Supply Company, Grand Rapids, MI
Modern, Engineering, Warren, MI
MSI Stamping, Battle Creek, MI
Nachi Robotic Systems Incorporated, Novi, MI
National Element Incorporated, Troy, MI
National Standard, Various Locations
Holland Neway International , Muskegon, MI
Newport News Shipbuilding, Newport News, VA
Nissan Motors Corporation, Nashville, TN
Non-Destructive Testing Group, Caledonia, MI
Northern Tube, Incorporated, Pinconning, MI
Ogihara America Corporation, Howell, MI
OIK Industries, Kalamazoo, MI
PCC Superior Fabrication, Kincheloe, MI
OTD Corporation, South Bend, IN
Oxford Automotive, Various Locations
Pandrol Jackson Corporation, Ludington, MI
Paradigm International Incorporated, Union Lake, MI
PCC Superior Fabrication, Kincheloe, MI
Pico, Southfield, MI
Precision Robotics & Engineering Incorporated, Grand Rapids, MI
Progressive Stampings Incorporated, Ottoville, OH
Progressive Systems Incorporated, Auburn Hills, MI

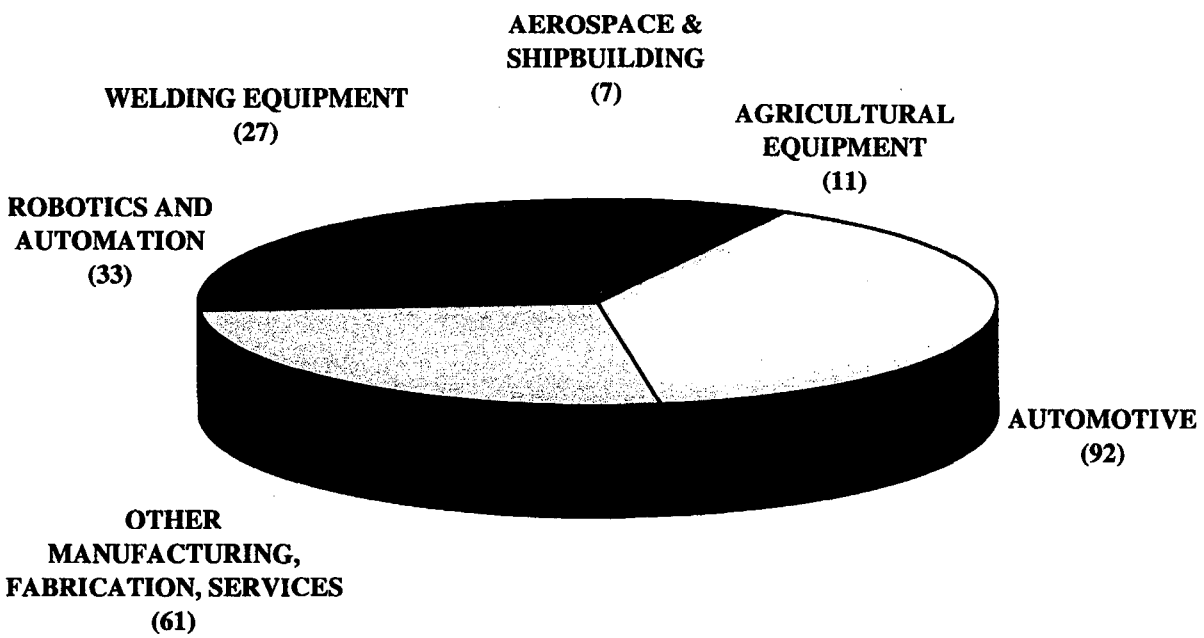
WELDING ENGINEERING TECHNOLOGY EMPLOYERS

Progressive Systems Incorporated, Auburn Hills, MI
RAMCO Manufacturing Company, Auburn, IN
Rich Manufacturing Corporation, Grandbury, NJ
Ridgeview Industries, Grand Rapids, MI
Robotic Production Technology, Madison Heights, MI
Rolls Royce Allison, Indianapolis, IN
Roy Smith Company, Detroit, MI
RWC, Incorporated, Bay City, MI
Saginaw Machine Systems, Troy, MI
Smith Welding Supply, Sterling Heights, MI
South West Mobile Systems, West Plains, MO
Special Welding Services Incorporated, Saginaw, MI
Stageright Corporation, Clare, MI
STC Industries, Sterling Heights, MI
Steelcase Corporation Grand Rapids, MI
Stoody Company, Bowling Green, KY
Tailor Welded Blanks, Monroe, MI
Tech Welding Corporation, Troy, MI
Technical Solutions, Evart, MI
Tenneco Corporation, Various Locations
The Dow Chemical Company, Midland, MI
The Lincoln Electric Company, Various Locations
Thermadyne Industries, Bowling Green, KY
Thrall Car, Clinton, IL
Total Petroleum Corporation, Alma, MI
Tower Automotive, Various Locations
Toyota Corporation, Various Locations
TRW Automotive, Queen Creek, AZ
Union Pump Corporation, Battle Creek, MI
United Technologies, Pratt and Whitney Division, East Hartford, CT
U.S. Manufacturing Corporation, Various Locations
US Tool and Die, Pittsburgh, PA
Utica Enterprises, Shelby Township, MI
Viscal, Angola, IN
Visteon, Various Locations
Voyager Products, Elkhart, IN
Voest Alpine Services & Technologies, Lindon, UT
Vulcan Industries, Sturgis, MI
Welding Engineering Supply Company Incorporated, Prichard, AL
West Shore Welding Services, Hart, MI
Wilson Automation Company, Warren, MI

WELDING ENGINEERING TECHNOLOGY EMPLOYERS

Wohlert Corporation, Lansing, MI
Yale Corporation, Material Handling Division, Greenville, NC
Yamaha Motor Manufacturing Corporation, Newnan, GA
Yamakawa Corporation, Portland, TN

EMPLOYERS OF FERRIS STATE UNIVERSITY WELDING ENGINEERING TECHNOLOGY ALUMNI BY INDUSTRY - MAY 2001



WELDING ENGINEERING TECHNOLOGY
STATES WITH ALUMNI

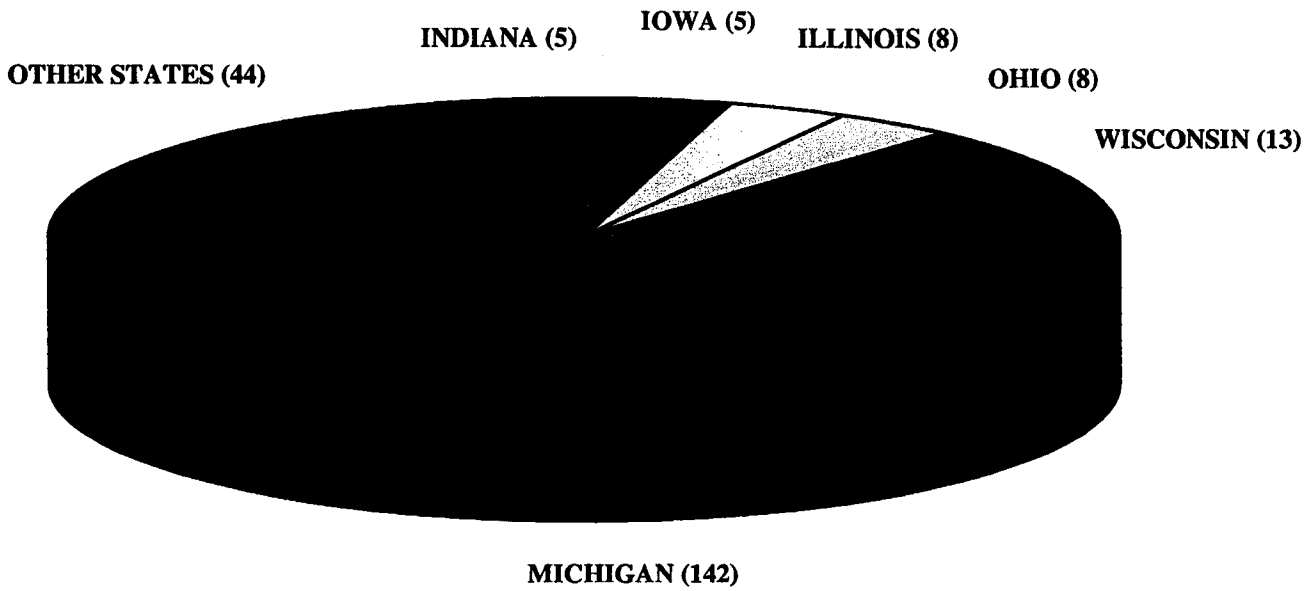
NORTHEAST
Connecticut
Massachusetts
New Hampshire
New Jersey
Pennsylvania
Rhode Island

SOUTHEAST
Alabama
Florida
Georgia
Louisiana
Mississippi
North Carolina
South Carolina
Virginia
West Virginia

MIDWEST
Illinois
Indiana
Iowa
Kansas
Kentucky
Michigan
Minnesota
Missouri
Nebraska
Ohio
Tennessee
Wisconsin

SOUTHWEST & WEST
Arizona
California
Colorado
Oklahoma
Texas
Utah

STATES WITH CONCENTRATIONS OF FERRIS STATE UNIVERSITY WELDING ENGINEERING TECHNOLOGY ALUMNI - MAY 2001



1	Acemco Incorprated, Grand Haven, MI					1		1		
2	Air Liquide America				1	1				
3	Alcoa, Pittsburgh, PA				1	1				
4	Alcotec Wire, Traverse City, MI		1							
5	American Axle, Detroit, MI				1	1		1		
6	Bechtel, Baytown, TX					1		1		
7	Benteler Automotive, Grand Rapids, MI	1	1							
8	BWX Technologies, Lynchburg, VA			1						
9	Cadillac Fabrication, Cadillac, MI					1		1		
10	Case Corporation, Burlington, IA				1					
11	Center Manufacturing Inc., Byron Center, MI				1					
12	Consumers Energy, MI		1							
13	Copeland Corporation, Sidney, OH	1	1							
14	DamilerChrysler Corp., Warren, MI				1	1		1		
15	Deere & Company	1	1					3		2
16	Dura Automotive, Gladwin, MI	1	1							
17	Edison Welding Institute, Columbus, OH					1				1
18	Ford Motor Company, Wayne, MI					1		1		
19	General Motors Corp., Tech Center, Warren, MI				1	1		2		1
20	Genesis Systems Inc., Davenport, IA	1	1							
21	Johnson Controls, Plymouth, MI	1	1							
22	K & M Fabricating, Cassopolis, MI		1							
23	L&W Engineering, Belleville, MI					1		1		
24	Midway Products, Monroe, MI					1		1		
25	Miller Electric Manufacturing, Appleton, WI	1						2		
26	Newport News Shipbuilding			1		1				
27	Oxford Automotive, Alma, MI					1				1
28	P & H Mining	1	1					1		
29	Panasonic Factory Automation, Franklin Park, IL			1				1		
30	Polaris Industries, Roseau, MN				1	1				
31	Ridgeview Stamping	1						1		
32	Roman Engineering, Dearborn, MI					1		2		
33	Stageright Corporation, Clare, MI					1				1
34	The Lincoln Electric Co., Cleveland, OH	1	1							3
35	Visteon, Monroe, MI	1				1		2		
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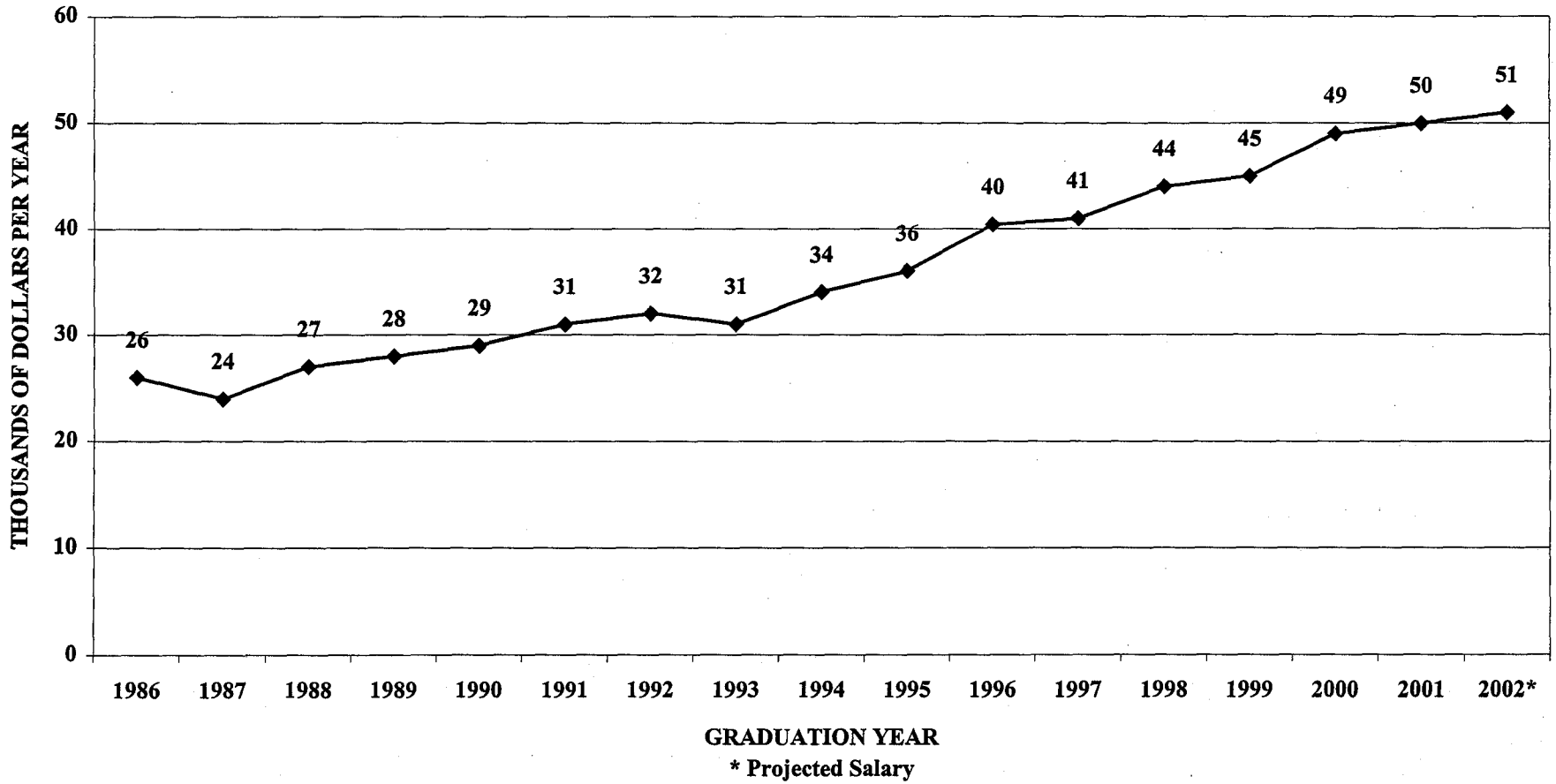
	Company									
1	Acceleron		1							1
2	Action Automation				1					
3	Air Liquide America		1							1
4	American Axle				1					
5	Angus-Palm Industries					1				
6	Applied Manufacturing Technologies		1							
7	BF Goodrich Aerospace		1							
8	Brown Corporation					1				
9	BWX Technologies					1	1			1
10	Center Manufacturing Incorporated						1			
11	Consumers Energy		1							
12	Copeland Corporation				1	1				1
13	Dana Corporation					1				
14	DCT Incorporated					1	1			
15	Deere & Company				1		1		3	4
16	Delphi Steering Systems					1	1		1	
17	Edison Welding Institute						1		1	1
18	Ford Motor Company, AutoAlliance		1							1
19	Ford Motor Company, Dearborn				1	1				
20	General Motors Corporation, FMC						1		1	
21	General Motors Corporation, MFD						1		3	1
22	General Motors Corporation, Tech Center				1		1		1	1
23	General Motors Corporation, WI						1			1
24	Genesis Systems Group	1	1						2	1
25	GHSP						1		1	
26	Gilman Engineering & Manufacturing					1				
27	GR Spring and Stamping		1							
28	Harvard Industries					1				
29	Hobart	1	1							
30	HydroRaufuss	1	1						1	
31	Industrial Metal Corporation						1			
32	Ingalls Shipbuilding					1	1			1
33	Kawasaki Robotics						1			1
34	L & W Engineering						1			1
35	Lear Systems		1							
36	Lincoln Electric		1				1		1	1
37	Lockheed Martin	1	1							
38	Manchester Tank				1					
39	Michael Baker Corporation		1							
40	Midway Products Group					1				
41	Miller Electric Manufacturing	1	1						2	3
42	Nachi Robotics					1				1
43	Newport News Shipbuilding						1			1
44	Oxford Automotive				1	1				
45	P&H Mining						1			
46	Polaris Industries				1					
47	Progressive Systems Incorporated					1				2
48	Progressive Tool Incorporated						1		1	
49	Robotic Production Technology				1					
50	Sciaky Incorporated					1	1			
51	Stageright Corporation					1			1	
52	Steelcase									
53	Therm-O-Disc		1							
54	Tower Automotive	1	1							
55	Track Corporation					1	1			
56	Tregaskis					1				
57	Unipress Incorporated					1	1			

1999/2000
FERRIS STATE UNIVERSITY STARTING SALARIES
RANK BY AVERAGE STARTING SALARY
SOURCE OF DATA: CAREER SERVICES

RANK	DEGREE	PROGRAM	# REPORTING	AVG. SALARY	TOTAL SALARY
1	BS	Pharmacy	54	$ 56,685	$ 3,060,990
2	OD	Optometry	9	$ 51,723	$ 465,507
3	BS	Manufacturing Engineering Technology	17	$ 49,265	$ 837,505
4	**BS**	**Welding Engineering Technology**	**22**	**$ 48,955**	**$ 1,077,010**
5	BS	HVACR Engineering Technology	25	$ 45,820	$ 1,145,500
6	BS	Plastics Engineering Technology	33	$ 44,894	$ 1,481,502
7	BS	Nuclear Medicine Technology	5	$ 44,700	$ 223,500
8	MS	Career and Technical Education	14	$ 44,107	$ 617,498
9	BS	Electrical/Electronic Engineering Technology	6	$ 43,500	$ 261,000
10	BS	Product Design Engineering Technology	12	$ 43,500	$ 522,000
11	MS	Information Systems Management	7	$ 42,643	$ 298,501
12	BS	Construction Management	12	$ 41,500	$ 498,000
13	Pharm D.	Pharmacy	6	$ 40,833	$ 244,998
14	BS	Surveying Engineering	11	$ 40,773	$ 448,503
15	BS	Nursing, Professional	22	$ 40,045	$ 880,990
16	BS	Auto & Heavy Equipment Management	34	$ 39,618	$ 1,347,012
17	BS	Medical Records Administration	4	$ 38,500	$ 154,000
18	MS	Criminal Justice Administration	6	$ 37,500	$ 225,000
19	AAS	Nuclear Medicine Technology	4	$ 36,500	$ 146,000
20	BS	Computer Information Systems	19	$ 36,237	$ 688,503
21	BS	Business Administration	27	$ 35,426	$ 956,502
22	BS	Industrial/Environmental Health Management	7	$ 34,071	$ 238,497
23	AAS	Dental Hygiene	14	$ 33,500	$ 469,000
24	AAS	Nursing, Technical	10	$ 33,500	$ 335,000
25	BS	Marketing	8	$ 33,500	$ 268,000
26	BS	Marketing/Sales	4	$ 33,500	$ 134,000
27	BS	Facilities Management	5	$ 33,500	$ 167,500
28	BS	Heavy Equipment Service Engineering	8	$ 33,500	$ 268,000
29	AAS	Manufacturing Tooling Technology	4	$ 33,500	$ 134,000
30	AAS	Building Construction Technology	7	$ 32,929	$ 230,503
31	AAS	Automotive Service	17	$ 32,176	$ 546,992
32	AAS	Heavy Equipment Technology	8	$ 31,500	$ 252,000
33	BS	Medical Technology	5	$ 31,100	$ 155,500
34	BS	Accounting	17	$ 30,676	$ 521,492
35	BS	Criminal Justice	24	$ 30,354	$ 728,496
36	BS	Printing Management	12	$ 30,167	$ 362,004
37	BS	Mathematics Education	7	$ 30,071	$ 210,497
38	BS	Health Care Systems Administration	10	$ 29,500	$ 295,000
39	AAS	Respiratory Care	5	$ 28,700	$ 143,500
40	BS	Recreation Leadership & Management	5	$ 27,900	$ 139,500
41	BS	English Education	5	$ 27,100	$ 135,500
42	BS	Television Production	4	$ 26,500	$ 106,000
43	AAS	Radiography	21	$ 26,476	$ 555,996
44	BS	Marketing/Pro Golf Management	13	$ 25,846	$ 335,998
45	AAS	Medical Records Technology	4	$ 25,500	$ 102,000
46	AAS	Opticianry	4	$ 25,500	$ 102,000
47		Resident	4	$ 24,500	$ 98,000
48	BS	Advertising	7	$ 24,357	$ 170,499
49	BS	Visual Communication	5	$ 23,100	$ 115,500
50	AAS	Medical Laboratory Technology	4	$ 22,625	$ 90,500
51	AAS	Technical Drafting and Tool Design	4	$ 22,625	$ 90,500
52	BS	Social Work	16	$ 22,563	$ 361,008
		UNIVERSITY TOTALS	**617**		**$ 23,443,003**
		UNIVERSITY AVERAGE		**$ 37,995**	

WELDING ENGINEERING TECHNOLOGY
AVERAGE STARTING SALARIES
Source: FSU Career Services/Institutional Research and Testing



1999/2000
FERRIS STATE UNIVERSITY STARTING SALARIES
RANK BY TOTAL STARTING SALARY
SOURCE OF DATA: CAREER SERVICES

RANK	DEGREE	PROGRAM	# REPORTING	AVG. SALARY	TOTAL SALARY
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45	AAS	Manufacturing Tooling Technology	4	$ 33,500	$ 134,000
46	BS	Visual Communication	5	$ 23,100	$ 115,500
47	BS	Television Production	4	$ 26,500	$ 106,000
48	AAS	Medical Records Technology	4	$ 25,500	$ 102,000
49	AAS	Opticianry	4	$ 25,500	$ 102,000
50		Resident	4	$ 24,500	$ 98,000
51	AAS	Medical Laboratory Technology	4	$ 22,625	$ 90,500
52	AAS	Technical Drafting and Tool Design	4	$ 22,625	$ 90,500
		UNIVERSITY TOTALS	**617**		**$ 23,443,003**
		UNIVERSITY AVERAGE		**$ 37,995**	

Section #8: Evaluation of Facilities and Equipment

Programs: Welding Technology / Welding Engineering Technology
Degrees: Associate in Applied Science Degree in Welding Technology and Bachelor of Science Degree in Welding Engineering Technology
Department: Welding Engineering Technology
College: Technology

Area	Meets Objectives	Limited Objectives	Not Possible To Meet Objectives	Comments or Concerns
Laboratory Location	X			The location of the lab is convenient for the students.
Laboratory Size (square footage)		X		The facility size is one of the factors limiting the program growth.
Classroom Space		X		Scheduling conflicts are common
Electrical Requirements	X			Excellent!
Ventilation Requirements		X		Excessive noise level; Regular preventative maintenance schedule; Entire system needs to be reviewed.
Media Requirements		X		Multi media equipment needed for all lecture rooms; Dedicated computer applications lab.
Laboratory Comfort Level (Heating & Cooling)		X		Heating problems are common during the winter months
Handicap Access		X		Only access from outside of building
Equipment Hand tools	X			Sufficient quantity to meet student needs.
Equipment Processing		X		Press Brake tooling required; Iron Worker tooling needed
Equipment - Fuel Gas		X		Manifold system and components need replacement
Equipment - GMAW	X			Excellent industry support provides us with latest equipment technology.

Equipment - SMAW	X			Excellent industry support provides us with latest equipment technology.
Equipment - SMAW	X			Excellent industry support provides us with latest equipment technology.
Equipment - GTAW	X			Excellent industry support provides us with latest equipment technology.
Equipment - Testing		X		Tensile Machine upgrade; X-Ray Machine upgrades
Equipment - Safety	X			A priority with faculty and students!
Equipment - Automation	X			Excellent industry support provides us with latest equipment technology.
Equipment - High Energy		X		YAG Laser needed; Water Jet cutting needed

Section #9: Curriculum Review

Programs: Welding Technology / Welding Engineering Technology
Degrees: Associate in Applied Science Degree in Welding Technology and Bachelor of Science Degree in Welding Engineering Technology
Department: Welding Engineering Technology
College: Technology

The curriculum of the programs in the Welding Engineering Technology Department is reviewed on an annual basis. Discussions among the faculty, and with the Advisory Board members, have resulted in various changes to the programs since the last Academic Program Review. These changes are implemented after discussions regarding the potential positive and negative impacts on the program are investigated.

Chronological List of Program Changes Since Last Academic Program Review:

November, 1996:
Proposal: Curriculum Clean up

Activity #1: Addition of Chemistry 121 to WET program
Rationale: Requirement for ABET Accreditation in the future

Activity #2: Addition of Psychology 326 to the WET program
Rationale: Advisory Board recommendation for Social Awareness requirement

Activity #3: Addition of Psychology 150 to WT program
Rationale: Prerequisite for Psychology 326

Activity: Addition of Physics 211 to WT program
Rationale: Advisory Board recommendation for Scientific Understanding requirement

October, 1997:
Proposal: Curriculum Clean up

Activity #1: Break current WELD 111 lecture/lab course into two courses: WELD 111 lecture and WELD 113 laboratory.
Rationale: Allows for better access to the student competencies (ie: Psychomotor/ cognitive) and provide more options for articulation

Activity #2: Break current WELD 121 lecture/lab course into two courses: WELD 121 lecture and WELD 133 laboratory.
Rationale: Allows for better access to the student competencies (i.e.: Psychomotor/ cognitive) and provide more options for articulation

Activity #3: Add WELD 121 and WELD 123 as prerequisites for WELD 211 and WELD 212 courses.

Rationale: Technical information from WELD 121 and WELD 123 is required for WELD 211 and WELD 212

Activity #4: Change WELD 221 Lec/Lab configuration from 3+6 to 1+9 and require ENGL 250 as a prerequisite for the course

Rationale: WELD 221, Welding Fabrication II, is a capstone course for the Welding AAS program. Students design, cost estimate, and build customer fabrications and enter this body of work in a national welding contest along with a research paper. It has become apparent that the old course format does not fit the work required for this class. The current lab time is not sufficient to complete the projects as they are becoming more complex. The lecture time, which has been used in the past to review methods of writing a technical paper, will not be required since ENGL 250 will be a required prerequisite for the course.

September, 2002:

Proposal: Minor Curriculum Clean up and Course Change

Activity #1: Change WELD 412 from 3+0 to 4+0 configuration

Rationale: The increase in lecture time will allow welding economics, which is currently taught in MFGE 423, to be cover more specifically to the welding discipline

Activity #2: Change WELD 321 from 3+0 to 3+3 configuration

Rationale: Addition of laboratory component for practical application of theoretical topics

Activity #3: Drop MFGE 423 (2+0) from WET curriculum

Rationale: Balances credits in program. Information taught regarding economics would be taught in WELD 412

FERRIS STATE UNIVERSITY
COLLEGE OF TECHNOLOGY

WELDING TECHNOLOGY
ASSOCIATE IN APPLIED SCIENCE DEGREE
FALL SEMESTER
Curriculum Guide Sheet

NAME OF STUDENT _____ STUDENT I.D.: _____

Total semester hours required for graduation: 66

NOTE: Meeting the requirements for graduation indicated on this sheet is the responsibility of the student. The student is also responsible for meeting all FSU General Education requirements as outlined in the university catalog.
Your advisor is available to assist you.

	CREDITS	COMMENTS/GRADE
FIRST YEAR - FALL SEMESTER (16)		
WELD 111 Welding Processes 1 Lecture	3	
WELD 113 Welding Processes 1 Lab	5	
WELD 112 Welding Graphics	2	
ETEC 140 Engineering Graphics Comprehensive	3	
____ ___ Cultural Enrichment Elective	3	
FIRST YEAR - WINTER SEMESTER (19)		
WELD 121 Welding Processes 2 Lecture (WELD 111, 113)	3	
WELD 123 Welding Processes 2 Lab (WELD 111, 113)	5	
MATL 240 Introduction to Material Science	4	
MATH 116 Int. Algebra & Numerical Trig. (MATH 110)	4	
ENGL 150 English 1	3	
SECOND YEAR - FALL SEMESTER (16)		
WELD 211 Welding Fabrication 1(WELD 121/123)	5	
WELD 212 Quality Testing (WELD 121/123)	4	
PHYS 211 Introductory Physics I (MATH 116)	4	
ENGL 250 English 2 (ENGL 150)	3	
SECOND YEAR - WINTER SEMESTER (15)		
WELD 221 Welding Fabrication 2 (WELD 211, 212, ENGL 250)	4	
WELD 222 Introduction to Welding Automation (WELD 211, 212)	3	
EEET 201 Electrical Fundamentals	3	
MFGT 150 Manufacturing Processes	2	
PSYC 150 Introductory Psychology	3	

CURRICULUM REQUIREMENTS
WELDING TECHNOLOGY
ASSOCIATE IN APPLIED SCIENCE DEGREE
FALL SEMESTER

TECHNICAL			CREDIT HOURS
WELD	111	Welding Processes 1 Lecture	3
WELD	113	Welding Processes 1 Laboratory	5
WELD	112	Welding Graphics	2
WELD	121	Welding Processes 2 Lecture	3
WELD	123	Welding processes 2 Laboratory	5
WELD	211	Welding Fabrication 1	5
WELD	212	Quality Testing	4
WELD	221	Welding Fabrication 2	4
WELD	222	Intro. to Welding Automation	3
Technical Related			
EEET	201	Electrical Fundamentals	3
ETEC	140	Engineering Graphics	3
MATL	240	Intro. to Material Science	4
MFGT	150	Manufacturing Processes	2

GENERAL EDUCATION			CREDIT HOURS
Communication Competence			
ENGL	150	English 1	3
ENGL	250	English 2	3
Scientific Understanding			
PHYS	211	Introductory Physics I	4
Quantitative Skills			
MATH	116	Inter. Algebra & Num. Trig.	4
Cultural Enrichment			
Elective			3
Social Awareness			
PSYC	150	Introductory Psychology	3

A.A.S. Degree Minimum General Educational Requirements in Semester Hours:

Cultural Enrichment Credits - 3
Communication Credits - 6
Social Awareness Credits - 3
Scientific Understanding Credits - 3/4

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WELDING ENGINEERING TECHNOLOGY
BACHELOR OF SCIENCE DEGREE
FALL SEMESTER
Curriculum Guide Sheet

NAME OF STUDENT _____ STUDENT I.D.: _____

Total semester hours required for graduation: 72

NOTE: Meeting the requirements for graduation indicated on this sheet is the responsibility of the student. Your advisor is available to assist you.

			CREDITS	COMMENTS/GRADE
THIRD YEAR-FALL SEMESTER (19)				
WELD	311	Welding Automation & Robotics (JR status)	4	
WELD	312	Design of Weldments (JR status)	3	
EEET	301	Controls for Automation	3	
MATH	126	Algebra & Analytical Trigonometry (MATH 116)	4	
CHEM	121	General Chemistry (CHEM 103 or H/S chemistry)	5	
THIRD YEAR - WINTER SEMESTER (17)				
WELD	321	Laser Welding, Cutting & Processing (JR status)	3	
WELD	322	Advanced Resistance Welding (JR status)	3	
MATH	216	Applied Calculus (MATH 126)	4	
MECH	340	Statics and Strengths of Materials (MATH 126)	4	
ENGL	311	Advanced Technical Writing (ENGL 250)	3	
THIRD YEAR - SUMMER SEMESTER				
WELD	393	Internship	4	
FOURTH YEAR - FALL SEMESTER (17)				
MFGE	353	Statistical Quality Control (MATH 126)	3	
WELD	412	Comp. Aided Weldment Design (MECH 240/WELD 312/393)	3	
WELD	422	Material Science (AAS in Welding, WELD 393)	3	
MFGE	423	Engineering Economics (MATH 126)	2	
COMM	121	Fundamentals of Public Speaking	3	
____	____	Social Awareness Elective	3	
FOURTH YEAR - WINTER SEMESTER (15)				
WELD	411	Advanced Welding Processes (AAS in welding, WELD 393)	3	
WELD	499	Proj. Eng. and Mgt. (WELD 412)	3	
PSYC	326	Indust-Organizational Psychology (PSYC 150)	3	
____	____	Cultural Enrichment Elective	3	
____	____	Advanced Cultural Enrichment Elective	3	

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CURRICULUM REQUIREMENTS
WELDING ENGINEERING TECHNOLOGY
BACHELOR OF SCIENCE DEGREE
FALL SEMESTER

ENTRY CRITERIA:

1. Application for admission submitted by February 15 prior to Fall term requested.
2. Associate in Welding Technology.
3. A minimum 3.0 honor point average overall.
4. Satisfy all prerequisites to enter MATH 126.

TECHNICAL			CREDIT HOURS
WELD	311	Welding Automation & Robotics	4
WELD	312	Design of Weldments	3
WELD	321	Laser Welding, Cutting & Processing	3
WELD	322	Advanced Resistance Welding	3
WELD	393	Internship	4
WELD	411	Advanced Welding Processes	3
WELD	412	Computer Aided Weldment Design	3
WELD	422	Material Science	3
WELD	499	Project Engineering & Management	3
Technical Related			
EEET	301	Controls for Automation	3
MECH	340	Statics & Strengths of Materials	4
MFGE	353	Statistical Quality Control	3
MFGE	423	Engineering Economics	2

GENERAL EDUCATION			CREDITS HOURS
Communication Competence			
COMM	121	Fundamentals of Public Speaking	3
ENGL	311	Advanced Technical Writing	3
Scientific Understanding			
CHEM	121	General Chemistry	5
Quantitative Skills			
MATH	126	Algebra & Anal. Trigonometry	4
MATH	216	Applied Calculus	4
Cultural Enrichment *			
Elective			3
Elective (200+)			3
Social Awareness *			
Elective			3
PSYC	326	Indust-Organizational Psychology	3

***Must satisfy General Education Basic, Foundations, Global Consciousness, Race/Gender/Ethnicity requirements as specified in the university catalog.**

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Section #10: Enrollment Trends Over the Past Five Years

Programs: Welding Technology / Welding Engineering Technology
Degrees: A.A.S. and B.S.
Department: Welding Engineering Technology
College: Technology

Welding Engineering Technology Department Enrollment Summary:

Welding Engineering Technology Department Enrollment 2001

- Welding Technology majors: 73
- Welding Engineering Technology majors: 52
- Welding Related Technical Students: 120

See pie chart in this section

Welding Engineering Technology Department Total Majors

97/98	98/99	99/00	00/01	01/02
86	101	110	125	116

See graph in this section.

Welding Technology Majors

97/98	98/99	99/00	00/01	01/02
43	55	55	73	68

See graph in this section

Welding Technology Degrees

97/98	98/99	99/00	00/01	01/02
22	10	21	15	23

See graph in this section

Welding Engineering Technology Majors

97/98	98/99	99/00	00/01	01/02
43	46	55	52	52

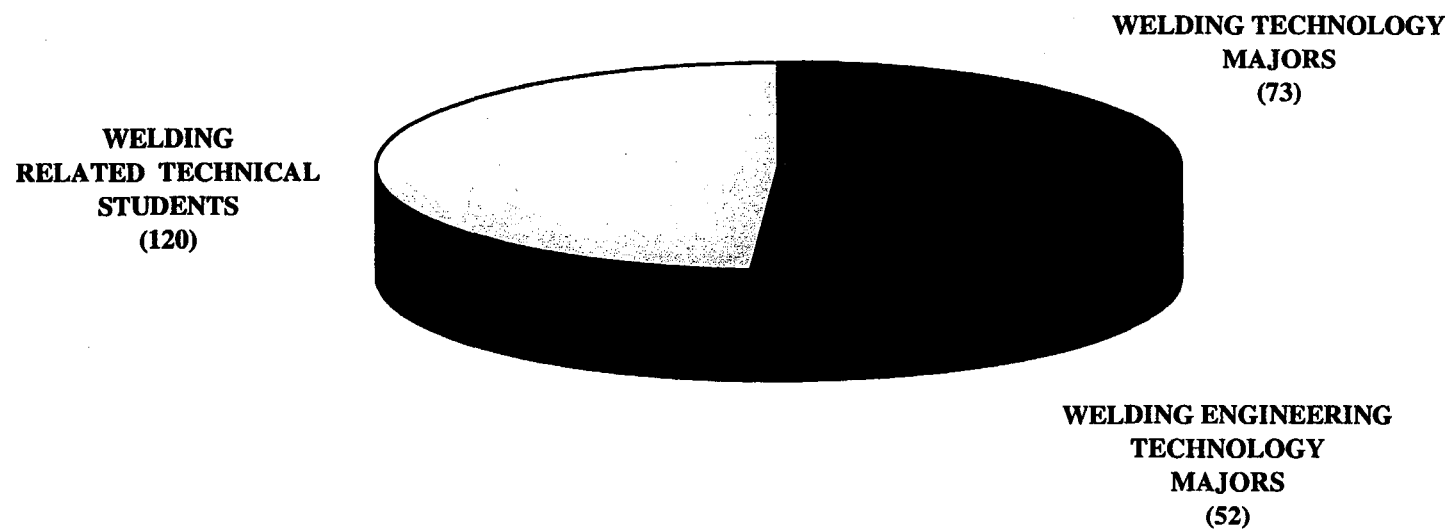
See graph in this section

Welding Engineering Technology Degrees

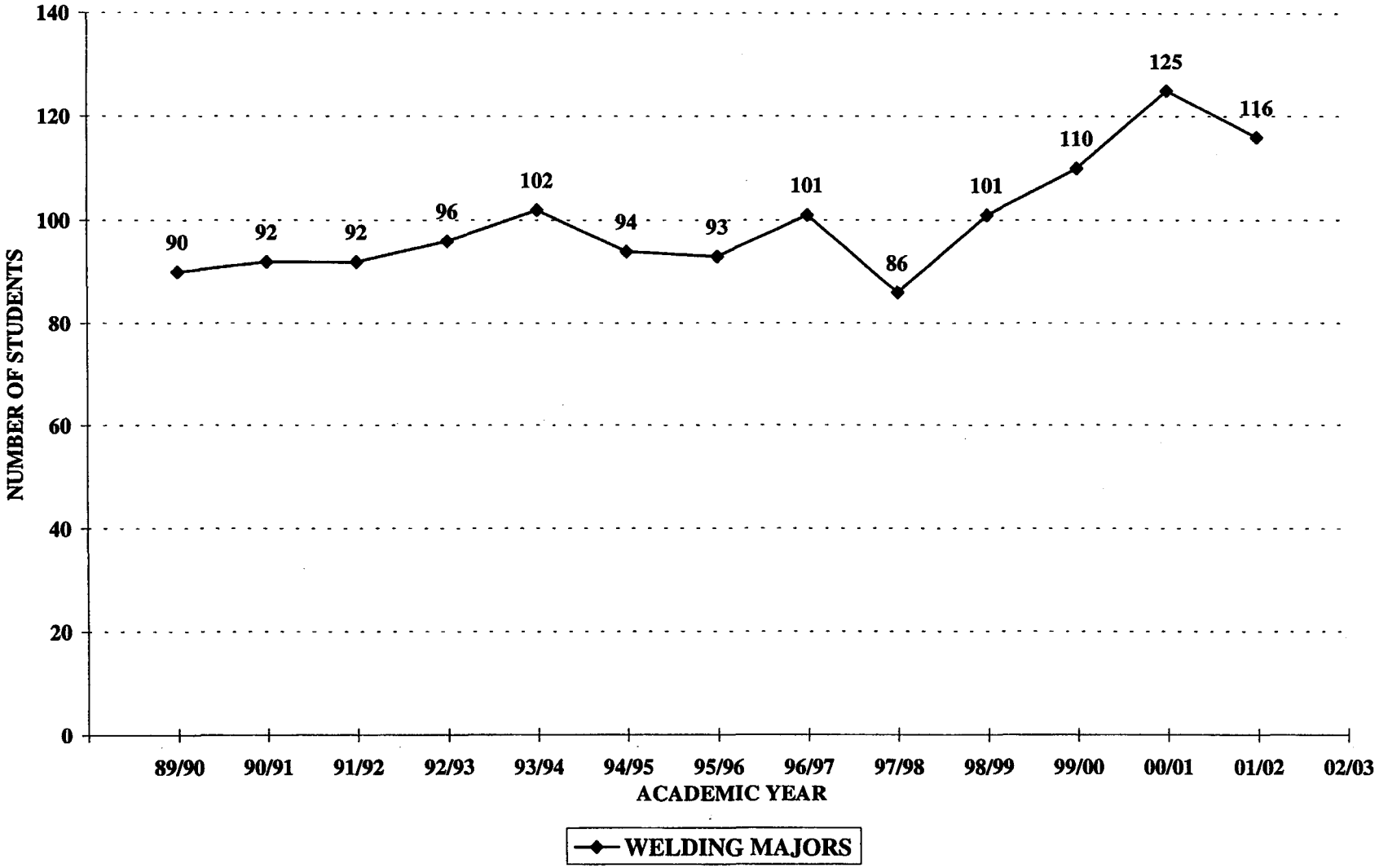
97/98	98/99	99/00	00/01	01/02
22	18	28	14	25

See graph in this section

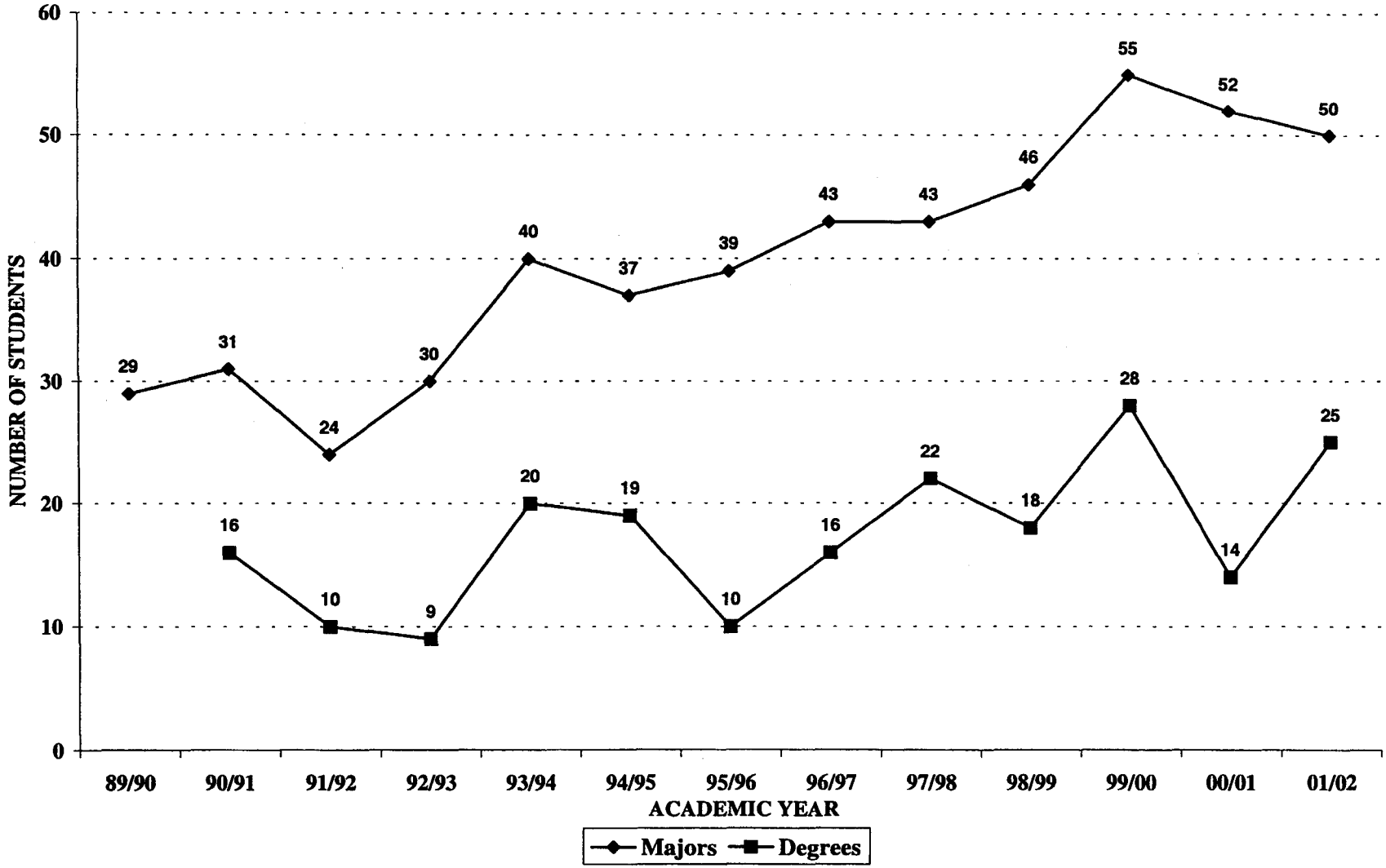
FERRIS STATE UNIVERSITY
WELDING ENGINEERING TECHNOLOGY DEPARTMENT
TOTAL ENROLLMENT



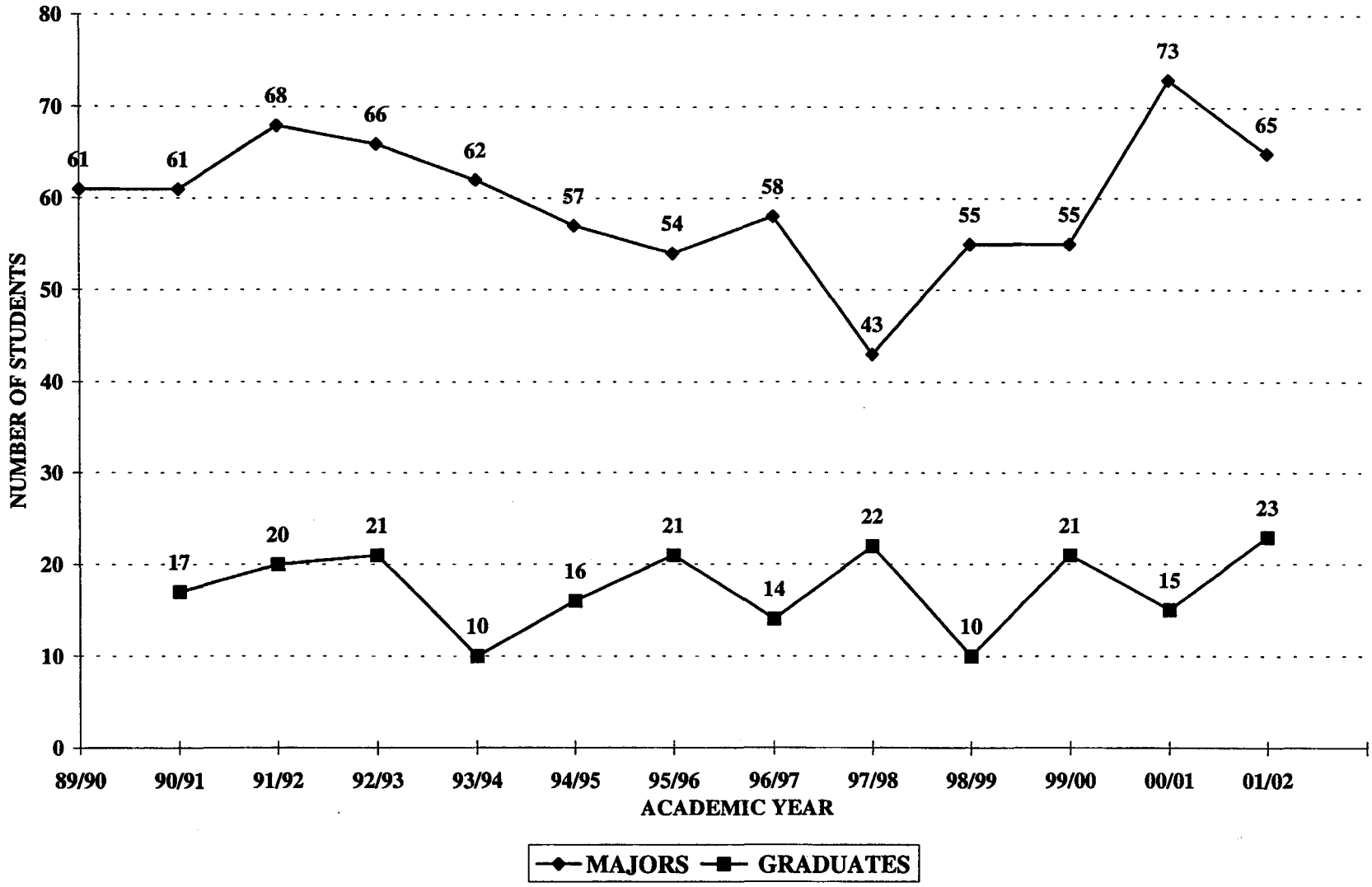
WELDING ENGINEERING TECHNOLOGY DEPARTMENT
TOTAL MAJORS



WELDING ENGINEERING TECHNOLOGY
MAJORS/DEGREES



WELDING TECHNOLOGY
MAJORS/DEGREES



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UNITED STATES
WELDING ENGINEERING TECHNOLOGY/WELDING ENGINEERING
PROGRAM COMPARISONS

Prepared By: Kenneth A. Kuk, January, 2001

Institution	Ferris State University	LeTourneau Univ.	Ohio Sate University	Utah State University	Montana Tech
Type	Public	Private	Public	Public	Public
Location	Big Rapids, Michigan	Longview, Texas	Columbus, Ohio	Logan, Utah	Butte, Montana
Telephone	231-591-2000	903-233-3450	614-292-2545	435-797-2790	800-445-TECH
Degree	B.S. Welding Engineering Technology	B.S. Eng/Eng. Tech	B.S. Welding Engineering	B.S. Industrial Technology	B.S. Engineering Science
Major	NA	Welding Engineering	NA	Aerospace/Welding	Welding Engineering
Accreditation	No	EAC/ABET	EAC/ABET	No	No Pending
Welding Credits	64	22	32	17	20
Technical Credits	25	44	31	51	65
Calculus Plus Credits	4	12	16	4	13
Total Credits	138	137	132	130	136
Graduates per Year	28	9	27	11	7
Graduate Employment	Automotive, Automation, Equipment	General Fabrication	Automotive, Manufacturing, Research	Aerospace, Manufacturing	Construction

Section #11: Program Productivity/Cost

Programs:	Welding Technology / Welding Engineering Technology
Degrees:	Associate in Applied Science Degree in Welding Technology and Bachelor of Science Degree in Welding Engineering Technology
Department:	Welding Engineering Technology
College:	Technology

Please see Administrative Program Review documentation in Section #1 for additional financial information

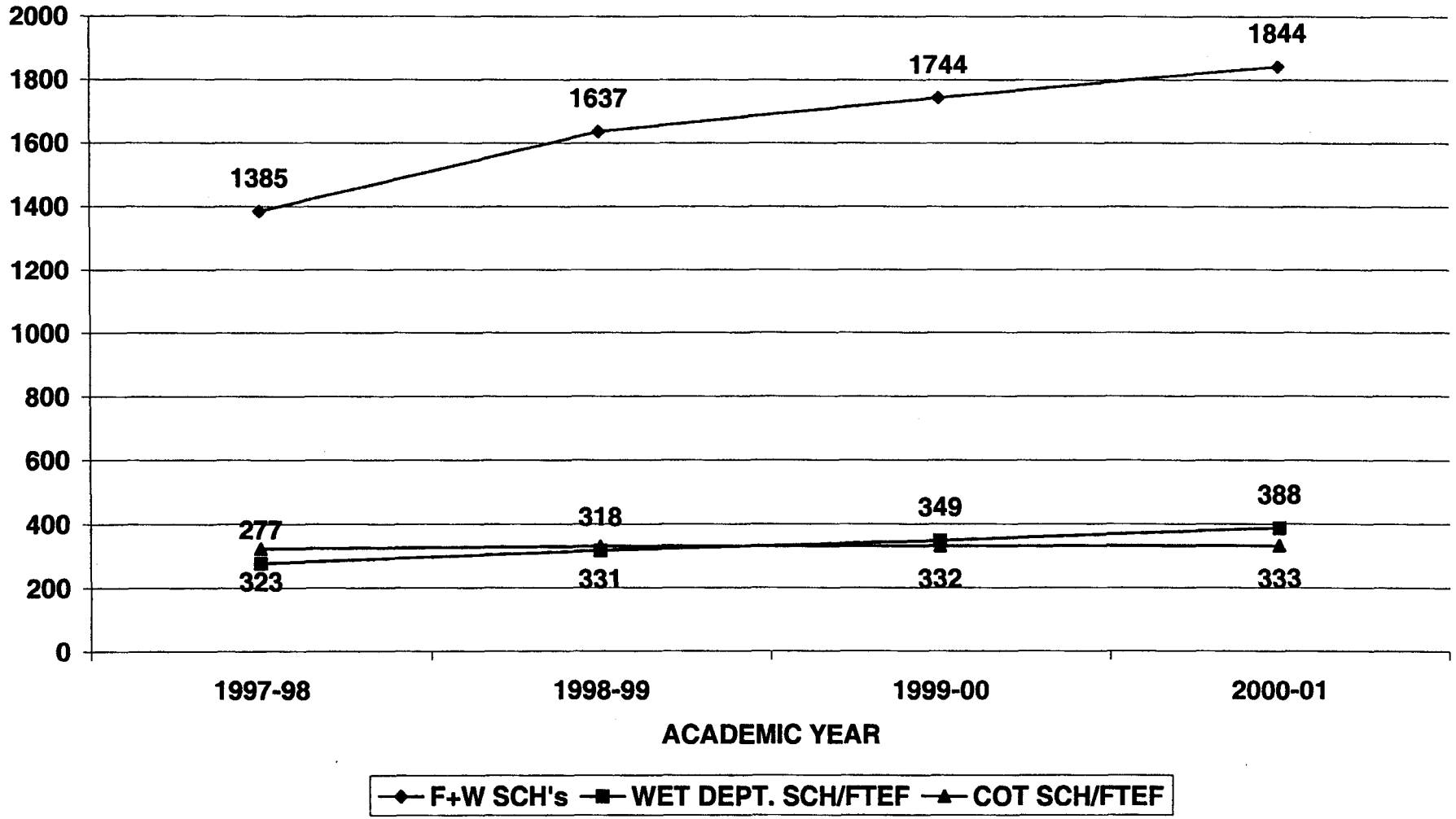
Operational Efficiencies
Welding Engineering Technology Department
2001-2002 Academic Year

Prepared By: Kenneth A. Kuk
May 8, 2002

Opportunity 1	Department enrollment
Solution	Recruit via web, expositions, high schools, community colleges
Efficiency Result	Department enrollment at capacity of 120* students for 2001-2002
Opportunity 2	Department instructional productivity
Solution	Schedule faculty and facilities for appropriate productivity
Efficiency Result	47,765** Student contact hours and 1795 SCH's** for 2001-2002
Opportunity 3	Private scholarship funding for majors
Solution	Work with related professional societies and students
Efficiency Result	Obtained $53,750*** in private scholarships for 2001-2002
Opportunity 4	Gift-in-kind donations to the department to supplement budget
Solution	Concept, implement, and manage corporate equipment consignment and donation programs
Efficiency Result	Obtained $121,704*** in donations and equipment consignments to date for 2001-2002

Source:	*	*Ferris State University Fact Book 2001-2002*
	**	*Ferris State University Student Information System*
	***	*University Advancement and Marketing*

WELDING ENGINEERING TECHNOLOGY DEPARTMENT PRODUCTIVITY



Ferris State University
Degree Program Costing 1999 - 2000 (Summer, Fall, and Winter)

College : Technology
Department : Design, Manufacturing & Graphic Arts

Program Name: Welding Technology AAS

Program Credits Required (Total credits to graduate) 67

*Instructor Cost per Student Credit Hour(SCH) (Average for program)	$141.81
**Department Cost per Student Credit Hour	$48.98
***Dean's Cost per Student Credit Hour	$16.17
Total Cost per Student Credit Hour (Average for program)	**$206.96**
Total Program Instructor Cost (Assumes a student will complete program in one year)	$9,501.02
Total Program Department Cost	$3,281.74
Total Program Dean's Cost	$1,083.61
Total Program Cost (Assumes a student will complete program in one year)	**$13,866.38**

Course ID	Level	Instructor Cost	Dept Cost	Dean's Cost	SCH's Produced	Instructor Cost/SCH	Dept Cost/SCH	Dean's Cost/SCH	Credits Required	Program Instructor Cost	Program Dept Cost	Program Dean's Cost
CULTELE	E	$1,544,513	$261,981	$148,924	18223	$85	$14	$8	3	$254	$43	$25
EEET228	L	$16,005	$9,159	$2,277	116	$138	$79	$20	4	$552	$316	$79
ENGL150	L	$549,468	$70,827	$51,473	6417	$86	$11	$8	3	$257	$33	$24
ENGL250	L	$431,435	$52,351	$38,045	4743	$91	$11	$8	3	$273	$33	$24
ETEC140	L	$54,862	$30,400	$9,777	498	$110	$61	$20	3	$330	$183	$59
MATH116	L	$137,470	$20,162	$14,374	1792	$77	$11	$8	4	$307	$45	$32
MATL240	L	$60,975	$25,394	$8,167	416	$147	$61	$20	4	$586	$244	$79
MFGT150	L	$52,600	$20,755	$6,675	340	$155	$61	$20	2	$309	$122	$39
PHYS211	L	$103,003	$49,653	$12,770	1592	$65	$31	$8	4	$259	$125	$32
PSYC150	L	$264,468	$85,143	$33,088	4125	$64	$21	$8	3	$192	$62	$24
WELD111	L	$11,254	$4,578	$1,472	75	$150	$61	$20	3	$450	$183	$59
WELD112	L	$8,448	$3,052	$982	50	$169	$61	$20	2	$338	$122	$39
WELD113	L	$18,756	$7,325	$2,356	120	$156	$61	$20	5	$782	$305	$98
WELD121	L	$11,859	$3,846	$1,237	63	$188	$61	$20	3	$565	$183	$59
WELD123	L	$19,765	$6,410	$2,061	105	$188	$61	$20	5	$941	$305	$98
WELD211	L	$26,043	$9,462	$3,043	155	$168	$61	$20	5	$840	$305	$98
WELD212	L	$24,596	$7,814	$2,513	128	$192	$61	$20	4	$769	$244	$79
WELD221	L	$25,398	$7,081	$2,277	116	$219	$61	$20	4	$876	$244	$79
WELD222	L	$18,006	$5,311	$1,708	87	$207	$61	$20	3	$621	$183	$59

* Instructor Cost - ***Salary & Fringe*** - the actual cost to teach a course

** Depatment Cost - ***Departmental Level Non Instructor Compensation, Supplies and Equipment*** - departmental average applied to all course prefixes within a department

*** Dean's Cost - ***Dean's Level Non Instructor Compensation, Supplies and Equipment*** - college average applied to all course prefixes within a college

Source: Office of Institutional Research, g:\...\progcost\9900\progcost.rsl

Ferris State University
Degree Program Costing 1999 - 2000 (Summer, Fall, and Winter)

College : Technology
Department : Design, Manufacturing & Graphic Arts

Program Name: Welding Engineering Technology BS (Yrs 3 & 4)

Program Credits Required (Total credits to graduate) 73

*Instructor Cost per Student Credit Hour(SCH) (Average for program)	$152.63
**Department Cost per Student Credit Hour	$43.36
***Dean's Cost per Student Credit Hour	$14.74
Total Cost per Student Credit Hour (Average for program)	**$210.74**
Total Program Instructor Cost (Assumes a student will complete program in one year)	$11,142.30
Total Program Department Cost	$3,165.18
Total Program Dean's Cost	$1,076.22
Total Program Cost (Assumes a student will complete program in one year)	**$15,383.69**

Course ID	Level	Instructor Cost	Dept Cost	Dean's Cost	SCH's Produced	Instructor Cost/SCH	Dept Cost/SCH	Dean's Cost/SCH	Credits Required	Program Instructor Cost	Program Dept Cost	Program Dean's Cost
CHEM121	L	$109,480	$59,727	$15,361	1915	$57	$31	$8	5	$286	$156	$40
COMM121	L	$174,555	$43,764	$22,813	2844	$61	$15	$8	3	$184	$46	$24
CULTELE	E	$1,544,513	$261,981	$148,924	18223	$85	$14	$8	6	$509	$86	$49
EEET315	U	$16,672	$7,264	$1,806	92	$181	$79	$20	4	$725	$316	$79
ENGL311	U	$132,766	$12,417	$9,024	1125	$118	$11	$8	3	$354	$33	$24
MATH126	L	$150,850	$14,131	$10,075	1256	$120	$11	$8	4	$480	$45	$32
MATH216	L	$52,227	$5,536	$3,946	492	$106	$11	$8	4	$425	$45	$32
MECH240	L	$87,462	$39,068	$12,565	640	$137	$61	$20	4	$547	$244	$79
MFGE353	U	$21,737	$15,749	$5,065	258	$84	$61	$20	3	$253	$183	$59
MFGE423	U	$34,232	$14,651	$4,712	240	$143	$61	$20	2	$285	$122	$39
PSYC326	U	$26,650	$12,013	$4,668	582	$46	$21	$8	3	$137	$62	$24
SOCAELE	E	$1,447,253	$377,260	$175,262	20110	$72	$19	$9	3	$216	$56	$26
WELD311	U	$27,457	$5,616	$1,806	92	$298	$61	$20	4	$1,194	$244	$79
WELD312	U	$12,672	$4,212	$1,355	69	$184	$61	$20	3	$551	$183	$59
WELD321	U	$20,593	$4,029	$1,296	66	$312	$61	$20	3	$936	$183	$59
WELD322	U	$20,090	$4,212	$1,355	69	$291	$61	$20	3	$873	$183	$59
WELD393	U	$15,370	$6,837	$2,199	112	$137	$61	$20	4	$549	$244	$79
WELD411	U	$16,292	$2,930	$942	48	$339	$61	$20	3	$1,018	$183	$59
WELD412	U	$13,729	$5,311	$1,708	87	$158	$61	$20	3	$473	$183	$59
WELD422	U	$12,672	$5,311	$1,708	87	$146	$61	$20	3	$437	$183	$59
WELD499	U	$20,593	$5,311	$1,708	87	$237	$61	$20	3	$710	$183	$59

* Instructor Cost - ***Salary & Fringe*** - the actual cost to teach a course

** Depatment Cost - ***Departmental Level Non Instructor Compensation, Supplies and Equipment*** - departmental average applied to all course prefixes within a department

*** Dean's Cost - ***Dean's Level Non Instructor Compensation, Supplies and Equipment*** - college average applied to all course prefixes within a college

Source: Office of Institutional Research, g:\...\progcost\9900\progcost.rsl

Student Contact Hours
2000 - 2001

Welding Technology/Welding Engineering Technology Programs
Prepared by: Kenneth A. Kuk

Course Number	Course Name	Section Number	Lecture Hours per Week	Laboratory Hours per Week	Weeks per Semester	Number of Students	Sections Required	Total Contact Hours	Total SCH's
MAJOR COURSES - FALL SEMESTER									
Weld 111	Processes 1 Lecture	1	3	0	15	46	1	2070	138
Weld 113	Processes 1 Lab	301	0	15	15	22	1	4950	110
Weld 113	Processes 1 Lab	302	0	15	15	23	1	5175	115
Weld 112	Welding Graphics	211	1	3	15	23	1	1380	46
Weld 112	Welding Graphics	221	1	3	15	23	1	1380	46
Weld 211	Fabrication 1	211	3	0	15	21	1	945	63
Weld 211	Fabrication 1		0	6	15	21	1	1890	42
Weld 211	Fabrication 1		0	6	15	0	1	0	0
Weld 212	Quality Testing	211	3	0	15	21	1	945	63
Weld 212	Quality Testing	211	0	3	15	11	1	495	11
Weld 212	Quality Testing	212	0	3	15	10	1	450	10
Weld 212	Quality Testing		0	3	15	0	1	0	0
									0
Weld 311	Automation	211	3	0	15	30	1	1350	
Weld 311	Automation	211	0	3	15	11	1	495	11
Weld 311	Automation	212	0	3	15	10	1	450	10
Weld 311	Automation	213	0	3	15	9	1	405	9
Weld 312	Weld Design	211	2	3	15	30	1	2250	90
Weld 411	Advanced Processes	1	3	0	15	17	1	765	51
Weld 412	CAE Weld Design	1	3	0	15	22	1	990	66
TOTALS - MAJOR COURSES - FALL SEMESTER			**22**	**69**	**285**	**350**	**19**	**26385**	**881**
MAJOR COURSES - WINTER SEMESTER									
Weld 121	Processes 2 Lecture	1	3	0	15	36	1	1620	108
Weld 121	Processes 2 Lab	301	0	15	15	19	1	4275	95
Weld 121	Processes 2 Lab	302	0	15	15	17	1	3825	
Weld 221	Fabrication 2	211	1	0	15	17	1	255	17
Weld 221	Fabrication 2	211	0	9	15	17	1	2295	51
Weld 221	Fabrication 2		0	9	15	0	1	0	0
Weld 222	Intro Weld Automation	211	2	0	15	18	1	540	36
Weld 222	Intro Weld Automation	211	0	3	15	9	1	405	9
Weld 222	Intro Weld Automation	212	0	3	15	9	1	405	9
Weld 321	Laser Processing	1	3	0	15	28	1	1260	84
Weld 322	Resistance Welding	211	3	0	15	28	1	1260	84
Weld 322	Resistance Welding	211	0	3	15	14	1	630	14
Weld 322	Resistance Welding	212	0	3	15	14	1	630	14
Weld 422	Weld Material Science	1	3	0	15	20	1	900	60
Weld 499	Project Management	1	3	0	15	22	1	990	66
TOTALS - MAJOR COURSES - WINTER SEMESTER			**18**	**60**	**225**	**268**	**15**	**19290**	**647**
TECHNICAL RELATED COURSES - FALL & WINTER SEMESTERS									
Weld 116	Combined Welding	211	2	0	15	23	1	690	46
Weld 116	Combined Welding	211	0	3	15	17	1	765	17
Weld 116	Combined Welding	212	0	3	15	6	1	270	6
Weld 146	Combined Welding	211	1	0	15	48	1	720	48
Weld 146	Combined Welding	211	0	3	15	20	1	900	20
Weld 146	Combined Welding	212	0	3	15	14	1	630	14
Weld 146	Combined Welding	213	0	3	15	14	1	630	14
Weld 416	Weld Prod. Proc.	1	2	0	15	22	1	660	44
TOTALS - RELATED COURSES - FALL & WINTER			**5**	**15**	**120**	**164**	**8**	**5265**	**209**
TOTALS			**45**	**144**	**630**	**782**	**42**	**50940**	**1737**

Student Contact Hours
2001-2002

Welding Technology/Welding Engineering Technology Programs
Prepared by: Kenneth A. Kuk

Course Number	Course Name	Section Number	Lecture Hours per Week	Laboratory Hours per Week	Weeks per Semester	Number of Students	Sections Required	Total Contact Hours	Total SCH's
MAJOR COURSES - FALL SEMESTER									
Weld 111	Processes 1 Lecture	1	3	0	15	27	1	1215	81
Weld 113	Processes 1 Lab	301	0	15	15	15	1	3375	75
Weld 113	Processes 1 Lab	302	0	15	15	12	1	2700	60
Weld 112	Welding Graphics	211	1	3	15	15	1	900	30
Weld 112	Welding Graphics	221	1	3	15	12	1	720	24
Weld 211	Fabrication 1	211	3	0	15	34	1	1530	102
Weld 211	Fabrication 1		0	6	15	14	1	1260	28
Weld 211	Fabrication 1		0	6	15	20	1	1800	40
Weld 212	Quality Testing	211	3	0	15	34	1	1530	102
Weld 212	Quality Testing	211	0	3	15	10	1	450	10
Weld 212	Quality Testing	212	0	3	15	8	1	360	8
Weld 212	Quality Testing	213	0	3	15	10	1	450	10
Weld 212	Quality Testing	214	0	3	15	10	1	450	10
Weld 311	Automation	211	3	0	15	20	1	900	60
Weld 311	Automation	211	0	3	15	10	1	450	10
Weld 311	Automation	212	0	3	15	10	1	450	10
Weld 312	Weld Design	211	2	3	15	20	1	1500	60
Weld 411	Advanced Processes	1	3	0	15	25	1	1125	75
Weld 412	CAE Weld Design	1	3	0	15	25	1	1125	75
TOTALS - MAJOR COURSES - FALL SEMESTER			**22**	**69**	**285**	**331**	**19**	**22290**	**870**
MAJOR COURSES - WINTER SEMESTER									
Weld 121	Processes 2 Lecture	1	3	0	15	23	1	1035	69
Weld 121	Processes 2 Lab	301	0	15	15	23	1	5175	115
Weld 221	Fabrication 2	211	1	0	15	33	1	495	33
Weld 221	Fabrication 2	211	0	9	15	18	1	2430	54
Weld 221	Fabrication 2		0	9	15	15	1	2025	45
Weld 222	Intro Weld Automation	211	2	0	15	33	1	990	66
Weld 222	Intro Weld Automation	211	0	3	15	16	1	720	16
Weld 222	Intro Weld Automation	212	0	3	15	17	1	765	17
Weld 321	Laser Processing	1	3	0	15	18	1	810	54
Weld 322	Resistance Welding	211	3	0	15	18	1	810	54
Weld 322	Resistance Welding	211	0	3	15	9	1	405	9
Weld 322	Resistance Welding	212	0	3	15	9	1	405	9
Weld 422	Weld Material Science	1	3	0	15	25	1	1125	75
Weld 499	Project Management	1	3	0	15	24	1	1080	72
TOTALS - MAJOR COURSES - WINTER SEMESTER			**18**	**45**	**210**	**281**	**14**	**18270**	**688**
TECHNICAL RELATED COURSES - FALL & WINTER SEMESTERS									
Weld 146	Combined Welding	211	2	0	15	17	1	510	34
Weld 146	Combined Welding	211	0	3	15	17	1	765	17
Weld 146	Combined Welding	211	1	0	15	38	1	570	38
Weld 146	Combined Welding	211	0	3	15	18	1	810	18
Weld 146	Combined Welding	212	0	3	15	20	1	900	20
Weld 416	Weld Prod. Proc.	AGA	2	0	15	30	1	900	60
Weld 416	Weld Prod. Proc.	1	2	0	15	25	1	750	50
TOTALS - RELATED COURSES - FALL & WINTER			**7**	**9**	**105**	**165**	**7**	**5205**	**237**
TOTALS			**47**	**123**	**600**	**777**	**40**	**45765**	**1795**

Section #12: Conclusions

Programs: Welding Technology / Welding Engineering Technology
Degrees: Associate in Applied Science Degree in Welding Technology and Bachelor of Science Degree in Welding Engineering Technology
Department: Welding Engineering Technology
College: Technology

Upon review of the data from Sections 1-11 of this report, the members of the Welding Engineering Technology Program Review Panel conclude the following:

Centrality to Mission

The Ferris State University mission is to be a national leader in providing career opportunities for innovative teaching and learning in career-oriented, technical and professional education. The Welding Technology and Welding Engineering Technology programs are hands-on experiential based, career focused curriculum designs. The mission of the department is to continuously define the profession by producing graduates whose knowledge, skills, and attitudes are nationally recognized. ***Reference Section 1***

Uniqueness and Visibility

According to the United States National Center for Educational Statistics the Bachelor of Science program in Welding Engineering Technology is one of five four-year programs in the country and the Associate in Applied Science Welding Technology program is one of approximately 126 two-year programs in the country. ***Reference Section 10***

Service to State and Nation

The Welding Technology and Welding Engineering Technology programs produce more graduates that any other program of their type in the nation. The Associate program has produced 106 graduates over the last six years for an average of 18 per year and the Bachelors program has produced 123 graduates for an average of 21 per year. Approximately 30% of the nations four-year welding graduates obtain their degree at Ferris State University. 60% of the Bachelor of Science graduates over the last sixteen years were placed in the state of Michigan with the remaining 40% placed in 35 states across the country. Since well over 100 graduates work at car and light truck OEM's, suppliers, capital equipment and consumable manufacturers the data indicates that it is currently not possible to purchase an automobile manufactured in North America without a Ferris Welding Engineering Technology graduate playing a role in it's development. With one out of two products that comprise the gross national product containing a weld, the programs are vital and integral to the United States economy. ***Reference Section 10***

Demand by Students

The Welding Engineering Technology department has a capacity of 120 majors based on current resources, primarily faculty. Over the past three academic years the department has enjoyed an average enrollment of 117 or 98% of capacity. The department also delivers welding instruction to approximately 120 students in three different departments per year. Junior transfer students have now been admitted from 26 community colleges from across the United States and Canada. ***Reference Sections 1 and 10***

Quality of Instruction

98% of the reporting department's advisory board members, associate and bachelor degree graduates, and employers would recommend this program to a friend and 87% are satisfied to a great extent with the overall program. The department hosts an annual advisory board meeting to review and insure department curriculum quality. Over $500,000 in outside private scholarship money has been awarded to majors since 1986. The faculty is very committed to the implementation of an overall outcomes assessment plan. In addition to capstone course experiences in the associate and bachelors programs a pre/post has been developed and implemented for the entire technical course sequence over the past four years. The post-test data indicates a gain of approximately 65% in the attainment and retention of curriculum objectives. In order to keep the programs continuously relevant curriculum changes have been made in 1996, 1997, and 2002. ***Reference Sections 2,3,4, 5, 6 and 9***

Demand for Graduates

Because the programs have defined a strategic niche in the market place within great lakes basin states, as well as nationally through out the industry, graduates typically enjoy multiple position offers prior to graduation. Spring 2002 graduates did have a more difficult time but all were placed in their field by August. Career progression is excellent for 5,10, and 15 year alumni in senior welding engineering and engineering management positions. ***Reference Section 7***

Placement Rate and Average Salary of Graduates

Over the 16-year history of the Welding Engineering Technology program the placement rate for graduates has been 98%+ in the field of study. The Bachelor of Science program is consistently one of the highest paying degrees offered at Ferris and in the nation. 2001 graduates received an average annual starting salary of $50,166. Career progression is excellent as indicated by the fact that 50% of the program's graduates report salaries over $60,000 per year and 23% report more than $69,000 per year. The associate program graduates typically ladder into bachelors program with the occasional student transferring to pursue a baccalaureate degree in education or business. ***Reference Sections 2, 3, and 7***

Service to Non-Majors

The department delivers welding course instruction to approximately 120 students in three different academic departments (Automotive, Heavy Equipment, and Manufacturing) per year. Over the years the department has a played a significant role in supporting campus physical plant operations by incorporating maintenance and fabrication projects into the curriculum. Numerous works of art on campus have been engineered and fabricated by the department including the football field bulldog, quad globe, student recreation center, and athletic facility projects. ***Reference Section 10***

Facilities and Equipment

The welding programs enjoy a consolidated laboratory area, which is subdivided into four specialized training facilities. The program has state of the art welding, cutting, and automation equipment that has almost exclusively been donated on consigned by industry leading manufactures. Federal vocational education equipment funds are received once every 4-5 years. Cash and Gift-in-Kind totaled $122,000 in FY2002. Since 1998 four members have been inducted into the Ferris State University Phoenix Society for $100,000+ contributions of equipment and consumables to the department. Current consigned equipment in the laboratories has a market value of approximately $450,000. ***Reference Section 1***

Library information Resources

Welding majors enjoy full access to the state of the art FLITE building. Technical reference is completely adequate, technology and facilities are wonderful, and the professional staff is outstanding, they have always been very attentive to any needs or requests submitted.

Cost

The 1999-2000 degree cost was:	Welding Technology AAS	$13,866.38
	Welding Engineering Technology BS	$15,383.69

Weld prefix productivity was:	1997-98	277
	1998-99	318
	1999-00	349
	2000-01	388
Weld Prefix SCH Generated:	1997-98	1385
	1998-99	1637
	1999-00	1744
	2000-01	1844

Reference Sections 1 and 11

Faculty Professional and Scholarly Activities

Faculty in the department typically has embraced continuing education and development. Since the 1996/97 academic program review the department faculty have pursued two graduate degrees attended numerous seminars/workshops, and obtained two professional society certifications. Each faculty member is active at the local, state, and national level of the American Welding Society. All of the faculty engage in relevant consulting in the areas of process development, design, and training on an annual basis. ***Reference Section 1***

Administrative Effectiveness

The welding programs were elevated to department status effective winter semester 2001. The department is lead by a faculty chairman who teaches and is the day-to-day operations manager of the unit via release time. The chair reports to the Dean of the College of Technology. Prior to winter semester 2001 the programs were within a larger department but still lead by a program coordinator with release time. Since 1996 the College of Technology has struggled with stability in the dean's office, 5 deans, 2 permanent and 3 interims. This has lead to 3 different organizational structures in the college. Despite this constant change the programs have prospered by any standard of measure. To be fair it must be stated that the each of the college administrative leaders over the last 5 years have been supportive of the programs goals and objectives.

Section #13: Recommendations

Programs: Welding Technology / Welding Engineering Technology
Degrees: Associate in Applied Science Degree in Welding Technology and Bachelor of Science Degree in Welding Engineering Technology
Department: Welding Engineering Technology
College: Technology

The welding programs at Ferris State University have continuously evolved since their humble beginnings as a clock hour certificate program in 1955. Today the Bachelors and Associates programs are the largest of their kind in the nation in production of graduates. The enrollment is nearly 100% of capacity and graduates enjoy placement opportunities around the country at one of the highest compensation rates of all Ferris programs. Career progression opportunities are abundant based alumni surveys and tracking. Industry support is outstanding based on the fact that since 1986 over $1,700,000 in private scholarships, equipment, and consumables have been donated to the department.

The Welding Engineering Technology Department, based on this Academic Program Review, makes the following recommendations:

1. At a minimum maintain and continue the programs.
2. Consider designating the department a "Center of Excellence".
3. Maintain the Welding Engineering Technology department status.
4. Complete the roof over the welding yard that was started under the university planning process.
5. Based on current staffing maintain enrollment at 120.
6. If the university desires the department to grow to 140-160 majors add an additional full time tenure track faculty member to increase the number of B.S. students.
7. Consider reassigning the material science faculty member to the department to increase curriculum development and increase the potential for private sector equipment donations.
8. Designate and support Swan 104 as a welding computer applications classroom.
9. Consider a specialized COB marketing degree with an imbedded welding certificate.
10. Develop an annual capital equipment budget.

11. Introduction to Welding Automation (WELD 222, 3 credits)
Welding automation used in manufacturing. Review of common justifications procedures and feasibility studies on basic weldments. Variations in joint design and filler materials, selection of optimum welding process and equipment. Laboratory: set-up and operation of basic automatic welding system with a study of the effects of

12. Electronic Technology for Welding 1 (EEET 228, 4 credits) — A B C D E
Covers DC basic, AC basics, inductance and capacitance, magnetics, characteristics of welding power supplies, control of power supplies, as well as basic control. Prerequisites: welding major or permission of department head.

13. Manufacturing Processes (MFGT 150, 2 credits) — A B C D E
A basic machine process course. The fundamental operations on machine tool equipment including engine lathe, band saw, and horizontal and vertical milling machine. Measuring and inspection tools, drill press, and surface plate.

General Education:

14. Science: Introductory Physics (PHYS 211, 4 credits) — A B C D E
Basic concepts and applications of motion, force, energy, fluids, heat and sound.

15. Mathematics: Intermediate Algebra & Numerical Trigonometry (MATH 116, 4 credits) — A B C D E
Special factoring forms, exponents, roots and radicals, scientific notation, fractions, first and second degree equations and inequalities, functions and graphs, logarithms, and solutions of logarithmic and exponential equations, systems of equations up to 3x3 and Cramer's Rule, numerical trigonometry including vectors, Law of Sines and Cosines, and graphs of trigonometric functions.

16. Cultural Enrichment (IN GENERAL, 3 credits) — A B C D E

17. Social Awareness (IN GENERAL, 3 credits) — A B C D E

BEGINNING OF B.S. PROGRAM

Fall Third Year

18. Welding Automation & Robotics (WELD 311, 4 credits) — A B C D E
Advanced welding theory and practical applications. Course emphasizing the economics, feasibility and fundamentals of welding automation. Fixturing, positioning, safety, and adaptive control devices applied to various fixed, flexible, and programmable automated welding processes. Program, perform, and analyze various automated welds.

19. Design of Weldments (WELD 312, 3 credits) — A B C D E
The design, drawing, manufacturing engineering, and cost considerations of creating weldments: engineering graphics, weld joint types and welding symbols, estimating welding costs, production considerations needed in designing and fabricating weldments, the use of tolerance dimensioning, geometric tolerancing, mechanical and section properties of materials; load and stress analysis and code requirement for welding.

(OVER)

To what extent does a graduate require the course knowledge?

Please circle appropriate rating

	To a Great Extent	Somewhat	Neutral	Very Little	Not at All
20. Electronic Technology For Welding (EEET 315, 4 credits) For welding technology majors. DC and AC basics, magnetics, inductance and capacitance. Also included are 3-phase power, transformers, semi-conductor power devices and controls. Many control devices are covered through PLC's.	A	B	C	D	E
[redacted]					
21. Laser Welding, Cutting, & Processing (WELD 321, 3 credits) The theory, economics, and feasibility of industrial laser applications. Laser designs, beam delivery systems, materials processing characteristics, and unique safety considerations applied to welding and cutting. Set-up, program, and operate industrial laser.	A	B	C	D	E
22. Advanced Resistance Welding (WELD 322, 3 credits) Resistance welding: set-up and operation of systems typically found in automotive, appliance, and other sheet metal manufacturing industries. Written laboratory reports required.	A	B	C	D	E
23. Statics & Strengths of Materials (MECH 240, 4 credits) Mechanics: Statics and strength of materials. Forces, components, resultants, equilibrium, friction, centroids, and stress/strain relationships. Dynamics: strength of materials; the concepts of stress and strain, axial stress and deformation, thermal stress and deformation, stress concentrations, factor of safety, torsional stress and deformation, beam stresses, combined stress, riveted joints, welded joints, and Mohr's circle.	A	B	C	D	E
[redacted]					
24. Internship (WELD 393, 4 credits) Placement in an industrial setting for a minimum of 400 hours over a ten-week period a combined effort of the training site, university and student. Industrial projects and daily activities involved in the design, engineering, & manufacturing of welded products.	A	B	C	D	E
[redacted]					
25. Statistical Quality Control (MFGE 353, 3 credits) Fundamentals and applications of statistics in the control of manufacturing quality. The construction and interpretation of histograms, Pareto, variable and attribute control charts. The calculation and interpretation of process capability, regression analysis, measurement error techniques, an overview of design of experiments and cause and effect diagrams.	A	B	C	D	E

To what extent does a graduate require the course knowledge?

Please circle appropriate rating

	To a Great Extent	Somewhat	Neutral	Very Little	Not at All
26. Computer Aided Weldment Design (WELD 412, 3 credits) Application of computer aided drafting, material selection, and finite element analysis software and hardware to facilitate the process of designing weldments. Mechanical and shape properties of materials utilized to determine and analyze weldment design functionality. Design approach methods and programs. Solve several weldment design problems.	A	B	C	D	E
27. Material Science (WELD 422, 3 credits) Exposure to the chemical composition, metallurgical aspects, applications, weldability, and specific requirements for welding of several materials. The metallurgical response to heating and cooling during the welding cycle; proper welding techniques and requirements. Ferrous and nonferrous alloys, along with non-metals.	A	B	C	D	E
28. Engineering Economics (MFGE 423, 2 credits) Engineering economic analysis. Money and time relationships in respect to capital purchases and equipment justification in detail.	A	B	C	D	E
[redacted]	**To a Great Extent**	**Somewhat**	**Neutral**	**Very Little**	**Not at All**
29. Advanced Welding Processes (WELD 411, 3 credits) Welding processes, techniques, and methods for joining materials not previously covered. Mechanical and chemical energy joining systems, high-energy electrical joining processes, adhesive bonding, and mechanical fasteners. How to and why select a process for a specific application.	A	B	C	D	E
30. Project Engineering and Management (WELD 499, 3 credits) Capstone for the Welding Engineering Technology program. Designing, engineering, manufacturing, and managing a welding project. Design of welded structures and machine elements in terms of allowable stresses, joint configuration, material and process selection, welding procedures, equipment specification and purchasing, production forecasting, project supervision, and resource management techniques.	A	B	C	D	E
[redacted]					
31. Science: Preparatory Chemistry (CHEM 103, 3 credits) General process skills necessary for chemistry. Fundamental principles of chemistry, including observations and analysis; matter and atoms; periodic priorities; the mole concept; chemical reactions; and states of matter.	A	B	C	D	E

(OVER)

To what extent does a graduate require the course knowledge?

Please circle appropriate rating

	To a Great Extent	Somewhat	Neutral	Very Little	Not at All
32. Mathematics: Applied Calculus MATH 216, 4 credits) The derivative and applications of the derivative. Integration and applications of the integral: derivatives of the trigonometric, inverse trigonometric, and transcendental functions, with applications of each. Techniques of integration, integration using tables, and approximate integration.	A	B	C	D	E
33. Communications: Fundamentals of Public Speaking (COMM 121, 3 credits) Training and experience in preparation and delivery of short speeches with emphasis on the clear, concise, logical communication of ideas. Emphasis on informative and persuasive speaking.	A	B	C	D	E
34. Advanced Technical Writing (ENGL 311, 3 credits) Advanced course to train technical communicators: technical concepts, facts, data analysis and evaluation to both a scientific or technical audience; skills in editing, organization, and development of technical articles for publication, abstracting, proposals, memorandum reports, project/progress reports, technical descriptions, professional and technical letters, and the protocols of formal research reporting.	A	B	C	D	E
35. Cultural Enrichment: (IN GENERAL, 3 credits)	A	B	C	D	E
36. Social Awareness (IN GENERAL, 3 credits)	A	B	C	D	E

Continued

In thinking over your experiences at Ferris State University, to what extent do you feel your education prepared you for success?
Please circle appropriate rating

		To a Great Extent	Somewhat	Neutral	Very Little	Not at All
37.	**Overall Technical training**	A	B	C	D	E
38.	**Gaining a broad general education about different fields of knowledge**	A	B	C	D	E
39.	**Writing clearly and effectively**	A	B	C	D	E
40.	**Acquiring proficiency with the use of personal computers**	A	B	C	D	E
41.	**Developing values and ethical standards**	A	B	C	D	E
42.	**The ability to think analytically and logically**	A	B	C	D	E
43.	**The ability to learn on your own, pursue ideas, and find information you need**	A	B	C	D	E
44.	**How effectively did the Ferris welding program(s) prepare you for employment?**	A	B	C	D	E

45. **When you were a Welding major at Ferris, did you receive an American Welding Society scholarship?**
   A. Yes
   B. No

46. **When you were a Welding major at Ferris, did you receive scholarship(s) other than the American Welding Society scholarship?**
   A. Yes
   B. No

47. **Are you currently an American Welding Society member?**
   A. Yes
   B. No

48. **Do you currently hold a professional certification / registration?**
   A. American Welding Inspector
   B. Society of Manufacturing Engineers, Certified Manufacturing Engineer
   C. Professional Engineer
   D. Other
   E. No

49. **What is your approximate annual salary?**
   A. Less than $40,000
   B. $40,000 - 49,000
   C. $50,000 - 59,000
   D. $60,000 - 69,000
   E. More than $69,000

50. **What industry are you employed in?**
   A. Automotive related manufacturing
   B. Welding and/or automation equipment manufacturing/application/sales
   C. Other/general manufacturing
   D. Construction
   E. Defense or aerospace

51. **What is your job title?**
   A. Engineer
   B. Technician
   C. Management
   D. Sales
   E. Other

52. **Are you currently enrolled in a degree granting program?**
   A. Bachelor of Science
   B. Master of Science
   C. Doctoral
   D. No

53. **Have you received an additional degree(s) since completing the Ferris welding program?**
   A. Bachelor of Science
   B. Master of Science
   C. Doctoral
   D. No

2001/2002 Welding Engineering Technology Academic Program Review Survey Results

Q1 Welding Processes 1 - Lec	Advisory Board	AAS Graduate	BS Graduate	Employers
To a Great Extent	88.0%	88%	85%	71%
Somewhat	0.0%	12%	15%	24%
Neutral	12.5%	0%	0%	6%
Very Little	0.0%	0%	0%	0%
Not at All	0.0%	0%	0%	0%
Total Percent	**100.5%**	**100%**	**100%**	**100%**
Number of Responses	**8**	**34**	**39**	**17**

Q2 Welding Graphics	Advisory Board	AAS Graduate	BS Graduate	Employers
To a Great Extent	88%	88%	90%	82%
Somewhat	13%	12%	10%	18%
Neutral	0%	0%	0%	0%
Very Little	0%	0%	0%	0%
Not at All	0%	0%	0%	0%
Total Percent	**100%**	**100%**	**100%**	**100%**
Number of Responses	**8**	**34**	**39**	**17**

Q3 Welding Processes 1 - Lab	Advisory Board	AAS Graduate	BS Graduate	Employers
To a Great Extent	75%	82%	82%	77%
Somewhat	25%	15%	15%	24%
Neutral	0%	0%	0%	0%
Very Little	0%	3%	3%	0%
Not at All	0%	0%	0%	0%
Total Percent	**100%**	**100%**	**100%**	**100%**
Number of Responses	**8**	**34**	**39**	**17**

Q4 Engineering Graphics	Advisory Board	AAS Graduate	BS Graduate	Employers
To a Great Extent	75%	82%	78%	65%
Somewhat	13%	15%	20%	29%
Neutral	13%	3%	3%	6%
Very Little	0%	0%	0%	0%
Not at All	0%	0%	0%	0%
Total Percent	**100%**	**100%**	**100%**	**100%**
Number of Responses	**8**	**34**	**40**	**17**

Q5 Welding Processes 2 - Lec	Advisory Board	AAS Graduate	BS Graduate	Employers
To a Great Extent	100%	82%	80%	77%
Somewhat	0%	18%	21%	24%
Neutral	0%	0%	0%	0%
Very Little	0%	0%	0%	0%
Not at All	0%	0%	0%	0%
Total Percent	**100%**	**100%**	**100%**	**100%**
Number of Responses	**8**	**34**	**39**	**17**

Q6 Welding Processes 2 - Lab	Advisory Board	AAS Graduate	BS Graduate	Employers
To a Great Extent	100%	82%	82%	82%
Somewhat	0%	15%	15%	18%
Neutral	0%	0%	0%	0%
Very Little	0%	3%	3%	0%
Not at All	0%	0%	0%	0%
Total Percent	**100%**	**100%**	**100%**	**100%**
Number of Responses	**8**	**34**	**39**	**17**

Q7 Intro to Material Science	Advisory Board	AAS Graduate	BS Graduate	Employers
To a Great Extent	75%	68%	68%	59%
Somewhat	25%	32%	30%	35%
Neutral	0%	0%	3%	6%
Very Little	0%	0%	0%	0%
Not at All	0%	0%	0%	0%
Total Percent	**100%**	**100%**	**100%**	**100%**
Number of Responses	**8**	**34**	**40**	**17**

Q8 Welding Fabrication 1	Advisory Board	AAS Graduate	BS Graduate	Employers
To a Great Extent	75%	82%	80%	77%
Somewhat	25%	18%	21%	24%
Neutral	0%	0%	0%	0%
Very Little	0%	0%	0%	0%
Not at All	0%	0%	0%	0%
Total Percent	**100%**	**100%**	**100%**	**100%**
Number of Responses	**8**	**34**	**39**	**17**

Q9 Quality Testing	Advisory Board	AAS Graduate	BS Graduate	Employers
To a Great Extent	50%	74%	72%	47%
Somewhat	50%	27%	28%	53%
Neutral	0%	0%	0%	0%
Very Little	0%	0%	0%	0%
Not at All	0%	0%	0%	0%
Total Percent	**100%**	**100%**	**100%**	**100%**
Number of Responses	**8**	**34**	**39**	**17**

Q10 Welding Fabrication 2	Advisory Board	AAS Graduate	BS Graduate	Employers
To a Great Extent	75%	74%	77%	65%
Somewhat	25%	27%	23%	35%
Neutral	0%	0%	0%	0%
Very Little	0%	0%	0%	0%
Not at All	0%	0%	0%	0%
Total Percent	**100%**	**100%**	**100%**	**100%**
Number of Responses	**8**	**34**	**39**	**17**

Q11 Intro to Welding Automation	Advisory Board	AAS Graduate	BS Graduate	Employers
To a Great Extent	88%	82%	85%	88%
Somewhat	13%	18%	15%	12%
Neutral	0%	0%	0%	0%
Very Little	0%	0%	0%	0%
Not at All	0%	0%	0%	0%
Total Percent	**100%**	**100%**	**100%**	**100%**
Number of Responses	**8**	**34**	**39**	**17**

Q12 Electronic Tech for Welding 1	Advisory Board	AAS Graduate	BS Graduate	Employers
To a Great Extent	63%	59%	59%	53%
Somewhat	38%	29%	31%	47%
Neutral	0%	9%	8%	0%
Very Little	0%	3%	3%	0%
Not at All	0%	0%	0%	0%
Total Percent	**100%**	**100%**	**100%**	**100%**
Number of Responses	**8**	**34**	**39**	**17**

Q13 Manufacturing Processes	Advisory Board	AAS Graduate	BS Graduate	Employers
To a Great Extent	25%	38%	44%	35%
Somewhat	75%	56%	51%	59%
Neutral	0%	6%	5%	6%
Very Little	0%	0%	0%	0%
Not at All	0%	0%	0%	0%
Total Percent	**100%**	**100%**	**100%**	**100%**
Number of Responses	**8**	**34**	**39**	**17**

Q14 Science: Introductory Physics	Advisory Board	AAS Graduate	BS Graduate	Employers
To a Great Extent	75%	35%	36%	41%
Somewhat	13%	44%	46%	47%
Neutral	13%	15%	13%	12%
Very Little	0%	6%	5%	0%
Not at All	0%	0%	0%	0%
Total Percent	**100%**	**100%**	**100%**	**100%**
Number of Responses	**8**	**34**	**39**	**17**

Q15 Math: Inter Algb & Num Trig	Advisory Board	AAS Graduate	BS Graduate	Employers
To a Great Extent	63%	50%	46%	35%
Somewhat	25%	41%	46%	59%
Neutral	13%	6%	5%	6%
Very Little	0%	3%	3%	0%
Not at All	0%	0%	0%	0%
Total Percent	**100%**	**100%**	**100%**	**100%**
Number of Responses	**8**	**34**	**39**	**17**

Q16 Cultural Enrichment	Advisory Board	AAS Graduate	BS Graduate	Employers
To a Great Extent	0%	6%	6%	12%
Somewhat	25%	12%	21%	18%
Neutral	63%	50%	39%	53%
Very Little	0%	21%	19%	12%
Not at All	13%	12%	15%	6%
Total Percent	**100%**	**100%**	**100%**	**100%**
Number of Responses	**8**	**34**	**52**	**17**

Q17 Social Awareness	Advisory Board	AAS Graduate	BS Graduate	Employers
To a Great Extent	0%	15%	15%	24%
Somewhat	38%	27%	33%	24%
Neutral	25%	35%	29%	29%
Very Little	38%	21%	21%	24%
Not at All	0%	3%	2%	0%
Total Percent	**100%**	**100%**	**100%**	**100%**
Number of Responses	**8**	**34**	**52**	**17**

Q18 Weld Automation & Robotics	Advisory Board	AAS Graduate	BS Graduate	Employers
To a Great Extent	88%	91%	91%	94%
Somewhat	13%	9%	7%	6%
Neutral	0%	0%	2%	0%
Very Little	0%	0%	0%	0%
Not at All	0%	0%	0%	0%
Total Percent	**100%**	**100%**	**100%**	**100%**
Number of Responses	**8**	**34**	**55**	**17**

Q19 Design of Weldments	Advisory Board	AAS Graduate	BS Graduate	Employers
To a Great Extent	75%	82%	76%	77%
Somewhat	25%	18%	24%	24%
Neutral	0%	0%	0%	0%
Very Little	0%	0%	0%	0%
Not at All	0%	0%	0%	0%
Total Percent	**100%**	**100%**	**100%**	**100%**
Number of Responses	**8**	**34**	**55**	**17**

Q20 Electronic Tech for Welding 2	Advisory Board	AAS Graduate	BS Graduate	Employers
To a Great Extent	75%	53%	58%	53%
Somewhat	25%	38%	31%	47%
Neutral	0%	0%	6%	0%
Very Little	0%	6%	4%	0%
Not at All	0%	3%	2%	0%
Total Percent	**100%**	**100%**	**100%**	**100%**
Number of Responses	**8**	**34**	**55**	**17**

Q21 Laser Weld, Cut, & Process	Advisory Board	AAS Graduate	BS Graduate	Employers
To a Great Extent	63%	56%	55%	47%
Somewhat	38%	35%	31%	41%
Neutral	0%	6%	6%	6%
Very Little	0%	3%	4%	6%
Not at All	0%	0%	6%	0%
Total Percent	**100%**	**100%**	**100%**	**100%**
Number of Responses	**8**	**34**	**55**	**17**

Q22 Advanced Resistance Welding	Advisory Board	AAS Graduate	BS Graduate	Employers
To a Great Extent	63%	65%	62%	65%
Somewhat	38%	21%	24%	29%
Neutral	0%	12%	9%	0%
Very Little	0%	3%	4%	6%
Not at All	0%	0%	2%	0%
Total Percent	**100%**	**100%**	**100%**	**100%**
Number of Responses	**8**	**34**	**55**	**17**

Q23 Statics & Strength of Materials	Advisory Board	AAS Graduate	BS Graduate	Employers
To a Great Extent	38%	50%	51%	35%
Somewhat	63%	41%	38%	53%
Neutral	0%	6%	7%	6%
Very Little	0%	0%	0%	0%
Not at All	0%	3%	4%	6%
Total Percent	**100%**	**100%**	**100%**	**100%**
Number of Responses	**8**	**34**	**55**	**17**

Q24 Internship	Advisory Board	AAS Graduate	BS Graduate	Employers
To a Great Extent	63%	88%	87%	82%
Somewhat	25%	3%	6%	12%
Neutral	13%	6%	6%	6%
Very Little	0%	3%	2%	0%
Not at All	0%	0%	0%	0%
Total Percent	**100%**	**100%**	**100%**	**100%**
Number of Responses	**8**	**34**	**55**	**17**

Q25 Statistical Quality Control	Advisory Board	AAS Graduate	BS Graduate	Employers
To a Great Extent	13%	35%	36%	29%
Somewhat	63%	41%	36%	53%
Neutral	25%	12%	16%	12%
Very Little	0%	12%	9%	6%
Not at All	0%	0%	2%	0%
Total Percent	**100%**	**100%**	**100%**	**100%**
Number of Responses	**8**	**34**	**55**	**17**

Q26 Comp Aided Weldment Design	Advisory Board	AAS Graduate	BS Graduate	Employers
To a Great Extent	38%	68%	64%	53%
Somewhat	50%	32%	27%	35%
Neutral	13%	0%	4%	12%
Very Little	0%	0%	2%	0%
Not at All	0%	0%	4%	0%
Total Percent	**100%**	**100%**	**100%**	**100%**
Number of Responses	**8**	**34**	**55**	**17**

Q27 Material Science	Advisory Board	AAS Graduate	BS Graduate	Employers
To a Great Extent	75%	65%	64%	59%
Somewhat	25%	32%	31%	41%
Neutral	0%	3%	6%	0%
Very Little	0%	0%	0%	0%
Not at All	0%	0%	0%	0%
Total Percent	**100%**	**100%**	**100%**	**100%**
Number of Responses	**8**	**34**	**55**	**17**

Q28 Engineering Economics	Advisory Board	AAS Graduate	BS Graduate	Employers
To a Great Extent	13%	38%	42%	29%
Somewhat	75%	47%	44%	65%
Neutral	0%	6%	4%	0%
Very Little	13%	9%	7%	6%
Not at All	0%	0%	4%	0%
Total Percent	**100%**	**100%**	**100%**	**100%**
Number of Responses	**8**	**34**	**55**	**17**

Q29 Advanced Welding Processes	Advisory Board	AAS Graduate	BS Graduate	Employers
To a Great Extent	63%	56%	55%	65%
Somewhat	25%	38%	36%	29%
Neutral	13%	6%	6%	6%
Very Little	0%	0%	4%	0%
Not at All	0%	0%	0%	0%
Total Percent	**100%**	**100%**	**100%**	**100%**
Number of Responses	**8**	**34**	**55**	**17**

Q30 Project Eng and Management	Advisory Board	AAS Graduate	BS Graduate	Employers
To a Great Extent	50%	85%	86%	82%
Somewhat	38%	6%	6%	18%
Neutral	13%	9%	7%	0%
Very Little	0%	0%	0%	0%
Not at All	0%	0%	2%	0%
Total Percent	**100%**	**100%**	**100%**	**100%**
Number of Responses	**8**	**34**	**55**	**17**

Q31 Science: Preparatory Chemistry	Advisory Board	AAS Graduate	BS Graduate	Employers
To a Great Extent	25%	18%	18%	12%
Somewhat	38%	44%	47%	59%
Neutral	38%	27%	18%	24%
Very Little	0%	9%	11%	6%
Not at All	0%	3%	6%	0%
Total Percent	**100%**	**100%**	**100%**	**100%**
Number of Responses	**8**	**34**	**55**	**17**

Q32 Math: Applied Calculus	Advisory Board	AAS Graduate	BS Graduate	Employers
To a Great Extent	50%	18%	15%	18%
Somewhat	25%	38%	35%	41%
Neutral	13%	15%	18%	18%
Very Little	0%	24%	20%	6%
Not at All	13%	6%	13%	18%
Total Percent	**100%**	**100%**	**100%**	**100%**
Number of Responses	**8**	**34**	**55**	**17**

Q33 Comm: Fund of Pub Speaking	Advisory Board	AAS Graduate	BS Graduate	Employers
To a Great Extent	50%	59%	60%	53%
Somewhat	38%	29%	31%	41%
Neutral	13%	12%	9%	6%
Very Little	0%	0%	0%	0%
Not at All	0%	0%	0%	0%
Total Percent	**100%**	**100%**	**100%**	**100%**
Number of Responses	**8**	**34**	**55**	**17**

Q34 Advanced Technical Writing	Advisory Board	AAS Graduate	BS Graduate	Employers
To a Great Extent	56%	77%	70%	71%
Somewhat	33%	18%	27%	24%
Neutral	11%	6%	4%	6%
Very Little	0%	0%	0%	0%
Not at All	0%	0%	0%	0%
Total Percent	**100%**	**100%**	**100%**	**100%**
Number of Responses	**9**	**34**	**56**	**17**

Q35 Cultural Enrichment	Advisory Board	AAS Graduate	BS Graduate	Employers
To a Great Extent	0%	6%	5%	12%
Somewhat	22%	15%	18%	18%
Neutral	22%	47%	43%	35%
Very Little	33%	24%	18%	29%
Not at All	22%	9%	16%	6%
Total Percent	**100%**	**100%**	**100%**	**100%**
Number of Responses	**9**	**34**	**56**	**17**

Q36 Social Awareness	Advisory Board	AAS Graduate	BS Graduate	Employers
To a Great Extent	22%	32%	27%	29%
Somewhat	44%	21%	29%	35%
Neutral	11%	29%	25%	24%
Very Little	22%	18%	14%	12%
Not at All	0%	0%	5%	0%
Total Percent	**100%**	**100%**	**100%**	**100%**
Number of Responses	**9**	**34**	**56**	**17**

Q37 Overall Technical Training	Advisory Board	AAS Graduate	BS Graduate	Employers
To a Great Extent	88%	88%	71%	81%
Somewhat	0%	9%	21%	13%
Neutral	13%	0%	5%	6%
Very Little	0%	3%	2%	0%
Not at All	0%	0%	0%	0%
Total Percent	**100%**	**100%**	**100%**	**100%**
Number of Responses	**8**	**34**	**56**	**16**

Q38 Gain a broad general educ...	Advisory Board	AAS Graduate	BS Graduate	Employers
To a Great Extent	25%	47%	43%	63%
Somewhat	63%	47%	45%	25%
Neutral	13%	6%	13%	13%
Very Little	0%	0%	0%	0%
Not at All	0%	0%	0%	0%
Total Percent	**100%**	**100%**	**100%**	**100%**
Number of Responses	**8**	**34**	**56**	**16**

Q39 Write clearly and effectively	Advisory Board	AAS Graduate	BS Graduate	Employers
To a Great Extent	25%	47%	39%	50%
Somewhat	50%	41%	50%	38%
Neutral	25%	9%	7%	13%
Very Little	0%	3%	4%	0%
Not at All	0%	0%	0%	0%
Total Percent	**100%**	**100%**	**100%**	**100%**
Number of Responses	**8**	**34**	**56**	**16**

Q40 Acquiring proficiency with...	Advisory Board	AAS Graduate	BS Graduate	Employers
To a Great Extent	25%	35%	41%	44%
Somewhat	25%	29%	29%	19%
Neutral	38%	21%	20%	25%
Very Little	13%	15%	11%	13%
Not at All	0%	0%	0%	0%
Total Percent	**100%**	**100%**	**100%**	**100%**
Number of Responses	**8**	**34**	**56**	**16**

Q41 Developing value and ethical...	Advisory Board	AAS Graduate	BS Graduate	Employers
To a Great Extent	50%	38%	29%	56%
Somewhat	13%	24%	41%	25%
Neutral	25%	27%	20%	19%
Very Little	0%	6%	7%	0%
Not at All	13%	6%	4%	0%
Total Percent	**100%**	**100%**	**100%**	**100%**
Number of Responses	**8**	**34**	**56**	**16**

Q42 The ability to think analytic...	Advisory Board	AAS Graduate	BS Graduate	Employers
To a Great Extent	63%	71%	57%	75%
Somewhat	25%	27%	36%	19%
Neutral	13%	3%	5%	6%
Very Little	0%	0%	2%	0%
Not at All	0%	0%	0%	0%
Total Percent	**100%**	**100%**	**100%**	**100%**
Number of Responses	**8**	**34**	**56**	**16**

Q43 The ability to learn on your...	Advisory Board	AAS Graduate	BS Graduate	Employers
To a Great Extent	86%	74%	59%	67%
Somewhat	0%	24%	30%	27%
Neutral	14%	3%	9%	7%
Very Little	0%	0%	2%	0%
Not at All	0%	0%	0%	0%
Total Percent	**100%**	**100%**	**100%**	**100%**
Number of Responses	**7**	**34**	**56**	**15**

Q44 How effectively did the Ferris...	Advisory Board	AAS Graduate	BS Graduate	Employers
To a Great Extent	71%	74%	59%	80%
Somewhat	14%	24%	38%	13%
Neutral	14%	0%	2%	7%
Very Little	0%	3%	2%	0%
Not at All	0%	0%	0%	0%
Total Percent	**100%**	**100%**	**100%**	**100%**
Number of Responses	**7**	**34**	**56**	**15**

Q 45 Receive AWS Scholarship	Advisory Board	AAS Graduate	BS Graduate	Employers
Yes	50%	81%	65%	71%
No	50%	19%	35%	29%
Total Percent	**100%**	**100%**	**100%**	**100%**
Number of Responses	**6**	**31**	**52**	**14**

Q46 Receive Other Scholarships	Advisory Board	AAS Graduate	BS Graduate	Employers
Yes	17%	39%	37%	29%
No	83%	61%	64%	71%
Total Percent	**100%**	**100%**	**100%**	**100%**
Number of Responses	**6**	**31**	**52**	**14**

Q47 Currently an AWS Member	Advisory Board	AAS Graduate	BS Graduate	Employers
Yes	100%	94%	94%	100%
No	0%	7%	6%	0%
Total Percent	**100%**	**100%**	**100%**	**100%**
Number of Responses	**7**	**31**	**52**	**15**

Q48 Hold Prof Cert or Registration	Advisory Board	AAS Graduate	BS Graduate	Employers
AWS Inspector	14%	17%	16%	14%
SME, Certified Manuf. Engineer	0%	3%	6%	7%
Professional Engineer	0%	0%	0%	0%
Other	14%	14%	8%	21%
No	71%	66%	69%	57%
Total Percent	**100%**	**100%**	**100%**	**100%**
Number of Responses	**7**	**29**	**49**	**14**

Q49 What is your approx. salary	Advisory Board	AAS Graduate	BS Graduate	Employers
Less than $40,000	0%	3%	2%	0%
$40,000 to $49,000	14%	0%	14%	0%
$50,000 to $59,000	0%	36%	35%	20%
$60,000 to $69,000	14%	36%	27%	27%
More than $69,000	71%	26%	23%	53%
Total Percent	**100%**	**100%**	**100%**	**100%**
Number of Responses	**7**	**31**	**52**	**15**

Q 50 Industry employed	Advisory Board	AAS Graduate	BS Graduate	Employers
Automotive related	29%	32%	29%	27%
Weld/Auto equipment mfg/sales/appl	43%	36%	37%	60%
Other/general manufacturing	14%	16%	14%	0%
Construction	14%	10%	12%	0%
Defense or Aerospace	0%	7%	8%	13%
Total Percent	**100%**	**100%**	**100%**	**100%**
Number of Responses	**7**	**31**	**49**	**15**

Q51What is your job title	Advisory Board	AAS Graduate	BS Graduate	Employers
Engineer	43%	55%	65%	40%
Technician	0%	0%	0%	0%
Management	57%	29%	20%	47%
Sales	0%	10%	8%	7%
Other	0%	7%	8%	7%
Total Percent	**100%**	**100%**	**100%**	**100%**
Number of Responses	**7**	**31**	**51**	**15**

Q52 Are you currently enrolled...	Advisory Board	AAS Graduate	BS Graduate	Employers
Bachelor of Science	0%	0%	2%	7%
Master of Science	0%	7%	6%	0%
Doctoral	0%	0%	0%	0%
No	100%	94%	92%	93%
Total Percent	**0%**	**0%**	**0%**	**0%**
Number of Responses	**7**	31	52	15

Q53 Additional degrees since Ferris	Advisory Board	AAS Graduate	BS Graduate	Employers
Bachelor of Science	14%	3%	0%	7%
Master of Science	14%	10%	6%	7%
Doctoral	0%	0%	0%	0%
No	71%	87%	94%	87%
Total Percent	**100%**	**100%**	**100%**	**100%**
Number of Responses	7	31	52	15

Q57 Overall program satisfaction	Advisory Board	AAS Graduate	BS Graduate	Employers
To a great extent	100%	88%	82%	92%
Somewhat	0%	13%	18%	8%
Neutral	0%	0%	0%	0%
Very little	0%	0%	0%	0%
Not at all	0%	0%	0%	0%
Total Percent	**100%**	**100%**	**100%**	**100%**
Number of Responses	**4**	**16**	**28**	**12**

Q58 Recommend program to...	Advisory Board	AAS Graduate	BS Graduate	Employers
Yes	100%	100%	96%	100%
No	0%	0%	0%	0%
Not sure	0%	0%	4%	0%
Total Percent	**100%**	**100%**	**100%**	**100%**
Number of Responses	**4**	**16**	**28**	**12**

Welding Engineering Technology Survey

Question #54: What do you believe was the most valuable part of your coursework?

WT Grad, WET Grad, & Employer-Automation, design, & project management.

WT Grad, WET Grad, & Employer-Welding processes lab.

WT Grad & WET Grad-Hands on experience with all welding processes and automation applications. Internship. Knowledgeable faculty.

WT Grad & WET Grad-Welding lecture, welding lab work (lots of it!), welding metallurgy, internship @ Robotics Systems House, and technical writing.

WET Grad-All the hands on training. That makes the program and helps tremendously.

?-The various assignments that involved group teamwork. I think relating with different people (of various personalities) successfully to achieve a goal is very important. Cultural enrichment & social awareness classes are great for a healthy balance also.

WET Grad-Welding automation & project management. (hands on training)

WT Grad & WET Grad-One of the most valuable parts of the coursework was the hands on labs. The labs with the hands on welding experience has put myself a level above fellow engineers I work with. Secondly, the understanding of welding codes and their purpose is another valuable part. Finally, some minor things listed below that I think of everyday: (1) Proper prior planning prevents piss poor performance. (2) Jeff Carney reminding me to always carry a pencil and piece of paper. Thanks, you wouldn't know how many times a pencil in my pocket has saved me.

WET Grad-The hands on experience is what allowed me to dig in without being concerned about making a mistake. Knowing how to weld makes talking to people lots easier.

WT Grad & WET Grad-Developing a thorough foundation in welding technology through hands on projects and simulated real world tasks.

WT Grad & WET Grad-Engineering economics, CAD training, and hands on welding labs.

WT Grad & WET Grad-Most valuable experiences are the lab time under the hood. I think Ferris needs to do a better job with automation training. Robots are a major part of today's welding environment. Also needed is more material science lab work.

WT Grad, WET Grad, & Employer-A solid foundation in joining technology, managing projects, and working with people.

WET Grad-Material sciences & design of weldments. More attention should be paid to these areas, especially material science.

WT Grad & WET Grad-Skill training.

WT Grad & WET Grad-Technical writing, project management, electronics theory. General: Refining the ability to learn on my own, pursue ideas, and find information. I learned to be self-sufficient.

WT Grad & WET Grad-The hands on in the first two years. Without that, I don't feel anyone can be a good engineer if they themselves can't weld!

WT Grad, WET Grad, Employer, & Advisory-The hands on experience in the labs was the most valuable part of my coursework. I have worked extensively with welding engineers from other universities. Most of them lack in the day-to-day hands on experience required in most welding careers.

WET Grad-Automation (robotics).

WT Grad & WET Grad-The core welding classes along with math and electrical classes. "The more welding knowledge the better. It seems you can NEVER know enough, there are no boundaries to what people will ask or expect you to know as soon as someone addresses you as Welding Engineer."

WET Grad-Learning how to apply the various processes to manufacturing.

WT Grad & WET Grad-Learning various welding processes by lab activities. Hands on robotic training.

WET Grad-Two areas: 1) Confidence in welding process knowledge, through hands on experience 2) Faculty to student relations

WET Grad-Statics & strengths of materials, physics, & robotics. The project management class adds real life experience and reinforces all that was learned in the previous 4 years.

WT Grad & WET Grad-hands on lab experience.

WT Grad, WET Grad, & Employer-learning how to learn.

WT & WET Grad, Advisory-"hands on" welding training. I enjoyed the "quarter" systems. The 10-week courses allowed me to take more classes.

?-Auto CAD & internship

WET Grad-Hands on applications of knowledge (i.e. CAD, FEA, & senior project management).

WET Grad-In my position at NDTG, I mainly write and consult on welding processes and procedures. In addition, I also troubleshoot welding problems with various welding processes and materials. I also rely hourly on the PC. Therefore, I would say that the welding applications and computer related course work would be the most valuable.

WET Grad-Labs using automation. Projects using CAD. The resistance welding and electronic courses could be very useful if taught in greater depth in the practical aspect. Too much emphasis was put on theory and formulas that are rarely used.

WT & WET Grad, & Employer-All computer related classes and teamwork projects, primarily for their social aspects. E.G. Communication of welding.

WT & WET Grad, Advisory-Knowledge of a broad range of welding processes, electronics, statistical quality control, CAD (needs to be more intensive), drafting, math & sciences need to strengthen reasoning skills, and material science.

WT & WET Grad-Hands on welding training, design, and process knowledge.

WET Grad-I have used virtually everything presented in the required courses plus some, therefore I would have to say the entire program.

WET Grad-Was the hands on experience along with instructors pushing you to limits that you can achieve. I can now look at projects with an easier mind and more often get better results after attending Ferris State.

WET Grad-The camaraderie and brotherhood of working with a select group of students with similar interests and goals.

WT Grad, WET Grad, & Employer-Welding theory, welding metallurgy, and welding lab activities.

WT Grad & WET Grad-Prepared me for future.

WT & WET Grad-The training I received in welding processes, welding automation, and project engineering & management.

WET Grad-Technical hands on training. Some of the psych class, really seeing the importance of how to deal with people.

?-The "hands on" aspect of the associate program. All the classes involving electronics and robotics.

WT & WET Grad-Major welding courses, both lectures & labs. The lectures provide essential information of process, procedure & theory, and labs follow up with hands on learning. The diversification of topics and principles has also been extremely helpful---including oxy-fuel!

WT & WET Grad-The ability to complete an assignment or task through critical thinking, group work, & various resources was very rewarding.

WET Grad-Teaching work ethic and problem solving.

WT & WET Grad & Employer-Hands-on welding, welding automation, and project management.

?-Professional Development: Things like business ethics, project management, the little things that require attention to detail. Technical: Hands-on welding experience. Robotic & manual. Basic understanding of electrical circuits.

?-Just being around others who also wanted to learn about welding, talking about it, and learning pros and cons in various classes held me the most. Class wise, probably the most useful class was WELD 412.

WET Grad & Employer-The most valuable coursework relating to my current position would be project management, automation, and resistance welding along with the guidance of the instructors of the welding program at FSU.

WT Grad, WET Grad, & Employer-Hands on shop knowledge, resistance welding lab robotics & hand welding skills.

?-all welding & welding engineering related subjects.

Question #55: What do you believe was the least valuable part of your coursework?

WET Grad & Employer- All the general ed. classes that had nothing to do with anything!

?- Cultural enrichments & social awareness were useless. I transferred in with 150 credits, and was 27 years old when I graduated. These courses burnt up TIME and MONEY.

?-Some of the humanities (general) courses. Maybe it was the courses that I selected, but some were not very useful.

WT Grad, WET Grad, Employer- Cultural enrichment.

WT Grad, WET Grad, & Employer- Physics, humanities, & flaming liberal social courses.

WT Grad, WET Grad, & Employer- General courses.

WT & WET Grad- Cultural enlightenment classes (pop music, geography, history)

WT & WET Grad- General education courses, electronics courses, and elected logic class with ex concentration camp nazi for an instructor

WET Grad- Social awareness electives

WET Grad- Perhaps calculus. That is one thing that I did not utilize or need during my college career.

WET Grad- Taking cultural enrichment classes. (need MORE hands on especially with robots.)

WT & WET Grad- The cultural enrichment electives were the least valuable. GET RID OF THEM!

WET Grad- The non-core classes helped in some respect but more so the classes that are well rounded classification did nothing: art, music, theater, all that sort of stuff.

WT & WET Grad- Repeating courses or material to accommodate transfer students, for example, EEET 228 and EEET 315 were the same class except for PLC.

WT & WET Grad- chemistry, advanced physics

WT & WET Grad- cultural enrichment and calculus.

WT & WET Grad, & Employer- Some improvement is needed in the electronics courses. The course should include more hands on instruction applicable to industry. There should be more instruction dealing with PC & PLC controls.

WET Grad- Electronics & advanced resistance welding- never use it at work.

WT & WET Grad- Robotics

WT & WET Grad- Humanities, cultural enrichment, etc.

WT & WET Grad- All ELECTIVES!!!

WT & WET Grad, Employer, Advisory- Since very course was very valuable to myself, I cannot decide what was the least valuable. The four years I spent at Ferris went by too quickly. If I were to do it over again, I would go another year to take some of the classes I didn't have the time to take in those four years.

WET Grad- Music Appreciation

WT & WET Grad- Cultural Enrichment

WET Grad- Technical English-because it was poorly administered.

WT & WET Grad- Electronics

WET Grad- Required general classes (i.e. humanities)

WET Grad- Cultural Enrichment classes, psychology classes, resistance welding, robotics should be weld joints other than bead on plate.

WT & WET Grad- Math 216.

WT & WET Grad, Employer- Nothing

?- Calculus, cultural enrichment

WET Grad- Statistical Quality Management: from my viewpoint, this is only applicable to automotive & some appliance industries on the production floor. This is not an industry tool, which is widely used by welding engineers.

WET Grad- I believe that would be the computer aided weldment design and calculus.

WET Grad- A lot of the electives, however some were beneficial. Calculus.

WT & WET Grad, Employer- Seldom use of RW & LW, Perhaps combining the two courses would have been better.

WT & WET Grad, Advisory- Cultural enrichment & social awareness. Extensive time spent on oxyfuel, stick welding, etc. (rather than on more advanced welding processes).

WT & WET Grad- Cultural enrichments.

WET Grad- Statistical Quality Control-only because we do not make many parts.

WET Grad- Some of the B.S. General Education stuff. Psyc 326 (worthless teacher)

WET Grad- All resistance education (poor at the time of my attendance).

WT & WET Grad, Employer- Would like to see coursework on reading & interpreting industrial specifications. (i.e. military, commercial, astm, asme, etc.)

WT & WET Grad- Some lecture classes were too dry & boring.

WT & WET Grad- General education courses.

WET Grad- The cultural enrichment classes.

?- I haven't used any calculus since I had to at Ferris! The drafting class that I took from Mikols. It was a great class, everyone uses autocad. More exposure to robots.

WT & WET Grad- I believe that each part of my education was valuable, and that includes related & electives. Knowledge of anything is never bad-for ignorance is not an acceptable excuse.

WT & WET Grad- I felt that cramming for tests and memorization was of little value, because most of the information was never retained.

WT & WET Grad, Employer- It all helps.

?- Taking electives that are nearly useless to a career as a welding engineer such as cultural enrichment & social awareness classes. I would have preferred to focus more of my time learning in greater depth as much welding engineering related material as possible! Having more time to focus on the core classes & less distractions due to worrying about keeping an acceptable grad in these non-welding related classes would have given me a better chance at getting an A in all of my welding classes.

Though I'm not the sharpest knife in the drawer, or don't have the knowledge retention of a Mr. Puls or Mr. Flemming, I do understand that being able to juggle a few non-related classes throughout semesters does help prepare a person for typical on-the-job scenarios.

We both know that you professors could have swamped us with welding related material greater than or equal to what we gained in the cultural enrichment and social awareness classes! That's my opinion for the day-Thanks.

Question #56: What trends in the welding industry do you see impacting the welding program(s) in the next five years?

WET Grad & Employer- I think that aluminum and automation will have the largest impact on the welding industry as a whole.

?- I see hard times for the next 1.5 years or so. After that, I think aluminum is going to be hot and heavy.

?- Companies are using processes that offer higher deposition rates. Automated processes. Designs that reduce the amount of welding, and also offer better repeatability of weld joints to use automation (less welding, fast, and automated).

WT Grad, WET Grad, & Employer- Pulsed MIG, adhesives, AC MIG

WT Grad, WET Grad, & Employer- Coated/exotic materials, computer-automation interfacing

WT Grad, WET Grad, & Employer- Lack of knowledgeable/skilled workers

WT & WET Grad- Full automation-automotive industry is always asking for 2-5'l. Givebacks-the only avenue left is to eliminate manual labor and implement full automation that articulates with welding automation. Lean MFG principles also play heavily.

WT Grad & WET Grad- Tandem wire MIG Welding for high production robot welding. Robot Technician: A person with a two year degree who can program and baby-sit robots. This position may or may not be a salaried position. His job is not to run the workcell, but to assist the operator when problems go beyond his skill level.

WET Grad- Aluminum processing (welding). Laser applications (welding & cutting).

?- Technological advancements of course as the technology era is constantly growing. Maybe something to do with how various employers function; a class in "employment strategies" or something?

WET Grad- Flexible cells that can be used for a number of different jobs instead of tooling dedicated to just one job then being scrapped when no longer needed. (lean manufacturing!)

WT & WET Grad- 1) Aluminum welding in high volume production and basic hands on aluminum welding will impact the welding programs. I remember the welding courses lacking in aluminum welding. 2) Robotics, which already has impacted the program. I feel Ferris should have a more comprehensive robotics program.

WET Grad- Smarter robots, aluminum welding, intensified GD&T, process control, tooling (this is something that need to be part of the program).

WT & WET Grad- The emphasis on e-tools and building visual mock-ups of manufacturing processes.

WT & WET Grad- Heavy impact with new robotic technology and ever increasing use of aluminum.

WT & WET Grad, Employer- Joining of pre-primed, high strength, and non-ferrous materials. Increased utilization of mechanical joining and adhesive processes.

WET Grad- Computerized weld sequencing to mitigate distortion.

WT & WET Grad- The need for skilled welders.

WT & WET Grad- Increasing demand for resistance welding knowledge, mostly due to many FSU grads taking up employment in the auto industry of SE MI.

WT & WET Grad- Aluminum Alloys, HSLA Steels. (weldability and design using these materials.)

WET Grad- I have been a part of a couple of aluminum projects already, and I believe we will see a great deal more.

WT & WET Grad- Automation in welding/tooling, aluminum/titanium, and faster welding techniques and processes.

WET Grad- The use of automation.

WT & WET Grad- Welding robotics- better power supplies-ether net arc data monitoring.

WET Grad- Servire and Servire products are becoming popular. Companies are reducing staffs and require more technical support than ever to meet their production needs. This is especially true in "high or unique" technology areas.

WET Grad- Robotics, laser welding & plasma welding. Need strong trouble shooting skills in the above-mentioned areas. Need a strong understanding of aluminum and high strength low alloy materials.

WT & WET Grad- An additional course in aluminum welding would help. GMAW & Resistance processes.

WT & WET Grad, Employer- Technology

WT & WET Grad, Advisory- 1) Hybrid welding processes; laser/MIG, plasma/MIG 2) aluminum welding processes

WET Grad- 3D-CAD & Modeling, Plasma-laser technology, Mid-frequency DC resistance welding, Robotic Diode PAC laser technology, friction stir welding, and magnetic pulse welding

WET Grad- The need for more highly skilled and welding competent upper and middle level management personnel. Very few engineers and management have welding knowledge of any sort, much less design and applications.

WET Grad- High frequency DC resistance welding, Servo guns, aluminum structural components.

WT & WET Grad, Employer- "Sales" is growing as weld-as heavy weldments for power generation and pressure vessels. Also more exotic aluminums and titaniums as we as corrosive resistance moduels/Income's are present even in Kansas!

WT & WET Grad, Advisory- Advanced weld control systems-electrical & mechanical, increased focus on SPC, cost reductions- doing more with less people (more duties non-welding related)

WT & WET Grad- Automation

WET Grad- The addition of magnetic pulse welding may be needed in the advanced welding processes class. There is a lot of interest in this process and it may become more commonplace.

WET Grad- Robotics seems to be the fastest thing moving. Also I can see laser getting to be used more in the future.

WET Grad- Cost control, doing more with fewer resources, more technical equipment.

WT & WET Grad, Employer- Emphasis on robotic welding with adaptive controls. Self-guided welding robots with vision capabilities.

WT & WET Grad- Older workers in the welding field, will not be replaced fast enough when they retire, thus causing a demand for young skilled people. (which FSU produces)

WT & WET Grad- I see no obvious trends in the welding industry however I see a need to be bi-lingual.

?- Aluminum in all areas. Until I worked at Miller I had no idea how many people are welding aluminum, pulsed MIG on steel with metal-core wire, on stainless and on aluminum.

WT & WET Grad- 1)Aluminum 2)Aluminum 3)Flexible Automation 4)Fixed (hard) Automation 5)Microprocessor Technology & Capabilities 6)Inverters→welding and electronics 7)Serial communication in automation & monitoring cells 8)Alloys/Exotics→nickel alloys, HSLA 9)Unconventional processes: AC MIG, AC SUB-ARC TANDEM & TWIN WIRE PROCESSES IN BOTH AS WELL 10)Metal-core wire for GMAW

WT & WET Grad- I can see new/advanced welding techniques and processes impacting the welding program as well as many applications of lasers in the future.

WT Grad, Employer, Advisory- New lightweight materials, more automation, and global economy.

WT & WET Grad, Employer- Aluminum Resistance Welding

?- Greater knowledge of robotic welding applications being able to completely utilize what can be included in a robotic welding package (i.e. touch sensing, TAST, weave patterns & parameters, etc.) Greater understanding of geometric dimensioning & tolerances. Greater knowledge of controlling and predicting distortion.

Section #3: Employer Follow-Up Survey Information

Programs: Welding Technology / Welding Engineering Technology
Degrees: Associate in Applied Science Degree in Welding Technology and Bachelor of Science Degree in Welding Engineering Technology
Department: Welding Engineering Technology
College: Technology

Please see Section #2 for Employer Follow-Up Survey Instrument and Data

Section #4: Student Evaluation of Program Survey Information

Programs: Welding Technology / Welding Engineering Technology
Degrees: Associate in Applied Science Degree in Welding Technology and Bachelor of Science Degree in Welding Engineering Technology
Department: Welding Engineering Technology
College: Technology

Welding Technology
Program Evaluation - Student

Please complete the following questions by placing an "X" in the appropriate box, using the scale below. Your input is key to the continued success of the Welding Technology (WT) program at Ferris State University.

1=poor, 2=below expectations, 3= acceptable, 4= good, 5 = excellent, ?=do not know	1	2	3	4	5	?
Courses in your occupational program are:						
Available and conveniently located						
Based on realistic prerequisites						
Available at a moderate cost						
2. Written objectives for courses in your occupational program:						
Are available to students						
Describe what you will learn in the course						
Are used by the instructor to keep you aware of your progress						
3. Teaching methods, procedures, and course content:						
Meet your occupational needs, interests, and objectives						
Provide supervised practice for developing job skills						
4. Related courses (such as English, Math, and Sciences) are:						
Pertinent to occupational instruction						
Current and meaningful to you						
5. Practical work experience (or clinical experience) in your occupational program is:						
Readily available at convenient locations						
Readily available to both day and evening students						
Coordinated with classroom instruction						
Coordinated with employer supervision						
6. Career planning information:						
Meets your needs and interests						
Helps you plan your progress						
Helps you make career decisions and choices						
Helps you understand your rights and responsibilities as an employee						
Helps you evaluate job opportunities in relation to salary, benefits, and conditions of employment						
Is provided by knowledgeable, interested staff						
Explains non-traditional opportunities for both sexes						
7. Job success information of former students in your occupational program:						
Is provided to help you make career decisions						
Indicates how many job opportunities there are in your occupation						
Identifies where these job opportunities are located						
Tells about job advancement opportunities						
8. Placement services are available to:						
Helps you find employment opportunities						
Prepare you to apply for a job						
9. Occupational instructors						
Know the subject matter and occupational requirements						
Are available to provide help when you need it						
Provide instruction so it is interesting and understandable						
10. Instructional support services (such as tutoring, lab assistance) are:						
Available to meet your needs and interests						
Provided by knowledgeable, interested staff						

Welding Technology
Program Evaluation - Student

11. Instructional lecture and laboratory facilities:						
Provide adequate lighting, ventilation, heating, power, and other utilities						
Include enough workstations for the number of students enrolled						
Are safe, functional, and well maintained						
Are available on an equal basis for all students						
12. Instructional equipment is:						
Current and representative of industry						
In sufficient quantities to avoid long delays in use						
Safe and in good condition						
13. Instructional materials (e.g., textbooks, reference books, supplies) are:						
Available and conveniently located for use as needed						
Current and meaningful to the subject						
Not biased toward "traditional" sex roles						
Available at a reasonable cost						

Comments:

Thank You!!

Welding Technology
Program Evaluation - Student ***Results***

Please complete the following questions by placing an "X" in the appropriate box, using the scale below. Your input is key to the continued success of the Welding Technology (WT) program at Ferris State University.

Number of Surveys: 56

1=poor, 2=below expectations, 3= acceptable, 4= good, 5 = excellent, ?=do not know	1	2	3	4	5	?
Courses in your occupational program are:						
Available and conveniently located	0	0	8	19	29	0
Based on realistic prerequisites	0	0	3	28	25	0
Available at a moderate cost	1	4	32	12	6	1
2. Written objectives for courses in your occupational program:						
Are available to students	0	0	6	26	24	0
Describe what you will learn in the course	0	0	6	25	24	0
Are used by the instructor to keep you aware of your progress	0	1	10	23	23	0
3. Teaching methods, procedures, and course content:						
Meet your occupational needs, interests, and objectives	0	0	5	31	20	0
Provide supervised practice for developing job skills	0	0	4	17	35	0
4. Related courses (such as English, Math, and Sciences) are:						
Pertinent to occupational instruction	0	3	23	22	8	0
Current and meaningful to you	1	4	21	22	7	0
5. Practical work experience (or clinical experience) in your occupational program is:						
Readily available at convenient locations	0	5	10	22	13	6
Readily available to both day and evening students	0	4	18	15	12	8
Coordinated with classroom instruction	0	6	10	21	14	5
Coordinated with employer supervision	0	3	16	19	8	10
6. Career planning information:						
Meets your needs and interests	0	3	7	24	21	1
Helps you plan your progress	0	3	10	23	19	1
Helps you make career decisions and choices	0	3	5	28	20	0
Helps you understand your rights and responsibilities as an employee	0	1	9	29	16	1
Helps you evaluate job opportunities in relation to salary, benefits, and conditions of employment	0	1	10	27	16	2
Is provided by knowledgeable, interested staff	0	0	5	23	26	2
Explains non-traditional opportunities for both sexes	0	2	8	25	16	5
7. Job success information of former students in your occupational program:						
Is provided to help you make career decisions	1	2	8	22	20	3
Indicates how many job opportunities there are in your occupation	0	2	10	19	23	2
Identifies where these job opportunities are located	0	2	10	21	21	2
Tells about job advancement opportunities	1	3	8	19	21	3
8. Placement services are available to:						
Helps you find employment opportunities	3	0	13	16	19	5
Prepare you to apply for a job	3	0	11	22	17	3
9. Occupational instructors						
Know the subject matter and occupational requirements	0	0	5	20	30	1
Are available to provide help when you need it	0	0	4	22	29	1
Provide instruction so it is interesting and understandable	0	0	5	22	28	1
10. Instructional support services (such as tutoring, lab assistance) are:						
Available to meet your needs and interests	0	1	6	22	22	5
Provided by knowledgeable, interested staff	0	0	6	21	23	6

Welding Technology
Program Evaluation - Student ***Results***

11. Instructional lecture and laboratory facilities:						
Provide adequate lighting, ventilation, heating, power, and other utilities	0	1	11	18	26	0
Include enough workstations for the number of students enrolled	0	1	13	21	20	1
Are safe, functional, and well maintained	0	0	5	27	24	0
Are available on an equal basis for all students	0	1	5	23	27	0
12. Instructional equipment is:						
Current and representative of industry	1	0	3	24	28	0
In sufficient quantities to avoid long delays in use	0	1	6	29	20	0
Safe and in good condition	0	0	2	27	27	0
13. Instructional materials (e.g., textbooks, reference books, supplies) are:						
Available and conveniently located for use as needed	0	0	7	25	23	1
Current and meaningful to the subject	0	0	3	29	24	0
Not biased toward "traditional" sex roles	0	1	2	26	23	4
Available at a reasonable cost	6	4	18	17	11	0

Comments:

Thank You!!

Welding Engineering Technology
Program Evaluation - Student

Please complete the following questions by placing an "X" in the appropriate box, using the scale below. Your input is key to the continued success of the Welding Engineering Technology (WET) program at Ferris State University.

1=poor, 2=below expectations, 3= acceptable, 4= good, 5 = excellent, ?=do not know	1	2	3	4	5	?
1. WET courses are:						
Available and conveniently located						
Based on realistic prerequisites						
Available at a moderate cost						
2. Written objectives for WET courses:						
Are available to students						
Describe what you will learn in the course						
Are used by the instructor to keep you aware of your progress						
3. Teaching methods, procedures, and course content:						
Meet your needs, interests, and objectives						
Provide supervised practice for practical skills						
4. Related courses (such as English, Math, and Sciences) are:						
Pertinent to WET instruction						
Current and meaningful to you						
5. Practical work experience (lab) in the WET program is:						
Readily available during regular school hours						
Coordinated with classroom instruction						
Relevant to industry applications						
6. Career planning information:						
Meets your needs and interests						
Helps you plan your progress						
Helps you make career decisions and choices						
Helps you understand your rights and responsibilities as an employee						
Helps you evaluate job opportunities in relation to salary, benefits, and conditions of employment						
Is provided by knowledgeable, interested staff						
Explains non-traditional opportunities for both sexes						
7. Job success information of former students of the WET program:						
Is provided to help you make career decisions						
Indicates how many job opportunities are available						
Identifies where job opportunities are available						
Tells about job advancement opportunities						
8. Placement services are available to:						
Help you prepare resume and cover letter						
Helps you find employment opportunities						
Prepare you to apply for a job						
9. WET instructors						
Know the subject matter and industry requirements						
Are available to provide help when needed						
Provide instruction so it is interesting and understandable						
10. Instructional support services (IE: tutoring, lab assistance) are:						
Available to meet your learning needs						
Provided by knowledgeable, interested staff						

Welding Engineering Technology
Program Evaluation - Student

11. Instructional lecture and laboratory facilities:						
Provide adequate lighting, ventilation, heating, power, and other utilities						
Include enough workstations for the number of students enrolled						
Are safe, functional, and well maintained						
Are available on an equal basis for all students						
12. Instructional equipment is:						
Current and representative of industry						
In sufficient quantities to avoid long delays in use						
Safe and in good operating condition						
13. Instructional materials (IE: textbooks, reference books, supplies) are:						
Available for use						
Current and meaningful to the subject						
Not biased toward "traditional" sex roles						
Available at a moderate cost						

Comments:

Thank You!!

Welding Engineering Technology
Program Evaluation - Student ***Results***

Please complete the following questions by placing an "X" in the appropriate box, using the scale below. Your input is key to the continued success of the Welding Engineering Technology (WET) program at Ferris State University.

Number of Surveys: 42

1=poor, 2=below expectations, 3= acceptable, 4= good, 5 = excellent, ?=do not know	1	2	3	4	5	?
1. WET courses are:						
Available and conveniently located	1	0	3	12	26	0
Based on realistic prerequisites	0	2	5	15	20	0
Available at a moderate cost	1	1	11	19	10	0
2. Written objectives for WET courses:						
Are available to students	0	0	3	15	24	0
Describe what you will learn in the course	1	1	5	16	19	0
Are used by the instructor to keep you aware of your progress	1	3	9	16	13	0
3. Teaching methods, procedures, and course content:						
Meet your needs, interests, and objectives	2	3	8	12	17	0
Provide supervised practice for practical skills	3	2	2	15	20	0
4. Related courses (such as English, Math, and Sciences) are:						
Pertinent to WET instruction	0	5	9	19	9	0
Current and meaningful to you	3	6	10	14	9	0
5. Practical work experience (lab) in the WET program is:						
Readily available during regular school hours	1	1	6	15	19	0
Coordinated with classroom instruction	1	1	3	19	18	0
Relevant to industry applications	2	1	4	14	20	1
6. Career planning information:						
Meets your needs and interests	0	2	8	20	12	0
Helps you plan your progress	0	3	10	17	11	1
Helps you make career decisions and choices	1	2	6	21	12	0
Helps you understand your rights and responsibilities as an employee	1	2	9	17	13	0
Helps you evaluate job opportunities in relation to salary, benefits, and conditions of employment	1	0	9	19	13	0
Is provided by knowledgeable, interested staff	1	0	7	17	17	0
Explains non-traditional opportunities for both sexes	2	0	9	16	8	7
7. Job success information of former students of the WET program:						
Is provided to help you make career decisions	0	2	8	13	18	1
Indicates how many job opportunities are available	1	1	8	15	17	0
Identifies where job opportunities are available	1	0	5	17	19	0
Tells about job advancement opportunities	1	1	5	21	14	0
8. Placement services are available to:						
Help you prepare resume and cover letter	0	3	4	14	20	1
Helps you find employment opportunities	2	2	6	20	11	1
Prepare you to apply for a job	3	1	5	18	14	1
9. WET instructors						
Know the subject matter and industry requirements	0	1	4	13	24	0
Are available to provide help when needed	1	2	5	11	23	0
Provide instruction so it is interesting and understandable	1	1	6	13	21	0
10. Instructional support services (IE: tutoring, lab assistance) are:						
Available to meet your learning needs	1	0	9	13	13	6
Provided by knowledgeable, interested staff	1	2	10	12	10	7

Welding Engineering Technology
Program Evaluation - Student ***Results***

11. Instructional lecture and laboratory facilities:						
Provide adequate lighting, ventilation, heating, power, and other utilities	0	2	9	13	18	0
Include enough workstations for the number of students enrolled	0	2	7	18	15	0
Are safe, functional, and well maintained	0	3	1	13	25	0
Are available on an equal basis for all students	0	2	1	15	23	1
12. Instructional equipment is:						
Current and representative of industry	0	2	5	16	18	1
In sufficient quantities to avoid long delays in use	1	2	6	17	16	0
Safe and in good operating condition	1	0	7	14	20	0
13. Instructional materials (IE: textbooks, reference books, supplies) are:						
Available for use	1	0	5	12	24	0
Current and meaningful to the subject	0	1	3	13	25	0
Not biased toward "traditional" sex roles	0	1	2	9	25	5
Available at a moderate cost	3	8	7	12	12	

Written Comments:

Why did we not weld in a laser welding and cutting class?

WET program has helped me learn some valuable information, however more can be done to improve the quality of education and expectation of industry

Enough with "you know what I mean". This department needs more actual examples pictures and hard evidence!

As of now it seems as if the first two years were more beneficial.

I think this is a good program thus far.

Done!!

Anything I could ever do to assist this program would be my pleasure.

None

The WET program is outstanding. Not only is the education level high but also the teacher to student relationship is outstanding. The teachers in the program really care about the students.

Thank You!!

Section #5: Faculty Perceptions of Program Survey Information

Programs: Welding Technology / Welding Engineering Technology
Degrees: Associate in Applied Science Degree in Welding Technology and Bachelor of Science Degree in Welding Engineering Technology
Department: Welding Engineering Technology
College: Technology

Welding Engineering Technology
Department Evaluation - Faculty

Please complete the following questions by placing an "X" in the appropriate box, using the scale below. Your input is key to the continued success of the Welding Engineering Technology (WET) program at Ferris State University.

1=poor, 2=below expectations, 3= acceptable, 4= good, 5 = excellent, ?=do not know	1	2	3	4	5	?
Goals and Objectives:						
1. Participation in development of college occupational education program plan						
2. Program goals						
3. Course objectives						
4. Competency based performance objectives						
5. Use of competency based performance objectives						
6. Use of information on labor market needs						
7. Use of information on job performance requirements						
8. Use of profession/industry standards						
9. Use of student follow-up information						
Processes:						
10. Adaptation of instruction						
11. Relevance of supportive courses						
12. Coordination with other community agencies and educational programs						
13. Provision for work experience, cooperative education or clinical experience						
14. Program availability and accessibility						
15. Provision for the disadvantaged						
16. Provision for the handicapped						
17. Efforts to achieve sex equity						
18. Provision for program advisement						
19. Provision for career planning and guidance						
20. Adequacy of career planning and guidance						
21. Provision for employability information						
22. Placement effectiveness for students in program						
23. Student follow-up system						
24. Promotion of this program						
Resources:						
25. Provision for leadership and coordination						
26. Qualifications of administrators and supervisors						
27. Instructional staffing						
28. Qualifications of instructional staff						
29. Professional development opportunities						
30. Use of instructional support staff						
31. Use of clerical support staff						
32. Adequacy and availability of instructional equipment						
33. Maintenance and safety of instructional equipment						
34. Adequacy of instructional facilities						
35. Scheduling of instructional facilities						
36. Adequacy and availability of materials and supplies						
37. Adequacy and availability of learning resources						
38. Use of advisory committees						
39. Provisions in current operating budget						
40. Provisions for capital outlay budget for equipment						

Welding Engineering Technology
Department Evaluation - Faculty

Comments:

Thank You!!

Welding Engineering Technology
Department Evaluation - Faculty ***Results***

Please complete the following questions by placing an "X" in the appropriate box, using the scale below. Your input is key to the continued success of the Welding Engineering Technology (WET) program at Ferris State University.

Number of Surveys: 5

1=poor, 2=below expectations, 3= acceptable, 4= good, 5 = excellent, ?=do not know	1	2	3	4	5	?
Goals and Objectives:						
1. Participation in development of college occupational education program plan		1		3	1	
2. Program goals				1	4	
3. Course objectives				1	4	
4. Competency based performance objectives				2	3	
5. Use of competency based performance objectives				2	3	
6. Use of information on labor market needs				2	3	
7. Use of information on job performance requirements				3	2	
8. Use of profession/industry standards				1	4	
9. Use of student follow-up information		1	1		3	
Processes:						
10. Adaptation of instruction			1	1	3	
11. Relevance of supportive courses		2		3		
12. Coordination with other community agencies and educational programs			1	2	2	
13. Provision for work experience, cooperative education or clinical experience	1		1	3		
14. Program availability and accessibility				2	3	
15. Provision for the disadvantaged			3	2		
16. Provision for the handicapped		1	2	2		
17. Efforts to achieve sex equity			1	3	1	
18. Provision for program advisement					5	
19. Provision for career planning and guidance				1	4	
20. Adequacy of career planning and guidance				2	3	
21. Provision for employability information					5	
22. Placement effectiveness for students in program			1		4	
23. Student follow-up system		1		1	3	
24. Promotion of this program		1		2	2	
Resources:						
25. Provision for leadership and coordination			1	2	2	
26. Qualifications of administrators and supervisors		1		1	3	
27. Instructional staffing		1		2	2	
28. Qualifications of instructional staff					5	
29. Professional development opportunities		1	1	1	2	
30. Use of instructional support staff				3	1	1
31. Use of clerical support staff				1	4	
32. Adequacy and availability of instructional equipment	1			2	2	
33. Maintenance and safety of instructional equipment				1	4	
34. Adequacy of instructional facilities				4	1	
35. Scheduling of instructional facilities				2	3	
36. Adequacy and availability of materials and supplies				2	3	
37. Adequacy and availability of learning resources				2	3	
38. Use of advisory committees					5	
39. Provisions in current operating budget	1	1	1	2		
40. Provisions for capital outlay budget for equipment	1		2	2		
Totals	**4**	**11**	**16**	**66**	**102**	**1**

Welding Engineering Technology
Department Evaluation - Faculty ***Results***

Comments:

9. Post test
12. Yes, H.S. & C.C. articulation transfer recruiting presentations
15. Central coordination by the University
17. Pro-active in recruiting, articles, scholarships
20. Department & central
27. Need another FTEF
30. Tutors
32. Would like electronic media in all classrooms
33. Outstanding private sector support
34. Renovations are in the works for laboritories
37. Outstanding library staff, resources
40. Would like an annual capital equipment plan

Thank You!!

Section #6: Advisory Committee Perceptions of Program Survey Information

Programs: Welding Technology / Welding Engineering Technology
Degrees: Associate in Applied Science Degree in Welding Technology and Bachelor of Science Degree in Welding Engineering Technology
Department: Welding Engineering Technology
College: Technology

Please see Section #2 for Advisory Board Perceptions of Program Survey Instrument and Data

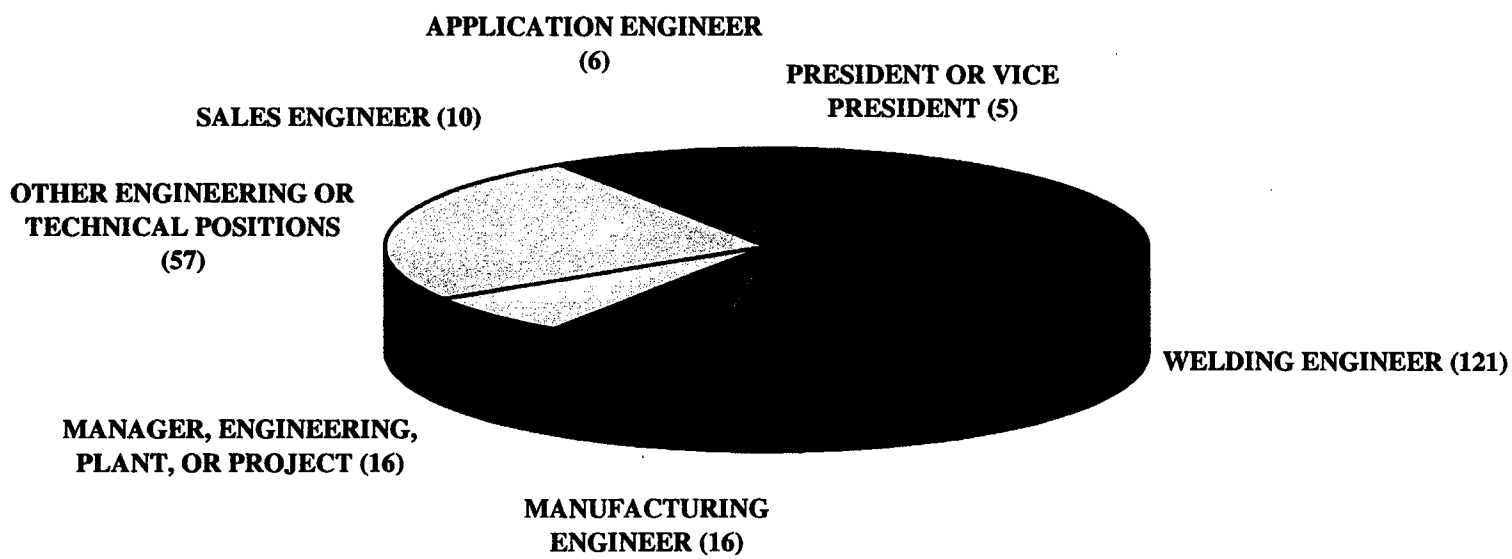
Section #7: Labor Market Analysis

Programs: Welding Technology / Welding Engineering Technology
Degrees: Associate in Applied Science Degree in Welding Technology and Bachelor of Science Degree in Welding Engineering Technology
Department: Welding Engineering Technology
College: Technology

WELDING ENGINEERING TECHNOLOGY
SELECTED POSITION TITLES OF ALUMNI

EMPLOYMENT CATEGORY	POSITION TITLE
Education	Associate Professor
Management	District Sales Manager Engineering Manager General Manager Manager Application Engineering Managing Director Plant Manager President Product Manager Production Manager Project Manager Quality Assurance Manager Vice President Welding Department Manager
Sales and Marketing	Technical Sales Sales Engineer
Technical	Application Engineer Assembly Engineer Design Engineer Development Engineer Industrial Engineer Manufacturing Engineer Process Engineer Product Engineer Project Engineer Quality Control Engineer Robotic Engineer Training Development Engineer Welding Engineer Welding Technician Welding Technologist

POSITION TITLES OF FERRIS STATE UNIVERSITY WELDING ENGINEERING TECHNOLOGY ALUMNI - MAY 2001



WELDING ENGINEERING TECHNOLOGY EMPLOYERS

ABB Flexible Automation, Auburn Hills, MI
Acceleron Incorporated, East Granby, CT
Acemco Incorporated, Muskegon, MI
Acutus Industries, Pontiac, MI
Accubilt Incorporated, Jackson, MI
AccuData, Incorporated, Jackson, MI
Action Automation Incorporated, Fraser, MI
Advanced Robotic Concepts, Garden City, MI
Aerotek, Various Locations
Aetna Industries, Incorporated, Centerline, MI
AGA Gas & Welding, Grand Rapids, MI
Air Liquide America Corporation, Various Locations
Aircraft Technology, Incorporated, Daina, FL
Alcan Automotive Structures, Southfield, MI
Allied Signal, Spartanburg, SC
Allied Technical Services, Midland, MI
American Seating Company, Grand Rapids, MI
American Axle Manufacturing, Various Locations
American Linen, Denver, CO
Amtrol Incorporated, West Warwick, RI
A.O. Smith Corporation, Rockford, IL
AP Parts Manufacturing Company, Various Locations
Argus & Associates Incorporated, Wixom, MI
Arvin Industries, Pulaski, TN
Atlantic Tool and Die, Strongsville, OH
Baker Hughes Process Equipment Corporation, Foxboro, MA
Benteler Automotive Corporation, Various Locations
Black & Decker Corporation, Mt. Clemens, MI
BMX Technologies, Lynchburg, VA
BMY Corporations, York, PA
Bolt Design Company, Midland, MI
Bradford White Corporation, Middleville, MI
BTR Antivibration Systems Incorporated, Logansport, IN
Candid Logic Incorporated, Madison Heights, MI
Case Corporation, Various Locations
Center Manufacturing Incorporated, Byron Center, MI
Clark Manufacturing Company, Traverse City, MI
Cloos Robotic Welding, Incorporated, Schaumburg, IL
CMI International, McDaniel Tank Division, Holly, MI
Columbus McKinnon Corporation, Muskegon, MI
Comau, Warren, MI

WELDING ENGINEERING TECHNOLOGY EMPLOYERS

Consumers Energy, Bay City, MI
Copeland Corporation, Sidney, OH
CRC Evans Corporation, Houston, TX
DaimlerChrysler Corporation, Various Locations
Dana Corporation, Various Locations
DCT Incorporated, Warren, MI
Delmia Corporation, Troy, MI
Delphi Automotive Systems, Saginaw, MI
Deere & Company, Various Locations
Douglas Autotech Corporation, Bronson, MI
Dura Automotive Systems Incorporated, Various Locations
Edison Welding Institute, Columbus, OH
Engineering Manufacturing Services, Madison Heights, MI
Fanuc Robotics, Rochester Hills, MI
Faurecia Exhaust Systems, Granger, IN
Ferranti Sciaky International, Chicago, IL
Ferris State University, Big Rapids, MI
Fischer Welding, Troy, MI
Fleet Engineers Incorporated, Muskegon, MI
Ford Motor Company, Various Locations
Gabriel Incorporated, Pulaski, TN
General Motors Corporation, Various Locations
Genesis Systems Group, Davenport, IA
Gill Manufacturing Incorporated, Grand Rapids, MI
Goshen Industries, Goshen, IN
GHSP, Grand Haven, MI
Grand Rapids Community College, Grand Rapids, MI
Hart & Cooley, Holland, MI
Harvard Industries Incorporated, Deckerville, MI
Hess Engineering Incorporated, Niles, MI
Hobart Brothers Company, Troy, OH
Hoke Incorporated, Spartanburg, SC
Holland Neway International , Muskegon, MI
H.R.U. Incorporated, Various Locations
Hydro Automotive Structures North America Incorporated, Holland, MI
Impact Engineering, Jackson, MI
Integrated Metal Technology Incorporated, Spring Lake, MI
ITT Automotive Group, Various Locations
Johnson Controls, Various Locations
Kawasaki Robotics Incorporated, Wixom, MI
K & M Fabrication, Cassopolis, MI

Program Review Evaluation Form

Program(s): Welding Technology and Welding Engineering Technology

Instructions: Circle the number, which most closely describes the program you are evaluating.

1. Student Perception of Instruction **Average Score: 4.6**

Currently enrolled students rate the instructional effectiveness as extremely high.

Currently enrolled students rate the instructional effectiveness as below average

2. Student Satisfaction with Program **Average Score: 4.2**

Currently enrolled students are very satisfied with the program, faculty, equipment, facilities, and curriculum.

Currently enrolled students are not satisfied with program faculty, equipment, facilities, or curriculum.

3. Advisory Committee Perceptions of Program **Average Score: 4.6**

Advisory committee members perceive the program curriculum facilities, and equipment to be of the highest quality

Advisory committee members perceive the program curriculum, facilities, and equipment needs improvement.

4. Demand for Graduates **Average Score: 5.0**

Graduates easily find employment in filed

Graduates are sometimes forced to find positions out of their field

5. Use of Information on Labor Market **Average Score: 4.8**

The faculty and administrators use current data on labor market needs and emerging trends in job openings to systematically develop and evaluate program.

The faculty and administrators do not use labor market data in planning or evaluating the program.

6. Use of Profession/Industry Standards **Average Score: 4.4**

Profession/Industry standards (such as licensing, certification, accreditation) are consistently used in planning and evaluating this program and content of its courses.

Little or no recognition is given to specific profession/industry standards in planning and evaluating this program.

7. **Use of Student Follow-up Information** — **Average Score: 4.4**

Current follow-up data on completers and leavers are consistently and systematically used in evaluating this program.

Student follow-up information has not been collected for use in evaluating this program.

8. **Relevance of Supportive Courses** — **Average Score: 4.2**

Applicable supportive courses are closely coordinated with this program and are kept relevant to program goals and current to the needs of the students.

Supportive course content reflects no planning approach to meeting needs of students in this program.

9. **Qualifications of Administrators and Supervisors** — **Average Score: 4.4**

All persons responsible for directing and coordinating this program demonstrate a high level of administrative ability.

Persons responsible for directing and coordinating this program have little administrative training and experience.

10. **Instructional Staffing** — **Average Score: 4.2**

Instructional staffing for this program is sufficient to permit optimum program effectiveness.

Staffing is inadequate to meet the needs of this program effectively.

11. **Facilities** — **Average Score: 4.0**

Present facilities are sufficient to support a high quality program.

Present facilities are a major problem for program quality.

12. **Scheduling of Instructional Facilities** — **Average Score: 4.4**

Scheduling of facilities and equipment for this program is planned to maximize use and be consistent with quality instruction.

Facilities and equipment for this program are significantly under or over scheduled.

13. **Equipment** — **Average Score: 4.6**

Present facilities are sufficient to support a high quality program.

Present equipment is not adequate and represents a threat to program quality.

14. Adaptation of Instruction **Average Score: 4.4**

Instruction in all courses required for this program recognizes and responds to individual student interest, learning styles, skills, and abilities through a variety of instructional methods (such as, small group or individualized instructions, laboratory or "hands on" experiences, credit by examination)

Instructional approaches in this program do not consider individual student differences.

15. Adequate and Availability of Instructional Materials and Supplies **Average Score: 4.4**

Faculty rate that the instructional materials and supplies as being readily available and in sufficient quantity to support quality instruction.

Faculty rate that the instructional materials are limited in amount, generally outdated, and lack relevance to program and student needs.

Appendix Section

Programs: Welding Technology / Welding Engineering Technology
Degrees: Associate in Applied Science Degree in Welding Technology and Bachelor of Science Degree in Welding Engineering Technology
Department: Welding Engineering Technology
College: Technology

Attached please find course syllabi and outlines of the capstone course for the Welding Technology and Welding Engineering Technology programs.

COURSE SYLLABUS

FERRIS STATE UNIVERSITY
COLLEGE OF TECHNOLOGY
Welding Engineering Technology Department

COURSE: WELD 221
Prepared by: Dave Murray
Revised: Winter 2002

COURSE TITLE: WELD 221 Welding Fabrication 2

COURSE DESCRIPTION: The capstone course in the two-year Associate in Applied Science Degree. Students will work on assorted construction projects, dealing with the realities of process selection, joint design, cost estimating, and design of welded products. Students will complete a customers based fabrication project and perform a welding research project to be submitted in a written national welding contest. Concurrently with the above welding activities students will engage in press brake operation, layout, inspection, measurement, design and product improvement of welded assemblies.

CREDIT HOURS: Four Semester Hours

CONTACT HOURS: Lecture - 1 hour/week
Lab- 9 hours/week

PREREQUISITES: WELD 112, WELD 211, ENGL 250

TEXTBOOKS REQUIRED: Procedure Handbook of Arc Welding, Lincoln, Principles of Industrial Welding, Lincoln

UNITS OF INSTRUCTION AND LEARNING GOALS FOR EACH UNIT:

I. Introduction, Objectives, and Term Assignments
   A. Explain Course objectives and summary sheets
   B. Identify term assignments
   C. Review procedures and policies

II. Term Fabrication Project
   A. Construct project from blue print or sketch provided by instructor
   B. Select the optimum welding process for fabrication project

C. Select optimum filler material for fabrication project
D. Perform trimming and finishing of product
E. Estimate cost of project prior to fabricating
F. Calculate the exact cost including labor and materials from students own records
G. Complete a written report and submit to national technical paper contest.

III. Term Research Project

A. Identify a welding research problem.
B. Review the literature on the subject.
C. Develop a research question and hypothesis.
D. Determine the research methodology.
E. Select equipment and materials needed to complete research.
F. Complete the research task.
G. Write up the test results.
H. Summarize the research data.
I. Formulate a conclusion.
J. Complete and submit a written research paper to a National Welding Contest.

Attendance is required; Students will have final grade adjustments after missing 2 classes.

Final Course Grading Based on:

ITEM	REQUIREMENT	POINTS
1	FAB PROJECT SUBJECT	10
2	RESEARCH PROJECT SUBJECT	10
3	FAB APPLICATION FORM	20
4	RESEARCH APPLICATION FORM	20
5	MATERIAL ORDER LIST	20
6	PHOTO SCHEDULE	20
7	FAB INTRODUCTION	30
8	RESEARCH INTRODUCTION	30
9	FAB DRAWINGS	50
10	REASEARCH METHODOGY	30
11	BILL OF MATERIALS	20
12	FAB EQUIPMENT LISTS	20
13	RESEARCH EQUIPMENT LISTS	20
14	FABRICATION SEQUENCE	20
15	RESEARCH MATERIALS REVIEW (BIBLIOGRAPHY)	30
16	RESEARCH SEQUENCE	20
17	FABRICATION COMPLETED	100
18	RESEARCH COMPLETED	100
19	FABRICATION SUMMARY	20

20	RESEARCH SUMMARY	30
21	1ST DRAFT FINAL REPORT-FAB	30
22	1ST DRAFT FINAL REPORT- RESEARCH	30
23	COMPLETED LOG BOOK	30
24	REPAIR WEEK	30
25	FINAL EXAM	30
26	ATTENDANCE 5 PO-NTS PER DAY	225
	TOTAL POSSIBLE	995

A	995– 979	C+	885– 862	D-	765 – 742
A-	978 – 956	C	862 – 838	F	741>
B+	955 – 933	C-	837 – 814		
B	932 – 919	D+	813 – 790		
B-	908 – 886	D	789 - 766		

COURSE OUTLINE

FERRIS STATE UNIVERSITY
COLLEGE OF TECHNOLOGY
Welding Engineering Technology Department

COURSE: WELD 221
Prepared by: Dave Murray
Revised: Winter 2001

COURSE TITLE: WELD 221 Welding Fabrication 2

COURSE DESCRIPTION: The capstone course in the two-year Associate in Applied Science Degree. Students will work on assorted construction projects, dealing with the realities of process selection, joint design, cost estimating, and design of welded products. Students will complete a customers based fabrication project and perform a welding research project to be submitted in a written national welding contest. Concurrently with the above welding activities students will engage in press brake operation, layout, inspection, measurement, design and product improvement of welded assemblies.

CREDIT HOURS: Four Semester Hours

CONTACT HOURS: Lecture - 1 hour/week
Lab- 9 hours/week

PREREQUISITES: WELD 112, WELD 211, ENGL 250

TEXTBOOKS REQUIRED: Procedure Handbook of Arc Welding, Lincoln, Principles of Industrial Welding, Lincoln, & Press Brake Manual, Faculty

UNITS OF INSTRUCTION AND LEARNING GOALS FOR EACH UNIT:

	Time Weight Lecture	Lab
I. Introduction, Objectives, and Term Assignments A. Explain Course objectives and summary sheets B. Identify term assignments C. Review procedures and policies	1	
II. Term Fabrication Project A. Construct project from blue print or sketch provided by instructor	7	68

B. Select the optimum welding process for fabrication project
C. Select optimum filler material for fabrication project
D. Perform trimming and finishing of product
E. Estimate cost of project prior to fabricating
F. Calculate the exact cost including labor and materials from students own records
G. Complete a written report and submit to national technical paper contest.

III. Term Research Project	7	67

A. Identify a welding research problem.
B. Review the literature on the subject.
C. Develop a research question and hypothesis.
D. Determine the research methodology.
E. Select equipment and materials needed to complete research.
F. Complete the research task.
G. Write up the test results.
H. Summarize the research data.
I. Formulate a conclusion.
J. Complete and submit a written research paper to a National Welding Contest.

TOTAL HOURS	15	135

TOPICAL UNIT OUTLINE OF MAJOR UNIT OF INSTRUCTION:

I. Introduction, Objectives and Term Assignments
A. Course objectives and summary sheets.
B. Term assignments.
C. Review procedures and policies.

II. Fabrication Project
A. Scope of project.
B. Material lists.
C. Equipment lists.
D. Photo schedules.
E. Report formats.
F. Drawing designs.
G. Fabrication sequences.
H. Written conclusion.
I. Entry form.
J. Report Copying.

III. Research Project
- A. Scope of project
- B. Welding problem
- C. Review literature
- D. Develop research question
- E. Develop methodology
- F. Material lists.
- G. Equipment lists.
- H. Photo schedules.
- I. Report formats.
- J. Research schedule.
- K. Written conclusion.
- L. Entry form.
- M. Report Copying.

MINIMUM REQUIRED STUDENT LAB ACTIVITIES DEFINED:
Complete a customer fabrication project approved by the instructor.
Complete a welding research project approved by the instructor.
Complete welding repairs as requested by the instructor.

COURSE SYLLABUS

FERRIS STATE UNIVERSITY
COLLEGE OF TECHNOLOGY
WELDING ENGINEERING TECHNOLOGY DEPARTMENT

COURSE TITLE: Weld 499 Welding Project Engineering and Management

COURSE DESCRIPTION: A lecture course emphasizing the design, engineering, manufacturing, and management of a welded product. Design of welded structures and machine elements in terms of allowable stresses, joint configuration, material and process selection, equipment specification and purchasing, production forecasting, project supervision, and resource management techniques and project control methods are addressed. The student will be required to concept, design, engineer, develop and manage a welded product.

CREDIT HOURS: 3 Semester Hours

CONTACT HOURS:

Lecture	3 hours/week
Laboratory	0 hours/week

PREREQUISITES: Mech 340, Weld 412, and completion of all 300 level Welding courses

TEXTBOOKS REQUIRED: Design of Weldments, by Blodgett
Project Management, by Meredith

UNITS OF INSTRUCTION AND STUDENT LEARNING GOALS FOR EACH UNIT:

I. Introduction
- A. Know the course content, goals, and objectives
- B. Know the course instructional format
- C. Know the course attendance and grading policy
- D. Know the instructional managers academic and professional background
- E. Know instructional managers office locations and telephone numbers

II. Oral Report Presentation
- A. Know the objective of a technical oral report
- B. Know the specific components of an oral report outline
- C. Know the presentation environment and audience
- D. Apply attention overview, information, and review techniques in a technical report

III. Weldment Design Concept
- A. Identify the problem and function of the product
- B. Be aware of loading types and amount
- C. Apply size, weight, and geometry restrictions
- D. Identify service condition
- E. Apply material selection considerations

F. Consider competitive designs
G. Concept a welded product
H. Conduct a review of literature related to the problem.

IV. Weldment Stress Analysis
A. Identify all service conditions
B. Determine types and amount of loading
C. Determine allowable stress, strain, deflection, and deformation
D. Apply a factor of safety
E. Select a material
F. Analyze and determine allowable design geometry
G. Analyze and determine allowable weld size

V. Weldment Detail and Assembly Drawings
A. Know and apply the stages of the design process
B. Know the objective of weldment detail drawings
C. Know the objective of weldment assembly drawings
D. Produce weldment detail and assembly drawings, a model

VI. Welding Procedure Specifications
A. Know the purpose of a welding procedure specification
B. Understand the application of a broad vs. specific welding procedure specification
C. Understand what essential and nonessential variables are
D. Know the role of weldment testing in welding procedure specifications
E. Perform welding procedure specifications, procedure qualification records, welder performance qualifications

VII. Project Scheduling and Management
A. Know the role of time vs. resource management
B. Understand what a program evaluation and review technique is
C. Perform a program evaluation review technique
D. Understand what a Gantt chart evaluation is
E. Perform a Gantt chart evaluation
F. Understand project control purposes and methods used

VIII. Project Supervision
A. Know what situational leadership is
B. Determine responsibility or task to influence
C. Specify the level of performance required by the worker
D. Determine the development level of the person on the task
E. Analyze leadership style required
F. Perform a situational leadership analysis

IX. Equipment Specification and Purchasing
A. Identify the equipment application
B. Determine the prime contractor type
C. Understand what a vendor evaluation procedure is
D. Perform an equipment performance specification

E. Perform a request for quotation
F. Analyze a quotation based on performance specifications

X. Production Forecasting
A. Know the definition of forecasting
B. Understand level, trend, seasonal, and random forecasting methods
C. Analysis model fitting and validation techniques
D. Perform a weldment forecast based on historical data

XI. Problem Solving Techniques
A. Develop problem statements, processing methods, and determining solutions
B. Experience team building exercises
C. Develop training methods and designs
D. Apply critical thinking reasoning elements and traits
E. Perform a handling conflict self assessment

XII. Project Initiation
A. Know the definition of a project
B. Understand the project manager's roll
C. Know and apply project organizational methods
D. Understand the project life cycle.

XIII. Project Evaluation and Selection
A. Know the criteria for project selection models
B. Understand the project selection model types
C. Apply risk analysis techniques

XIV. Project Manager, Organization, and planning
A. Know functional vs. project organization designs
B. Understand the unique demands of a project manager
C. Know the common characteristics of effective team members
D. Apply project manager selection criteria.
E. Apply the project planning phases and elements

XV. Project Control and Termination
A. Know the elements of project control
B. Understand the purpose of project control
C. Apply cybernetic, go/no go, and post control types
D. Understand the reasons for poor project control
E. Know the purpose and components of a project audit
F. Know project termination types
G. Know the transition items
H. Apply project termination factors
I. Understand why projects succeed or fail
J. Know the termination manager duties

XVI. Perform oral project presentations to students, faculty and administration

XVII. Final Examination

MINIMUM COURSE ACTIVITIES:

1. Project Management Techniques
2. Design research/design concept
3. Mechanical analysis
4. Detail, assembly, and tooling drawings
5. WPS, PQR, WPQ
6. Prototype fabrication
7. Prototype fabrication management
8. Prototype test
9. Two oral presentations
10. Project summary report

ATTENDANCE POLICY:

Full attendance required. More than one (1) unexcused absence or tardiness will result in a lowered final grade.
NOTE" Unexcused late work will result in no grade or a lower grade on an individual basis.

93% A
90% A-
87% B+
83% B
80% B-
77% C+
73% C
70% C-
67% D+
63% D
60% D-

Final Term Grade Based On:

1) 7 projects, 2 oral presentations and 1 summary report
2) Late: project, report, or oral presentations will result in a 25% deduction per class period.
3)

Project 1	50 points
Project 2	50 points
Project 3	50 points
Project 4	50 points
Project 5	50 points
Project 6	50 points
Project 7	100 points
Summary Report	200 points
Oral Presentation 1	100 points
Oral Presentation 2	100 points
Final Exam	200 points
TOTAL POINTS	1,000 points

COURSE OUTLINE

FERRIS STATE UNIVERSITY
COLLEGE OF TECHNOLOGY
WELDING ENGINEERING TECHNOLOGY DEPARTMENT

Prepared By: K. Kuk
Date Revised: Winter 2001

COURSE TITLE: Weld 499 Welding Project Engineering and Management

COURSE DESCRIPTION: A lecture course emphasizing the design, engineering, manufacturing, and management of a welded product. Design of welded structures and machine elements in terms of allowable stresses, joint configuration, material and process selection, equipment specification and purchasing, production forecasting, project supervision, and resource management techniques and project control methods are addressed. The student will be required to concept, design, engineer, develop and manage a welded product.

CREDIT HOURS: 3 Semester Hours

CONTACT HOURS:

Lecture	3 hours/week
Laboratory	0 hours/week

PREREQUISITES: Mech 340, Weld 412, and completion of all 300 level Welding courses

TEXTBOOKS REQUIRED: Design of Weldments, by Blodgett
Project Management, by Meredith

UNITS OF INSTRUCTION AND STUDENT LEARNING GOALS FOR EACH UNIT:	**TIME WEIGHT LECTURE-LAB**
I. Introduction	
A. Know the course content, goals, and objectives	1
B. Know the course instructional format	
C. Know the course attendance and grading policy	
D. Know the instructional managers academic and professional background	
E. Know instructional managers office locations and telephone numbers	
II. Oral Report Presentation	1
A. Know the objective of a technical oral report	
B. Know the specific components of an oral report outline	
C. Know the presentation environment and audience	
D. Apply attention overview, information, and review techniques in a technical report	

III. Weldment Design Concept 3

A. Identify the problem and function of the product
B. Be aware of loading types and amount
C. Apply size, weight, and geometry restrictions
D. Identify service condition
E. Apply material selection considerations
F. Consider competitive designs
G. Concept a welded product
H. Conduct a review of literature related to the problem.

IV. Weldment Stress Analysis 3

A. Identify all service conditions
B. Determine types and amount of loading
C. Determine allowable stress, strain, deflection, and deformation
D. Apply a factor of safety
E. Select a material
F. Analyze and determine allowable design geometry
G. Analyze and determine allowable weld size

V. Weldment Detail and Assembly Drawings 3

A. Know and apply the stages of the design process
B. Know the objective of weldment detail drawings
C. Know the objective of weldment assembly drawings
D. Produce weldment detail and assembly drawings, a model

VI. Welding Procedure Specifications 3

A. Know the purpose of a welding procedure specification
B. Understand the application of a broad vs. specific welding procedure specification
C. Understand what essential and nonessential variables are
D. Know the role of weldment testing in welding procedure specifications
E. Perform welding procedure specifications, procedure qualification records, welder performance qualifications

VII. Project Scheduling and Management 6

A. Know the role of time vs. resource management
B. Understand what a program evaluation and review technique is
C. Perform a program evaluation review technique
D. Understand what a Gantt chart evaluation is
E. Perform a Gantt chart evaluation
F. Understand project control purposes and methods used

VIII. Project Supervision 6

A. Know what situational leadership is
B. Determine responsibility or task to influence
C. Specify the level of performance required by the worker
D. Determine the development level of the person on the task
E. Analyze leadership style required
F. Perform a situational leadership analysis

IX. Equipment Specification and Purchasing 2

A. Identify the equipment application
B. Determine the prime contractor type
C. Understand what a vendor evaluation procedure is
D. Perform an equipment performance specification
E. Perform a request for quotation
F. Analyze a quotation based on performance specifications

X. Production Forecasting 3

A. Know the definition of forecasting
B. Understand level, trend, seasonal, and random forecasting methods
C. Analysis model fitting and validation techniques
D. Perform a weldment forecast based on historical data

XI. Problem Solving Techniques 3

A. Develop problem statements, processing methods, and determining solutions
B. Experience team building exercises
C. Develop training methods and designs
D. Apply critical thinking reasoning elements and traits
E. Perform a handling conflict self assessment

XII. Project Initiation 1

A. Know the definition of a project
B. Understand the project manager's roll
C. Know and apply project organizational methods
D. Understand the project life cycle.

XIII. Project Evaluation and Selection 2

A. Know the criteria for project selection models
B. Understand the project selection model types
C. Apply risk analysis techniques

XIV. Project Manager, Organization, and planning 3

A. Know functional vs. project organization designs
B. Understand the unique demands of a project manager
C. Know the common characteristics of effective team members
D. Apply project manager selection criteria.
E. Apply the project planning phases and elements

XV. Project Control and Termination 2

A. Know the elements of project control
B. Understand the purpose of project control
C. Apply cybernetic, go/no go, and post control types
D. Understand the reasons for poor project control
E. Know the purpose and components of a project audit
F. Know project termination types
G. Know the transition items
H. Apply project termination factors
I. Understand why projects succeed or fail
J. Know the termination manager duties

XVI. Perform oral project presentations to students, faculty and administration 3

TOTAL 45

MINIMUM COURSE ACTIVITIES:

1. Project Management Techniques
2. Design research/design concept
3. Mechanical analysis
4. Detail, assembly, and tooling drawings
5. WPS, PQR, WPQ
6. Prototype fabrication
7. Prototype fabrication management
8. Prototype test
9. Two oral presentations
10. Project summary report

TOPICAL OUTLINE OF MAJOR UNITS OF INSTRUCTION:

I. Introduction

A. Course content, goals, and objectives
B. Instructional format
C. Attendance and grading policy
D. Instructional managers academic and professional background
E. Instructional manager's office locations and telephone numbers

II. Oral Report Presentation

A. Objective of a technical oral report
B. Specific components of an oral report outline
C. Presentation environment and audience
D. Attention overview, information, and review techniques in a technical report

III. Weldment Design Concept

A. Problem and function of the product
B. Loading types and amount

C. Size, weight, and geometry restrictions
D. Service condition
E. Material selection considerations
F. Competitive designs
G. Concept a welded product
H. Literature related to the problem.

IV. Weldment Stress Analysis
A. Service conditions
B. Types and amount of loading
C. Allowable stress, strain, deflection, and deformation
D. Factor of safety
E. Material selection
F. Design geometry
G. Weld size

V. Weldment Detail and Assembly Drawings
A. Stages of the design process
B. Weldment detail drawings
C. Weldment assembly drawings
D. Design models

VI. Welding Procedure Specifications
A. Purpose of welding procedure specifications
B. Broad vs. specific welding procedure specification
C. Essential and nonessential variables are
D. The role of weldment testing in welding procedure specifications
E. Welding procedure specifications, procedure qualification records, welder performance qualifications

VII. Project Scheduling and Management
A. Role of time vs. resource management
B. Program evaluation and review techniques
C. Gantt charts
D. Project control purposes and methods used

VIII. Project Supervision
A. Situational leadership
B. Responsibility or task to influence
C. Level of performance required by the worker
D. Development level of the person on the task
E. Leadership style required
F. Situational leadership analysis

IX. Equipment Specification and Purchasing
- A. Equipment application
- B. Prime contractor type
- C. Vendor evaluation procedure
- D. Equipment performance specification
- E. Request for quotation
- F. Quotation based on performance specifications

X. Production Forecasting
- A. Definition of forecasting
- B. Level, trend, seasonal, and random forecasting methods
- C. Model fitting and validation techniques
- D. Weldment forecast based on historical data

XI. Problem Solving Techniques
- A. Problem statements, processing methods, and determining solutions
- B. Team building exercises
- C. Training methods and designs
- D. Critical thinking reasoning elements and traits
- E. Handling conflict self assessment

XII. Project Initiation
- A. Definition of a project
- B. Project manager's roll
- C. Apply project organizational methods
- D. Project life cycle.

XIII. Project Evaluation and Selection
- A. Criteria for project selection models
- B. Project selection model types
- C. Risk analysis techniques

XIV. Project Manager, Organization, and planning
- A. Functional vs. project organization designs
- B. Unique demands of a project manager
- C. Common characteristics of effective team members
- D. Project manager selection criteria.
- E. Project planning phases and elements

XV. Project Control and Termination
- A. Elements of project control
- B. Purpose of project control
- C. Cybernetic, go/no go, and post control types
- D. Reasons for poor project control
- E. Purpose and components of a project audit
- F. Project termination types
- G. Transition items
- H. Project termination factors
- I. Why projects succeed or fail
- J. Termination manager duties

XVI. Perform oral project presentations to students, faculty and administration

XVII. Final Examination

Curriculum Vitae:

Welding Engineering Technology Department Faculty

BRADLEY OWEN BREW

11670 190th Ave.
Big Rapids, Michigan 49307
231-796-2895 Home
231-591-2639 Work
brewb@ferris.edu

EDUCATION:

February 1979, Associate of Applied Science degree in Welding Technology, Ferris State University.(received outstanding student award).
November 1985, Bachelor of Science degree in Technical Education Ferris State University.

ORGANIZATIOINS:

American Welding Society Member (27 years)
American Welding Society Executive member
Radiation Control Board Ferris State University
Advisory Committee Member, Freemont Committee College
Examiner Highway Department, State of Michigan Highway Department
Advisory Committee Member, Mecosta-Osceola Career Center

EMPLOYMENT EXPERIENCE:

August 1981 to Present: Assistant Professor, Welding Engineering Technology, Ferris State University.
Job Includes: Teach all the Welding Processes in the Associate program along with Nondestructive and destructive testing, which includes X-ray, Gamma ray Radiation and ultrasonic testing. Teach welding and procedure qualifications to the API 1104, A.W.S. and A.S.M.E. section IX welding codes.

August 1983 to September 1986: Welding Instructor (part time)
Mecosta-Osceola Career Center, Big Rapids, Michigan
Job includes: Teaching adult students Gas Tungsten, Gas Metal, Flux Cored, and Shielded Metal Arc Welding processes in all positions.

September 1980 to August 1981: Welding Engineer, Clarage Fan Company, Kalamazoo Michigan .
Job includes: Writing welding procedures AWS D1-1 Structural code, justification and implementation of capital expenditures, training and qualification of all welding personal. Updating welding department with new automated equipment for increased productivity. Supervise 85 welders on the shop floor and 3 shop foreman's.

March 1979 to September 1980: Welding Engineer, Welders Supplies and Gases, Kalamazoo, Michigan 49001
Job includes: Sales, teaching customers new welding processes, and operation for different applications in their organization. Helped customers decide what type of Automation equipment to purchase for their application And taught them how to use it.

September 1979 to August 1981: Welding instructor (part time), Kalamazoo Central High School, Kalamazoo, Michigan.
Job Includes: Instructing students, oxy-fuel welding and cutting, basic joint design, and Shielded metal arc welding on pipe and mild steel.

January 1980 to August 1981: Welding Instructor (part time) Kalamazoo Valley community College, Kalamazoo, Michigan
Job Includes: Instructing students joint design, weld symbols, Shield Metal Arc Welding in all Positions.

September 1972 to September 1976: United States Air Force,
Job Includes: Electrical power line specialist, Job includes base wide electrical maintenance and construction and airfield supervisor. Honorably discharged with the rank of sergeant.

References and letters of recommendation upon request.

Jeffrey N. Carney

14101 Wildwood Drive
Big Rapids, MI 49307
Home Phone: (231) 796-4473
Office Phone: (231) 591-2952
Welding Lab)231) 591-2952
Email: carneyj@ferris.edu

ACADEMIC TEACHING EXPERIENCE

August 2002 to present
Associate Professor of Welding Technology and Welding Engineering Technology, Ferris State University, Big Rapids, MI 49307
Promotion to rank of Associate Professor, August 2002

August 1996 to August 2002
Assistant Professor of Welding Technology and Welding Engineering Technology, Ferris State University, Big Rapids, MI 49307 Responsible for teaching laboratory and lecture content of various courses at the freshman, sophomore and junior levels. Specific courses written and/or taught to date are as follows:

WELD 111	Welding Processes I – Lecture
WELD 113	Welding Processes I – Laboratory
WELD 121	Welding Processes II – Lecture
WELD 123	Welding Processes II – Laboratory
WELD 221	Welding Fabrication II – Laboratory
WELD 222	Introduction to Welding Automation – Lecture & Laboratory
WELD 311	Welding Automation and Robotics – Lecture & Laboratory
WELD 393	Internship – Coordinator

September 2000
Adjunct Faculty, Davenport University, Grand Rapids, MI 49503
Responsibility for creating and presenting Maintenance Welding course lecture and laboratory content.

June 2001
Adjunct Faculty, Montcalm Community College, Sidney, MI 48885-9723 Responsibility for creating and presenting Basic Welding Training course lecture and laboratory content.

COMMITTEE ACTIVITIES

University:
Co-Chairman, 2000 Ferris State University Self Study, North Central Accreditation of Colleges and Schools,

College of Technology:
Promotion Committee
Futures Conference
Logo Committee
Michigan Manufacturing Technology Team

Department
Chairmen of Academic Program Review committee for Welding Technology and Welding Engineering Technology programs

Other:
Advisory Committee to Welding Technology program at Mecosta-Osceola Intermediate School District, Big Rapids, MI

Advisory Committee to Welding Technology program at Oakland Technical Center – Southeast Campus, Royal Oak, MI

Advisory Committee to Welding Technology program at Oakland Community College – Auburn Hills Campus, Auburn Hills, MI

INDUSTRIAL EXPERIENCE

August 1994 to August 1996
Manager of Automotive Weld Center, ABB Flexible Automation Inc. - Welding Systems Division, Auburn Hills, MI. Responsible for sales of arc welding robotic systems to OEM automotive accounts, supervision of Applications Specialists for customer programs, welding lab operations, and interface with customer product engineering for development of manufacturing processes.

May 1990 to August 1994
Welding Engineer – Technical Sales, Robotic Production Technology, Madison Heights, MI. Integrator of turn-key robotic manufacturing systems. Responsibilities included sales, customer liaison, systems proposals, work cell and tooling concepts, cost justification, cycletime analysis, installation supervision and customer post-installation follow-up.

May 1987 to May 1990
Welding Engineer – Technical Sales, Welding & Engineering Products Company, Madison Heights, MI. Supplier of welding hardware and consumables. Duties included technical support for customers and sales staff, equipment/product demonstration, development of welding procedures, product training for customers, outside sales.

April 1980 to August 1983
Welder/Fitter, Doorman Manufacturing Company, Auburn Hills, MI. Supplier of door assemblies for industrial and nuclear facilities. Duties included inventory of stock, blueprint reading, welding and fabrication of door panel details, field installation.

EDUCATION & ACADEMIC HONORS

Master of Science Degree in Career and Technical Education
Ferris State University, Big Rapids, MI 49307
3.864 Graduate GPA (4.0 scale)
August 1999

Bachelor of Science Degree in Welding Engineering Technology
Ferris State University, Big Rapids, MI 49307
3.435 Undergraduate GPA (4.0 scale)
May 1987

Associate in Applied Science in Welding Technology
Ferris State University, Big Rapids, MI 49307
3.537 Undergraduate GPA (4.0 scale)
May 1985

Graduated with Distinction from the Master of Science Degree in Career and Technical Education at Ferris State University. Graduated with Distinction and High Distinction from Ferris State University in the Welding Engineering Technology and Welding Technology programs respectively. Received American Welding Society Scholarship from the Detroit Section for 1985/1986 and 1986/1987 academic years.

PROFESSIONAL CERTIFICATION

Certified Welding Inspector, Former, American Welding Society, 1987

PROFESSIONAL AFFILIATION AND HONORS

Chairman, American Welding Society Western Michigan Section, 2000 to 2002

Educational Representative, American Welding Society Western Michigan Section, 1999/2000

Committee Member, American Welding Society, B5C Committee on the Certification of Welding Engineers, 1998 to present

Member, American Welding Society since 1987

Advisor, Ferris State University Student Chapter of the American Welding Society, 1996 to present

Advisor, SkillsUSA 1999 Overall Gold medal winner in post-Secondary Welding and 2000 3rd place finisher at International Welding Trials

Advisor, SkillsUSA Ferris State University Chapter

Member, Revision Committee for Welding, National Occupational Competency Testing Institute (NOCTI), October 1996

Certified Welding Inspector (Former), American Welding Society, 1987

PROFESSIONAL DEVELOPMENT

Courage to Teach Seminar
Ferris State University
Big Rapids, MI
September 2002

WebCt Training
Ferris State University
Big Rapids, MI
Summer 2002

Robotic Workcell Training
Genesis System Group
Davenport, IA
August 1998

Pulsed Gas Metal Arc Welding – Parameter Development
Miller Electric Manufacturing Company
Appleton, WI
July 1998

Pulsed Gas Metal Arc Welding – Equipment Training
Lincoln Electric Company
Big Rapids, MI
July 1998

2nd Faculty Summer Institute
Ferris State University
Big Rapids, MI
May 1997

Automotive Laser Applications Workshop
University of Michigan
Dearborn, MI
March 1996

IRB S4 Robot Training
ABB Flexible Automation inc.
Auburn Hills, MI
November 1994

Flagship Distributor Equipment Training
Lincoln Electric Company
Cleveland, OH
May 1989

Oxy-Fuel Torch and Regulator Application Training
Harris Calorific Corporation
Gainesville, GA
April 1988

CONSULTING & TRAINING

Welder Certification for three (3) welder/fabricators in Gas Metal Arc Welding (GMAW) of steel, stainless steel and aluminum for all position operation, JD Metalworks, Clare, MI August 2001

Maintenance Welding for five (5) Michigan Department of Transportation employees. Ferris State University, Big Rapids, MI July 2001

Basic Theory and Hands-On Welding for 32 Production Welders, Fitters and Project Engineers. JD Metalworks, Clare, MI June 2001

Review of Welding Text Book draft, Glencoe/McGraw-Hill, Columbus, OH March 2001

Welder Certification for three (3) welder/fabricators in Gas Metal Arc Welding (GMAW) and Shielded Metal Arc Welding (SMAW) for all position operation, Hydaker-Wheatlake Company, Reed City, MI January, 2001

Journeyman Testing review and test development for 15 Yoplait-Columbo Employees, Reed City, MI November, 2000

Maintenance Welding for 25 union Millwrights, Pipe fitters, Electricians and Laborers. Frigidaire Incorporated, Greenville, MI September, 2000

Maintenance Welding for six (6) Michigan Department of Transportation employees. Ferris State University, Big Rapids, MI July 2000

Welding Standards and Inspection for 17 Product Engineers and Production Supervisors. Morbark Incorporated, Winn, MI October 1999

Basic Theory and Hands-On Welding for 26 Production Welders and Product Engineers. Morbark Incorporated, Winn, MI September 1999

Coordinator of Electronic Welding Helmet Feedback Experiment at Ferris State University. Supervised twelve (12) students during experiment and documented results. Impact Engineering, Jackson, MI March 1999

Basic Theory and Hands-On Welding for 23 Production Welders and Product Engineers. Morbark Incorporated, Winn, MI January 1999

Basic Theory and Hands-On Welding for 25 Production Welders and Product Engineers, Morbark Incorporated, Winn, MI September 1998

Basic Hands-On Welding for six (6) Welder/Fabricators, Brown Machine Corporation, Beaverton, MI June 1997

Welder Certification for three (3) welder/fabricators in Gas Metal Arc Welding (GMAW) and Shielded Metal Arc Welding (SMAW) for all position operation, Hydaker-Wheatlake Company, Reed City, MI January, 2001

JONATHON J. COX

Office Telephone Number: (231) 591-2952
Home Phone Number: (616) 875-3015
E-mail: coxj@ferris.edu

TEACHING EXPERIENCE:

AUGUST 2000 TO PRESENT

Assistant Professor of Welding Engineering Technology, Ferris State University, Big Rapids, Michigan, 49307. Classes taught: WELD 112 Welding Graphics (lecture and lab), WELD 146 Welding for Heavy Equipment (lecture and lab), WELD 221 Welding Fabrication 2 (lab), WELD 222 Introduction to Welding Automation (lab), WELD 311 Welding Automation and Robotics (lab), WELD 312 Design of Weldments (lecture and lab), Weld 321 Laser Welding, Cutting and Processing (lecture), WELD 411 Advanced Welding Processes (lecture).

INDUSTRIAL EXPERIENCE:

JULY 1998 TO AUGUST 2000

Welding Engineer, L&W Engineering, Holland, Michigan, 49423. Responsibilities consisted of following new programs from prototype development through mass production launch. Followed welding and other manufacturing equipment needed to launch new programs. Developed welding parameters and documented welding procedure specification sheets for new programs. Performed training for operators and maintenance personnel on new equipment brought into the plant. Supported maintenance in trouble shooting of equipment.

MAY 1995 TO JULY 1998

Application Engineer, Genesis Systems Group, Davenport, Iowa, 52807. Responsibilities consisted of robot part programming and process development of factory automated welding systems. Performed equipment in-house equipment buyoff as well as starting up systems at customer facilities. Developed documentation for each system responsible for. Provided customer support following final acceptance of systems purchased.

MAY 1994 TO AUGUST 1995

Welding Engineering Internship, Walker Manufacturing, Culver, Indiana, 46511. Responsibilities consisted of analyzing current manufacturing methods with economic justification of welding processes, writing welding procedures, production line layout, purchasing equipment for better production line efficiency, operator training and trouble shooting weld equipment.

JANUARY 1989 TO APRIL 1995 (Summers and Weekends)
Welder / Fabricator, Moran Iron Works, Onaway, Michigan, 49765.
Responsibilities consisted of fabrication and repair in both the field and shop.

EDUCATION:

Master of Science in Career and Technical Education
Ferris State University, Big Rapids, Michigan, 49307.
Expected Graduation: December 2003

Bachelor of Science degree in Welding Engineering Technology
Ferris State University, Big Rapids, Michigan, 49307.
May 1995

Associate in Applied Science degree in Welding Technology
Ferris State University, Big Rapids, Michigan, 49307.
May 1993

ACADEMIC HONORS:

3.95 Graduate grade point average, Ferris State University.

3.33 Undergraduate grade point average, Ferris State University.

Received an American Welding Society Scholarship, Detroit chapter to Ferris State University, 1991, 1992, 1993, 1994.

Received an American Welding Society Scholarship, National to Ferris State University, 1992.

Received the Outstanding Student Award, Welding Technology, Ferris State University, May 1993.

Received a James F. Lincoln Arc Welding Foundation Silver Award, Division II – B, research entry, 1993.

Received a James F. Lincoln Arc Welding Foundation Silver Award, Division II – A, project entry, 1993.

PROFESSIONAL AFFILIATION:

Member of the American Welding Society, 1991 to Present.

PROFESSIONAL COMMITTEES:

Advisory Board Member (Welding Program)
Mecosta / Osceola County Career Center
Big Rapids, Michigan (2001 to Present)

PROFESSIONAL COMMITTEES CONTINUED:

American Welding Society
Chair of The Higher Education Committee
Miami, Florida (2002 – 2005)

PROFESSIONAL DEVELOPMENT:

Ferris State University Leadership and Development Program
Big Rapids, Michigan 2002 / 2003

Romer Portable CMM Training
Romer Inc.
Dearborn, Michigan 1999

Welding Inspection Seminar
American Welding Society
Chicago, Illinois, 1998

Motoman MRC Robotic Training
Motoman Inc.
Dayton, Ohio, 1998

PanelView 550 and 900 Software Training
Allen Bradley Corporation
Kansas City, Kansas, 1997

Aluminum Welding Seminar
Aluminum Association Inc.
Pittsburg, Pennsylvania, 1996

Kuka Robotic Training
Kuka Welding Systems & Robot Corporation
Sterling Heights, Michigan, 1995

SLC-500 PLC Training
Allen Bradley Corporation
Davenport, Iowa, 1995

Fanuc R-J Robotic Training
Genesis Systems Group
Davenport, Iowa, 1995

PROFESSIONAL CONSULTING:

1) **Genesis Systems Group**
Davenport, Iowa (8/5/2002 to 9/13/2002)
187 hours of robotic programming and welding development.

2) **L&W Engineering**
Holland, Michigan (5/15/2002 to 8/2/2002)
777 hours of robotic welding, tooling and robotic consulting.

3) **Marked Tool Inc.**
Hudsonville, Michigan (May 2002)
11 hours setting up and programming a GMAW-P robotic welding cell.

4) **Marked Tool Inc.**
Hudsonville, Michigan (April 2002)
5 hours of robotic programming.

5) **Marked Tool Inc.**
Hudsonville, Michigan (February 2002)
32 hours setting up and programming a GMAW robotic work cell.

6) **Marked Tool Inc.**
Hudsonville, Michigan (January 2002)
11 hours setting up and programming a GMAW robotic work cell.

7) **Marked Tool Inc.**
Hudsonville, Michigan (September 2001)
20 hours of setting up and programming a robotic work cell.

8) **Acemco Inc.**
Spring Lake, Michigan (August 2001)
12.5 hours of robotic programming and trouble shooting.

9) **Marked Tool Inc.**
Hudsonville, Michigan (August 2001)
51.25 hours of setting up and programming two GMAW-P robotic work cells.

10) **L&W Engineering**
Holland, Michigan (5/8/2001 to 8/18/2001)
593 hours of robotic welding, tooling and robotic consulting.

PROFESSIONAL CONSULTING CONTINUED:

11) **L&W Engineering**
Holland, Michigan (12/11/2000 to 12/29/2000)
80 hours of robotic welding, tooling and robotic consulting.

KENNETH A. KUK
13677 190th Avenue - Big Rapids, Michigan 49307
Home Telephone Number: (231) 796-1284
Office Telephone Number: (231) 591-5287
Office Fax Number: (231) 591-2407
E-mail: kukk@ferris.edu

TEACHING AND ADMINISTRATIVE EXPERIENCE:

AUGUST 2001 to MAY 2002
Interim Assistant Dean of the College of Technology, Ferris State University, Big Rapids, Michigan 49307. Responsibilities included oversight of academic program review and administrative program review cycles, faculty workload, equipment priorities, curriculum committee, department income and expense analysis, targeted recruiting and marketing plans, and business/technology computer consortium.

MARCH 2000 to PRESENT
Tenured Professor/Department Chair of the Welding Engineering Technology department, Ferris State University, Big Rapids, Michigan 49307. Current responsibilities include classroom and laboratory instruction in 100-400 level courses, faculty and student schedule design, industrial advisory board moderator, budget formulation, classroom and laboratory physical plant coordination, supervision of office staff, and department project management.

APRIL 1996 to AUGUST 1999
Tenured Professor, Faculty Coordinator of the Manufacturing Tooling Technology, Welding Technology, and Welding Engineering Technology Programs in the Design, Manufacturing, and Graphic Arts Department, Ferris State University, Big Rapids, Michigan 49307. Current responsibilities include classroom and laboratory instruction in 100-400 level courses, faculty and student schedule design, industrial advisory board moderator, budget formulation, classroom and laboratory physical plant coordination, supervision of office staff, and department project management.

AUGUST 1994 to APRIL 1996
Tenured Associate Professor, Faculty Coordinator of the Mechanical Engineering Technology, Product Design Engineering Technology, and Technical Drafting and Tool Design Technology programs in the Manufacturing Engineering Technologies Department, Ferris State University, Big Rapids, Michigan 49307. Responsibilities listed above.

APRIL 1990 to AUGUST 1994
Tenured Associate Professor of Welding Engineering Technology,
Ferris State University, Big Rapids, Michigan 49307. Responsibilities included classroom and laboratory instruction of 300 and 400 level Engineering Technology courses, program development, industrial internship development

and coordination, student advisement, and automated welding laboratory coordination.

MARCH 1985 to APRIL 1990
Assistant Professor of Welding Engineering Technology,
Ferris State University, Big Rapids, Michigan 49307. Responsibilities listed above. Specific current courses written and/or taught to date are:
EGRG 141, Descriptive Geometry
FSUS 100, Ferris State University Seminar
MATL 240, Introduction to Material Science Laboratory
WELD 311, Welding Automation and Robotics
WELD 312, Design of Weldments
WELD 321, Laser Welding, Cutting, and Processing
WELD 322, Resistance Welding Laboratory
WELD 393, Welding Engineering Technology Internship
WELD 411, Advanced Welding Processes
WELD 412, Computer Aided Weldment Design
WELD 499, Welding Project Management and Engineering

COMMITTEE ACTIVITIES:

University:
Transfer Student Processes
Programmatic Marketing
Dean Search, Dean College of Technology (2)
Student Outcomes Assessment
Dean Search, Dean of Enrollment Services
Presidential Search
Ombudsmen Review
Long Range Strategic Planning
Environmental Scanning
Program Review, Office Automation
Program Review Automotive Body, Chair
College of Technology:
New Faculty Mentor
Computer Technician Search, Chair
Mission Statement, Chair
Engineering Graphics Review, Chair
Internship Review, Chair
Industrial Department Focus
Department Head Search
Computer Integrated Manufacturing Planning
Personal Computer Utilization and Planning
Program Director Search, Chair
Faculty Tenure
Bachelor of Science Recruiting Strategy, Chair

INDUSTRIAL EXPERIENCE:

SEPTEMBER 1983 TO MARCH 1985
Product and Application Engineer, GMF Robotics Corporation, Troy, Michigan 48098. Responsibilities included robotic system engineering and management from concept to installation, fixture design, robotic demonstrations, feasibility studies, cost justification, documentation, conducting robotic arc welding industrial seminars, and new product and equipment evaluations.

SEPTEMBER 1982 TO SEPTEMBER 1983
Manufacturing Engineer, National Element Incorporated, Troy, Michigan 48084. Responsibilities included electric furnace and heating element design, factory scheduling, design of mechanical assemblies, production supervision, tooling design, factory scheduling, and establishing welding procedure specifications.

APRIL 1981 TO AUGUST 1982
Project Engineer, Wall Colmonoy Corporation, Detroit, Michigan 48203. Responsibilities included the development of an automated plasma transferred arc welding system; equipment design, equipment testing, performing customer demonstrations, and application development.

EDUCATION:

Master of Science degree in Engineering Management
Western Michigan University, Kalamazoo, Michigan 49008,
June 1994

Master of Science degree in Occupational Education
Ferris State University, Big Rapids, Michigan 49307,
August 1988

Bachelor of Manufacturing/Industrial Engineering Technology
Wayne State University, Detroit, Michigan 48202,
June 1982.

Associate in Applied Science degree in Welding Technology
Ferris State University, Big Rapids, Michigan 49307,
February 1980

Electrical Engineering Major
Western Michigan University, Kalamazoo, Michigan 49008,
September 1977 to April 1978.

ACADEMIC HONORS:

3.75 Graduate grade point average Western Michigan University
4.00 Graduate grade point average Ferris State University

3.07 Undergraduate grade point average Wayne State University
3.33 Undergraduate grade point average Ferris State University

Graduated with Highest Distinction from the Master of Science program in Occupational Education, Ferris State University. Recipient of the1980 American Welding Society Scholarship, Detroit chapter to Wayne State University.

PROFESSIONAL CERTIFICATION:

Certified Manufacturing Engineer (Robotics),
Society of Manufacturing Engineers, Certification Number 1921156.
Certified Welding Inspector, Former,
American Welding Society

PROFESSIONAL AFFILIATION AND HONORS:

Member of the American Welding Society, Since 1981
Vice-Chairman, National Named Scholarship Committee, 1996-2001
Recipient of the Adams Memorial Award, in recognition as the outstanding welding educator, 1994
Western Michigan Section Chairman, 1989-1990
Western Michigan Section Executive Board Member, 1986-1990
Western Michigan Section Certification Chairman, 1986-1988
Member of the American Society of Engineering Educators, Since 1995

PROFESSIONAL DEVELOPMENT:

Design of Weldments
The Lincoln Electric Company
Cleveland, Ohio June 2002

Aluminum Welding Technology Theory and Practice
AlcoTec Wire Corporation
Traverse City, Michigan June 2001

Rock Climbing Instructor Training
Ferris State University
Big Rapids, Michigan, January 1999

Robotic Work Cell Operations
Genesis Systems Group
Davenport, Iowa, August 1998

Ropes Course Facilitator Training
Ferris State University
Big Rapids, Michigan, August 1998

Experiential Activities for Teachers
Ferris State University
Big Rapids, Michigan, June 1998

Miller Power Supply Training
Miller Electric Manufacturing Company
Appleton, Wisconsin, August 1996

Algor Finite Element Analysis Training
Algor, Incorporated
Detroit, Michigan, August 1995

AutoCAD Applications Training
Autodesk Incorporated
Grand Rapids, Michigan, January 1995

Automotive Laser Applications Workshop
University of Michigan
Dearborn, Michigan, March 1994

Robotics Programming
Miller Electric Manufacturing Company
Appleton, Wisconsin, February 1992

Industrial Laser Safety
Rockwell Laser Industries

Cincinnati, Ohio, September 1992

Laser Applications in Material Processing and Manufacturing
Society of Manufacturing Engineers
Southfield, Michigan, June 1992

Laser Operations and Programming,
Laser Machining Incorporated
Sommerset, Wisconsin, April 1991

Sheet Metal Welding Conference IV
American Welding Society
Southfield, Michigan, October 1990

Laser Technology
Society of Manufacturing Engineers
Dearborn, Michigan, April 1990

Sheet Metal Welding Conference III
American Welding Society
Southfield, Michigan, October 1988

Experimental Design
Solutions Specialists
Grand Rapids, Michigan, May 1988

Operations and Programming Al -32 Robot Controllers
Automatix Corporation
Farmington Hills, Michigan, November 1985

Machine Vision Automotive Applications
Society of Manufacturing Engineers
Dearborn, Michigan, November 1985

484 Programmable Controllers
Gould Modicon Corporation
Troy, Michigan, February 1984

Operations and Programming R Model C Robot Controllers
GMF Robotics Corporation
Troy, Michigan, September 1983

CONSULTING & TRAINING:

Weld Design and Process Training for 8 engineers, designers, and technicians Century Specialties Incorporated, Traverse City, Michigan, March 2000

Academic Review of the Welding and Welding Technology Programs at Northern Michigan University, Marquette, Michigan, January 2000

Designing Welds and Weld Processes for Manufacturing for 9 Engineers, designers, and technicians, Society of Manufacturing Engineers, Springfield, Massachusetts, May 1997

Weld Design and Process Training for 14 operators, welders, and, managers, Brown Company, Beaverton, Michigan, January 1997

Fundamentals of Weldment Design and Process Implementation for 21 engineers, designers, and technicians, Society of Manufacturing Engineers, Nashville, Tennessee, November 1996

Fundamentals of Weldment Design and Process Implementation for 17 engineers, designers, and technicians, Society of Manufacturing Engineers, Grand Rapids, Michigan, September 1996

Fundamentals of Weldment Design and Process Implementation for 21 engineers, designers, and technicians, Society of Manufacturing Engineers, Dearborn, Michigan, June 1996

Weld Design and Process Training for 10 operators, welders, and managers, Moiron Incorporated, Sparta, Michigan, February 1995

Weld Design and Process Training for 10 operators, welders, and managers, Moiron Incorporated, Gladwin, Michigan, July 1994

Laser Processing Laminated Dies, Michigan Department of Commerce, State Research Foundation Grant, Grand Rapids, Michigan, December 1993

Robotic Arc Welding Workshop for 27 technicians, engineers, and managers. Industrial Technology Institute, Ann Arbor, Michigan, October 1992

Robotic Arc Welding Workshop for 27 technicians, engineers, and managers. Industrial Technology Institute, Ann Arbor, Michigan, July 1992

Evaluation of Gas Metal Arc Welding Shielding Gas, Environmental Planning Group Limited, Lansing, Michigan, September 1992

Weldment Design Training for 12 managers, engineers, designers, APV Baker Incorporated, Grand Rapids, Michigan, March 1991

Industrial Robotic Training Seminar for 24 technicians, engineers, and managers from the country of Costa Rica, May 1990

Weld Design and Process Training for 10 operators, welders, and managers, Moiron Incorporated, Sparta, Michigan, June 1989

Technological Summer Program for 15 high school students, career exploration in Welding Engineering Technology, July 1986

Robotic Welding Seminar for 75 employees of General Motors Corporation, Fisher Guide Division, Flint, Michigan, July 1986

Heat Treating Furnace Element Design and Engineering, National Element Incorporated, Troy, Michigan, January 1985

Plasma Transferred Arc Automated Hardsurfacing Applications, Wall Colmonoy Corporation, Detroit, Michigan, April 1983

RESUME

David H. Murray
18191 Arthur Road
Big Rapids, Michigan 49307
Telephone: (231) 796-1490

EDUCATION:

Ferris State University, Big Rapids, Michigan;
Date: June 1986 to present; Masters Degree in
Occupational Education. Graduation Spring of 2003

Ferris State College, Big Rapids, Michigan;
Date: September 1981 – May 1986;
B.S. Degree in Trade-Technical Education.

Resistance Welding School, RWMA, Chicago, Illinois;
Date: October, 1985; an extensive program covering
all forms of resistance welding, both in theory and operation.

Ferris State College, Big Rapids, Michigan;
Date: September 1976 – February 1978; A.A.S. Degree in Welding Technology.

Aronson School of Positioning, Arcade, New York;
A complete course in the operation and set-up of welding positioneers.
Date: February, 1979.

Linde, Union Carbide Div., Chicago, Illinois;
Course in communication and use of assertiveness.
Date: March, 1980.

Weld-Mold, Detroit, Michigan; A comprehensive course on welding all tool and die materials.
Date: May, 1980.

Lincoln Electric, Hobart Brothers, Linde, Jetline;
Short seminars from each of the above to cover new products or new applications.
February, 1978 through June 1981.

WORK EXPERIENCE:

Ferris State University, Big Rapids, Michigan
Date: September 1996. Promoted to Associate Professor.

Grand Rapids Community College, Grand Rapids, Michigan
Date: September 1998 to present. Part-time evening college
Adjunct Teacher for welding program.

Ferris State University, Big Rapids, Michigan
Date: September, 1991 – 1996. Manufacturing Department Coordinator. Duties include faculty and class scheduling, equipment and supplies purchasing and common administrative duties.

Ferris State College, Big Rapids, Michigan;
Date: September, 1986-present; Assistant Professor in the Welding Technology Program. Developed a new course and constructed a laboratory for advanced resistance welding. Specialty areas include, N.D.T., and automation.

Ferris State College, Big Rapids, Michigan;
Date: September, 1981-1985; Technical Instructor. Give instruction in all Welding major classes, along with related welding courses. Responsibilities include lectures, labs, course development and
student placement.

Welders Supplies and Gases, Kalamazoo,
Michigan; Date: February, 1978-September, 1981.
Welding Engineer in Sales. Provided many services to customers, which included equipment set-up and design, operator training, procedure qualification and time studies.

Kalamazoo Valley Community College, Kalamazoo, Michigan; Welding Instructor, WLD 118: Weld Inspection and Blue Print Reading. Constructed the class syllabus for this.

CONSULTING EXPERIENCE:

Brown Corporation, Ionia, Michigan
Resistance Welding
August 2002

Allied Machine, Newaygo, Michigan
Welder Training
May 2002

Genzink Steel, Holland, Michigan
Welder Training
October 2001

Lear Corporation, Grandville, Michigan
Quality testing
August 2001

Brown Corporation, Ionia, Michigan
Resistance Welding and Pulsed Gas Metal Arc Welding Training
November 2000

TruHeat Corporation, Allegan, Michigan
Product Development
August 2000

Lear Corp, Grand Rapids, Michigan
Welder Skill Training
December, 1999

Avon Automotive, Cadillac, Michigan
Welding Maintenance training and Qualification
January, 2000 & December 1999

Brown Machinery, Beaverton, Michigan
Welder Qualification
November 1999

PPG Industries, Evart, Michigan;
Welder Qualification
July, 1999

Impact Engineering, Jackson, Michigan;
Experimental Welding Helmet Data collection.
March 1999

Steelcase, Grand Rapids, Michigan;
GMAW-P Robotic weld troubleshooting.
August 1998

Knoll Group, Muskegon, Michigan;
Parameter development of plasma arc welding.
November 1996.

Michcon, Big Rapids, Michigan;
Skilled development with SMAW.
August 1996.

Evart Products, Evart, Michigan;
Maintenance welding training.
May 1996.

Simpson Industries, Gladwin, Michigan;
Trouble shooting a projection welding problem.
August 1994.

Quincy L.P., Jonesville and North Adams, Michigan;
Trained 80+ employees in resistance Welding quality, set-up, and maintenance.
July 1994.

Newell Manufacturing Company, Lowell, Michigan
April, 1992, Training in Welding Practices.

Dake Incorporated, Grand Haven, Michigan
December 1994, and January 1992;
Trained 25 in weld quality and procedure development.

AC - Flint, Michigan
June 1991, Trained 75 people in resistance welding.

D & M Manufacturing, Grand Rapids, Michigan
May 1991, Training in resistance and sheet metal welding.

Alofs Manufacturing, Grand Rapids, Michigan
May 1991, Review resistance welding practices.

A.P.V. Baker, Grand Rapids, Michigan
April 1991 Weld quality update.

LEGAL CONSULTATIONS:

William, Brinks, Olds, Hofer, Gilson, & Lione
NBC Tower Suite 3600, Chicago, IL. 60611
Expert Witness for Patent Violation on a weldment design.

Schenk, Boncher and Prasher Firm
Grand Rapids, Michigan
Expert Witness: Personal injury involving defective resistance weld.

ACTIVITIES:

1999-2002 College Curriculum Committee
1995-1996 Strategic Planning Committee
1991-1993 "1993" All University Committee
1987-1989 Executive Board, FSU Academic Senate
1986-1989 Ferris State University Academic Senate
1981-1982 Executive Board A.W.S.
1983-1984 First Vice Chairman, American Welding Society
1984-1985 Chairman, American Welding Society
1982-1993 Advisory Committee, Mecosta-Osceola Career Center
1997-2002 Advisory Committee, Newaygo Area Career Center

REFERENCES:

References and student evaluations are available on request.

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