Welding Technology; Welding Engineering Technology

APRC 1996-1997

Section 1 of 3

Academic Program Review 1996/97
A.A.S. Welding Technology / B.S. Welding Engineering Technology
May 1996 - May 1997

PANEL MEMBERSHIP

Chair

Kenneth Kuk, Professor, Welding Engineering Technology

Department Head

Doug Chase, Assistant Dean/Department Head
Design, Manufacturing, and Graphic Arts

Faculty

Bradley Brew, Assistant Professor, Welding Engineering Technology
Jeff Carney, Assistant Professor, Welding Engineering Technology
Kenneth Kuk, Professor, Welding Engineering Technology
Joseph Mikols, Associate Professor, Welding Engineering Technology
David Murray, Associate Professor, Welding Engineering Technology

Associates

David Snider, District Sales Manager, The Lincoln Electric Company
Ray Dickenson, Professor / Librarian, Ferris State University

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Program Profile

Programs: Welding Technology / Welding Engineering Technology
Degrees: A.A.S. and B.S.
Department: Design, Manufacturing, and Graphic Arts
College: College of Technology

I. *Purpose of the program*

A. Describe the goals and objectives of the program (refer to role and mission statement of the program.

The Welding Technology degree is designed to prepare students to enter industry as technicians which support engineering and manufacturing activities and to provide them with technical foundation course work to enter the Welding Engineering Technology program.

B. How is the program compatible with the role and mission statement of FSU?

The program(s) are compatible with the University mission by providing hands-on, laboratory based career education and training.

C. How is the program integrated/coordinated with other programs at FSU?

In addition to serving its majors, the welding programs provide courses for Auto Body, Heavy Equipment, and Manufacturing Engineering Technology majors.

D. How is the program integrated/coordinated with programs at other institutions?

The B.S. Welding Engineering Technology program accepts Associate Degree transfers from community colleges in/outside Michigan. During the past ten years, over 20 colleges have transferred students into the program.

E. How does the program serve society at the community, state, nation, and world?

The Welding Engineering Technology program is one of only six four-year programs in the country. Graduates are 100% placed in their field every year with 65% working in Michigan. Alumni have enjoyed the highest average starting salary of all four-year program at Ferris (1995/96 approximately $40,000/yr.) the last four years.

II. Resources of the program

A. Personnel

1. *Faculty: List by rank with degrees (including year, field of study and institution, certificates, and/or related work experience.*

a. *Tenure-track*

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

2. Jeffery Carney, Assistant Professor, 1996
   B.S. Welding Engineering Technology, Ferris State University
   A.A.S. Welding Technology, Ferris State University

3. Kenneth Kuk, Professor, 1985
   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

4. Joseph Mikols, Associate Professor, 1986
   M.S. Welding Engineering, The Ohio State University
   B.S. Mechanical Engineering, Michigan Technological University

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

b. Adjunct

N/A

c. Temporary, full-time and part-time

N/A

2. FTE overload

FTE overloads are nominal as required for varying student numbers

3. Off-campus programs: location and involvement of faculty

Off-campus programs do not apply

4. *Administration: degrees (including year, field of study, and institution), certificates, and/or related work experience*

Administration

a. Douglas Chase, Assistant Dean/Department Head, Design, Mfg., & Graphic Arts
   M.S. Education, Michigan State University
   B.S. Trade and Technical Education, Ferris State University
b. Mark Curtis, Acting Dean, College of Technology
   EdD. Educational Leadership, Western Michigan University
   M.S. Education, Western Michigan University
   B.S. Education, Western Michigan University

5. *Support staff (clerical, technical, ...)*

One clerical and one technical support staff person is shared with 6 other programs and 30 other faculty

6. *Student assistants*

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

7. *Advisory committee: names, affiliations, and positions of the membership*

Advisory board membership

a. Scott Coolidge, Engineer, General Motors, Lansing, MI
b. Paul D'Angelo, Marketing, Weldmation, Madison Heights, MI
c. Jeff Grossman, Instructional Manager, Capital Area Career Center, Mason, MI
d. Nick Hamers, Vice President, Roy Smith Co., Detroit, MI
e. Kurt Hofman, Engineer, Roman Manufacturing, Grand Rapids, MI
f. Dale Kitchen, Engineer, General Motors, Lansing, MI
g. Glen Knight, Welding Training, Chrysler Motors, Auburn Hills, MI
h. David Snider, District Sales Manager, Lincoln Electric, Grand Rapids, MI
i. Eric Young, Welding Engineer, Miller Electric Mfg., Appleton, WI
j. James Ward, Manufacturing Engineer, General Motors, Warren, MI
k. David Williamson, Welding Engineer, Utilase, Detroit, MI

B. *Instructional Resources*

1. *Describe, in general, the facilities (classroom, lab, clinic, etc.) and equipment available to the program.*

The welding programs utilize 4 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 by all programs in the College of Technology.

2. *Supplies and expense budget*

Supplies and expense budget for past five academic years.

91/92	92/93	93/94	94/95	95/96
$31,529*	$32,093*	$21,208*	$25,337*	$31,077*

* Note amounts are actual funds spent not reflective of formulated budget.

3. *Equipment acquisition budget*

Equipment acquisition budget for past five academic years.

91/92	92/93	93/94	94/95	95/96
$0*	$0*	$0*	$0*	$0*

*Voc. Ed. Dollars are no longer a source of revenue because of restrictions and program phase-out.

4. *Gifts and Grants*

Gifts, Grants, and Consignments for past five academic years.

91/92	92/93	93/94	94/95	95/96
$100,000-200,000*	$100,000-200,000*	$100,000-200,000*	$100,000-200,000*	$100,000 200,000*

*Includes steel donations, consumable donations, equipment gifts and consignments, and over $30,000 in scholarships per year.

5. *Travel budget (faculty and administration, separately)*

Travel Budget for 1995/96 was $0 funds were provided from welding Local account.

6. *Professional development, other than travel, budget*

Professional Development for 1995/96 was $400 per faculty member.

7. *Library resources*

Library Resources are appropriate with full access for faculty and students. The F.S.U. is one of a few sources in the world that has the complete collection of American Welding Society Journals.

C. *Describe faculty activities other than instruction, eg.*

Faculty Activities

1. *Committee involvement: program, department, college, university, state, and national levels.*

Each faculty member serves on department, college, and university committees.

2. *Professional organizations*

The faculty are actively involved in the American Welding Society at the chapter, district, and national levels through committee membership and convention attendance. Membership in the Society of Manufacturing Engineers, and the American Association of Engineering Educators is also noteworthy.

3. *Publications*

Occasional articles about the program have been published in the AWS journal.

4. *Consulting*

All faculty members are actively involved in consulting on a continual basis in part to keep their expertise relevant for the students. Fabrication welding, training, and engineering activities are typical forms.

III. *Enrollment, Recruitment and Retention*

A. *Enrollment Trends for the past five years.*

1. Student credit hours/FTE.

	91/92	92/93	93/94	94/95	95/96
SCH/FTEF	Unknown	Unknown	276*	320*	286*

* Two(2) faculty coordinators for seven (7) different academic programs have been incorrectly charged to this program the last three years. True SCH/FTEF is 350-400 per year over this period.

2. Majors (on-campus and off-campus, separately).

	91/92	92/93	93/94	94/95	95/96
A.A.S.	68	66	62	57	54
B.S.	24	30	40	37	19

Note: No off-campus programs

3. Graduates (on-campus and off-campus, separately).

	91/92	92/93	93/94	94/95	95/96
A.A.S.	20	21	10	16	
B.S.	10	9	10	19	

Note: No off-campus programs

4. Graduates employability (field of employment, starting salary).

	91/92	92/93	93/94	94/95	95/96
% Placed	100%	100%	100%	100%	100%
Salary	$31,517	$31,200	$34,135	$37,068	$40,000*

* Estimated

5. Graduates promotability and advancement.

Graduates enjoy outstanding career mobility. B.S. Alumni are located in over 30 states and 3 Continents. 43% of B.S. graduates are making more than $50,000 per year. Over 10 percent of the Alumni either hold or are pursuing a graduate degree* (See Annual Report).

6. Program capacity.

With current resources, the program can accept 40 freshmen and 25 juniors. Targeted theoretical enrollment for the A.A.S. and B.S. programs is 120 (70 lower division/50 upper division) without additional resources.

7. Accepts/enrollees ratio.

Approximately 80% of applicants to both the A.A.S and B.S. programs meet acceptance criteria.

B. *Recruitment*

1. *Describe recruitment activities in the program and how they are coordinated with those carried out by the College and the University.*
    a. Attend AWS Western Michigan Section Technical meeting.
    b. Attend AWS Annual District meetings
    c. Maintain a Ferris booth at the AWS International Exposition annually.
    d. Are on the following national boards.
        1. Scholarship
        2. Certified Welding Engineer
    e. Visit 10 high schools per year.
    f. Visit 3 community colleges per year.
    g. Participate in Autumn Adventure.
    h. Participate in homecoming activities.
    I. Write and Administer the NOCTI welding test.
    j. Judge the Annual State VICA Welding contest.
    k. Administer over $30,000 in AWS Scholarships annually.

2. *Describe interest in the program, eg, number of applicants compared with program capacity.*

    For the 1996/97 academic year the A.A.S. and B.S. programs were both at capacity for incoming freshmen/juniors respectively.

C. *Retention.*

1. *Are there any identifiable retention problems associated with the program?*

    No.

2. *What efforts are being exerted to resolve retention issues? Assess program achieved in this area.*

    The program(s) enjoy one of the highest retention rates on campus because of the academic program course content , and the faculty commitment to the students and providing solid academic counseling.

3. *Describe activities of program-related student organizations.*

    Over 80% of the welding majors belong to the American Welding Society student chapter. Technical speakers from industry, plant tours, trips to the AWS Annual Convention are activities that take place four times per year.

4. *Describe the involvement of the faculty on student advising.*

    Each of the program faculty are assigned student advisees during enrollment. Students meet with faculty a minimum of once per semester to monitor and build a schedule. Each faculty member is actively enrolled in advising the AWS Student Society Chapter.

IV. *Effectiveness of the program.*

A. Curriculum.

1. What are the graduation requirements?

See attached check sheets.

2. Include a suggested semester-by-semester sequence of courses to be completed.

See attached check sheets. (Section 1)

3. Comment on the currency of the curriculum with respect to the present and future expectations form the graduate at the workplace.

Please review Alumni, Employer, Advisory Board Survey. (Section 2)

B. Quality of the program.

1. In what ways can the quality of the program be demonstrated (accreditation, success rate in licensure exam, recognition by others, ect.)?

The Welding Engineering Technology program enjoys the best placement rate and highest average starting salary of all 56 four year programs at Ferris State University for the past five years. The 3 largest welding equipment manufacturers in the United States provide the program with approximately $100,000 of equipment per year.

2. What approaches are utilized to enhance the quality of instruction?

Constant pursuit by the faculty of additional degrees and attendance at workshops, seminars, and expositions.

3. How is student performance assessed?

Examinations, quizzes, term papers, laboratory projects, reports, oral presentations, and sophomore/senior capstone projects.

4. How is the quality of instruction measured?

Student Evaluations, Peer Evaluations, and Alumni Evaluations.

5. How are the course contents kept current?

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

6. How is the success of graduates gauged?

Initial employment in their field and annual Alumni surveys.

C. What are the strengths and weaknesses of the program?

Advantages

1. A unique program with little to non competition (see chart).
2. Very high demand vs. supply of graduates.
3. Strategic asset to the Michigan and Great Lakes regional economy. Autos, appliances, furniture, etc.
4. A very high level of industrial support.
5. A very high level of scholarship support form the American Welding Society.

6. A high level of laboratory content which is the competitive advantage.

Disadvantages

An inadequate capital equipment supply and faculty development budget. The program is at risk because of its extreme dependence on the private sector without a University developed plan.

V. *Actions taken and future prospects*

A. *Assessment of actions taken*

1. *What measures have been taken to correct weaknesses and to emphasize strengths of the program?*

It is anticipated that with new leadership and organization in the College of Technology, a solid program-based financial plan will be implemented.

2. *What are the results in response to the measures executed?*

To date, administrative cost reduction and initial recognition of program financial constraints.

B. *Future measures needed to enhance the program.*

1. *What are the environmental factors which pose threats or present opportunities for the program (eg. political, cultural, economic, fiscal, administrative, organizational, curricular, technical, social)?*

a. *What impact will these factors have on the program?*

1. Enrollment
2. Quality of program
3. Impact of the future focus/direction of the program

b. *What additional measures should be instituted to enhance the program?*

With a lack of funding for capital equipment, supplies and expenses and faculty development, the faculty go to the private sector for donations and consignments. The program has been very successful in obtaining gifts but strings are always 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).

Because the welding industry is involved in over half the products that comprise the gross national product and only six universities produce B.S. graduates, its enrollment and placement potential is unlimited. A national program based advertisement campaign would result in significant enrollment increased. The budget for the program should be increased to include:
$30,000/year for supplies and expenses, maintenance
$20,000/year for welding capital equipment
$5,000/year for faculty development
and reviewed and adjusted annually to reflect inflation, enrollment, and technological change. To insure a state-of-the-art hands-on national welding program.

FERRIS STATE UNIVERSITY
COLLEGE OF TECHNOLOGY

WELDING TECHNOLOGY
ASSOCIATE IN APPLIED SCIENCE DEGREE
FALL SEMESTER 96\97
Curriculum Guide Sheet

NAME OF STUDENT _____ STUDENT I.D.: _____

Total semester hours required for graduation: 68

NOTE: Meeting the requirements for graduation indicated on this sheet is the responsibility of the student. Compliance with this agreement will assure the student completion of the program in the time frame indicated. Your advisor is available to assist you.

			CREDITS	COMMENTS/GRADE
FIRST YEAR - FALL SEMESTER				
WELD	111	Welding Processes 1	8	
WELD	112	Welding Graphics	2	
ETEC	140	Engineering Graphics Comprehensive	3	
____	___	Cultural Enrichment Elective	3	
FIRST YEAR - WINTER SEMESTER				
WELD	121	Welding Processes 2	8	
MATL	240	Introduction to Material Science	4	
MATH	116	Intermediate Algebra & Numerical Trigonometry	4	
ENGL	150	English 1	3	
SECOND YEAR - FALL SEMESTER				
WELD	211	Welding Fabrication 1	5	
WELD	212	Quality Testing	4	
PHYS	211	Introductory Physics 1	4	
ENGL	250	English 2	3	
SECOND YEAR - WINTER SEMESTER				
WELD	221	Welding Fabrication 2	5	
WELD	222	Introduction to Welding Automation	3	
EEET	228	Electronic Technology for Welding 1	4	
MFGT	150	Manufacturing Processes	2	
____	___	Social Awareness Elective	3	

FERRIS STATE UNIVERSITY
COLLEGE OF TECHNOLOGY

CURRICULUM REQUIREMENTS
WELDING TECHNOLOGY
ASSOCIATE IN APPLIED SCIENCE DEGREE
FALL SEMESTER 96\97

TECHNICAL	CREDIT HOURS
WELD 111 Welding Processes 1	8
WELD 112 Welding Graphics	2
WELD 121 Welding Processes 2	8
WELD 211 Welding Fabrication 1	5
WELD 212 Quality Testing	4
WELD 221 Welding Fabrication 2	5
WELD 222 Intro. to Welding Automation	3
Technical Related	
EEET 228 Electronic Tech. for Welding 1	4
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 1	4
Quantitative Skills	
MATH 116 Inter. Algebra & Num. Trig.	4
Cultural Enrichment	
Elective	3
Social Awareness	
Elective	3

EEET 228 Electronic Tech. for Welding 1	4
EGRG 140 Engineering Graphics	2
MATL 240 Intro. to Material Science	4
MFGT 150 Manufacturing Processes	2

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

Cultural Enrichment Credits - 3
Communications Credits - 6
Social Awareness Credits - 3
Scientific Understanding Credits - 3-4

(OVER)

FERRIS STATE UNIVERSITY
COLLEGE OF TECHNOLOGY

WELDING ENGINEERING TECHNOLOGY
BACHELOR OF SCIENCE DEGREE
FALL SEMESTER 96/97
Curriculum Guide Sheet

NAME OF STUDENT _____ STUDENT I.D.: _____

Total semester hours required for graduation: 71

NOTE: Meeting the requirements for graduation indicated on this sheet in the responsibility of the student. Compliance with this agreement will assure the student completion of the program i the time frame indicated. Your advisor is available to assist you.

			CREDITS	COMMENTS/GRADE
THIRD YEAR - FALL SEMESTER				
WELD	311	Welding Automation & Robotics	4	
WELD	312	Design of Weldments	3	
EEET	315	Electronic Technology for Welding	4	
MATH	126	Algebra & Analytical Trigonometry	4	
ENGL	311	Advanced Technical Writing	3	
THIRD YEAR - WINTER SEMESTER				
WELD	321	Laser Welding, Cutting & Procesing	3	
WELD	322	Advanced Resistance Welding	3	
MATH	216	Applied Calculus	4	
MECH	240	Statics and Strengths of Materials	4	
COMM	121	Fundamentals of Public Speaking	3	
THIRD YEAR - SUMMER SEMESTER				
WELD	393	Internship	4	
FOURTH YEAR - FALL SEMESTER				
MFGE	353	Statistical Quality Control	3	
WELD	412	Computer Aided Weldment Design	3	
WELD	422	Material Science	3	
MFGE	423	Engineering Economics	2	
____	___	Social Awareness Elective	3	
____	___	Scientific Understanding Elective*	3	
FOURTH YEAR - WINTER SEMESTER				
WELD	411	Advanced Welding Processes	3	
WELD	499	Project Engineering and Management	3	
____	___	Advanced Cultural Enrichment Elective	3	
____	___	Advanced Social Awareness Elective	3	
____	___	Cultural Enrichment Elective	3	

***Not required if MATL 240 is approved for Scientific Understanding.**

(OVER)

FERRIS STATE UNIVERSITY
COLLEGE OF TECHNOLOGY

CURRICULUM REQUIREMENTS
WELDING ENGINEERING TECHNOLOGY
BACHELOR OF SCIENCE DEGREE
FALL SEMESTER 96/97

ENTRY CRITERIA:

1. Application for admission submitted by February 15 prior to Fall term requested.
2. Associate in Welding Technology.
3. A minimum 2.75 honor point average in major courses.
4. A minimum 2.50 honor point average in all other courses in A.A.S. curriculum.
5. A minimum 2.50 honor point average for Mathematics courses required in A.A.S. degree program. C

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	315	Electronic Technology for Welding	4
MECH	240	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			
Electives			3
Quantitative Skills			
MATH	126	Algebra & Anal. Trigonometry	4
MATH	216	Applied Calculus	4
Cultural Enrichment			
Electives			6
Social Awareness			
Elective			6

B.S. Degree Minimum General Education Requirements in Semester Hours:

Cultural Enrichment Credits - 9
Communications Credits - 12
Social Awareness Credits - 9
Scientific Understanding Credits - 7-8

(OVER)

WELDING ENGINERING TECHNOLOGY/WELDING ENGINEERING PROGRAM COMPARISONS

Prepared By: Kenneth A. Kuk, 1997

Institution	**Ferris State University**	**Arizona State University**	**LeTourneau University**	**Ohio Sate University**	**Utah State University**
Type	Public	Public	Private	Public	Public
Location	Big Rapids, Michigan	Tempe, Arizona	Longview, Texas	Columbus, Ohio	Logan, Utah
Telephone	616-592-2000	602-727-1093	903-233-3400	614-292-2545	801-797-1000
Degree	B.S. Welding Engineering Technology	B.S. Manufacturing Engineering Technology	B.S. Engineering	B.S. Welding Engineering	B.S. Industrial Technology
Major	NA	Welding Engineering Technology	Welding Engineering	NA	Aerospace/Welding
Accreditation	No	TAC/ABET	EAC/ABET	EAC/ABET	No
Welding Credits	64	12	22	32	17
Technical Credits	25	51	44	31	51
Calculus Plus Credits	4	6	12	16	4
Total Credits	138	128	137	132	130
Graduates per Year	20-25	0-10	0-10	30-35	0-10
Graduate Employment	Automotive, Automation, Equipment	Aerospace, Heavy Machinery, Heavy Fabrication	General Fabrication	Automotive, Manufacturing, Research	Aerospace, Manufacturing

a:comparisons

FERRIS STATE UNIVERSITY

COLLEGE OF TECHNOLOGY

FERRIS STATE UNIVERSITY

EXCELLENCE • HERITAGE • QUALITY • COMMITMENT

WELDING ENGINEERING TECHNOLOGY ANNUAL ALUMNI REPORT 1995-1996

Prepared By:
Kenneth A. Kuk, Associate Professor
and
Christopher Serafin, W.E.T. Class of 1997

AUTHORS MESSAGE

BACHELOR OF SCIENCE PROGRAM
IN
WELDING ENGINEERING TECHNOLOGY

1995-1996 ANNUAL REPORT

FERRIS STATE UNIVERSITY
BIG RAPIDS, MICHIGAN

Dear Students, Alumni, Employers, Friends, and Interested parties:

It is with great pleasure that I present the 1995-1996 annual report of the Welding Engineering Technology program at Ferris State University. It is my hope that the information presented in this report will serve to enlighten the reader as to status and role our program plays in the welding industry.

1995-1996 was another outstanding year, specific highlights of the program include:

- **21 graduates in 1995**
- **119 total graduates since the programs conception in 1986**
- **1995 Average starting salary of over $36,000 per year**
- **21 accepted juniors for Fall 1995**
- **Over $35,000 in welding academic scholarships and awards obtained by students in the program**
- **Over 145 companies have now hired a graduate**
- **Alumni are now placed in 25 states and 4 countries**

I would like to thank students, faculty, and staff past and present for their dedication and support to growing this program and making this report possible.

Dedicated to our friend and colleague Professor Bill Beegle F.S.U. 1975-95

Best wishes for continued success,

Kenneth A. Kuk, C.Mfg.E.
Associate Professor

TABLE OF CONTENTS

WELDING ENGINEERING TECHNOLOGY PROGRAM FACULTY
FERRIS STATE UNIVERSITY

COLLEGE OF TECHNOLOGY
MANUFACTURING ENGINEERING TECHNOLOGIES DEPARTMENT

Bradley O. Brew**.....*Assistant Professor, Welding Engineering Technology***
BS, Education, Ferris State University
American Welding Society
Areas of Expertise: X-Ray & Ultrasonic Testing

Kenneth A. Kuk**.....*Associate Professor & Faculty Coordinator, Welding Engineering Technology***
MS Engineering Management, Western Michigan University
MS Occupational Education, Ferris State University
BET Manufacturing Engineering Technology, Wayne State University
AAS Welding Technology, Ferris State University
Certified Manufacturing Engineer, Society of Mfg. Engineers
Certified Welding Inspector, American Welding Society
Areas of Expertise: Project Management, Welding Automation & Design, Welding Economics.

Joseph S. Mikols**.....*Associate Professor, Welding Engineering Technology***
MS Welding Engineering, The Ohio State University
BS Mechanical Engineering, Michigan Technological University
Licensed Boiler Repairer, State of Michigan
Licensed Boiler Installer, State of Michigan
Licensed Boiler Erector, State of Michigan
Areas of Expertise: Welding Metallurgy, Welding Processes, and ASME Codes

David H. Murray**.....*Assistant Professor & Faculty Coordinator, Welding Engineering Technology***
MS Occupational Education, Ferris State University
BS Trade Technology, Ferris State University
AAS Welding Technology, Ferris State University
Areas of Expertise: Resistance Welding, Welding Procedure Development and ASME Codes

EMERITI WELDING FACULTY
FERRIS STATE UNIVERSITY

Roger Kennedy 1955-1986

Ansel Hook 1962-1972

Phillip Girrouix 1965-1968

Emery Wiltse 1968-1981

Harold Hankes 1972-1995

William Carroll 1974-1981

William Beegle 1975-1995

Dennis Nance 1974-1975

Gordon Cossaboom 1986-1988

WELDING PROGRAMS INDUSTRIAL ADVISORY COMMITTEE MEMBERS

Mr. Scott Chapple.....Welding Engineer
Benteler Industries
Grand Rapids, MI

Mr. Scott Coolidge.....General Motors
B.O.C. Lansing Automotive
Lansing, MI

Mr. Paul L. D'Angelo.....Director, Sales / Marketing
Weldmation, Inc.
Madison Heights, MI

Mr. Jeff Grossman.....Instructional Manager, Welding
Capitol Area Career Center
Mason, MI

Mr. Nick A. Hamers.....Vice President, Auto Sales
Roy Smith Company
Detroit, MI

Mr. Kurt Hofman.....Engineer
RoMan Manufacturing Inc.
Grand Rapids, MI

Mr. Dale R. Kitchen.....Engineer
Lansing Automotive / General Motors
Lansing, MI

Mr. Glen A. Knight.....Administrator, Welding Training
Chrysler Motors
Auburn Hills, MI

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

Mr. Eric S. Young.....Welding Engineer
Miller Electric Manufacturing Co.
Appleton, WI

Mr. James N. Ward.....Manufacturing Engineer
General Motors Corporation
Warren, MI

Mr. David Williamson.....Welding Engineer
Utilase Inc.
Detroit, MI

WELDING ENGINEERING TECHNOLOGY
PROGRAM CONCENTRATIONS

AUTOMATION

Welding Automation and Robotics
Laser Welding and Cutting
Resistance Welding

DESIGN

Welding Design and Fabrication
Computer Aided Weldment Engineering
Welding Metallurgy
Statics and Strengths of Materials

PRODUCTION

Welding Engineering Project Management
Welding Processes
Welding Codes and Procedures
Non-Destructive Testing
Weldment Fabrication

GENERAL ENGINEERING TOPICS

Statistical Quality Control
Engineering Economics
Industrial Control Electronics

MATHEMATICS AND SCIENCE

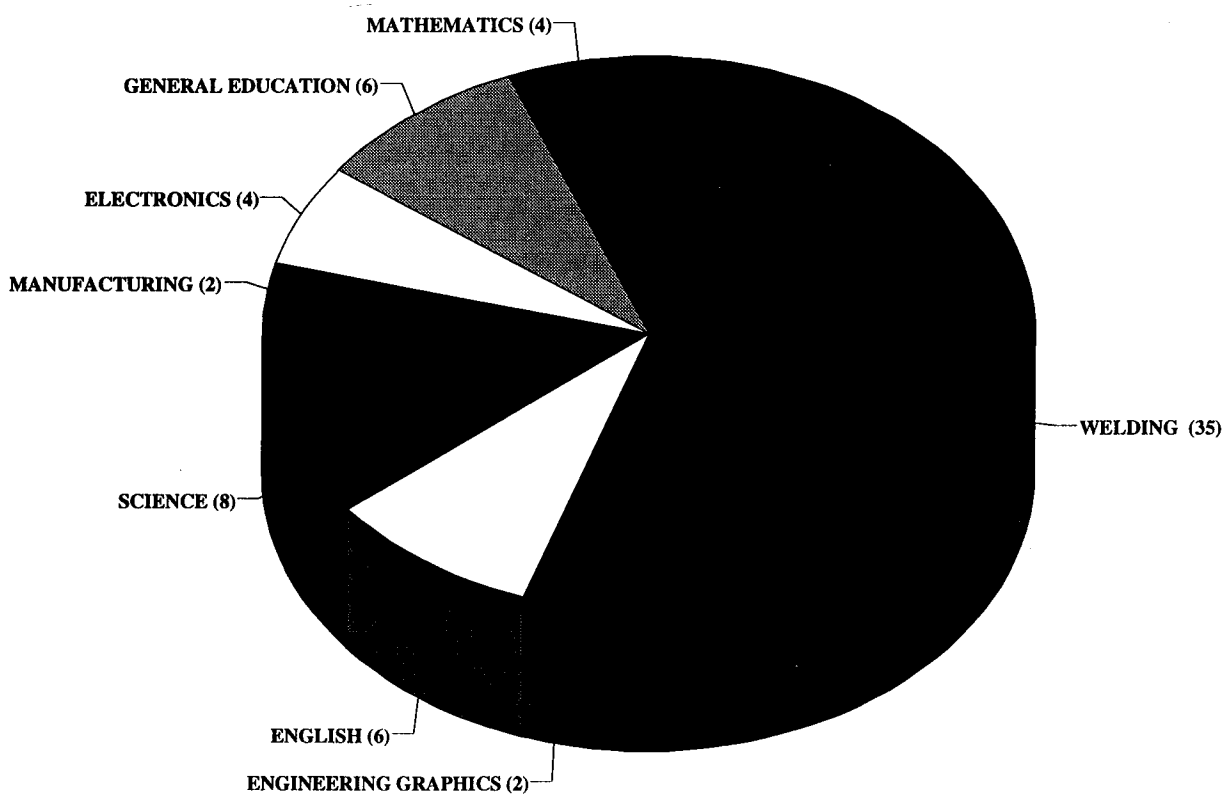
Calculus
Physics

WELDING ENGINEERING TECHNOLOGY PROGRAM HISTORY

- *1955 Welding began as a related subject*
- *1956 One year welding certificate added*
- *1958 Metallurgy added*
- *1965 Submerged Arc Welding added*
- *1965 Destructive Testing added*
- *1974 Two year A.A.S. Welding Technology program established*
- *1974 Plasma Welding and Cutting added*
- *1976 Student Section of the American Welding Society chartered*
- *1983 Centennial Bulldog constructed*
- *1984 Four year B.S. Welding Engineering Technology program established*
- *1985 Welding Automation added*
- *1986 Computer Aided Design added*
- *1986 Internships required in B.S. degree*
- *1986 First B.S. class of Welding Engineering Technologists graduate*
- *1990 Resistance Welding added*
- *1991 Laser Welding and Cutting added*
- *1992 Adhesives added*
- *1994 10th Anniversary of B.S. Welding Engineering Technology Program*
- *1993 100th anniversary of Main Campus World Structure added*
- *1995 40th Anniversary of Welding at Ferris State University*

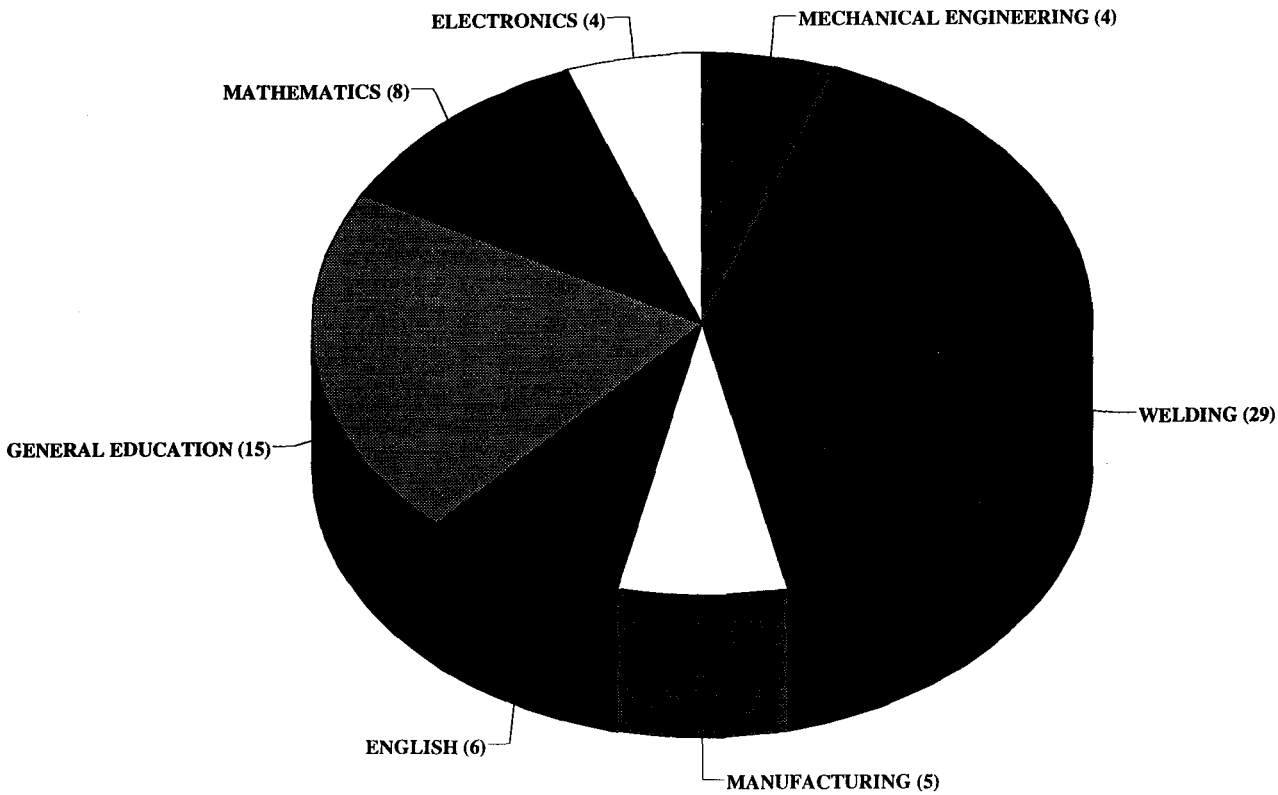
WELDING ENGINEERING TECHNOLOGY

A.A.S. COURSE CREDITS

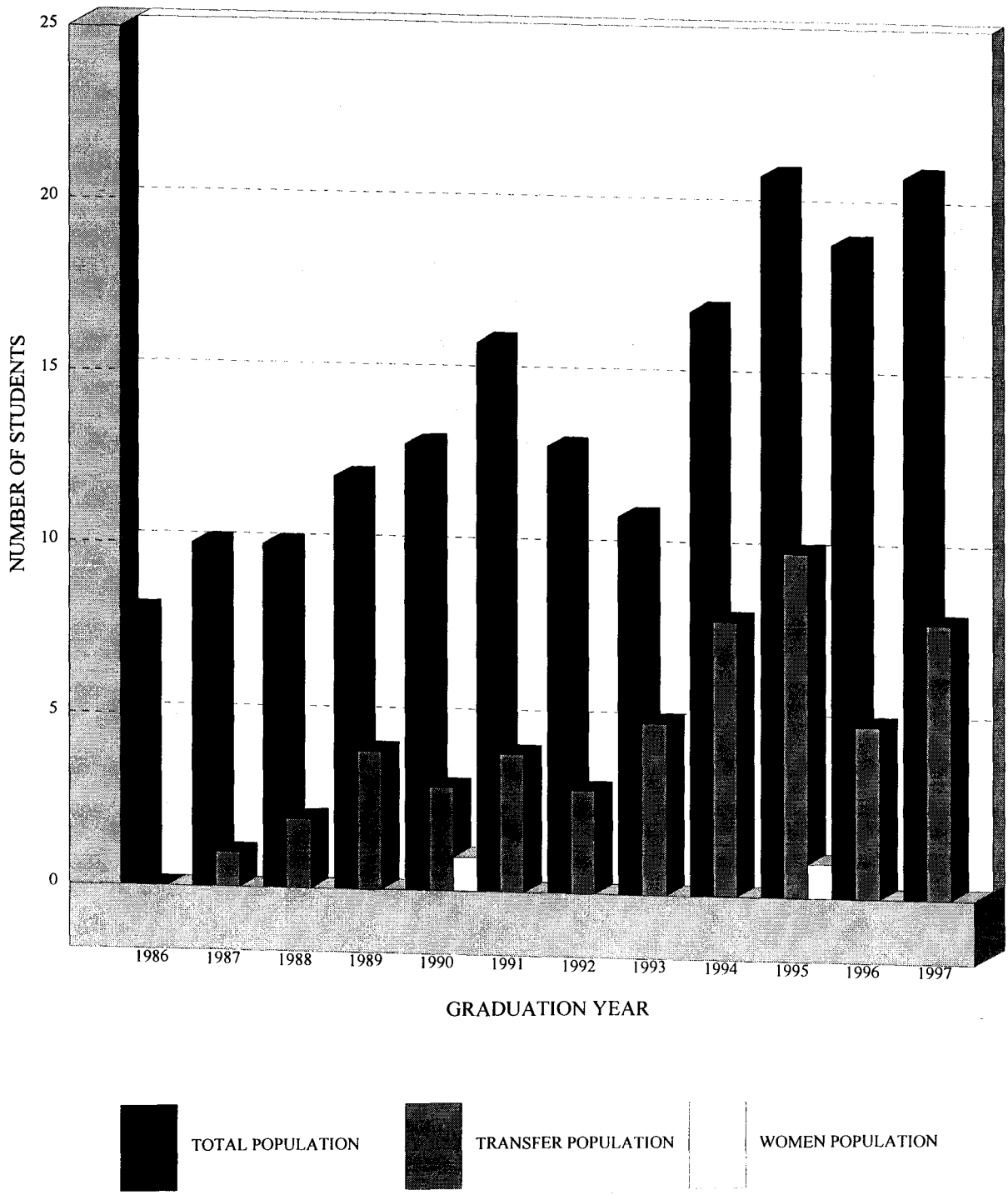


WELDING ENGINEERING TECHNOLOGY

B.S. COURSE CREDITS

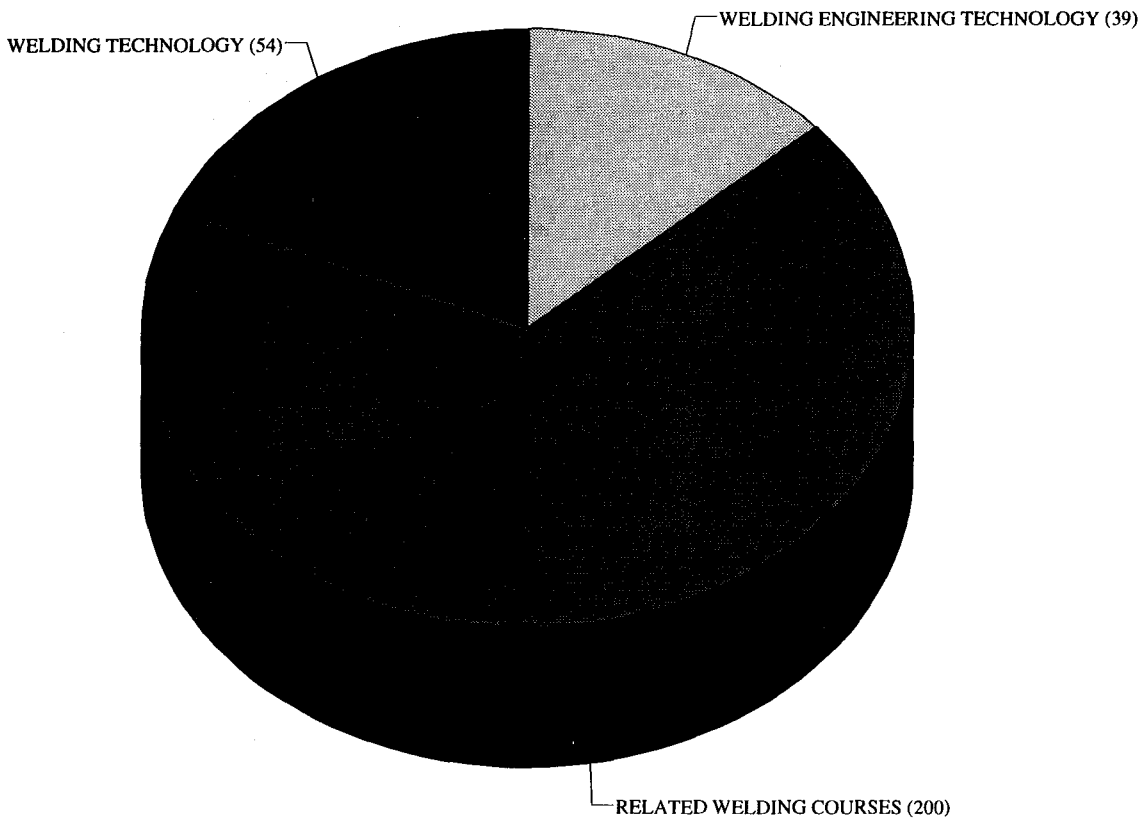


ENROLLMENT
WELDING ENGINEERING TECHNOLOGY



FERRIS STATE UNIVERSITY

STUDENTS IN WELDING PROGRAM



COMMUNITY COLLEGE TRANSFERS TO THE FERRIS STATE UNIVERSITY'S BACHELOR OF SCIENCE PROGRAM IN WELDING ENGINEERING TECHNOLOGY

Alpena C.C., MI

Bay de Noc C.C., MI

Delta C.C., MI

Grard Rapids C.C., MI

Jackson C.C., MI

Kalamazoo Valley C.C., MI

Kellogg C.C., MI

Kirtland C.C., MI

Lansing C.C., MI

Macomb C.C., MI

Monroe C.C., MI

Mott C.C., MI

Mid Michigan C.C., MI

Schoolcraft C.C., MI

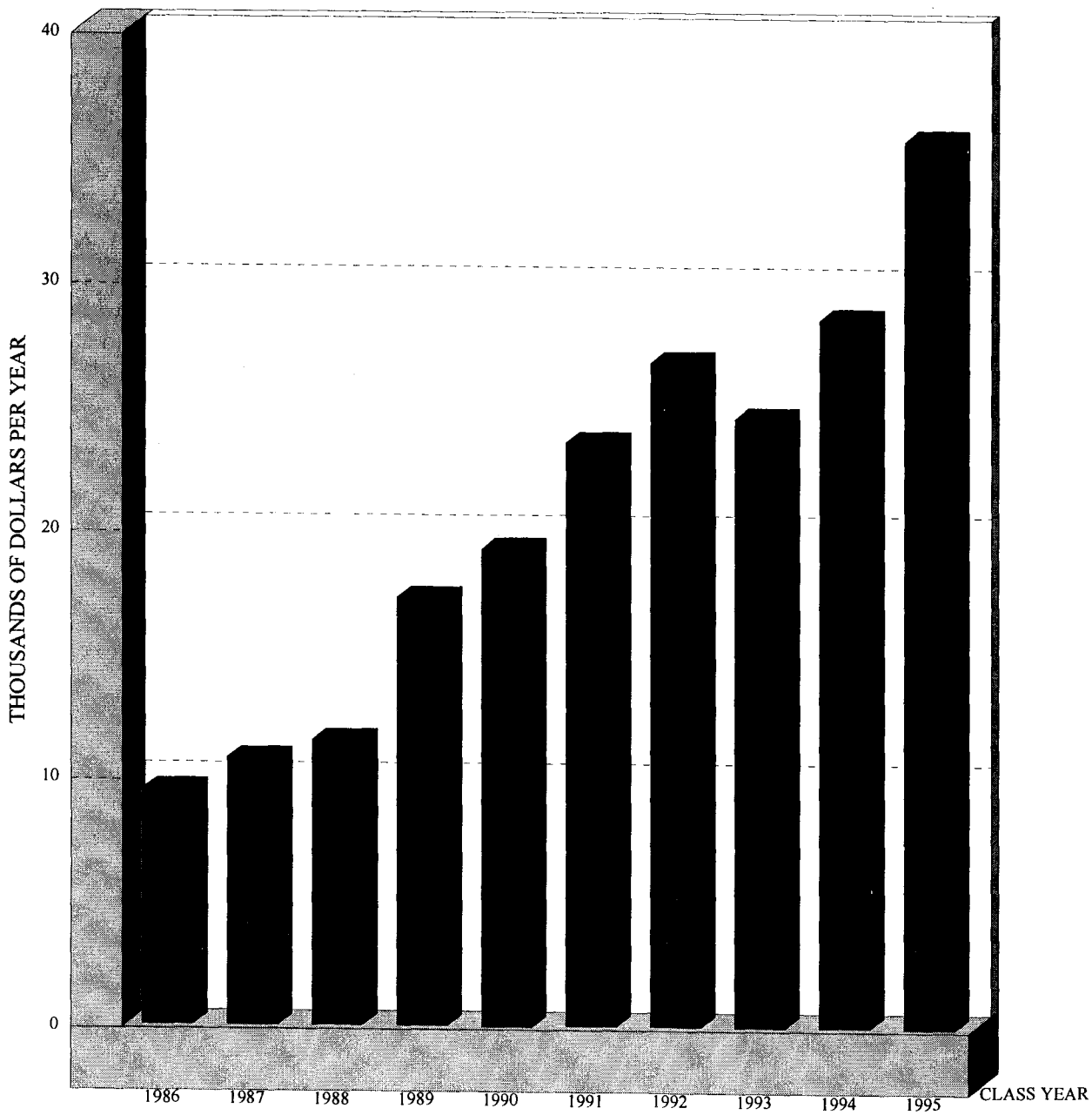
St. Clair C.C., MI

West Shore C.C., MI

Washtenaw C.C., MI

Vocational Technical C.C., NH

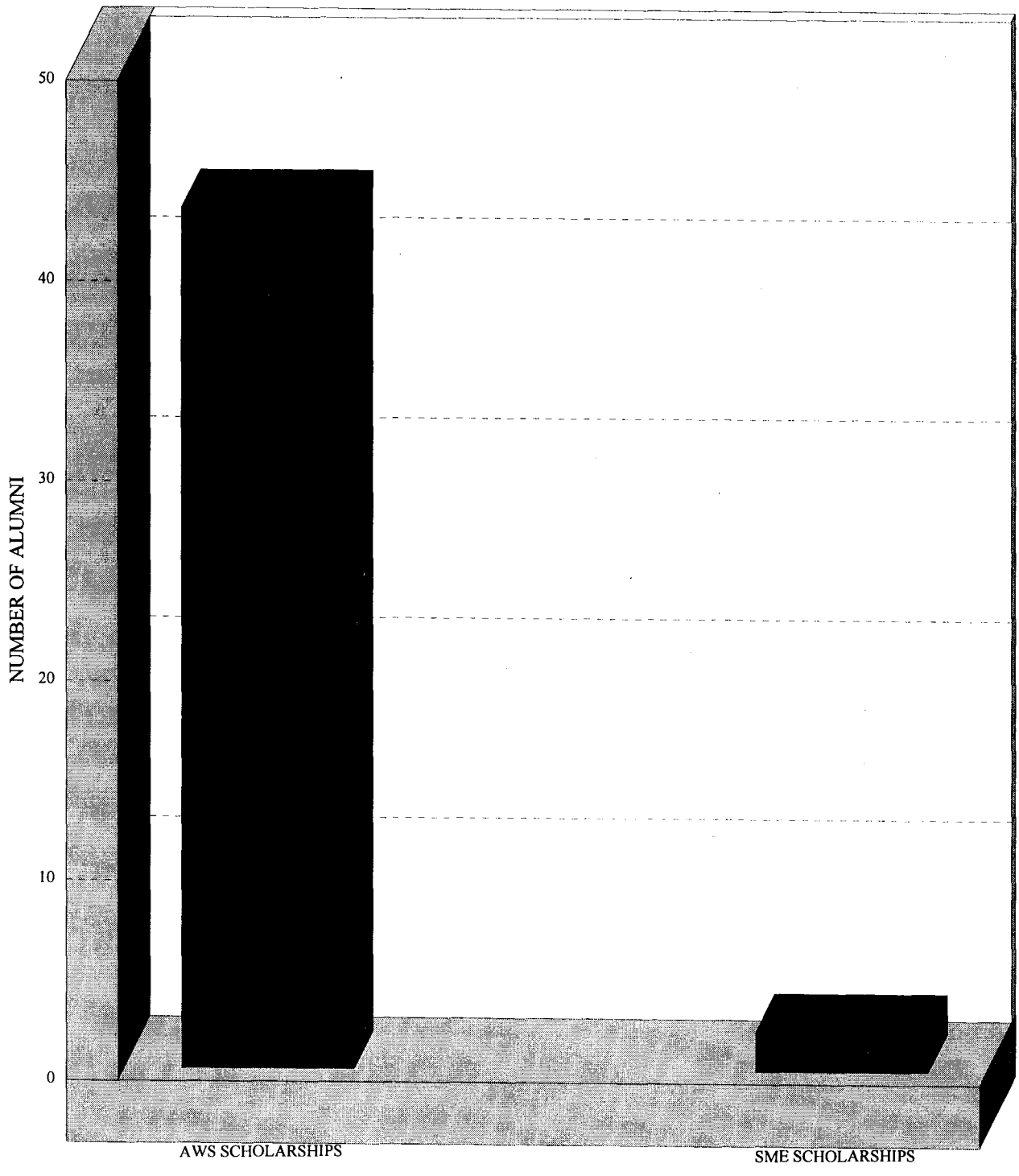
AMERICAN WELDING SOCIETY SCHOLARSHIPS
WELDING ENGINEERING TECHNOLOGY MAJORS



TOTAL VALUE OF SCHOLARSHIPS AT F.S.U.

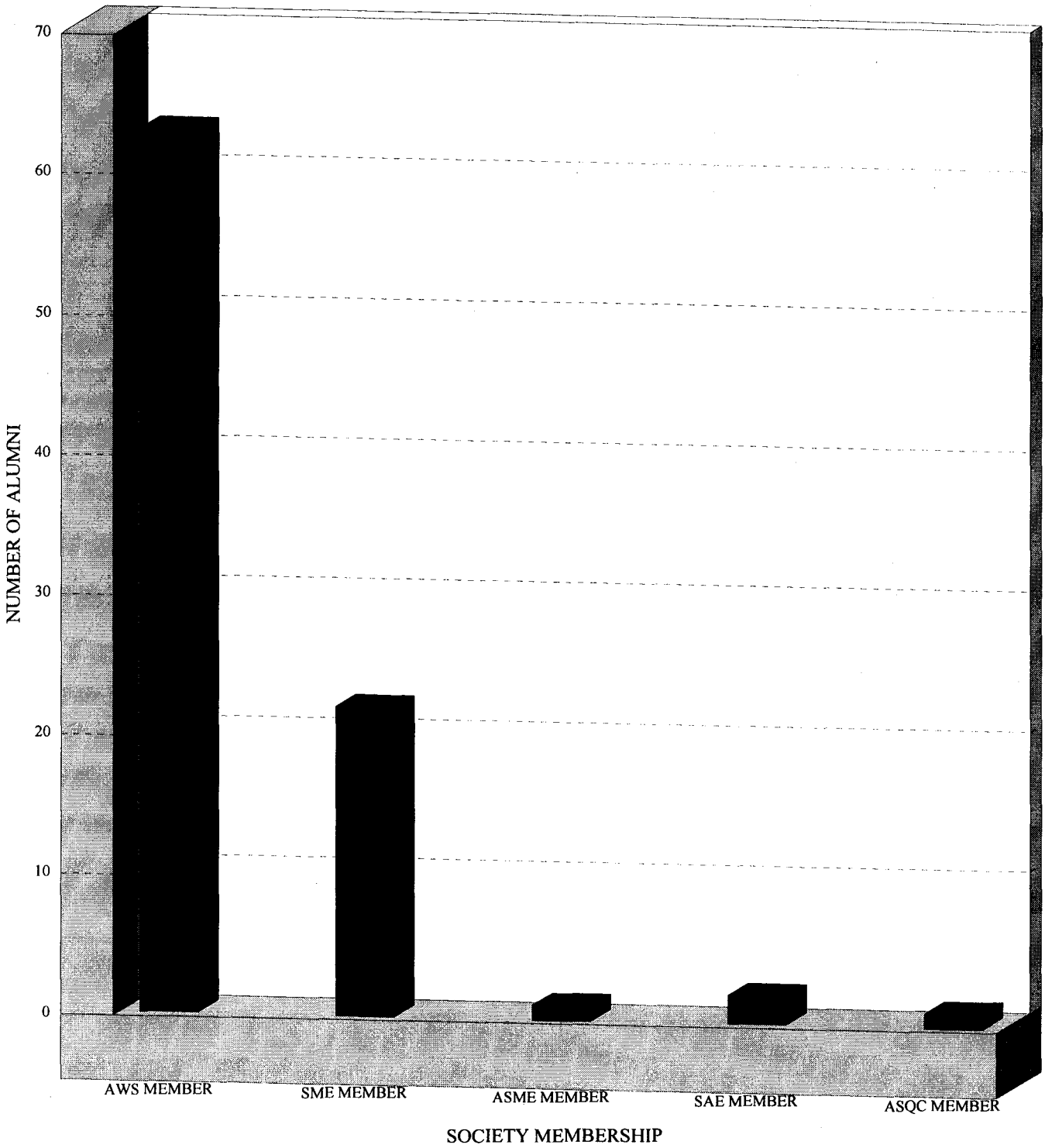
ALUMNI SCHOLARSHIPS & AWARDS AT F.S.U.

WELDING ENGINEERING TECHNOLOGY ALUMNI

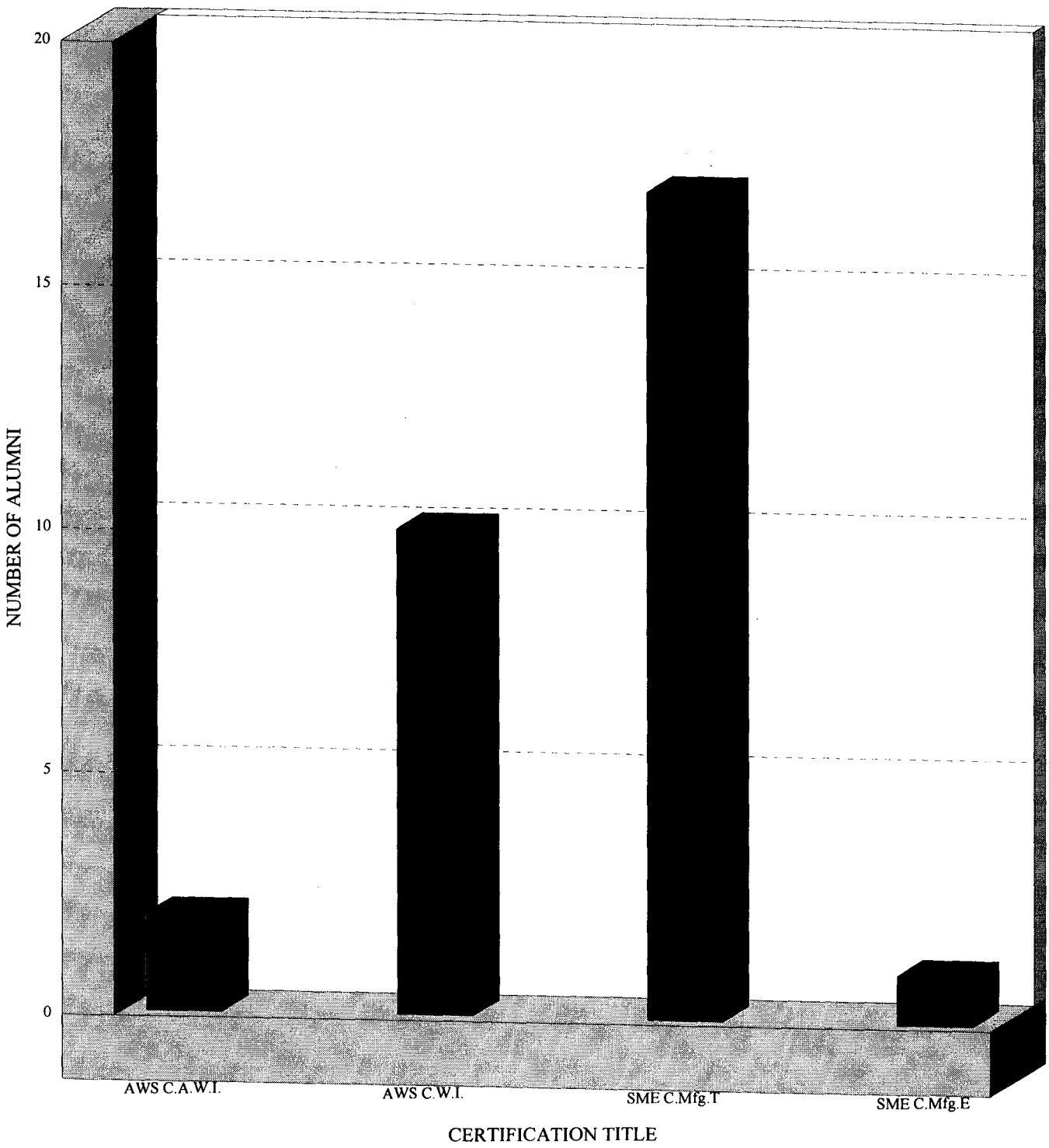


PROFESSIONAL AFFILIATIONS

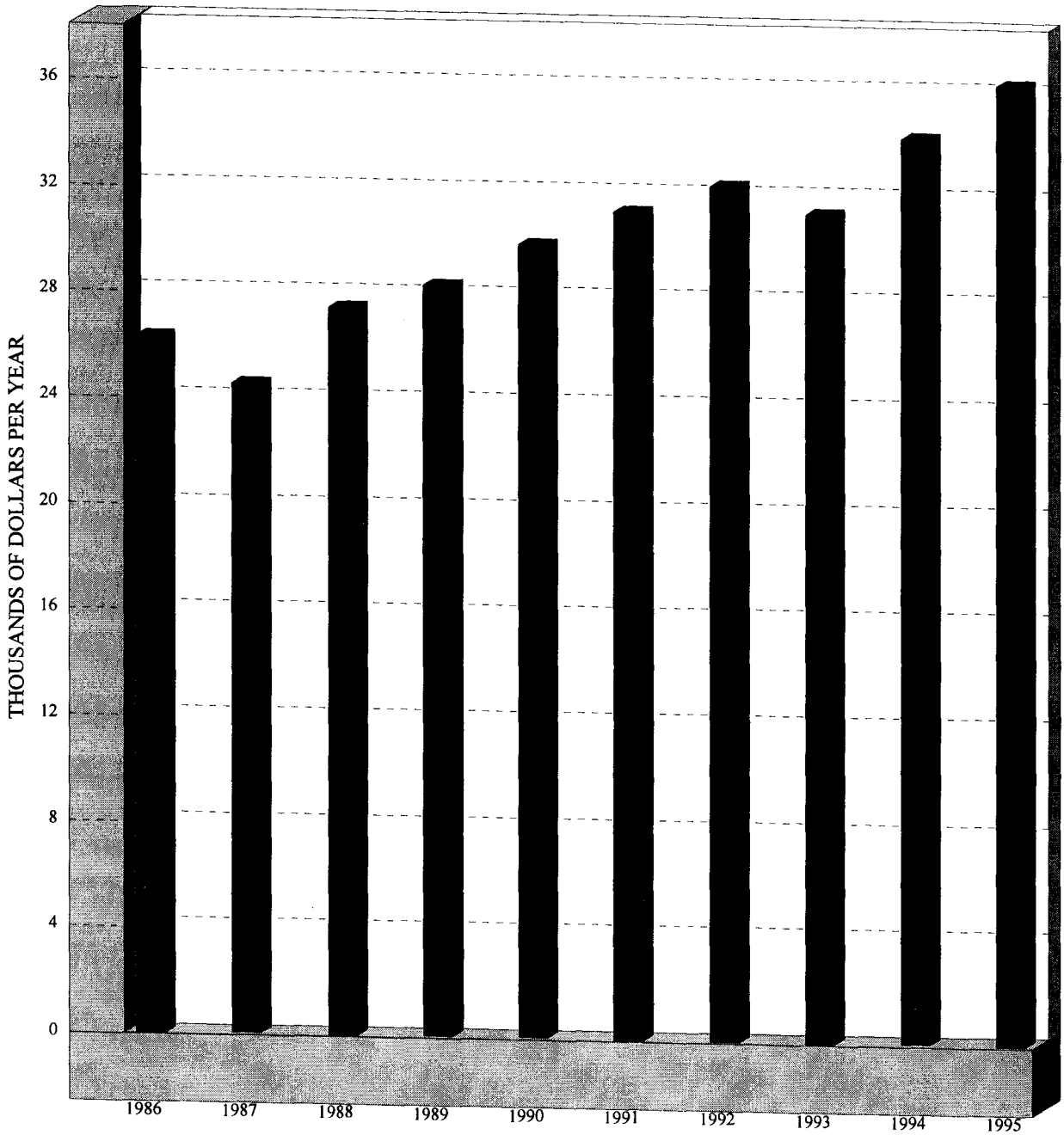
WELDING ENGINEERING TECHNOLOGY ALUMNI



PROFESSIONAL CERTIFICATIONS
WELDING ENGINEERING TECHNOLOGY ALUMNI



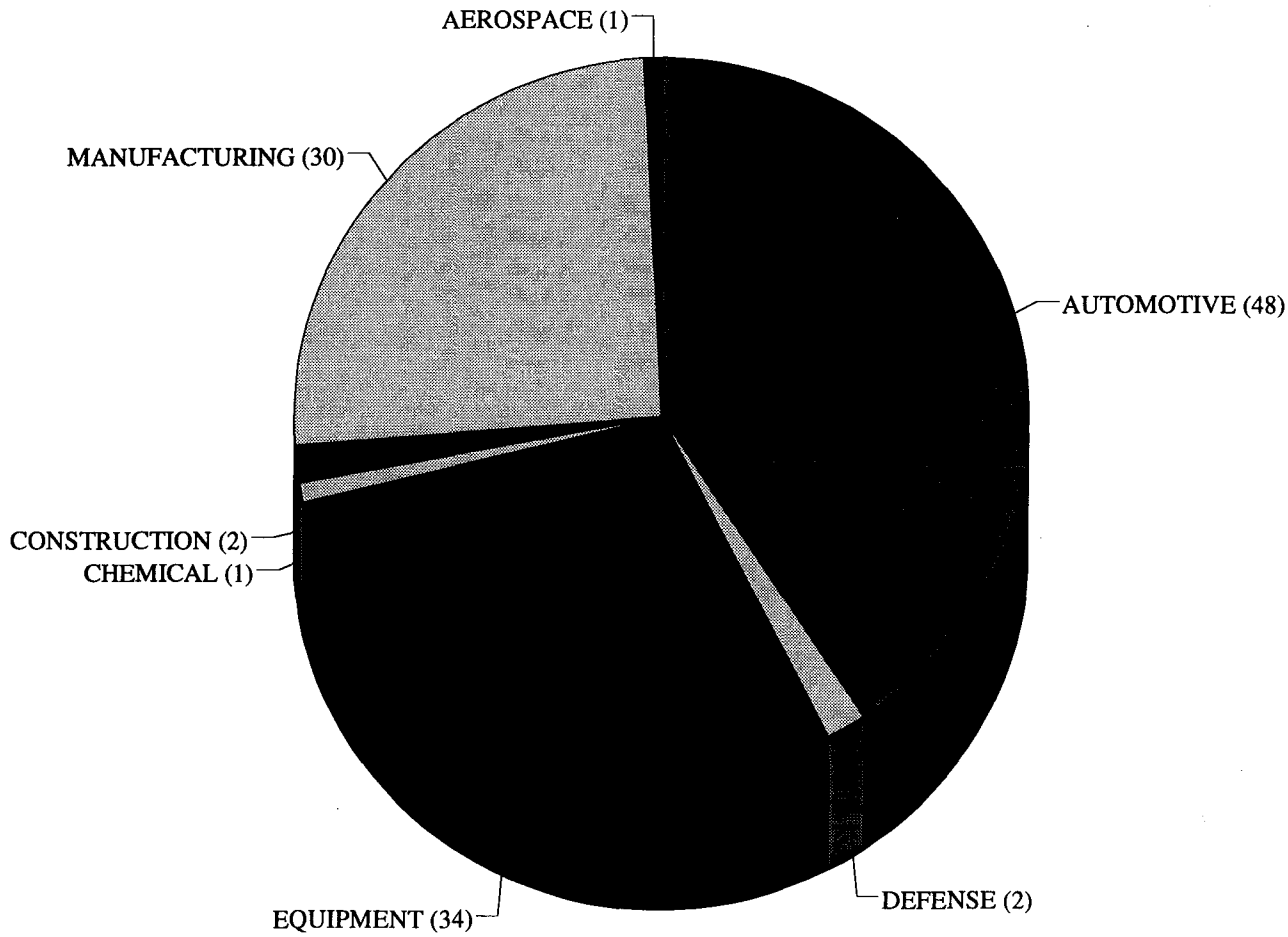
AVERAGE STARTING SALARIES
WELDING ENGINEERING TECHNOLOGY



SOURCE: F.S.U. PLACEMENT OFFICE

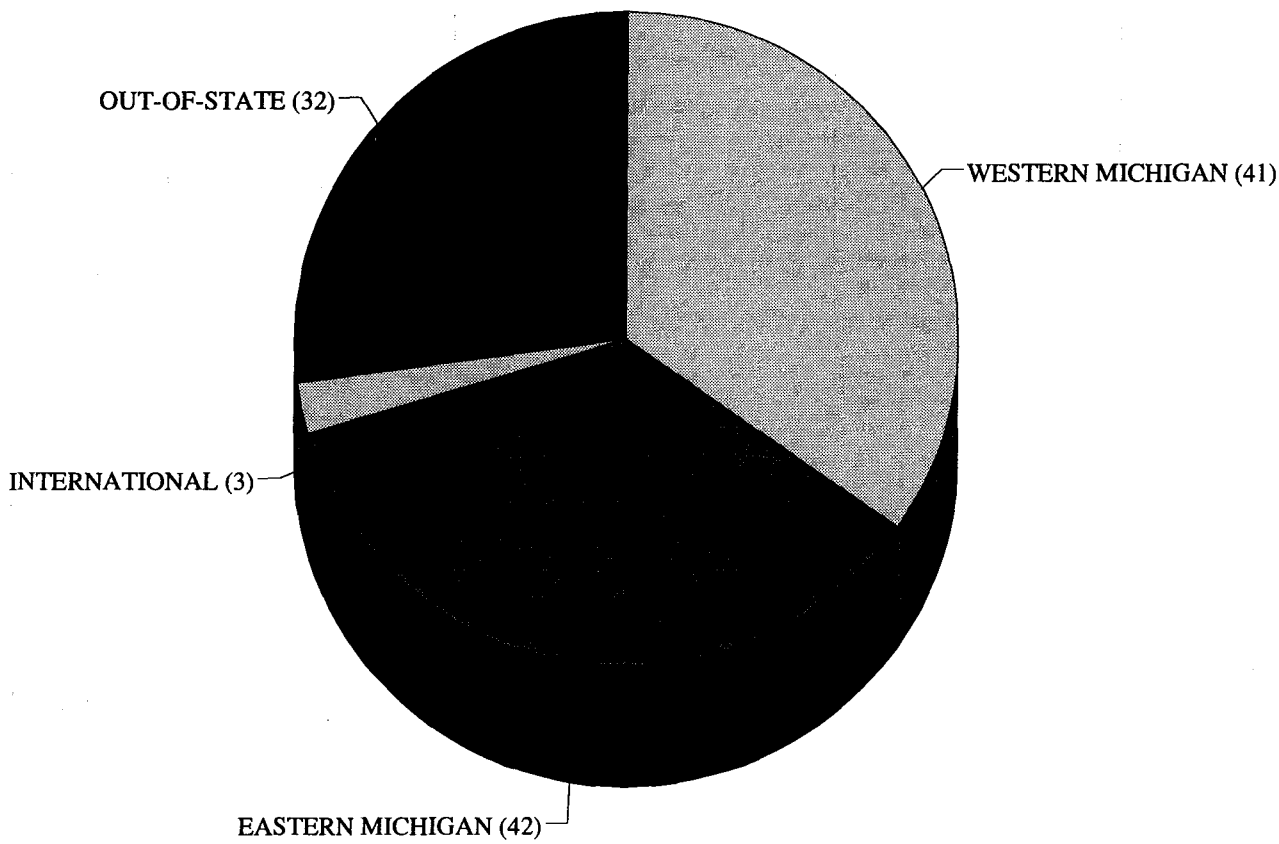
INDUSTRIES THAT EMPLOY F.S.U. GRADS

WELDING ENGINEERING TECHNOLOGY



PLACEMENT LOCATION OF GRADUATES

WELDING ENGINEERING TECHNOLOGY



JOB TITLES OF WELDING ENGINEERING TECHNOLOGY GRADUATES

- ***Technical Engineering*****.....*Advanced Manufacturing Engineer***
  Application Engineer
  Application Specialist
  Associate Project Engineer
  Body Assembly Engineer
  Design Engineer
  Floor Support Engineer
  Industrial Engineer
  International Engineer
  Manufacturing Engineer
  Mechanical Engineer
  Project Engineer
  Private Construction Engineer
  Process Engineer
  Project Design Engineer
  Product Engineer
  Purchasing Engineer
  Quality Control Engineer
  Robotic Engineer
  Robotic Systems Engineer
  Sales Engineer
  Senior Contract Engineer
  Senior Manufacturing Engineer
  Senior Process Engineer
  Senior Project Engineer
  Senior Tooling Engineer
  Senior Welding Engineer
  Specialist Production Engineer
  Technical Sales Engineer
  Tool Assembly Engineer
  Training and Development Engineer
  Welding Engineer
  Welding Manufacturing Engineer
  Welding Process Engineer
  Welding Robotics Engineer
  Welding Technologist

JOB TITLES OF WELDING ENGINEERING TECHNOLOGY GRADUATES

- ***Management*****.....***Account Manager*
  Area Sales Manager
  Assembly Supervisor
  Construction Manager
  Cost Analysis
  District Manager
  District Regional Sales Manager
  General Manager
  Managing Director
  President
  Private Construction Developer
  Project Manager
  Plant Engineering Supervisor
  Plant Manager
  Program Manager
  Quality Assurance Manager
  Vice President
  Vice President of Manufacturing
  Welding Department Manager

- **Sales.....***Sales Engineer*
  Sales Representative
  Technical Sales Representative

- **Inspection.....***Quality Assurance Inspector*

STATES WHICH EMPLOY
FERRIS STATE UNIVERSITY
WELDING ENGINEERING TECHNOLOGY ALUMNI

Northeast**.....***Connecticut***
Massachusetts
New Jersey

Midatlantic**.....***North Carolina***
Pennsylvania
South Carolina
Tennessee
Virginia
West Virginia
Florida

Midwest**.....***Illinois***
Indiana
Iowa
Kansas
Kentucky
Michigan
Missouri
Nebraska
Ohio
Oklahoma
Wisconsin

West & Southwest**....***Arizona***
California
Colorado
Texas
Utah

INTERNATIONAL ASSIGNMENTS OF F.S.U. GRADUATES

Australia

Canada

China

England

France

Germany

Holland

Italy

Japan

Mexico

Russia

Sweden

Thailand

COMPANIES THAT EMPLOY FERRIS STATE UNIVERSITY WELDING ENGINEERING TECHNOLOGY GRADUATES

ABB Robotics Incorporated, Troy, MI

Acutus Industries, Pontiac, MI

Accubuilt Incorporated, Jackson, MI

Action Automation Incorporated, Fraser, MI

Advanced Robotic Concepts, Garden City, MI

Aerotech, Lansing, MI

AGA Gas & Welding, Grand Rapids, MI

Alcan Automotive Structures, Southfield, MI

Allied Technical Services, Midland, MI

Ameco Incorporated, Grand Haven, MI

American Seating Company, Grand Rapids, MI

Anatek Incorporated, Midland, MI

A.P. Parts, Granger, IN

Argus & Associates Incorporated, Wixom, MI

Arvin Industries, Pulaski, TN

Atlantic Tool and Die, Strongsville, OH

Bentler Industries Incorporated, Engineering & Training, Gailsburg, MI

Benteler Industries Incorporated, Grand Rapids, MI

Benteler Industries Incorporated, Kalamazoo, MI

Black & Decker Corporation, Warren Division, Mt. Clemens, MI

BMY Corporation, York, PA

Welding Technology; Welding Engineering Technology

APRC 1996-1997

Section 2 of 3

COMPANIES THAT EMPLOY FERRIS STATE UNIVERSITY WELDING ENGINEERING TECHNOLOGY GRADUATES

Bolt Design Company, Midland, MI

Bos Consulting & Design, Grand Rapids, MI

Bradford White Corporation, Grand Rapids, MI

Burroughs Corporation, Elkart, IN

Candid Logic Incorporated, Madison Heights, MI

Center Manufacturing, Grand Rapids, MI

Clark Manufacturing, Traverse City, MI

Cloos Corporation, Elgin, IL

CMI International, McDaniel Tank Division, Holly, MI

Copeland Corporation, OH

CRC Evans Corporation, Houston, TX

Dana Corporation, Reading, PA

Detroit Center Tool, Detroit, MI

Douglas Autotech Corporation, Bronson, MI

Dura Automotive Systems Incorporated, East Jordan, MI

Dow Chemical Corporation, Midland, MI

Engineering Manufacturing Services, Madison Heights, MI

Fabricator Incorporated, Kincheloe, MI

Fanuc Robotics Corporation, Auburn Hills, MI

Ferranti Sciaky International, Chicago, IL

Fischer Welding, Troy, MI

COMPANIES THAT EMPLOY FERRIS STATE UNIVERSITY WELDING ENGINEERING TECHNOLOGY GRADUATES

Ford Motor Company, Allen Park, MI

Ford Motor Company, Power Train Operations, Sterling Heights, MI

Ford Motor Company, Dearborn, MI

Ford Motor Company, Wixom Assembly, Wixom, MI

Gabriel Incorporated, Pulaski, TN

Gencorp Automotive, Logansport, IN

General Dynamics Corporation, Fort Worth, TX

General Motors Corporation, Fisher Guide Division, Flint, MI

General Motors Corperation, Electric Car Division, Lansing, MI

General Motors Corporation, CPC Division, Warren, MI

General Motors Corperation, LAD Division, Warren, MI

General Welders Incorporated, Grand Rapids, MI

Genesis Systems Limited, Davenport, IA

Gill Manufacturing, Grand Rapids, MI

Goshen Industries, Goshen, IN

Hart & Cooley, Holland, MI

H&H Engineering, Muthuen, MA

Hess Engineering Incorporated, Niles, MI

Hobart Brothers Company, Troy, MI

Hoke Incorporated, Spartanburg, SC

H.R.U. Technical Resources Incorporated, Warren, MI

COMPANIES THAT EMPLOY FERRIS STATE UNIVERSITY WELDING ENGINEERING TECHNOLOGY GRADUATES

Integrated Metal Technology Incorporated, Spring Lake, MI

ITT Automotive Group, Elsie, MI

J.I. Case, Moline, IL

Kalamazoo Stamping and Die Corporation, Kalamazoo, MI

K & M Fabrication, Cassopolis, MI

Kuka Robotics, Clawson, MI

Lear Seating Corporation, World Headquaters, Southfield, MI

Lear Siegler, Truck Products Corporation, Muskegon, MI

Lenawee Stamping Corporation, Tecumseh, MI

Liberty Engineering Company, CBI Transportation Group, Troy, MI

Lift Tech International, Crane & Hoist Divison, Muskegon, MI

Lincoln Electric Company, Cleveland, OH

Lockheed, Fort Worth, TX

Lob Dell Emery Corporation, Alma, MI

L-Tec Corporation, Cleveland, OH

LTV Corporation, Aerospace and Defense Division, Dallas, TX

L & W Engineering Company, Belleville, MI

Modern Engineering, Warren, MI

Mark One Corporation, Gaylord, MI

Masco Industries, R & B Manufacturing, Hamburg, MI

Mascotech Stamping Technologies, Rochester Hills, MI

Mazda Motors Corporation, U.S.A. Division, Flat Rock, MI

COMPANIES THAT EMPLOY FERRIS STATE UNIVERSITY WELDING ENGINEERING TECHNOLOGY GRADUATES

McInerney Incorporation, Grand Rapids, MI

Metal Standard Corporation, Holland, MI

Michigan Arc Products, Troy, MI

Micro Alloy, Houston, TX

Miller Electric Manufacturing Company, Appleton, WI

MSI Stamping, Battle Creek, MI

National Element Incorporated, Troy, MI

National Standard, Niles, MI

Nissan Motors Corporation, Nashville, TN

OIK Industries, Kalamazoo, MI

Olofsson Corporation, Fabrication Division, Kincheloe, MI

OTD Corporation, South Bend, IN

Pandrol Jackson Corporation, Ludington, MI

Power Tools Plus Incorporated, Rochester Hills, MI

Plymouth Wayne Welding, Garden City, MI

Quincy Industries, Quincy, MI

Quincy L.P., Jonesville, MI

Rich Manufacturing Corporation, Grandbury, NJ

Resistance Welding Corporation, Bay City, MI

Robotic Production Technology, Madison Heights, MI

Roy Smith Company, Detroit, MI

COMPANIES THAT EMPLOY FERRIS STATE UNIVERSITY WELDING ENGINEERING TECHNOLOGY GRADUATES

R.J. Tower Corporation, Romulus, MI

Saturn Company, Troy, MI

South West Mobile Systems, West Plains, MO

Special Welding Services Incorporated, Saginaw, MI

Stageright Corporation, Clare, MI

Steelcase Corporation, Grand Rapids, MI

Tech Welding Corporation, Troy, MI

Technical Solutions, Jackson, MI

Tenneco Corporation, Monroe Automotive Division, Cozad, NE

Tenneco Corporation, Newport News, Shipbuilding Division, Newport News, VA

Tenneco Corporation, Walker Manufacturing Division, Argos, IN

Tenneco Corporation, Walker Manufacturing Division, Culver, IN

Tenneco Corporation Walker Manufacturing Division, Kalamazoo, MI

Tenneco Corporation Walker Manufacturing Division, Ligonier, IN

Tenneco Corporation, Walker Manufacturing Division, Marshall, MI

Thermadyne Industries, Bowling Green, KY

Thrall Car Manufacturing Company, Chicago Heights, IL

Tool and Accessory Company, Auburn Hills, MI

Total Petroleum Corporation, Alma, MI

Toyota, Industrial Equipment Division, Columbus, IN

Townsend and Bottum Incorporated, Ann Arbor, MI

COMPANIES THAT EMPLOY FERRIS STATE UNIVERSITY WELDING ENGINEERING TECHNOLOGY GRADUATES

TRW-VSSI, Queen Creek, AZ

U.S. Manufacturing Corporation, Lexington, MI

Union Pump Corporation, Battle Creek, MI

United States Army National Guard, Engineering Corps

United Technologies, Pratt and Whitney Division, East Hartford, CT

Utica Enterprises, Shelby Twp., MI

Utilase Incorporated, Detroit, MI

Viscal, Angola, IN

Voyager Products, Elkart, IN

Voest Alpine Services & Technologies, Lindon, UT

Vulcan Industries, White Pigeon, MI

Welding Engineering and Products Company, Madison Heights, MI

West Shore Welding Services, Ludington, MI

Wilson Automation Company, Warren, MI

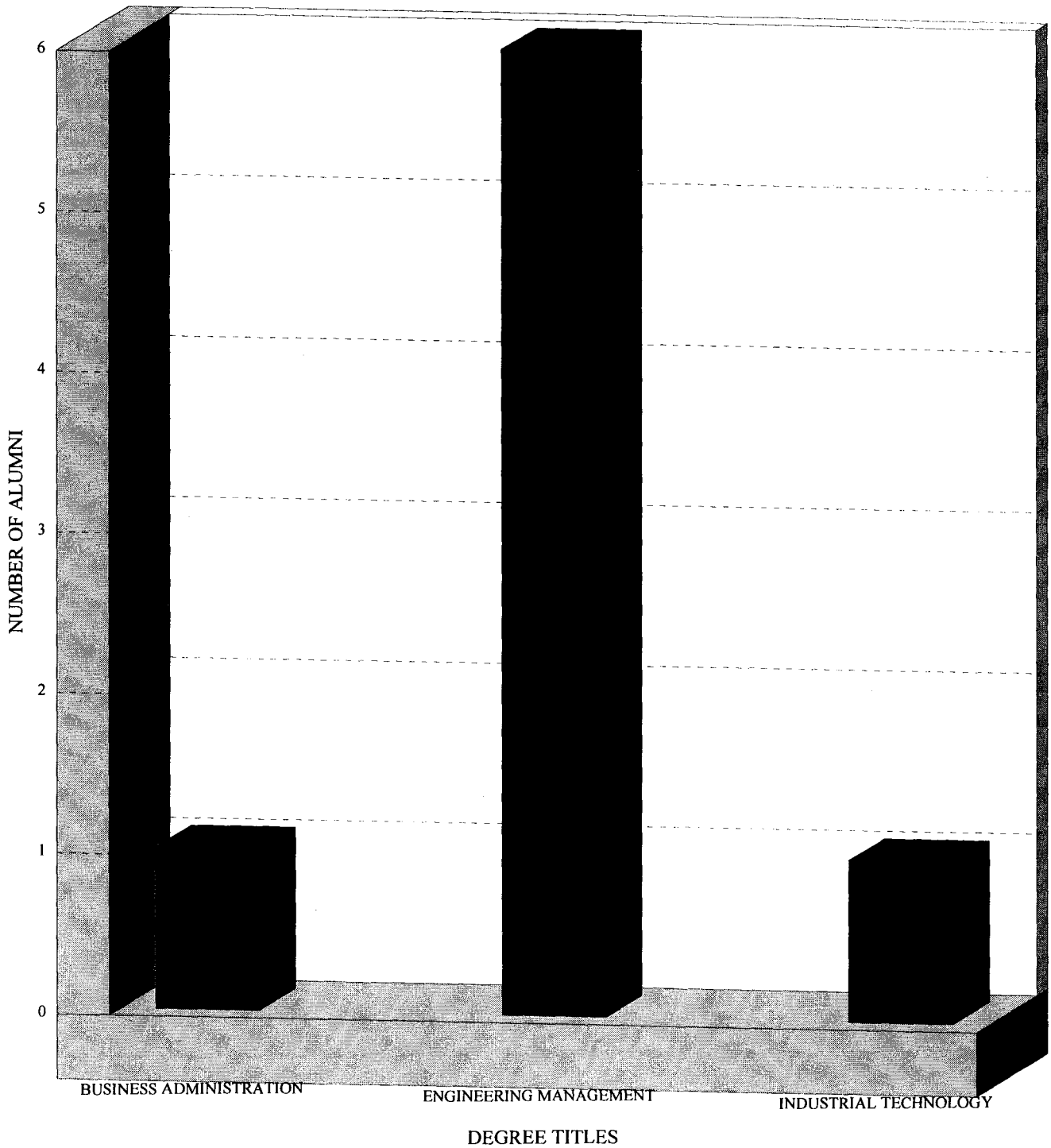
Wohlert Corporation, Lansing, MI

Yale Corporation, Material Handling Division, Greenville, NC

Yamakawa Corporation, Portland, TN

WELDING ENGINEERING TECHNOLOGY ALUMNI

WITH OR WORKING ON MASTERS DEGREES



COMPANIES THAT MONETARILY SUPPORT THE WELDING ENGINEERING TECHNOLOGY CURRICULUM AT FERRIS STATE UNIVERSITY

- *AC Delco, Coopersville, MI*
- *Bradford White Corp., Middleville, MI*
- *Consumers Power, Jackson, MI*
- *Convergent Energy, Sturbridge, Mass*
- *Dake Inc., Grand Haven, MI*
- *Detroit Edison, Detroit, MI*
- *Flex-Cable and Furnace Products, Troy, MI*
- *Ford Motor Corp., Dearborn, MI*
- *Genesis Systems Limited, Davenport, IA*
- *GWI Engineering Division, Grand Rapids, MI*
- *Hobart Brothers Company, Troy, OH*
- *Intergrated Metals, Spring Lake, MI*
- *Laser Machining Inc., Somerset, WI*
- *Lietelt Iron Works, Grand Rapids, MI*
- *Medar, Farmington Hills, MI*
- *Milco Manufacturing Co., Warren, MI*
- *Miller Electric Manufacturing Co., Appleton, WI*
- *Morbark, Winn, MI*
- *Roman Manufacturing Inc., Grand Rapids, MI*
- *Saginaw Control, Saginaw, MI*
- *Savair Inc., St. Clair Shores, MI*
- *Sparta Sheet Metal, Grand Rapids, MI*
- *Square D Company, Troy, MI*
- *The Lincoln Electric Co., Cleveland, OH*
- *Tregakiss, Ltd., Windsor, Ontario, Canada*
- *Utilase Systems Incorporated, Detroit, MI*
- *Van Dam Iron Works, Grand Rapids, MI*
- *Warren Division, Black & Decker, Detroit, MI*

WELDING ENGINEERING TECHNOLOGY
STUDENT OF THE YEAR

1986 Bill Powell, Manufacturing Engineer
Lockheed -Martin Corporation
Fort Worth, TX

1987 Randy Hotinsky, Process Engineer
Tenneco Automotive
Marshall, MI

1988 Rick Moe, Construction Manager
Dow Chemical Corporation
Midland, MI

1989 Tim Ederer, Manufacturing Engineer
Steelcase Corporation
Grand Rapids, MI

1990 Harlon Neumann, Project Engineer
Genesis Systems Limited
Davenport, IA

1991 Jon Root, Plant Engineer
L & W Engineering
Holland, MI

1992 Rick Leow, Plant Manager
Acemco Incorporated
Grand Haven, MI

1993 Robert Jozwiak, Application Engineer
Roy Smith Company
Detroit, MI

1994 Todd McEllis, Welding Engineer
Accubilt Automated Systems
Jackson, MI

1995 Tim Ruth, Process Engineer
Ford Motor Company
Dearborn, MI

FERRIS STATE UNIVERSITY

September 12, 1996

Welding Program Alumni, Employer, Advisory Board Member

Since the 1980's, regular academic program review has come to be seen as an essential part of curricular and institutional planning in higher education. Programs at Ferris State University with external accrediting agencies have always had to produce self-study reports periodically. The 1987 North Central Association site visit team mandated that the institution develop a program review process for all academic programs at the University.

The goal of program review 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, every academic program will have the opportunity to examine itself using a variety of survey instruments and other measures. The resultant self-study will permit the program, department, college, Division of Academic Affairs, and the University to make informed decisions about curricular issues and resource allocations.

During the 1996/97 academic year, the Welding Technology and Welding Engineering Technology programs at Ferris will be reviewed. A vital part of the review process will be your professional input. Enclosed find a survey that we request you complete. Please return the NCS answer sheet and your written responses in the addressed stamped envelope by October 11, 1996. The survey should take 15-20 minutes to complete. Individual responses are confidential but the overall responses will be analyzed to help determine the status, trend, and future of the welding programs at Ferris.

Your participation in this survey is critical in order for us to get an accurate review of our welding programs. On behalf of the students and faculty of the Welding Technology and Welding Engineering Technology programs, I thank you for your time and input.

Sincerely,

K. Kuk

Kenneth A. Kuk, C.Mfg.E.
Professor and Faculty Coordinator

Encl.

h:\users\faysall\faculty\weld\programr\survltr.doc

MANUFACTURING ENGINEERING TECHNOLOGIES DEPARTMENT
COLLEGE OF TECHNOLOGY
915 Campus Drive, Swan 107/109, Big Rapids, MI 49307-2291
Phone 616 592-2511 or 616 592-5979 Fax 616 592-2407

Welding Engineering Technology
Program Content Application Survey

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

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

BEGINNING OF A.A.S. PROGRAM

Please fill in the appropriate response to the following questions.

	To a Great Extent	Somewhat	Neutral	Very Little	Not at All
Fall First Year					
1. Welding Processes 1 (WELD 111, 8 credits) For students in associate degree or bachelor degree programs in welding. Practical experience in the use of oxy-acetylene, gas metal arc welding, and shielded metal arc welding of steel sheet and plate in the flat position. An introduction to oxy-acetylene cutting procedures.	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. Engineering Graphics (ETEC 140, 2 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
Winter First Year					
4. Welding Processes 2 (WELD 121, 8 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 n 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

(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
11. Manufacturing Processes (MFGT 150, 2 credits) 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.	A	B	C	D	E
General Education:					
12. Science: Introductory Physics (PHYS 211, 4 credits) Basic concepts and applications of motion, force, energy, fluids, heat and sound.	A	B	C	D	E
13. Mathematics: Intermediate Algebra & Numerical Trigonometry (MATH 116, 4 credits) 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.	A	B	C	D	E
14. Cultural Enrichment (IN GENERAL, 3 credits)	A	B	C	D	E
. Social Awareness (IN GENERAL, 3 credits)	A	B	C	D	E

BEGINNING OF B.S. PROGRAM

Fall Third Year					
16. Welding Automation & Robotics (WELD 311, 4 credits) 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.	A	B	C	D	E
17. Design of Weldments (WELD 312, 3 credits) 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.	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
24. 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
25. 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
26. 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
Winter Fourth Year	**To a Great Extent**	**Somewhat**	**Neutral**	**Very Little**	**Not at All**
. 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
28. 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
General Education					
29. 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)

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
35.	Overall Technical training	A	B	C	D	E
36.	Gaining a broad general education about different fields of knowledge	A	B	C	D	E
37.	Writing clearly and effectively	A	B	C	D	E
38.	Acquiring proficiency with the use of personal computers	A	B	C	D	E
39.	Developing values and ethical standards	A	B	C	D	E
40.	The ability to think analytically and logically	A	B	C	D	E
41.	The ability to learn on your own, pursue ideas, and find information you need	A	B	C	D	E
42.	How effectively did the Ferris welding program(s) prepare you for employment?	A	B	C	D	E

The following pages should be returned with your answer sheet. Thank you.

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

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

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

46. 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

47. 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

8. 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

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

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

51. 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

Your thoughtful responses to the following questions are especially necessary and appreciated.

52. **What do you believe was the most valuable part of your coursework? (please write in your response)**

53. **What do you believe was the least valuable part of your coursework? (please write in your response)**

54. **What trends in the welding industry do you see impacting the welding program(s) in the next five years? (please write in your response)**

55. **In general, how satisfied were you with your overall experience in the welding program(s) at Ferris State University?**
    - A. To a great extent
    - B. Somewhat
    - C. Neutral
    - D. Very little
    - E. Not at all

56. **Would you recommend the welding program(s) to a friend or relative?**
    - A. Yes
    - B. No
    - C. Not sure

Thank You

Please enclose your answer sheet and this page in the enclosed envelop by October 11, 1996.

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Q1 Welding Process 1	Advisory Board	AAS Graduates	BS Graduates	Employers	Average
To a Great Extent	86%	76%		56%	75%
Somewhat	14%	22%		33%	22%
Neutral		2%		11%	3%
Very Little					
Not at All					
TOTAL	100%	100%	0%	100%	100%
Valid Cases	7	54		9	65
Missing Cases	1	2		0	13
Q2 Welding Graphics	Advisory Board	AAS Graduates	BS Graduates	Employers	Average
To a Great Extent	100%	80%		78%	82%
Somewhat		17%		22%	15%
Neutral		2%			2%
Very Little		2%			2%
Not at All					
TOTAL	100%	100%	0%	100%	100%
Valid Cases	7	54		9	54
Missing Cases	1	2		0	13
Q3 Engineering Graphics	Advisory Board	AAS Graduates	BS Graduates	Employers	Average
To a Great Extent	100%	57%		67%	63%
Somewhat		32%		22%	28%
Neutral		6%		11%	5%
Very Little		4%			3%
Not at All		2%			2%
TOTAL	100%	100%	0%	100%	100%
Valid Cases	7	54		9	65
Missing Cases	1	2		0	13
Q4 Welding Processes 2	Advisory Board	AAS Graduates	BS Graduates	Employers	Average
To a Great Extent	100%	87%		78%	88%
Somewhat		11%		22%	11%
Neutral		2%			2%
Very Little					
Not at All					
TOTAL	100%	100%	0%	100%	100%
Valid Cases	7	54		9	65
Missing Cases	1	2		0	13
Q5 Intro Material Sci	Advisory Board	AAS Graduates	BS Graduates	Employers	Average
To a Great Extent	71%	51%		44%	55%
Somewhat	29%	42%		56%	39%
Neutral		2%			2%
Very Little		6%			5%
Not at All					
TOTAL	100%	100%	0%	100%	100%
Valid Cases	7	53		9	64
Missing Cases	1	3		0	14

Q6 Welding Fabrication	Advisory Board	AAS Graduates	BS Graduates	Employers	Average
To a Great Extent	100%	83%		78%	83%
Somewhat		13%		22%	14%
Neutral		2%			2%
Very Little		2%			2%
Not at All					
TOTAL	100%	100%	0%	100%	100%
Valid Cases	7	53		9	64
Missing Cases	1	3		0	14
Q7 Quality Testing	Advisory Board	AAS Graduates	BS Graduates	Employers	Average
To a Great Extent	57%	59%		22%	61%
Somewhat	43%	30%		56%	30%
Neutral		9%		22%	8%
Very Little		2%			2%
Not at All					
TOTAL	100%	100%	0%	100%	100%
Valid Cases	7	53		9	64
Missing Cases	1	3		0	14
Q8 Welding Fabrications 2	Advisory Board	AAS Graduates	BS Graduates	Employers	Average
To a Great Extent	100%	91%		89%	91%
Somewhat		6%			6%
Neutral		4%		11%	3%
Very Little					
Not at All					
TOTAL	100%	100%	0%	100%	100%
Valid Cases	7	53		9	64
Missing Cases	1	3		0	14
Q9 Intro Welding Automation	Advisory Board	AAS Graduates	BS Graduates	Employers	Average
To a Great Extent	100%	79%		78%	80%
Somewhat		11%		11%	11%
Neutral		8%		11%	8%
Very Little		2%			2%
Not at All					
TOTAL	100%	100%	0%	100%	100%
Valid Cases	7	53		9	64
Missing Cases	1	3		0	14
Q10 Elec Tech Welding 1	Advisory Board	AAS Graduates	BS Graduates	Employers	Average
To a Great Extent	71%	51%		44%	50%
Somewhat	29%	32%		56%	34%
Neutral		9%			8%
Very Little		6%			6%
Not at All		2%			2%
TOTAL	100%	100%	0%	100%	100%
Valid Cases	7	53		9	64
Missing Cases	1	3		0	14

Q11 Manufacturing Processes	Advisory Board	AAS Graduates	BS Graduates	Employers	Average
To a Great Extent	14%	43%		56%	40%
Somewhat	29%	39%		11%	40%
Neutral	43%	17%		33%	17%
Very Little	14%	2%			3%
Not at All					
TOTAL	100%	100%	0%	100%	100%
Valid Cases	7	54		9	65
Missing Cases	1	2		0	13
Q12 Intro Physics	Advisory Board	AAS Graduates	BS Graduates	Employers	Average
To a Great Extent	33%	21%		25%	22%
Somewhat	50%	53%		38%	53%
Neutral	17%	11%		13%	11%
Very Little		13%		25%	13%
Not at All		2%			2%
TOTAL	100%	100%	0%	100%	100%
Valid Cases	6	54		8	64
Missing Cases	2	2		1	14
Q13 Inter Alg & Num Trig	Advisory Board	AAS Graduates	BS Graduates	Employers	Average
To a Great Extent	43%	42%		33%	42%
Somewhat	43%	42%		44%	42%
Neutral	14%	8%		11%	6%
Very Little		9%		11%	8%
Not at All					2%
TOTAL	100%	100%	0%	100%	100%
Valid Cases	7	53		9	64
Missing Cases	1	3		0	14
Q14 Cultural Enrichment	Advisory Board	AAS Graduates	BS Graduates	Employers	Average
To a Great Extent		7%			6%
Somewhat	14%	20%		11%	23%
Neutral	29%	46%		44%	43%
Very Little	43%	15%		33%	17%
Not at All	14%	11%		11%	11%
TOTAL	100%	100%	0%	100%	100%
Valid Cases	7	54		9	65
Missing Cases	1	2		0	13
Q15 Social Awareness	Advisory Board	AAS Graduates	BS Graduates	Employers	Average
To a Great Extent		9%			8%
Somewhat	14%	22%		11%	25%
Neutral	29%	43%		44%	40%
Very Little	57%	17%		44%	20%
Not at All		9%			8%
TOTAL	100%	100%	0%	100%	100%
Valid Cases	7	54		9	65
Missing Cases	1	2		0	13

Q16 Automation Robotics	Advisory Board	AAS Graduates	BS Graduates	Employers	Average
To a Great Extent	100%		90%	75%	87%
Somewhat			10%	13%	11%
Neutral				13%	2%
Very Little					
Not at All					
TOTAL	100%	0%	100%	100%	100%
Valid Cases	8		29	8	47
Missing Cases	0		1	1	31
Q17 Design of Weldments	Advisory Board	AAS Graduates	BS Graduates	Employers	Average
To a Great Extent	75%		69%	38%	66%
Somewhat	25%		24%	63%	26%
Neutral			3%		6%
Very Little			3%		2%
Not at All					
TOTAL	100%	0%	100%	100%	100%
Valid Cases	8		29	8	47
Missing Cases	0		1	1	31
Q18 Elec Tech for Welding	Advisory Board	AAS Graduates	BS Graduates	Employers	Average
To a Great Extent	75%		48%	38%	50%
Somewhat	13%		38%	50%	34%
Neutral	13%		10%	13%	9%
Very Little			3%		7%
Not at All					
TOTAL	100%	0%	100%	100%	100%
Valid Cases	8		29	8	44
Missing Cases	0		1	1	34
Q19 Laser Weld, Cut & Process	Advisory Board	AAS Graduates	BS Graduates	Employers	Average
To a Great Extent	50%		41%	25%	46%
Somewhat	38%		35%	50%	36%
Neutral			21%	13%	14%
Very Little	13%		3%	13%	5%
Not at All					
TOTAL	100%	0%	100%	100%	100%
Valid Cases	8		29	8	44
Missing Cases	0		1	1	34
Q20 Adv Resistance Weld	Advisory Board	AAS Graduates	BS Graduates	Employers	Average
To a Great Extent	63%		69%	38%	71%
Somewhat	25%		14%	38%	16%
Neutral	13%		14%	25%	11%
Very Little			3%		2%
Not at All					
TOTAL	100%	0%	100%	100%	100%
Valid Cases	8		29	8	44
Missing Cases	0		1	1	34

Q21 Statics & Strength	Advisory Board	AAS Graduates	BS Graduates	Employers	Average
To a Great Extent	75%		59%	38%	55%
Somewhat			35%	13%	34%
Neutral			7%	25%	7%
Very Little	13%			13%	2%
Not at All	13%			13%	2%
TOTAL	100%	0%	100%	100%	100%
Valid Cases			29	8	44
Missing Cases			1	1	34
Q22 Internship	Advisory Board	AAS Graduates	BS Graduates	Employers	Average
To a Great Extent	75%		90%	63%	84%
Somewhat	25%		7%	25%	9%
Neutral			3%	13%	5%
Very Little					2%
Not at All					
TOTAL	100%	0%	100%	100%	100%
Valid Cases	8		29	8	44
Missing Cases	0		1	1	34
Q23 Statistical Qual Control	Advisory Board	AAS Graduates	BS Graduates	Employers	Average
To a Great Extent	50%		35%	13%	39%
Somewhat	25%		41%	38%	34%
Neutral	25%		14%	13%	14%
Very Little			7%	38%	11%
Not at All			3%		2%
TOTAL	100%	0%	100%	100%	100%
Valid Cases	8		29	8	44
Missing Cases	0		1	1	34
Q24 Comp Aid Design	Advisory Board	AAS Graduates	BS Graduates	Employers	Average
To a Great Extent	25%		52%	25%	57%
Somewhat	50%		31%	25%	26%
Neutral	25%		14%	50%	15%
Very Little			3%		2%
Not at All					
TOTAL	100%	0%	100%	100%	100%
Valid Cases	8		29	8	46
Missing Cases	0		1	1	32
Q25 Material Science	Advisory Board	AAS Graduates	BS Graduates	Employers	Average
To a Great Extent	75%		72%	38%	67%
Somewhat	13%		17%	50%	24%
Neutral	13%		10%	13%	9%
Very Little					
Not at All					
TOTAL	100%	0%	100%	100%	100%
Valid Cases	8		29	8	46
Missing Cases	0		1	1	32

Q26 Engineering Econ	Advisory Board	AAS Graduates	BS Graduates	Employers	Average
To a Great Extent	38%		48%	13%	50%
Somewhat	63%		35%	50%	33%
Neutral			10%	38%	13%
Very Little			7%		4%
Not at All					
TOTAL	100%	0%	100%	100%	100%
Valid Cases	8		29	8	46
Missing Cases	0		1	1	32
Q27 Adv Welding Process	Advisory Board	AAS Graduates	BS Graduates	Employers	Average
To a Great Extent	50%		52%	13%	52%
Somewhat	25%		41%	38%	37%
Neutral	13%		3%	25%	7%
Very Little	13%		3%	25%	4%
Not at All					
TOTAL	100%	0%	100%	100%	100%
Valid Cases	8		29	8	46
Missing Cases	0		1	1	32
Q28 Proj Eng & Management	Advisory Board	AAS Graduates	BS Graduates	Employers	Average
To a Great Extent	63%		86%	63%	76%
Somewhat	38%		7%	13%	17%
Neutral			7%	25%	7%
Very Little					
Not at All					
TOTAL	100%	0%	100%	100%	100%
Valid Cases	8		21	8	46
Missing Cases	0		1	1	32
Q29 Prep Chemistry	Advisory Board	AAS Graduates	BS Graduates	Employers	Average
To a Great Extent	13%		17%		13%
Somewhat	38%		38%	38%	41%
Neutral	13%		38%	25%	28%
Very Little	25%		3%	38%	13%
Not at All	13%		3%		4%
TOTAL	100%	0%	100%	100%	100%
Valid Cases	8		29	8	46
Missing Cases	0		1	1	32
Q30 Applied Calculus	Advisory Board	AAS Graduates	BS Graduates	Employers	Average
To a Great Extent			3%		9%
Somewhat	50%		48%	25%	47%
Neutral	13%		14%	25%	11%
Very Little	13%		24%	25%	20%
Not at All	25%		10%	25%	13%
TOTAL	100%	0%	100%	100%	100%
Valid Cases	8		29	8	45
Missing Cases	0		1	1	33

Q31 Communications	Advisory Board	AAS Graduates	BS Graduates	Employers	Average
To a Great Extent	75%		76%	63%	70%
Somewhat	13%		14%	13%	15%
Neutral	13%		7%	25%	13%
Very Little			3%		2%
Not at All					
TOTAL	100%	0%	100%	100%	100%
Valid Cases	8		29	8	46
Missing Cases	0		1	1	32
Q32 Adv Technical Writing	Advisory Board	AAS Graduates	BS Graduates	Employers	Average
To a Great Extent	88%		79%	63%	80%
Somewhat	13%		17%	38%	17%
Neutral			3%		2%
Very Little					
Not at All					
TOTAL	100%	0%	100%	100%	100%
Valid Cases	8		29	8	46
Missing Cases	0		1	1	32
Q33 Cultural Enrichment	Advisory Board	AAS Graduates	BS Graduates	Employers	Average
To a Great Extent			3%		7%
Somewhat	25%		28%	13%	24%
Neutral	25%		41%	38%	33%
Very Little	38%		21%	38%	24%
Not at All	13%		7%	13%	13%
TOTAL	100%	0%	100%	100%	100%
Valid Cases	8		29	8	46
Missing Cases	0		1	1	32
Q34 Social Awareness	Advisory Board	AAS Graduates	BS Graduates	Employers	Average
To a Great Extent			7%		9%
Somewhat	25%		28%	13%	24%
Neutral	25%		38%	38%	30%
Very Little	38%		21%	38%	24%
Not at All	13%		7%	13%	13%
TOTAL	100%	0%	100%	100%	100%
Valid Cases	8		29	8	46
Missing Cases	0		1	1	32
Q35 Overall Tech Training	Advisory Board	AAS Graduates	BS Graduates	Employers	Average
To a Great Extent		65%	59%		66%
Somewhat		32%	35%		31%
Neutral		2%	3%		2%
Very Little		2%	3%		2%
Not at All					
TOTAL	0%	100%	100%	0%	100%
Valid Cases		54	29		68
Missing Cases		2	1		10

Q36 Broad Education	Advisory Board	AAS Graduates	BS Graduates	Employers	Average
To a Great Extent		30%	45%		34%
Somewhat		48%	45%		47%
Neutral		15%	7%		12%
Very Little		6%	3%		6%
Not at All		2%			2%
TOTAL	0%	100%	100%	0%	100%
Valid Cases		54	29		68
Missing Cases		2	1		10
Q37 Writing Clearly	Advisory Board	AAS Graduates	BS Graduates	Employers	Average
To a Great Extent		25%	31%		27%
Somewhat		40%	48%		43%
Neutral		32%	17%		27%
Very Little		2%			2%
Not at All		2%	3%		2%
TOTAL	0%	100%	100%	0%	100%
Valid Cases		53	29		67
Missing Cases		3	1		11
Q38 Proficient W Computers	Advisory Board	AAS Graduates	BS Graduates	Employers	Average
To a Great Extent		23%	45%		30%
Somewhat		23%	31%		23%
Neutral		17%	17%		18%
Very Little		14%	7%		11%
Not at All		23%			18%
TOTAL	0%	100%	100%	0%	100%
Valid Cases		52	29		66
Missing Cases		4	1		12
Q39 Values & Ethical Standards	Advisory Board	AAS Graduates	BS Graduates	Employers	Average
To a Great Extent		19%	35%		24%
Somewhat		30%	31%		31%
Neutral		32%	35%		30%
Very Little		8%			6%
Not at All		11%			9%
TOTAL	0%	100%	100%	0%	100%
Valid Cases		53	29		67
Missing Cases		3	1		11
Q40 Think Analytical	Advisory Board	AAS Graduates	BS Graduates	Employers	Average
To a Great Extent		34%	55%		37%
Somewhat		42%	24%		42%
Neutral		17%	14%		15%
Very Little		4%	7%		3%
Not at All		4%			3%
TOTAL	0%	100%	100%	0%	100%
Valid Cases		53	29		67
Missing Cases		3	1		11

Q41 Learn on Own, Find Info	Advisory Board	AAS Graduates	BS Graduates	Employers	Average
To a Great Extent		37%	55%		41%
Somewhat		46%	24%		42%
Neutral		12%	14%		12%
Very Little		4%	7%		3%
Not at All		2%			2%
TOTAL	0%	100%	100%	0%	100%
Valid Cases		52	29		66
Missing Cases		4	1		12
Q42 FSU Welding Effective	Advisory Board	AAS Graduates	BS Graduates	Employers	Average
To a Great Extent		62%	52%		59%
Somewhat		27%	38%		30%
Neutral		6%	7%		6%
Very Little		4%	3%		3%
Not at All		2%			1%
TOTAL	0%	100%	100%	0%	100%
Valid Cases		55	29		69
Missing Cases		1	1		9
Q43 Amer Weld Soc Scholarship	Advisory Board	AAS Graduates	BS Graduates	Employers	Average
Yes		32%	59%		38%
No		68%	41%		62%
TOTAL	0%	100%	100%	0%	100%
Valid Cases		53	29		66
Missing Cases		3	1		12
Q44 Other Scholarships	Advisory Board	AAS Graduates	BS Graduates	Employers	Average
Yes		13%	28%		18%
No		87%	72%		82%
TOTAL	0%	100%	100%	0%	100%
Valid Cases		53	29		66
Missing Cases		3	1		12
Q45 Current AWS	Advisory Board	AAS Graduates	BS Graduates	Employers	Average
Yes		57%	90%		62%
No		43%	10%		38%
TOTAL	0%	100%	100%	0%	100%
Valid Cases		53	29		66
Missing Cases		3	1		12

Q46 Hold Pro Cert or Reg	Advisory Board	AAS Graduates	BS Graduates	Employers	Average
American Welding Inspector		11%	17%		11%
Soc/Cert Manufacturing Engineers		8%	14%		9%
Professional Engineer		11%			11%
Other		70%	7%		70%
No			62%		
TOTAL	0%	100%	100%	0%	100%
Valid Cases		53	29		66
Missing Cases		3	1		12
Q47 Annual Salary	Advisory Board	AAS Graduates	BS Graduates	Employers	Average
< $40,000		26%	14%		23%
$40,000 - 49,000		24%	43%		28%
$50,000 - 59,000		24%	25%		22%
$60,000 - 69,000		12%	11%		13%
> $69,000		16%	7%		14%
TOTAL	0%	100%	100%	0%	100%
Valid Cases		51	28		64
Missing Cases		5	2		14
Q48 Industry Employed	Advisory Board	AAS Graduates	BS Graduates	Employers	Average
Auto Related		18%	57%		28%
Weld/Equip/Appl/Sale		35%	29%		30%
Gen Manuuf		33%	11%		28%
Construction		14%	4%		13%
Def - Aerospace					2%
TOTAL	0%	100%	100%	0%	100%
Valid Cases		51	28		
Missing Cases		5	2		64
					14
Q49 Job Title	Advisory Board	AAS Graduates	BS Graduates	Employers	Average
Engineer		35%	79%		44%
Technician		4%			3%
Management		10%	3%		9%
Sales		8%	7%		6%
Other		43%	10%		38%
TOTAL	0%	100%	100%	0%	100%
Valid Cases		51	29		64
Missing Cases		5	1		14
Q50 Enrolled - Degree Prog?	Advisory Board	AAS Graduates	BS Graduates	Employers	Average
BS		2%			2%
MS		2%			3%
PHD		2%			2%
No		93%	10%		92%
Missing		2%			2%
TOTAL	0%	100%	10%	0%	100%
Valid Cases		53	29		66
Missing Cases		3	1		12

Q51Add Degree Post FSU?	Advisory Board	AAS Graduates	BS Graduates	Employers	Average
BS		25%			20%
MS		4%			3%
No		71%	100%		77%
TOTAL	0%	100%	100%	0%	100%
Valid Cases		49	28		61
Missing Cases		7	2		17
Q55 How Satisfied w/ FSU?	Advisory Board	AAS Graduates	BS Graduates	Employers	Average
To a Great Extent		92%	50%		94%
Somewhat		8%	50%		6%
Neutral					
Very Little					
Not at All					
TOTAL	0%	100%	100%	0%	100%
Valid Cases		44	28		62
Missing Cases		12	2		16
Q56 Would you Recommend?	Advisory Board	AAS Graduates	BS Graduates	Employers	Average
Yes		100%	100%		100%
No					
Not Sure					
TOTAL	0%	100%	100%	0%	100%
Valid Cases		44	28		62
Missing Cases		12	2		16

ANSWERS TO QUESTIONS 52-54

What do you believe was the most valuable part of your coursework?

Hands-on approach. The more things you actually have to do the more you learn. Project oriented work allows/helps in creating goals to work toward. Whether it be welding skills or engineering work.

What do you believe was the least valuable part of your coursework?

Having a teacher who is too old to be able to keep up with students - when I attended I had way too many out-of-date professors (general).

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

3D-Design/Engineering using Simulation. it is the best way to solve problems because of the reduced cost in "what-if" design and by proving designs out modeling.

What do you believe was the most valuable part of your coursework?

The basic hands on skills I learned. I consider the things I learned at Ferris the basic foundation for my future development. The thing I value most is now my ability to look at things and figure out the best way to do them on my own. If something doesn't work, I try something else.

What do you believe was the least valuable part of your coursework?

Some of the electives I took really don't help me now. I also should have concentrated more on computer skills. I feel I am way behind others in that respect.

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

I am no longer in the welding field so I can't really answer that. I am sure automation is very important. I also think if you can T.I.G. Weld pretty well, you should be able to find a job.

What do you believe was the most valuable part of your coursework?

Engineering Economics was the most valuable part of the coursework at F.S.U. It is the most important thing in industry. We must be able to understand how our decisions effect he companies for which we work.

What do you believe was the least valuable part of your coursework?

I feel that everything in the F.S.U. coursework is valuable in one aspect or another. Certain courses could have been better. I.E. Resistance Welding - there was not enough focus on this application, and I felt that the F.S.U. staff was spread to thin to effectively teach this subject.

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

Automation, Automation, Automation..... All companies are trying to downsize. The use of computers and different programs is steadily on the rise.

What do you believe was the most valuable part of your coursework?

Hands on technical training.

What do you believe was the least valuable part of your coursework?

No specific humanities and behavioral science course.

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

Increased welding automation P.C. Programmed Power Supplies material Science Lasers.

What do you believe was the most valuable part of your coursework?

- All welding courses after the first (2) quarters. (These were redundant of high school/vocational education.)
- Welding robotics
- Design
- Project Management
- Internship

What do you believe was the least valuable part of your coursework?

- Electrical/electronics: too much basics. Need controls/PLC and Safety Systems/Devices (Pre 1988???)

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

- Greater flexibility in automation. Beyond basic robotics and simple tooling.
- Highly adaptive welding controls - true Synerbic systems.
- Cell and Fixturing Ergonomics.

- Welded assemblies that don't rely on simple butt, lap, fillet type joints, but require high end systems for fusion (i.e., laser, plasma, EBW).
- Inverter Technology with CO_2 and Ti doped wire (currently used in Japan and Europe) U.S. machines are still "Stone Age".

What do you believe was the most valuable part of your coursework?

Hands on welding.

What do you believe was the least valuable part of your coursework?

(No answer for this question)

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

The need for welders not engineers, good quality welding.

What do you believe was the most valuable part of your coursework?

n/a

What do you believe was the least valuable part of your coursework?

n/a

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

- Welding related accidents and litigation - people in this field need to be aware of where responsibly for welds begins and ends - the process, application, testing, inspection, certification will get more regulated causing welding engineers to be articulate and through in speech, writing, politics, and procedures.

What do you believe was the most valuable part of your coursework?

Lab work and other related welding courses with hands on.

What do you believe was the least valuable part of your coursework?

I don't recall now.

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

Special alloys and consumable.

What do you believe was the most valuable part of your coursework?

The knowledge gained through emphasis of the basics in the first (2) years.

What do you believe was the least valuable part of your coursework?

Several of the general electives. Which would have provided more time to spend on computers, mathematics etc.

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

Computers advancing so rapidly that equipment changes equally as fast.

Retraining and seminars! Constant education.

What do you believe was the most valuable part of your coursework?

The courses that included classroom work and testing with labwork.

What do you believe was the least valuable part of your coursework?

(no answer to this question)

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

Increasing competition in the marketplace must make all companies more efficient. Classwork should stress using the best, or most cost effective, methods.

What do you believe was the most valuable part of your coursework?

Ability to perform hands on welding of welding processes. To have the knowledge and welding ability to discuss welding design and engineering - knowing it can "Actually" be done.

What do you believe was the least valuable part of your coursework?

Design of the electrical courses (very early in the life of the B.S. Program - no doubt has changed since).

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

Equipment technology advancements - Gman-P, Robotics, Weld Data Monitoring.

What do you believe was the most valuable part of your coursework?

Internship during the summer between junior and senior year (Manufacturing Engineering).

**No answers for questions 53 and 54.

What do you believe was the most valuable part of your coursework?

Having enough course work to be forced to be organized to complete all work. Having instructors versed in the industry to share their experiences with their classes. Having coursework challenging enough to have to work for a good grade.

What do you believe was the least valuable part of your coursework?

(No answer for this question)

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

Consolidation of the work force, Multi - task employee's. Well versed enough to do all aspects of our business.

What do you believe was the most valuable part of your coursework?

Having excellent teachers that were able to relate their knowledge to the students.

What do you believe was the least valuable part of your coursework?

Non-related courses in relation to welding.

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

1) An ever changing upgrade, in the related welding equipment.
2) Certification of more welders in specialized fields.

What do you believe was the most valuable part of your coursework?

The technical hands on training.

Do need to expose students to the effect on shielding gas on the metal transfer. When I was at Ferris (75-25 and CO_2) was just about all we used.

What do you believe was the least valuable part of your coursework?

The amount of time that was spent on the out of date welding processes (Oxy-acetylene welding, sman).

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

Automation for the small to medium manufacture because of the way the actual welding practice is viewed, there is a shortage of skilled people in the industry and it's only going to get worse.

What do you believe was the most valuable part of your coursework?

I would say that the related classes (Physics, metallurgy, electronics, statics and strengths) were my most valued classes. I also think that more machine tool classes should be required. Welding and machining go hand in hand in most industries, and Ferris students should have one or two more machine tool classes. These classes should be hands on machining, not CNC.

What do you believe was the least valuable part of your coursework?

I think that the cultural enrichment and social awareness were the least valued courses. I don't think that these classes should be eliminated, but I do think that less credits should be required of the students.

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

Look for inverter machines to be more efficient (lower input current). Keep an eye on the MillerAerowave for aluminum welding. Both sides of the AC sire wave can be controlled. I also think welding students need more machining experience (Drilling, Tapping, milling, Lathe turning, punch presses).

What do you believe was the most valuable part of your coursework?

It is well rounded - metallurgy. The knowledge of faculty.

What do you believe was the least valuable part of your coursework?

Gas welding and brazing - needed to spend more time on resistance welding.

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

Software integration.

What do you believe was the most valuable part of your coursework?

- Hands on experience qualifying procedures with various processes. Actually doing the welding provides tremendous insight into what the operators are faced with daily.

- Technical Writing Courses.

What do you believe was the least valuable part of your coursework?

- General Ed (cultural enrichment) type of courses.
- Calculus
- Engineering Level Chemistry.

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

- Adhesives
- Composite materials
- Move to thinner materials
- Move to automate

What do you believe was the most valuable part of your coursework?

The hands-on projects.

What do you believe was the least valuable part of your coursework?

Behavioral Science classes.

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

Welding of plastic sonics, hot air, or this should be added to the MFG Engineering Program.

What do you believe was the most valuable part of your coursework?

Metallurgy and material science courses.

Laboratory - actual hands on fabrication.

What do you believe was the least valuable part of your coursework?

Theory on the welding processes that the curriculum can not provide.

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

GMAW of Stainless Aluminum Bronze and Aluminum Construction of fixtures, jigs, holding devices, etc. Automation - set ups, procedures, maint., etc. Welding of Specialty Steels.

What do you believe was the most valuable part of your coursework?

Design work in the computer lab's and the demand to perform and put in the time. The lab work was found to be very beneficial.

What do you believe was the least valuable part of your coursework?

Macro and micro economics.

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

Faster welding robots (all types).
MIG welding over 100" minute.
More use of Yag Lasers!!

What do you believe was the most valuable part of your coursework?

A.A.S. skills combined with B.S. courses worked very well.

What do you believe was the least valuable part of your coursework?

Elective courses

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

Computer technology.

What do you believe was the most valuable part of your coursework?

Hands-on welding and technical training.

What do you believe was the least valuable part of your coursework?

(no answer to this question)

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

Laser welding and cutting.

What do you believe was the most valuable part of your coursework?

Hands on training.

What do you believe was the least valuable part of your coursework?

General studies.

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

Automation.

What do you believe was the most valuable part of your coursework?

Hands on welding (for practical exposure/experience)
Technical communication (both written and oral)
Computers
Drafting (GD&T becoming very popular)
Math (Glad to see Calculus added)

What do you believe was the least valuable part of your coursework?

Electives (of course!)
Advanced electronics

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

Speed
Both hard and soft automation
GD&T
Finance and management
Statistics (QS9000 certification)

What do you believe was the most valuable part of your coursework?

Having the best instructors with a broad base of experience to draw from.

What do you believe was the least valuable part of your coursework?

OXY - Acetylene welding

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

More automation and robotics.

What do you believe was the most valuable part of your coursework?

Blue Print reading, Tig Welding, Physics.

What do you believe was the least valuable part of your coursework?

English

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

Specialty welding/fabrication

What do you believe was the most valuable part of your coursework?

I feel there were two areas of equal importance.

1. The general knowledge gained of the various types of welding mediums.
2. The general knowledge gained of metallurgy.

What do you believe was the least valuable part of your coursework?

An elective, probably American history.

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

Spray-arc welding processes, hard surfacing process.

What do you believe was the most valuable part of your coursework?

I think that the related courses (drafting, electronics, physics, metallurgy, and statics and strengths) were the most valuable part of my coursework and are among the most useful on a day to day career basis.

What do you believe was the least valuable part of your coursework?

I think that the least valuable part of my coursework was the cultural enrichment and social awareness classes. I don't think that these classes should be eliminated, but they should have fewer credits toward a BS degree.

What trends in the welding industry do you see impacting the welding program(s) in the next five years?
Keep a close eye on future power supplies (i.e., Miller Aerowave) which use far less input current to do the same amount of work. Also, the AC waveband can be controlled unlike no other power supply which is very beneficial in Aluminum GTAW. Welding students also need to be more familiar with basic machining techniques such as Milling, tapping, grinding, and turning. More machining classes must be added to the curriculum.

What do you believe was the most valuable part of your coursework?

- Hands on technical training.
- Use of computers C.A.D.
- Resistance welding.
- Robotics.

What do you believe was the least valuable part of your coursework?

General studies.

What trends in the welding industry do you see impacting the welding program(s) in the next five years?
The welding industry is becoming more complex with the use of automation. I think Ferris needs to keep up with the latest technology (Automation and Resistance) because it's changing by leaps and bounds every year.

What do you believe was the most valuable part of your coursework?

Metallurgy, welding processes, technical report writing.

What do you believe was the least valuable part of your coursework?
Art, physical education.

What trends in the welding industry do you see impacting the welding program(s) in the next five years?
Ferris students are lacking and losing the art of welding GTAW, SMGW.

What do you believe was the most valuable part of your coursework?

- Hands on practical experience.
- The way Kuk managed us, he told us how he managed us through the 2 years.

What do you believe was the least valuable part of your coursework?

Cultural enrichment, social awareness.

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

- ARC data monitoring.
- Controlling the weld process for quality and QS9000.

What do you believe was the most valuable part of your coursework?

Being exposed to so many different aspects of being a welding engineer was the biggest help. Every grad will do a little different job. They will become a expert in their own field, so a little exposure to everything makes a well rounded engineer.

What do you believe was the least valuable part of your coursework?

The elective courses did very little for me.

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

The use of resistance welding and automation of just about everything. PLC's and flexible automation.

What do you believe was the most valuable part of your coursework?

Fixture design project.

What do you believe was the least valuable part of your coursework?

Welding electronics.

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

- Lasers for cutting and welding.
- Metal core wire replacing solid in critical applications.

What do you believe was the most valuable part of your coursework?
Hands on application.
Manufacturing Associated Activities.
Experienced (real world) instructors.

Welding Technology; Welding Engineering Technology

APRC 1996-1997

Section 3 of 3

What do you believe was the least valuable part of your coursework?

Beyond preparing students for industry. Need to educate them on opportunities. Such as how to continue in an NDT career. How to get into nuclear.

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

Changes in materials use, more adhesives. Aluminum use, resistance welding, automotive structures.

What do you believe was the most valuable part of your coursework?

Project Engineering and Mgt.

What do you believe was the least valuable part of your coursework?

Electronics.

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

Students must have a greater knowledge of metallurgy. Ferrous and non-Ferrous.

What do you believe was the most valuable part of your coursework?

All 4 years of welding lab time.

What do you believe was the least valuable part of your coursework?

I can't think of one right now.

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

(no answer for this question)

What do you believe was the most valuable part of your coursework?

1. Hands on training and set-up of equipment and gases and tech. training.
2. Electrical Training.
3. Construction Projects - Develop ability think.
4. Joint design and prep.

What do you believe was the least valuable part of your coursework?

Oxy-acetylene welding.

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

Inventor tech
Computer Tech - all welding field
CNC - Plasma
Time management spend 1) process selection, joint design, cost estimating, health and safety of workers environment.

What do you believe was the most valuable part of your coursework?

The most valuable part of the coursework at Ferris would have to be establishing and working with priorities. Logical and analytical thinking in working with priorities has allowed me to excel in a manufacturing environment.

What do you believe was the least valuable part of your coursework?

All seemed important when completing the degree, but if a subject must be picked it would have to be the cultural enrichment type courses.

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

A graduate of the program must hit the floor running hard and be able to apply a hands-on employment.

What do you believe was the most valuable part of your coursework?

The engineering management course.

What do you believe was the least valuable part of your coursework?

Cultural enrichment courses.

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

Welding of coated materials.

What do you believe was the most valuable part of your coursework?

Interaction with Ken Kuk - excellent. Primarily automation and analytical approaches.

What do you believe was the least valuable part of your coursework?

Geography and some behavioral sciences. The program needs more technical writing and grammar skills.

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

Need for knowledge of selecting/implementing filler metals which exhibit charpy values - D1.1 AWS.

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

The automotive industry is leaning towards aluminum and titanium. Maybe some more work with these materials in the four year degree.

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

Resistance welding.

What do you believe was the most valuable part of your coursework?

Welding labs - This allowed you to take what you have need or been briefed on then apply it to the application at hand.

Possessing the ability to comprehend what is being discussed and then apply that information is extremely critical in our professors.

What do you believe was the least valuable part of your coursework?

Unable to answer.....Thinking about it everything I was taught I use everyday...and it's all important labs (production floor), lectures (business meetings), presentations (presentations).

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

We are looking into more resistance welding of allowances.

What do you believe was the most valuable part of your coursework?

The technical and hands-on training your receive during the course.

What do you believe was the most valuable part of your coursework?

Hands on.

What do you believe was the least valuable part of your coursework?

Cultural enrichment and social awareness.

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

Increases in automation and weld monitoring.

What do you believe was the most valuable part of your coursework?

Hands on coursework and instructors who cared about students.

What do you believe was the least valuable part of your coursework?

Looking back it was all valuable.

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

1) Automation
2) Paying welders less money which in turn de-values the welding trade. More trade unions and apprenticeships are needed.

What do you believe was the most valuable part of your coursework?

Hands on welding with all processes.
Metallurgy
Non-destructive and destructive testing
Drafting
Print reading
Math

What do you believe was the least valuable part of your coursework?

Electronic tech-welding power sources Introductory Physics.

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

Hard to predict, I believe their will always be demand for good knowledge hands on welders automation and robotics will never completely eliminate. The need for need for them.

What do you believe was the most valuable part of your coursework?

The welding and blue print reading courses, really gave me a start in the welding field. Mr. Kennedy was a great teacher.

What do you believe was the least valuable part of your coursework?

All courses not pertaining to the welding field. The more hands on practice of learning how to weld and cut metals in school, will help a person out once he finds a job. And more blueprint reading classes a must. That is very important.

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

Plastics is really coming into market. Learning how to fuse plastics together might be another course to thinking about.

What do you believe was the most valuable part of your coursework?

I would have to say the Project Engineering Management have been the most useful for me. Although the technical courses were necessary, being able to lead and control projects from start to finish, regardless of relationship to welding, has been extremely valuable. Having this ability coupled with the ability to think analytically and logically has helped greatly in overcoming many obstacles and functioning successfully as an engineer.

What do you believe was the least valuable part of your coursework?
(no answer for this question)

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

More and more emphasis on ISO 9001/QS 9000 compliance in welding standards and procedures.

What do you believe was the most valuable part of your coursework?

All of the course work and instructors.

What do you believe was the least valuable part of your coursework?

All of my course work at F.S.U. has helped me at one time or another. I have taught high school in two states with teachers from varying University. I have always felt I was better prepared as an instructor and a welding consultant.

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

Computer Control Welding
Changes in materials (polymers, ceramics)

What do you believe was the most valuable part of your coursework?

Technical coursework - craftsmanship should not be lost in any curriculum revision.

What do you believe was the least valuable part of your coursework?

With the right teachers it can all be valuable.

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

The increase in the use of plastics and composites.

What do you believe was the most valuable part of your coursework?

Exposure to the total welding/manufacturing world through a faculty with practical experience and book knowledge. Exposure to all aspects of manufacturing; matching, welding, metallurgy, processes, computers, technical writing, etc.

What do you believe was the least valuable part of your coursework?

I don't believe there was a least valuable. I have used everything I've learned at different times.

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

More exotic metals are being introduced every year. Repair aspects of materials is key in the aircraft industry. Team orientation to problem solving/enpowerment. Helping people deal with issues that inpact productivity.

What do you believe was the most valuable part of your coursework?

Exposure to computer aided engineering, i.e. FEA, CAD and CAM. Another valuable part of my experience was the individualized experience I had with the professors, Mr. Kuk was extremely effective with his explanations and examples of what awaited us after graduation.

What do you believe was the least valuable part of your coursework?

I do not believe any of the coursework was invaluable, I feel it may have been not challenging enough, but not in-valuable. I feel staff should be diversified origins, i.e., different disciplines, former graduates, as staff, should be avoided as instructors.

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

I feel finite element analysis will play a major role in the future of the industry, as we are pushing our weld metal systems to their limits. An emphasis should be placed on design for fatigue.

What do you believe was the most valuable part of your coursework?

Hands-on lab experiments which required analytical thinking with a follow-up tech. report.

What do you believe was the least valuable part of your coursework?

Resistance welding lab with no teacher.

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

Highly advanced resistance welder controls (sophisticated software algorism)

What do you believe was the most valuable part of your coursework?

The technical classes at Ferris are very valuable in a Welding Engineering Technology Degree. The more technical a Welding Engineer is, the better off they will be in the long run.

What do you believe was the least valuable part of your coursework?

The classes that are non technical.

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

The movement toward more electrical based equipment other than mechanical and manual. Ferris needs to put more emphasis on electrical classes that are broken down into separate groups, instead of one class with everything. I think this is something Ferris should consider.

What do you believe was the most valuable part of your coursework?

Continue to emphasize hands on, actual welding. All process and all position. Nothing creates respect and credibility like actually showing a person how it should be done, and the fact that the welding engineer can actually weld carries a lot of weight.

What do you believe was the least valuable part of your coursework?

Micro circuitry/electronics
All general education
Any math higher than basic trigonometry

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

Pulsed GMAW
Inverters
ISO 9000 and QS 9000 certifications
Constantly reducing cost

What do you believe was the most valuable part of your coursework?

The hands on training of the welding course in general.

What do you believe was the least valuable part of your coursework?

The cultural enrichment and social awareness courses, if meaningless courses were taken to complete credit requirements.

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

The use of lasers replace other welding practices. More and more automation.

What do you believe was the most valuable part of your coursework?

Association with success minded - capitalistic thinking people, with strong Christian values.

What do you believe was the least valuable part of your coursework?

Association with socialistic, evolutionist thing atheists.

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

You most emphasis free thinking, free markets, and free society to continue to expand free enterprise.

What do you believe was the most valuable part of your coursework?

Learning how to test metals.

What do you believe was the least valuable part of your coursework?

Physics
Humanities

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

Robotics.

What do you believe was the most valuable part of your coursework?

Welding Processes 1, Labor Law Legislation, Quality Testing, Veterans Affair.

COLLEGE OF TECHNOLOGY

PROGRAM REVIEW EVALUATION

Results

WELDING TECHNOLOGY
FRESHMEN & SOPHOMORES
FALL
1996

% OF RESPONSES

	EXCELLENT	ABOVE AVERAGE	AVERAGE	BELOW AVERAGE	UNACCEPTABLE
1. MASTERY OF SUBJECT MATTER	53	40	7		
2. ORGANIZATION OF COURSE	28	40	28	5	
3. CLARITY OF PRESENTATION	33	47	19	2	
4. STIMULATION OF INTEREST	37	35	21	7	
5. AVAILABILITY FOR ASSISTANCE	30	23	33	7	7
6. IMPARTIALITY ON GRADES AND EXAMS	21	33	40	7	
7. CONCERN FOR STUDENT	40	26	23	7	5
8. OVERALL QUALITY OF INSTRUCTION	37	40	19	5	
9. OVERALL SATISFACTION OF PROGRAM	30	44	19	7	
10. FACULTY, EQUIPMENT, CURRICULUM	45	33	19	2	

COLLEGE OF TECHNOLOGY

PROGRAM REVIEW EVALUATION

Results

WELDING ENGINEERING TECHNOLOGY
JUNIORS AND SENIORS
FALL
1996

% OF RESPONSES	EXCELLENT	ABOVE AVERAGE	AVERAGE	BELOW AVERAGE	UNACCEPTABLE
1. MASTERY OF SUBJECT MATTER	18	61	21		
2. ORGANIZATION OF COURSE	24	53	24		
3. CLARITY OF PRESENTATION	8	50	37	5	
4. STIMULATION OF INTEREST	24	50	26		
5. AVAILABILITY FOR ASSISTANCE	21	47	26	3	3
6. IMPARTIALITY ON GRADES AND EXAMS	21	37	39	3	
7. CONCERN FOR STUDENT	32	34	26	8	
8. OVERALL QUALITY OF INSTRUCTION	24	61	13	3	
9. OVERALL SATISFACTION OF PROGRAM	45	40	13	3	
10. FACULTY, EQUIPMENT, CURRICULUM	29	53	16	3	

Faculty Perceptions of the Program

Program: ***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____

5	❹	3	2	1

Currently enrolled students rate instructional effectiveness as extremely high

Currently enrolled students rate the instructional effectiveness as below average

2. Student Satisfaction with Program — Average Score____

5	❹	3	2	1

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

Currently enrolled students are not satisfied with the program faculty, equipment, and curriculum

3. Advisory Committee Perceptions of Program — Average Score____

❺	4	3	2	1

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

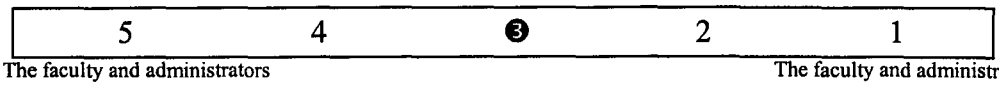
4. Demand for Graduates — Average Score____

❺	4	3	2	1

Graduates easily find employment in field

Graduates are sometimes forced to find positions outside of field

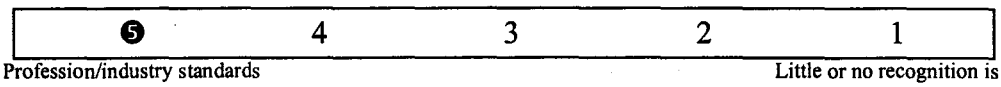
5. Use of Information on Labor Market Average Score____



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

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

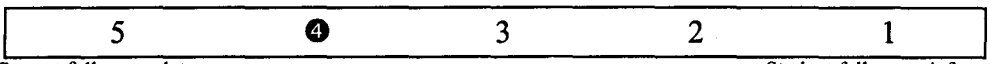
6. Use of Profession/Industry Standards Average Score____



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

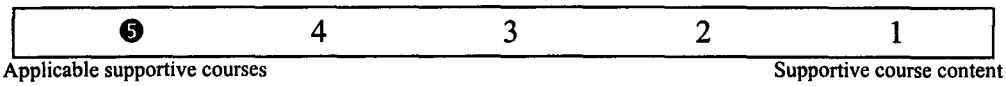
7. Use of Student Follow-up Information Average Score____



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

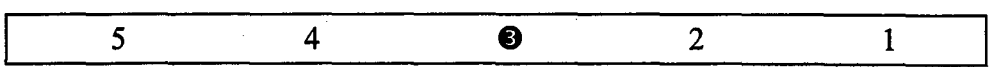
8. Relevance of Supportive Courses Average Score____



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

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

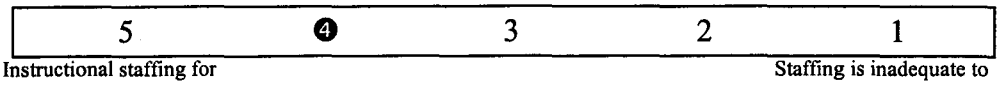
9. Qualifications of Administrators and Supervisors Average Score____



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

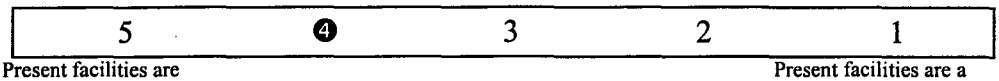
10. Instructional Staffing Average Score____



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

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

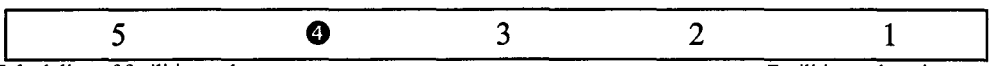
11. Facilities Average Score____



Present facilities are sufficient to support a high quality program

Present facilities are a major problem for program quality

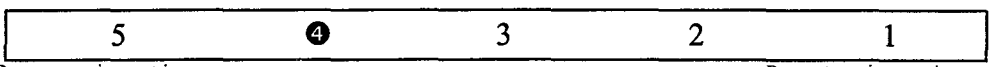
12. Scheduling of Instructional Facilities Average Score____



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 schedule

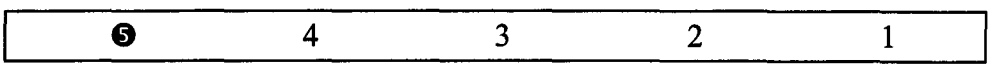
13. Equipment Average Score____



Present equipment is 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____

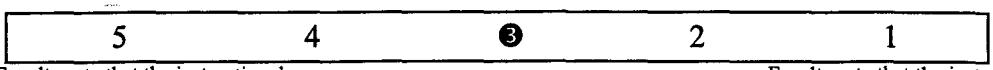


Instruction in all courses required for this program recognizes and responds to individual student interests, learning styles, skills, and abilities through a variety of instructional methods (such as: small group or individualized instruction, laboratory or "hands on" experiences, credit by examination)

Instructional approaches in this program do not consider individual student differences

15. Adequate and Availability of Instructional Materials and Supplies

Average Score____



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

training welders and metal workers begin to make and repair metal equipment under the direction of a supervisor. With experience, they may become managers of repair shops, maintenance depots, or shipyards.

OPPORTUNITIES FOR EXPERIENCE AND METHODS OF ENTRY

Welders may be required to take practical and written tests before being hired. Most employers of Arc or Gas Welders prefer applicants with high school or vocational school training. Persons entering a formal apprenticeship program may be required to pass written and oral tests and meet minimum age requirements. Welders performing work which must pass certification inspection have to pass performance tests for the type of welding required.

School-to-Work opportunities include:

informal apprenticeships

mentorships

job shadowing experiences

touring a local Welder employer

internships

volunteer work with a Welder employer

community service work with an agency

Secondary vocational education co-op programs in welding, brazing, and soldering and post-secondary programs in welding may offer opportunities for experience. Experience may also be gained through summer jobs, especially on auto production lines; all branches of military service; work programs at community colleges; and formal apprenticeship programs.

Persons wanting a job as a Welder should apply directly to employers, or contact civil service offices. Assistance in locating a job may be obtained by contacting local unions, school placement offices, or a local office of the Michigan Employment Security Commission. Job openings are often listed in newspaper want ads.

The average range of hourly earnings of Arc and Spot Welders in the Detroit Metropolitan area was $11.17 to $14.07 per hour, respectively in 1 5.

Welders employed by one Michigan utility company earned base rates between $17.03 and $23.12 an hour in mid 1995. In addition, they received an annual lump-sum bonus.

Various governments in Michigan paid Welders the following hourly rates in 1996.

Government	Hourly Wage
State of Michigan	$13.35 - $17.90
City of Detroit	$13.47 - $15.50
Grand Rapids	$14.33 - $17.31

The 1994 graduates of high school vocational education programs in Michigan who are working in jobs related to this occupation earned an average beginning wage of $7.89 an hour in 1995.

Welders may receive paid vacations and holidays; life, accident, and health insurance; sick leave; and retirement plans. Some workers may receive dental and/or optical benefits. These benefits are paid for, at least in part, by employers.

Workers in this occupation begin as Welder helpers or apprentices and advance to welder positions after completing their training and/or gaining experience. A career ladder may be: welder, helper or apprentice, Welder, Welder Fitter, welder inspector, supervisor. Advancement to inspector or supervisory positions for Welders depends on training, experience and supervisory ability. After gaining experience, some Welders open their own shops.

EMPLOYMENT AND OUTLOOK

Nationally, about 313,600 Welders were employed in 1994. Employment of Welders is expected to increase more slowly than the average for all c upations through the year 2005. About 7% of them were self-employed. The industry distribution for Welders looked like this:

SIC

cutting in construction is expected to expand as is the number of metal products needing repair. This work is generally less routine and more c ficult to automate than other welding jobs. Greater use of welding robots and other technologies, as well as the substitution of high-strength composite materials and plastics for should cause employment of Welders in manufacturing to decline. Robot welding systems have already eliminated some routine jobs, and this trend is expected to continue.

Employment of workers in the automobile industry will decrease as U.S. factories close or move operations to other countries, like Mexico, where labor is cheap. Most job openings will be due to replacement of Welders who retire or leave the occupation for other reasons.

In 1992, about 14,075 Welders were employed in Michigan.

According to the 1990 census, 8.0% of this occupation were female; 13.0% were Black; 1.1% were American Indian; and 2.4% were persons of Hispanic Origin.

Employment of Welders in Michigan is expected to grow about as fast as t average for all occupations through the year 2005. An average of 510 annual openings is expects, with 140 due to growth and 370 due to replacement of those who retire, die or leave the labor force for other reasons. In late 1995, there were 101 apprentices in training for this occupation, and 15 completed the apprentice program during the prior 12 months.

The demand for Welders will be affected by technological changes such as advances in robotics, visual and other machine-sensing capabilities, and computer-aided manufacturing all of which decrease production time and costs. Robotic welding systems are already eliminating the jobs of spot welders in the automobile industry. Wide-spread application of robotic arc welding in other manufacturing industries is not expected until the late 1990's.

The use of high strength composite materials and improved plastics instead of metals in products such as automobiles will reduce the demand for Welders also. In addition, Welders are vulnerable to periodic layoffs f factory retooling and to economic downturns. The jobs of highly skilled Welders should no be adversely affected by automation through the late 1990's.

*U.S. Department of Labor
Bureau of Apprenticeship
and Training
State Director's Office
801 South Waverly, Suite 304
Lansing, MI 48917
Phone: (517)377-1746

*American Welding Society
550 Lejeune Road
Miami, FL 33126
Phone: (305)443-9353

*North American Computer Service
Association, Attn: D. Glascock
100 Silver Beach, #918
Daytona Beach, FL 32118
Phone: (904)258-1501

National Certified Pipe
Welding Bureau
1385 Piccard Drive
Rockville, MD 20850

School Placement Offices

A Local Office of the
Michigan Employment
Security Commission

Federal, State, and Local
Civil Service Offices

Local Military Recruiters

SUMMARY PROFILE

The occupation of Welder can be summarized by the following:

Growth Outlook:	As fast as average
Salary Potential:	Below average potential growth
GOE Cluster:	Mechanical Interest Group (#05)
Work Values:	Work with hands, work with machines or equipment, routine work
SDS Code:	Realistic (permanently join pieces of metal with metal filler)
Relationship to Data:	Compiling (receives welding work requests)
Relationship to People:	Instructional (completes work tasks under the instruction of supervisors)

EARNINGS AND ADVANCEMENT

Earnings depend on the experience, skill, and specialty of the individual; the size and type of employer; the geographic location; and the extent of unionization.

Nationally, the median weekly earnings of Welders was $464 in 1995 which was about $11.60 an hour, based on a 40-hour week.

Earnings of most Welders, employed in the automobile industry (mid 1996) ranged from $17.94 to $21.11 per hour. They also earned a cost-of-living allowance.

Relationship to Things: Manipulating (manipulating metal using welding equipment)

MICHIGAN'S EMPLOYMENT OUTLOOK TO 2005

EMPLOYMENT AND OUTLOOK REGIONS	NUMBER EMPLOYED	PERCENT GROWTH	PROJECTED YEARLY JOB OPENINGS
State Total	14,075	12.9%	510

SOURCES OF ADDITIONAL INFORMATION

Printed occupational information is available upon written request from sources marked with an asterisk (*) below:

Code	Industry	% Employed
41000	Durable Goods Manufacturing	56.9
80000	Services	12.1
30000	Construction	11.2
61000	Wholesale Trade	8.9
50000	Transportation and Public Utilities	4.9
20000	Mining	2.5
42000	Nondurable Goods Manufacturing	1.9
91000	Federal Government	1.5
- -	Other	0.1

Employment of Welders in construction and manufacturing is vulnerable to periodic layoffs due to economic downturns. The need for welding and

WELDING ENGINEERING TECHNOLOGY PROGRAM
FACILITY AND EQUIPMENT PROGRAM REVIEW
SELF STUDY 1996

AREA	MEETS OBJECTIVES	LIMITED OBJECTIVES	NOT POSSIBLE TO MEET OBJECTIVES	COMMENTS OR CONCERNS
Laboratory Location	x			
Laboratory Size (square footage)	x			
Classroom Space		x		Scheduling Conflicts Common
Electrical Requirements	x			
entilation Requirements		x		Noise Level Too High
Media Requirements		x		Video Needed in all Lecture rooms
Laboratory Comfort level (Heating & Cooling)		x		Heating Problems are Common in winter
Handicap Assess		x		Only from outside access-none from building interior
Equipment-Handtools	x			

Equipment-Processing	X			Press brake tooling required
Equipment-Fuel Gas		x		Manifold system needs replacement
Equipment-GMAW	x			
Equipment-SMAW		x		Related lab needs new power supplies
Equipment-GTAW	x			
Equipment-Testing		x		Tensile machine upgrade
Equipment-Safety	x			
Equipment-Automation		x		New robotic work cells GMAW-P needed on robots
Equipment-High Energy		x		Yag Laser needed Water jet cutting needed

CURRICULUM EVALUATION

The Welding Technology and Welding Engineering Technology curriculums receive input from three distinct areas.

1. The programs are reviewed on an annual basis by the faculty and Advisory Board to insure industrial relevance.
2. At the direction of the Advisory Board, the Welding Engineering Technology program has been making gradual curriculum changes consistent with Accreditation Board for Engineering and Technology (ABET) standards. This is in anticipation of employers requiring this standard.
3. The alumni of the Welding Engineering Technology is surveyed on an annual basis to seek input on the curriculum relevant to their careers.

For 1996/97 the Welding Technology and Welding Engineering Technology programs are making three minor curriculum changes consistent with the input received from the above mentioned constituencies.

1. Require Chemistry as a science elective.
2. Require General Psychology as a social awareness elective.
3. Require Industrial Psychology as an advanced social awareness elective.

At the present time the curriculum is sound and no other additional changes are anticipated pending future input.

Program Review Panel Evaluation Form

Program: ***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____

5	❹	3	2	1

Currently enrolled students rate instructional effectiveness as extremely high

Currently enrolled students rate the instructional effectiveness as below average

2. Student Satisfaction with Program — Average Score____

❺	4	3	2	1

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

Currently enrolled students are not satisfied with the program faculty, equipment, and curriculum

3. Advisory Committee Perceptions of Program — Average Score____

❺	4	3	2	1

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____

❺	4	3	2	1

Graduates easily find employment in field

Graduates are sometimes forced to find positions outside of field

5. Use of Information on Labor Market Average Score____

❺	4	3	2	1

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

❺	4	3	2	1

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____

❺	4	3	2	1

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____

5	❹	3	2	1

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

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

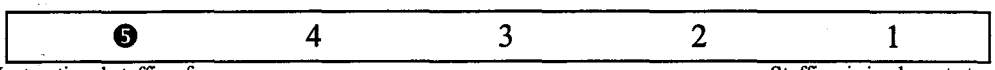
9. Qualifications of Administrators and Supervisors Average Score____

5	❹	3	2	1

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

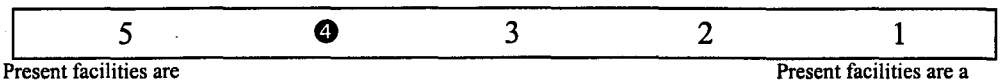
10. Instructional Staffing Average Score____



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

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

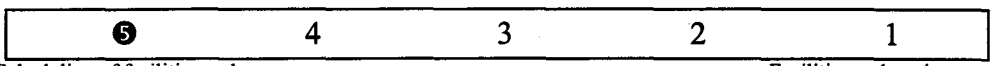
11. Facilities Average Score____



Present facilities are sufficient to support a high quality program

Present facilities are a major problem for program quality

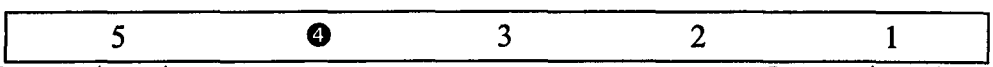
12. Scheduling of Instructional Facilities Average Score____



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 schedule

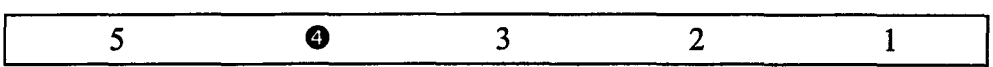
13. Equipment Average Score____



Present equipment is 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____

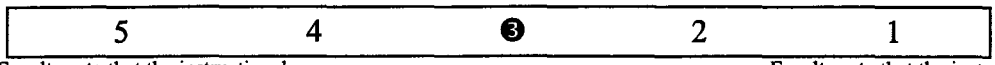


Instruction in all courses required for this program recognizes and responds to individual student interests, learning styles, skills, and abilities through a variety of instructional methods (such as: small group or individualized instruction, laboratory or "hands on" experiences, credit by examination)

Instructional approaches in this program do not consider individual student differences

15. Adequate and Availability of Instructional Materials and Supplies

Average Score____



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

EXECUTIVE SUMMARY

The welding program(s) at Ferris State University has a long and rich history that dates back to1955. Initially the program was a one year certificate that was designed to teach students to become welders. During the past 40 years Ferris has evolved from a institute, to state college, and finally a state university. The welding programs have constantly evolved during the past four decades as well to serve the people and economy of Michigan, the great lakes region, and the nation as well. In the early 1970's the program became a two year associate degree changing it's educational goal from producing welders to engineering technicians, then in 1984 the bachelor of science program was launched to produce Welding Engineering Technology graduates that are highly trained in automation, lasers, computer aided engineering, and design. Over the past four decades over 1,000 students have graduated from Ferris with a welding certificate or degree making it one of the universities most successful.

In 1996/97 the Welding Technology and Welding Engineering Technology Program enjoys enrollment of 93 majors, which is approximately 1% of the entire campus enrollment. Placement of the bachelor of science graduates leads the campus with a average starting salary of $40,000per year and 100% in their field of study. National competition is limited to a handful of institutions across the country. Only Ohio State University graduates more welding students with a four degree in this country than Ferris. The program has outstanding growth potential for additional students given additional program based marketing resources.

A. Conclusions

Centrality to FSU mission

The welding programs are hands-on laboratory based and career oriented in their curriculum design.

Uniqueness/Visibility

The Welding Engineering Technology program is one of only six in the country offering a Bachelor of Science degree.

Service to State and Nation

65% of graduates are employed in the State of Michigan and the remainder are in 30 other states across the country.

Demand by Students

The program has consistently been at 80%+ of theoretical capacity.

Quality of Instruction

Current students and alumni give the program above average and excellent ratings. 100% of alumni would recommend the program to a friend.
The Welding programs receive external support by the American Welding Society in the form of student scholarships totaling over $30,000 per year. The programs host annual advisory board meetings to ensure high quality curriculums. The programs conduct an annual alumni survey to ensure that the curriculum is consistent with industry standards.

Demand for Graduates

Over the past ten years 95%+ of all Welding Engineering Technology graduates have obtained employment in their field. Associate degree graduates primarily articulate into the Bachelor's program or find employment as welding technicians.

Service to Non-Majors

The Welding programs provide coursework for Associate Degree majors in Automotive Body, Automotive Service, and Heavy Equipment Service as well as Bachelor Degree majors in Manufacturing Engineering Technology.

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 and automation equipment exclusively donated or consigned by industry-leading equipment manufacturers.

Library Information Resources

Welding majors enjoy full access to the library's resources on the campus of Ferris State University which has appropriate technical references.

Cost

1994-95 320 SCH/FTEF
1995-96 286 SCH/FTEF
(please note that these figures are in error as two faculty coordinators for seven different academic programs have been incorrectly charged to this program). True SCH\FTEF is 350-400 per year for this period.

Faculty: professional and scholarly activities

Faculty typically have embraced continuing education in pursuing additional graduate degrees as well as attending workshops/seminars of specific technical reference. Each faculty member is active in the American Welding Society at the state and national level. Faculty engage in relevant consulting in the areas of process development, design, and training.

Administrative Effectiveness:

The welding programs report to a faculty coordinator, assistant dean/department head, and dean of the College of Technology. Traditionally the administration has been supportive of the goals and objectives of the welding programs. The program and faculty foresee benefiting from the reorganization of the College of Technology in 1996.

B. Recommendations

Continue the program: The program meets or exceeds all criteria and the job placement and career advancement is outstanding. This is the only curriculum of its kind in the State of Michigan.

The program recommends the following:

1. Increase supply and expense budget to $30,000/year (this will reflect actual spending levels).
2. Establish a $20,000/year welding capital equipment budget to replace vocational education dollars that have been phased out.
3. Increase faculty development funding to $5,000/year to ensure faculty and curriculum are technically relevant into the next century.
4. Faculty will continue their program-based recruiting efforts to increase enrollment from the present 93 majors to 120 without need for additional manpower requirements.