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Questions for BS in Mechanical Engineering Technology program Panel

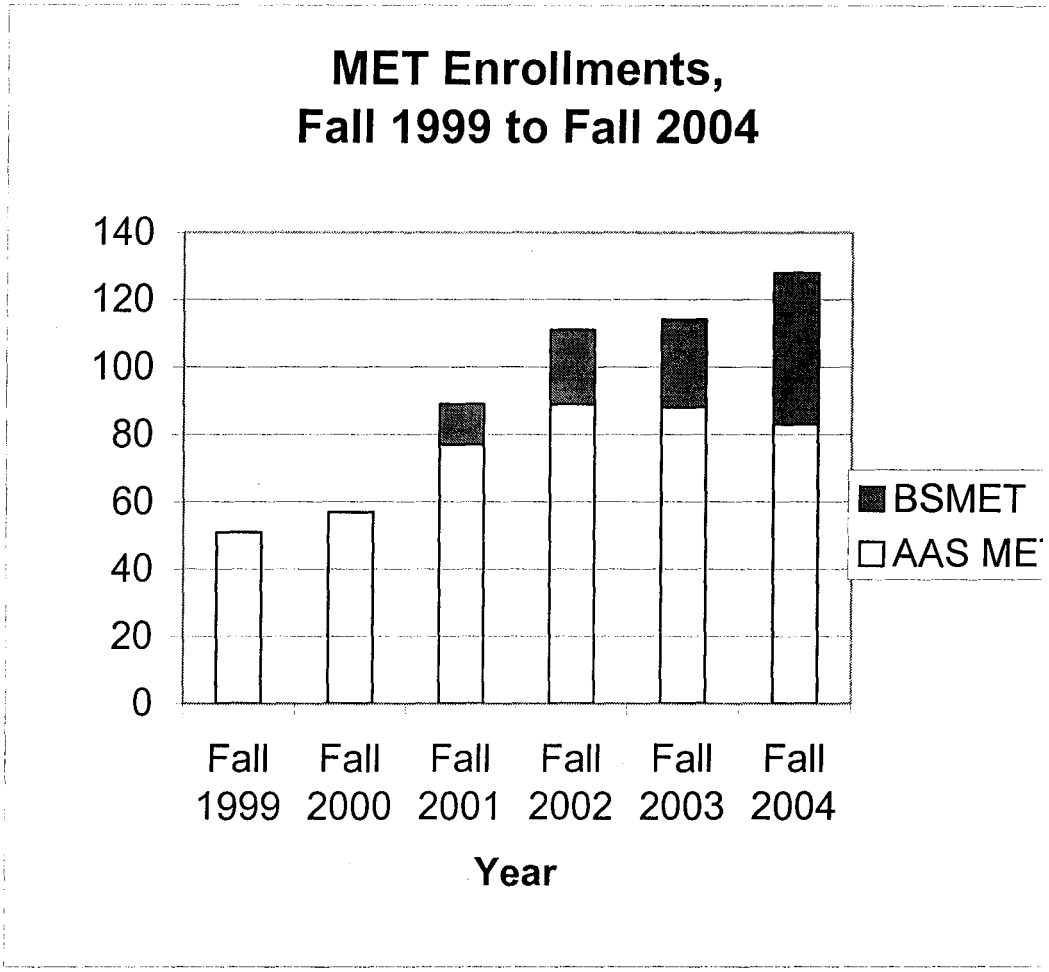
The following questions or requests for information are the result of our discussion concerning specific statements or material within the BS in Mechanical Engineering Technology Program Review Panel document. The page number containing the material upon which the question is based is cited prior to the question.

1-12 10-2 response **Please provide us with separate annual enrollment figures for the AAS and BS programs between the fall of 1999 and the fall of 2004.**

ENROLLMENTS IN MECHANICAL ENGINEERING TECHNOLOGY FALL 1999 TO FALL 2004

Sources: FSU Fact Book, 2002-2003
Enrollment Report Fall 2004 Institutional Research & Testing

	Fall 1999	Fall 2000	Fall 2001	Fall 2002	Fall 2003	Fall 2004
AAS MET						
MET	46	47	67	79	81	79
pre-MET	5	10	10	10	7	4
total	**51**	**57**	**77**	**89**	**88**	**83**
BS MET						
MET			11	18	24	37
pre-MET			1	4	2	8
			12	**22**	**26**	**45**



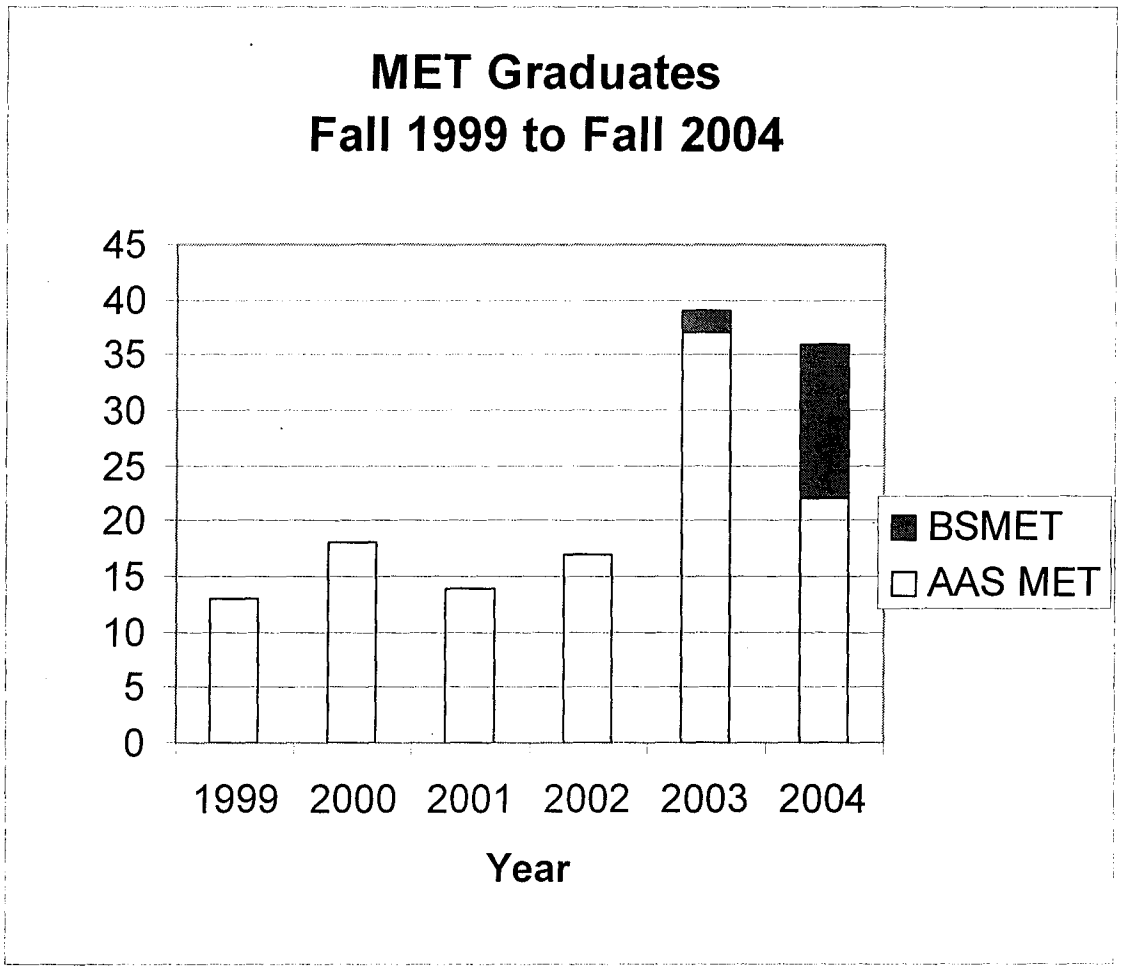
1-13 Please provide us with separate annual graduation figures for the AAS and BS programs between the fall of 1999 and the fall of 2004.

respon se

GRADUATES
MECHANICAL ENGINEERING TECHNOLOGY
1999 TO 2004

Sources: FSU Fact Book, 2002-2003
COT data.

	1999	2000	2001	2002	2003	2004
AAS MET	**13**	**18**	**14**	**17**	**37**	**22**
BS MET					**2**	**14**


MET Graduates
Fall 1999 to Fall 2004
45
40
35
30
25
20
15
10
5
0
1999
2000
2001
2002
2003
2004
Year
BSMET
AAS MET

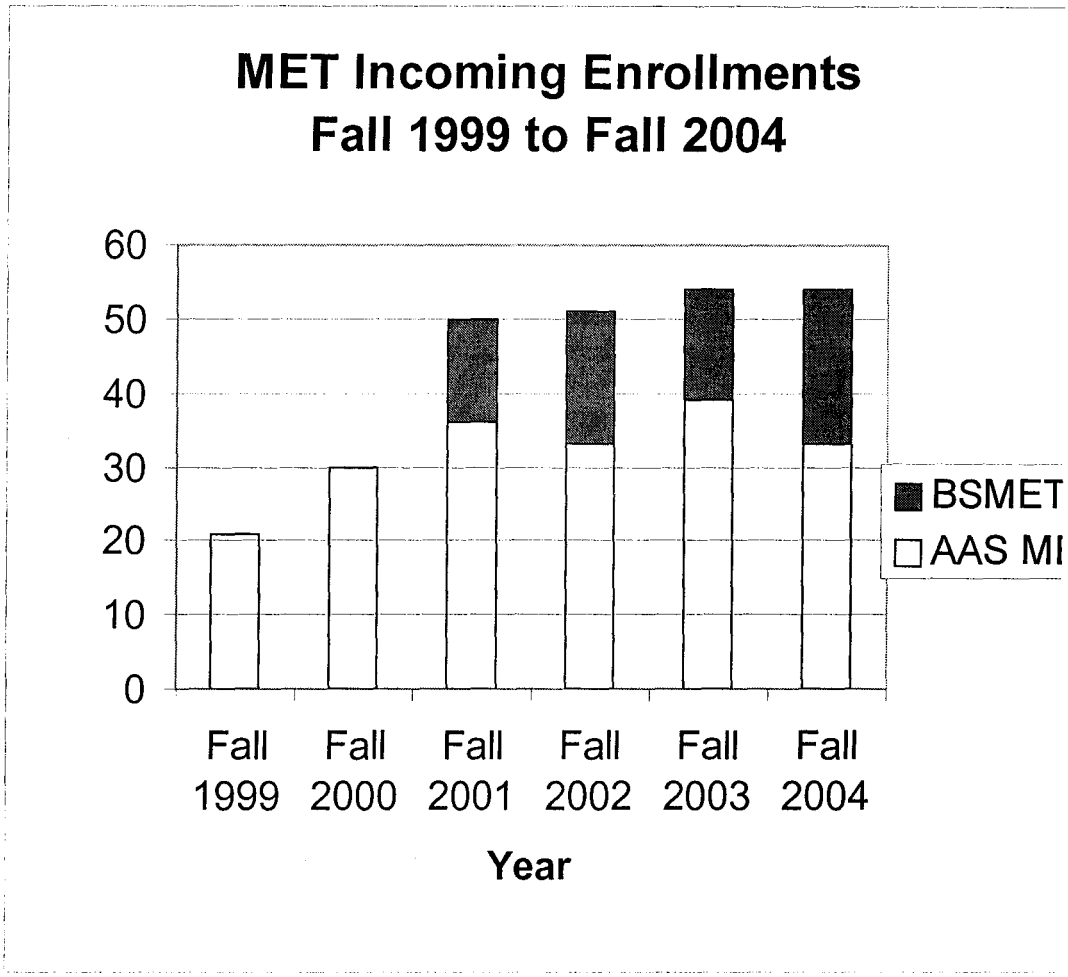
1-13 Please provide us the incoming enrollment figures for the AAS and BS programs between the fall of 1999 and the fall of 2004.

respons e

INCOMING ENROLLMENTS FOR MECHANICAL ENGINEERING TECHNOLOGY FALL 1999 TO FALL 2004

Source s: FSU SIS Data
Based on enrollment in key courses for freshmen in the AAS program (MECH 111)
and for juniors in the BSMET program (MECH 330) - with non-majors removed.

	Fall 1999	Fall 2000	Fall 2001	Fall 2002	Fall 2003	Fall 2004
AAS MET						
MECH 111	**21**	**30**	**36**	**33**	**39**	**33**
BS MET						
MECH 330			**14**	**18**	**15**	**21**



1-7 **Please discuss the options available to you with respect to teaching overloads**
1-9 **and the use of adjuncts to cover your classes. What are your needs with**
13-1 **respect to additional faculty?**

response

As with all other COT programs that come before APRC, finding competent and qualified adjuncts in the Big Rapids area to teach engineering technology courses is very difficult. Reaching out to surrounding areas such as Grand Rapids, Muskegon, Cadillac has been attempted, but the low pay and high mileage are a definite deterrent.
We feel that one additional full-time faculty is justified for the MET program.

1-8 **Please elaborate on your recommendations concerning lab space. How**
1-14 **much laboratory space do you need? Do you have any specific suggestions**
5-3 **in view of the current economy and facilities limitations to address the**

8-2 problem?

response

Defined needs:

1. A high-ceiling space, with large doorways, for construction and testing of full size projects (such as SAE All-Terrain Vehicles, senior projects). Space should include reverberation and anechoic chambers. 10,000 sq ft

2. A fluid power lab: 1000-1500 sq ft

3. A useable space for a computer lab where all can see visuals. 1200 sq ft with sufficient ceiling height and appropriate aspect ratio. This would replace Swan 105A.

Financial limitations are recognized. As noted in the report however, very substantial enhancements have been made for a number of programs in the Swan Complex – including additional space and extensive face lifts for areas with little growth compared to Mech Eng Tech.

1-15 3-1 Please discuss internships in your programs. Are their internships in both the AAS and BS program? How do students obtain internships? How are they administered?

response

One of the faculty has been assigned to oversee the internship program. It is the students responsibility to locate a suitable internship, but the program faculty will assist and provide leads if we hear of any. The faculty overseer receives written reports from each student during his internship (summer between jr and sr years) and also makes a personal visit to the internship site.
The AAS program does not have a required internship.

1-16 9-2 Please discuss the Capstone course for your program. Some concerns were raised about the current offering. When do you plan to make the changes in the course?

response

In March 1998 the first drafts of the BSMET proposal called for a capstone course specifically for BS MET students. In the interest of reducing the number of courses required, MET faculty agreed to start the BS MET program by using the capstone for Product Design Engineering Technology (PDET 499).

The "scenario" for the PDET course is a student preparing a major

proposal for presentation to management or a sponsor to develop or improve a product. A formal written report along with a formal oral presentation are required. Students include marketing, a business plan, manufacturing plans, a patent search, and a comprehensive set of CAD drawings. A prototype model, whether functional or not, is also required. PDET 499 adds substantial value to the PDET program. It is an appropriate capstone as it requires students to integrate many of the courses in the PDET program.

MET faculty and students do not feel this course is an appropriate capstone for their major. Expectations for a MET capstone include designing and testing systems with emphasis on bringing in many of their engineering courses. "Design-build-test-analyze" should be included in an appropriate capstone project. Much of the PDET capstone does not apply – and often centers around classes METs have not had (e.g. multiple CAD courses, ergonomics, and geometric tolerancing and dimensioning.) Eleven of the twelve seniors in last year's graduating class cited the capstone as a course to change. Additionally, students who are dual-majoring in MET and PDET should have distinct capstone courses.

2-19 How many graduate surveys were given to 2nd year students? How many
2-22 were returned? How many surveys were given to the 4th year students?

response

Second year students were surveyed in April 2004 at the end of a MECH 221 class. 28 surveys were returned. 32 students were enrolled in the course.

A survey was given in class to twelve seniors in MET in April 2004. All were returned.

5-1 How many faculty surveys were sent out? How many were returned?

response

All three faculty were surveyed as part of the PROE self-study in April 2003. All three faculty responded. This survey was updated prior to this report.

5-2 A concern express in the document is the apparent disparity in resource
8-2 allocation in the College of Technology. Are there items and pieces of
11-5 equipment that you need that you have asked for and been turned down? If
13-1 so, please list them. What suggestions do you have that would address this problem.

response Equipment requests are placed on the COT master equipment list, controlled by the Dean. Each department rank orders their requests and

the Dean makes the final decisions.

The MET program shares a place on the COT Equipment list with the two other programs in the MDSN department (CDTD and PDET). We are only permitted to select one #1 choice per department, so this means that each of the three programs in the MDSN department only get their first choice about once every three years, while a single program department will get their first choice almost every year.

Unfunded equipment requests include:

a. elastic buckling of struts experiment $3000
b. vibration analysis demonstrator $9500
c. computer replacement in SWAN 105A $40,000
d. computer, projector, portable stand $6500
e. series and parallel pump experiment $10,000
f. modeling/fabrication equipment $5000

Updated computers for faculty which can run the latest engineering software is a constant request, though we recognize that everyone else in the COT desires updated computer equipment as well.

10-1 **You have had a significant increase in enrollment in your programs since 1999. To what do you attribute this increase? Is your BS class composed entirely of AAS students from Ferris continuing with their education or do you get transfers into BS from other institutions? If so, what schools? Do you have articulation agreements with other schools? If so, which ones?**

response

We believe the major increase in enrollment came with simply being able to offer a bachelors degree to prospective students. Explaining that we were "2-year only, but you can then ladder into another program" complicated things and turned many off right away. Some came here thinking that we surely had a BS program.

7 freshmen, 10 sophomores, 3 juniors and 8 seniors are transfer students. These students come from community colleges including:

Delta College
Alpena Community College
Muskegon Community College
West Shore Community College
Kalamazoo Valley Community College
Fayetteville Technical Community College
Mott Community College
Lansing Community College
Kellogg Community College

Mid Michigan Community College
Oakland Community College
Henry Ford Community College
Macomb Community College
Northwestern Michigan College
ITT Tech Ft. Wayne.

Current students have also transferred from:
MTU, CMU, GVSU, Alma College, and Eastern Kentucky CC.

Some articulation agreements are in place. More could be added. One difficulty is that AAS programs – even in MET – can be quite different – with much less math and engineering science – than our programs at FSU.

12-1 **Who are your competitors? How does your program compare to the programs of your competition? Why do you think your students choose Ferris rather than one of your competitors?**

response

We compete with schools offering MET degrees and, to some extent, with those that offer engineering degrees.

Those offering MET degrees include: Michigan Tech and Wayne State that offer accredited programs. Delta College was at one time accredited, but we are not sure of their present status. Other non-accredited programs are available at Central Michigan, Eastern Michigan, Northern Michigan, and Lawrence Tech. We believe CMU is phasing theirs out in favor of a mechanical engineering program. Northern Michigan is a new entrant into engineering technology. While we have not studied these in depth, we believe they are comparable, though possibly weaker than FSU in math/physics/engineering sciences. Wayne State's may be more theoretical.

Students like that Ferris is a smaller school, more personal, our reputation as a technical school, and the reputation of the MET program (per some entering freshmen).

12-3 **Are there marketing strategies that you have for your program that currently you are unable to carry out? What would it take to allow you to accomplish these?**

response

None in place other than offering what students and parents are interested in.
More manpower/secretarial assistance would help.

12-3 The limited availability of projection technology is cited as a problem? What changes would result in your pedagogy would result if the faculty in the program had greater access to such technology?

response

We could more easily use modern presentation methods like PowerPoint, demonstrate newer engineering software and other software, and use simulations/animations/websites.

FERRIS STATE UNIVERSITY
College of Technology

TO: Academic Program Review Council

FROM: Interim Dean C. Matrosic

SUBJECT: APR, AAS/BS Mechanical Engineering Technology

DATE: November 1, 2004

I have reviewed the PRP Academic Program Review Report for the AAS and BS Mechanical Engineering Technology, and offer the following comments and observations.

Overall, this program is a valuable member of the College of Technology. The new BS degree has been a huge success, moving from 49 AAS only students in Fall 2000 to 79 AAS students and 39 BS students (total 116 students) in Fall 2004, an increase of 67 students (135%).

Section 12, Conclusions:

Limitations paragraph 2: The reference to overloads leaving little time for anything else, such as professional development or publishing, is inappropriate. The FFS/FSU Agreement (the contract) clearly states (Section 18) that overloads are voluntary, and that they shall not conflict nor interfere with the full-time duties of the faculty member. Faculty are expected to perform within the broad categories of teaching, scholarly activity and service, all of which include professional development and publishing.

Limitations paragraph 8: Unfortunately, current facilities in the college are stretched out thinly supporting the various offerings of the college. New space for programs such as this will not become available until either existing space is opened up by reducing allocations to other programs (not a viable option at this time) or an extensive capital outlay project to improve college facilities is approved. In recent years, the completion of the National Elastomer Center and the Granger Center for Construction and HVACR, combined with the current need for new College of Optometry facilities, have served to downgrade the institution's priority for College of Technology facilities and delay improvements to all programs currently housed in the Swan Building and Annex.

Section 13, Recommendations:

Recommendation 1: See Limitations paragraph 8 above. Also, the labs were cited as a Concern, not a Weakness. While still important, a Concern is a step below a Weakness in the accrediting hierarchy.

Recommendation 4: The need for an added faculty position in MECH is acknowledged, and is a factor in future planning for the college. The reference to a full time one semester faculty is accurate, but it should be pointed out that he teaches only ETEC 140, which serves a number of programs.

Recommendation 6: The creation of a MECH 499 course can be initiated at any time the faculty chooses to do so.

MEMORANDUM

DATE: November 17 2004

TO: Academic Senate

FROM: Academic Program Review Council

RE: Recommendations for:

Associate of Science Degree in Mechanical Engineering Technology
Bachelor of Science Degree in Mechanical Engineering Technology

CC: Randy Stein, Charles Matrosic, Thomas Oldfield, Michael Harris

IDENTITY OF PROGRAM:

AAS Degree in Mechanical Engineering Technology
BS Degree in Mechanical Engineering Technology

RECOMMENDATION OF ACADEMIC PROGRAM REVIEW COUNCIL:

We recommend that these programs be Enhanced

The program meets or exceeds all criteria and it warrants expansion in enrollment to meet the human resources needs in the State of Michigan. A program enhancement may involve additional faculty/staff, equipment, or other resources and/or expansion in enrollment. However, such an expansion would not be initiated without the allocation of resources needed to maintain quality with an enlarged student body.

CATALOG ENTRY:

AAS in Mechanical Engineering Technology

Why Choose Mechanical Engineering Technology?

In this program students develop an understanding of how mechanical systems perform. They begin by taking classes in engineering graphics and CAD, manufacturing processes and computer applications along with applied mathematics and physics. Writing and general education courses are included in the first year as well. Students are then well prepared to take the applied engineering science courses which give them a solid technical background for a future in technology. Coursework is enhanced with hands-on lab experiences and real-world applications provided by faculty with extensive industrial experience.

The AAS in Mechanical Engineering Technology is accredited by the Technology Accreditation Commission of the Accreditation Board for Engineering and Technology (TAC of ABET), 111 Market Place, Suite 1050, Baltimore, MD 21202-4012 - Phone: 410-374-7700.

Prepare for a Great Career

Graduates of the Mechanical Engineering Technology program work with others to develop machinery, equipment, products and processes. They operate test equipment, prepare engineering drawings with CAD systems, review designs for specifications, build prototypes of new products and design new or modify existing products and equipment. Employment opportunities in this field are plentiful because manufacturers are continually introducing new products and processes as well as redesigning current ones.

Students leaving school after receiving their A.A.S. degree accept positions as test technicians, machine designers, product designers, production expediters, quality control technicians, engineering assistants, cost estimators, specifications writers and machinery maintenance technicians. Most graduates of the program continue into B.S. programs including Mechanical Engineering Technology, Product Design Engineering Technology and Manufacturing Engineering Technology.

Admission Requirements

Admission to the College of Technology is open to high school graduates who demonstrate academic preparedness, maturity and seriousness of purpose with backgrounds appropriate to their chosen program of studies. Among first-time students in our technical programs, the average high school GPA is 2.8, and the average ACT composite score is 20.
Students entering the Mechanical Engineering Technology program should have a strong interest in mechanical devices and seek to understand them better. A background in math and science and/or vocational studies can be a suitable starting point. Admission is open to high school graduates with a ÒCÓ average or higher. A minimum ACT math subscore of 19 or completion of MATH 110 is also required for admission.
Students seeking to transfer into the second year of the program should have, at minimum, math through pre-calculus and a college level course in physics equivalent to PHYS 211 or PHYS 241. Courses in engineering graphics, CAD and computer applications are also of benefit but generally can be made up.

Graduation Requirements

The Mechanical Engineering Technology program at Ferris leads to an associate in applied science degree. Graduation requires a minimum 2.0 GPA in core classes, in the major and overall. Students must complete all general education requirements as outlined on the General Education website.

BS in Mechanical Engineering Technology

Why Choose Mechanical Engineering Technology?

Were you a "Legos kid"? Are you curious about how things work? Do you like to take things apart—and fix them? Do you like to use math to solve practical problems?

The Mechanical Engineering Technology program prepares students for a broad range of occupations and challenges. Beginning with foundation courses in math, applied science, CAD, manufacturing processes and communication, students move on to the applied engineering courses that give them a solid technical background for their careers. Students develop strong analytic and problem-solving skills. Their understanding of the principles taught in the classroom is enhanced with many hands-on labs and real-world applications provided by faculty with extensive industrial experience.

The B.S. in Mechanical Engineering Technology has been submitted for initial accreditation to the Technology Accreditation Commission of the Accreditation Board for Engineering and Technology (TAC of ABET), 111 Market Place, Suite 1050, Baltimore, MD 21202-4012; Phone: 410-374-7700.

Prepare for a Great Career

Due to the broad nature of their studies, graduates of the B.S. Mechanical Engineering technology program will find a great variety of jobs open to them. Many will work in the design and development of products,

machines and processes. Others will be involved in manufacturing, operations and technical sales. Their areas of employment will include automotive and transportation, power generation, climate control, machine design, manufacturing, materials and automation.

Admission Requirements

Students entering the program should have a strong interest in mechanical devices and seek to understand them better. They should have completed the A.A.S. in Mechanical Engineering Technology at Ferris (or a similar program elsewhere) with a minimum 2.5 GPA overall and a minimum 2.75 GPA in the major. Pre-engineering programs also make good starting points. Transfer candidates should contact the Mechanical Engineering Technology faculty to discuss options.

Graduation Requirements

The Mechanical Engineering Technology program at Ferris leads to a bachelor of science degree. Graduation requires a minimum 2.0 GPA in core classes, in the major and overall. Students must complete all general education requirements as outlined on the General Education website.

BACKGROUND INFORMATION OBTAINED FROM THE ACADEMIC PROGRAM REVIEW PROCESS:

CRITERIA SUMMARY BASED ON THE CONCLUSIONS OF THE PROGRAM PANEL:

- **Centrality to FSU Mission**
  The mission of Ferris State University is to "be a national leader in providing opportunities for innovative teaching and learning in career-oriented, technological and professional education."
  - The Mechanical Engineering Technology program seeks to provide a stimulating learning environment to prepare students for the broad array of technical careers associated with the discipline. This hands-on technical education is central to the University's stated mission.
  - Its graduates have productive careers in industry.
- **Uniqueness and Visibility**
  - By securing accreditation by the Technology Accreditation Commission of the Accreditation Board for Engineering and Technology (TAC of ABET), Mechanical Engineering Technology at Ferris joins a unique group of such programs nationwide, and one of only three in Michigan. With its many laboratory course offerings and a well-qualified and experienced faculty, it has established a strong position in technical education.
  - Industry in Michigan increasingly looks to MET graduates as valuable employees.
- **Service to State and Nation and World**
  - Services to state, nation and the world are provided by MET alumni, faculty and students. The program provides service by generating a supply of well-educated and trained engineering technologists.
  - Graduates are advancing into industrial leadership positions and are helping build and improve the industrial base.
- **Demand by Students**
  - Enrollments have shown a steady climb since the inception of the BS MET program.
  - In 1999 the official Fall enrollment for the AAS MET program was 53 students. Official enrollment for Fall 2004 was 128, which includes both AAS and BS students. Enrollment (AAS and BS) for the past 6 years is shown in the table below. All are on-campus students.

Fall	1999	2000	2001	2002	2003	2004
Enrollment	52	59	89	111	114	128

- Retention in the programs has been good.
- There exists a network of former students, relatives, friends, employers, and co-workers that spread the word about the value of the MET program at Ferris. Many of the students arrive with clear educational goals. The MET program often is the key element in their plans.

- **Demand for Graduates**
  - The labor market forecast data from both State of Michigan and the U.S. Government indicates very good projected growth in the demand for Mechanical Engineering Technology graduates through 2012.
  - The demand for better products and faster delivery of products will necessitate new engineering and manufacturing methodologies. These, in turn, will generate numerous job opportunities for Mechanical Engineering Technology graduates in the coming years.
  - Competitive pressures will force companies to improve and update manufacturing facilities and product designs, resulting in more jobs for engineering technologists.
- **Placement Rate and Average Salary of Graduates**
  - In Michigan, the average annual wage in 2001 of a mechanical engineering technologist was $45,020.
  - On a national basis, the median annual earning of a mechanical engineering technologist was $41,280 in 2002.
- **Service to Non-Majors**
  - The MET program offers service courses for a number of other programs. These include;
    - Electrical and Electronic Engineering Technology BS (electives in MET)
    - Manufacturing Engineering Technology BS degree (MECH 340)
    - Plastics Technology AAS degree (MECH 340, MECH 250)
    - Plastics Engineering Technology (MECH 340, MECH 250)
    - Welding Engineering Technology (MECH 340)
    - Most technology programs in the COT (ETEC 140)
  - These support courses serve as essential components of these programs.
- **Quality of Instruction**
  - There are a number of elements involved that promote the quality of the instruction for MET students. These include factors relating to curriculum, laboratories, faculty, and other resources of the College of Technology and the University.
  - The curriculum meets national standards set by ABET in coordination with the American Society of Mechanical Engineers (ASME). These standards are regularly reviewed and updated. The program undergoes periodic reviews to insure that these standards and criteria continue to be met.
  - The MET laboratories permit the student to enhance their classroom experiences via hands-on learning and through use of industry-standard computer software. They explore technical applications of applied science with solids, liquids, gases, and electricity. They learn to work together as teams. They are expected to prepare laboratory reports. For their capstone projects, they make both oral and written presentations.
  - The MET faculty are well-qualified. Present and past program faculty have had more than ten years of industrial experience. Their academic credentials meet ABET standards.
  - The College of Technology provides computer resources which are available to all students. These have become an important part of the MET program course work. A recent survey of computer usage and software in use by other engineering technology programs shows that the Ferris MET program is on par with its use of AutoCAD, Excel, LabView, and other engineering specific software.
- **Facilities and Equipment**
  - The campus laboratory facilities available to MET students include the following:
    - Machine shop (MFGT 150)
    - Computer labs (ETEC 140, MECH 122)
    - Chemistry labs (CHEM 114)
    - Physics labs (PHYS 211, PHYS 212)
    - Fluid mechanics laboratory (MECH 211, MECH 421)
    - Mechanical measurements laboratory (MECH 221, MECH 421)

    - Electrical and electronics laboratory (EEET 201)
  - These laboratories provide an excellent hands-on experience for the student. The lab activities complement and enhance the course textbook and lecture material.
  - It should be noted here that the ABET visiting team cited the program on the adequacy of its lab space. Specifically, the visitors noted that the space does not lend itself to full-size industrial equipment and that nearby programs (Plastics and Rubber, Welding, Manufacturing Tooling, and Printing) had much, much more space – and more suitable space.
- **Library Information Resources**
  - The FLITE library resources are adequate for the MET program.
  - The MET program liaison librarian periodically forwards lists of possible titles to faculty. The liaison assists with senior projects, including training and assistance with patent searches.
  - The liaison along with the Systems and Operations Department head were of great assistance in preparation for and during the ABET accreditation visit to the university in October 2003.
- **Faculty:**

  Quantity and Qualifications:
  - The three current MET faculty are well-qualified. All have had more than 10 years of significant industrial experience. Their academic credentials meet TAC of ABET standards.

  Professional and Scholarly Activities
  - All current faculty are members of various professional organizations. Two are registered engineers.
  - All faculty are active in campus activities and participate in university, college, and/or department committees.
- **Administrative Effectiveness**
  - The MET faculty are recognized as competent and diligent, requiring little assistance from administration in either day-to-day or long range planning activities.
  - In spite of the non-constancy of COT leadership over the past years (failed dean searches, interim deans, reorganizations, etc.) the MET program has expanded its offerings (addition of the BS MET degree) and significantly increased student enrollment.
  - The following need to be addressed by COT administration:
    - There is a substantial disparity in support, both funding and staffing, for programs within the COT. The MET program has low visibility since it is included in a department with two other unique programs, while other COT departments consist of a single program. This arrangement in the COT makes some programs very visible, with an accompanying increase in S&E funding for the more visible programs. The MET program suffers in this respect.
    - There is very limited technical support for the MET programs, with no full-time technician to set-up or repair laboratory equipment.
    - The COT (and FSU) does not have in place a regular budget for equipment repair and replacement. They also do not regularly budget for capital equipment acquisition.

COST INFORMATION:

According to the 2001-2002 report from institutional research:

Total cost per SCH

AAS Degree in Mechanical Engineering Technology	**$162.96**
BS Degree in Mechanical Engineering Technology	**$161.47**

Total program cost

AAS Degree in Mechanical Engineering Technology	**$10,755.28**
BS Degree in Mechanical Engineering Technology	**$11,626.19**

The cost of the MET program has three basic components: faculty salaries and benefits, materials and supplies, and laboratory equipment repair and acquisition.

Regarding faculty labor costs, the MET program is a real bargain. Program productivity is calculated by the ratio of student credit hours generated to the number of full-time equivalent faculty (SCH/FTEF).

The MET program is first overall in the College of Technology at 591.20 for the MECH prefix courses, and higher than the FSU mean.

Funding continues to be a problem. Although the MET labs have received significant support in the past, there remain problems in this area. The University and College of Technology do not have in place a regular budget for equipment repair and replacement. They also do not regularly budget for capital equipment acquisition.

The S&E budget given to the MET program is paltry relative to that given to other COT programs. There are serious discrepancies in program funding within the College of Technology which must be addressed.

Even with the advent of the BS MET program, there has been no increase in program resources from the College of Technology or Academic Affairs.

ASSESSMENT OF THE PROGRAM BY THE ACADEMIC PROGRAM REVIEW COUNCIL:

OBSERVATIONS:

- The Degree Program Cost Document for 2001-2002 published by Institutional Research and Testing lists all programs; 2 year, 4 year, graduate, and professional degrees in the same table.
- The AAS Degree in Mechanical Engineering Technology ranks 171/229 in programs at the University based on **total cost per student credit hour** ranked from high to low.
- The BS Degree in Mechanical Engineering Technology ranks 173/229 in programs at the University based on **total cost per student credit hour** ranked from high to low.
- The AAS Degree in Mechanical Engineering Technology ranks 159/229 in programs at the University based on **total program cost** ranked from high to low.
- The BS Degree in Mechanical Engineering Technology ranks 155/229 in programs at the University based on **total program cost** ranked from high to low.
- According to the Administrative Program Review, the capacity of the AAS program is 80 students.
- According to the Administrative Program Review, the capacity of the BS program is 60 students.
- The on campus enrollment in the program is summarized below:

	1999	2000	2001	2002	2003	2004
AAS	46	47	67	79	81	79
BS			11	18	24	37

- The number of on campus graduates in the program:

	1999	2000	2001	2002	2003	2004
AAS	13	18	14	17	37	22
BS					2	14

- The Administrative Program Review states that 2.25 FTE were assigned to this program in the Fall of 2003.
- The Administrative Program Review states that .94 FTE were assigned overload/supplemental in the Fall of 2003.
- The graduate survey was sent to 371 graduates of the AAS program. A total of 42 surveys were returned for a 11.3 % return rate.
- The employer survey was sent to 29 individuals whose organizations have employed Ferris Mechanical Engineering Technology graduates. A total of 10 surveys were returned for a 34.5 % return rate.

- There were 32 exit surveys given to AAS students and 28 were returned for an 87.5% return rate.
- A Students Survey was administered to 12 BS students. A total of 12 surveys were returned for a 100 % return rate.
- The Faculty survey was sent to 3 faculty. A total of 3 surveys were returned for a 100 % return rate.

STRENGTHS OF THE PROGRAM

- The program attracts students with a high level of interest and ability
- The addition of the BS degree in Mechanical Engineering Technology provides a path for AAS students to continue studies in Mechanical Engineering Technology and has been responsible for increased enrollment in the AAS program
- The program just received accreditation by TAC/ABET
- The program has seen a significant increase in growth and there is the potential for additional growth
- The industrial advisory board is very supportive of the program
- There is high productivity by the faculty
- There is 100% placement of graduates of the program
- Graduates obtain well paying jobs
- The program requires a substantial background in mathematics

THE ACADEMIC PROGRAM REVIEW COUNCIL HAS THE FOLLOWING COUNCERNS:

- The growth seen in the program is taxing the facilities and the faculty
  - The faculty members all carry overloads, an issue raised in the ABET accreditation report
  - The program has difficulty finding qualified adjunct faculty
  - The space allocation to this program is inadequate
  - The program has been unable to purchase equipment that is important in the instruction of students
- The funding process for S&E and Equipment in the College of Technology appears to be inequitable and does not reward growing programs
- The instruction by the Mathematics Department does not fully meet the needs of the students in this program
- The senior capstone course in the program is not meeting the needs of the students in the BS program

THE ACADEMIC PROGRAM REVIEW COUNCIL RECOMMENDS THAT THE FOLLOWING STEPS BE TAKEN TO IMPROVE THE PROGRAM:

- The program faculty and administration should continue to explore options to address problems associated with the rapid increase in enrollment in this program
  - The issue of overloads needs to be addressed either by finding qualified adjuncts, elimination of off-campus instruction, or the hiring of an additional faculty member
  - The program faculty and administration should continue to review options with respect to the space allocated to this department
  - The program faculty and administration should continue to explore ways to assure adequate funding for necessary material and equipment in this program
- The College of Technology should reevaluate the procedures used in distribution of S & E funding to programs and allocation of equipment funds to insure more equitable distribution of funds
- In view of the present state of the economy and the University priority list for construction of new facilities, the College of Technology should carry out a comprehensive review of the allocation of rooms in the Swann Building to determine if the current space is being optimally utilized
- The program faculty should meet with representatives of the Mathematics Department to express their concerns and the programs should work together to achieve a mutually satisfactory solution
- The program faculty should consider creating a separate capstone course for majors in the BS in Mechanical Engineering Technology which better meets the needs of students in this program

SELF-STUDY FOR ACADEMIC PROGRAM REVIEW

MECHANICAL ENGINEERING TECHNOLOGY

ASSOCIATE IN APPLIED SCIENCE DEGREE
BACHELOR OF SCIENCE DEGREE

October 2004

PROGRAM REVIEW PANEL

Program Faculty

Randy J. Stein
Chair of the Program Review Panel
Associate Professor of Mechanical Engineering Technology
Chair of the Mechanical Design Department

Charles G. Drake
Professor of Mechanical Engineering Technology

Thomas W. Hollen
Assistant Professor of Mechanical Engineering Technology

Other Faculty

Christina Hollenbeck
Coordinator of Structured Learning Assistance (SLA) Program

Industry Representative

Dr. Thiru Thiruvengadam
Project Manager, Consumers Energy

PREFACE

The Mechanical Engineering Technology (MET) Programs, both AAS and BS, have been selected for academic program review in the 2004-2005 cycle. This report, prepared by the Program Review Panel (PRP) and submitted to the Academic Program Review Council (APRC), responds to the requirements and guidelines established for the academic program review process.

Organization of the report follows the Council guidelines. Section 1 presents an overview of the program, including mission, history, impact, expectations, and plans for improvement. Sections 2 through 9 cover results and analyses of the data collection activities. Section 10 reviews enrollment trends since semester conversion, and Section 11 presents program productivity and cost information. Section 12 contains conclusions based on the data analysis and Section 13 has recommendations addressing program strengths and weaknesses.

In 2003-2004 the MET programs underwent review by a team from the Technology Accreditation Commission of the Accreditation Board for Engineering and Technology, Inc. (TAC of ABET, hereafter referred to as ABET in this report). As a result, the MET programs have received accreditation by ABET (see Appendix A). The accreditation expiration date is September 30, 2006. An interim report focusing on continuous improvement planning is due by July 1, 2005 in order to extend the accreditation for up to an additional four years. The documents prepared for the ABET review, whose tables of contents appear in Appendix B, contain a wealth of information concerning the program and the university, and are available on request. Graduates of the AAS MET program, commencing May 1997 and thereafter, will receive ABET accredited degrees. Graduates of the BS MET program, commencing with the first graduating class in May of 2003, also receive ABET accredited degrees.

The MET faculty wish to express our appreciation and thanks to our students, alumni, fellow faculty, and industry representatives who contributed to this work.

The program review panel remains available to meet with the Council to discuss this report.

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SECTION 1

OVERVIEW AND ADMINISTRATIVE PROGRAM REVIEW

A. GOALS AND OBJECTIVES OF THE MET PROGRAM

The Associate In Applied Science Degree Program in Mechanical Engineering Technology (AAS MET) originated in Fall quarter, 1970. This was the first engineering technology program at Ferris State. Instruction began in the Bachelor of Science in Mechanical Engineering Technology (BS MET) program in Fall 2001. Constituents, mission, early career objectives, and program outcomes were revised as a result of the recent ABET visit. These appear below.

I. Constituents

Students
State of Michigan

II. Mission Statement

The Mechanical Engineering Technology program seeks to provide a stimulating learning environment to prepare students for the broad array of technical careers associated with the discipline.

III. Program Early Career Objectives

AAS MET Early Career Objectives

In the first five years after completion of the AAS MET degree, graduates will be able to:

1. successfully complete a bachelor of science degree in a technical or other discipline
2. and find employment appropriate to the discipline.

BS MET Early Career Objectives

In the first five years after completion of the BS MET degree, graduates will be able to:

1. find employment appropriate to the discipline
2. further their education either by pursuing advanced degrees or with continuing education
3. and be able to advance to supervisory or other higher positions.

IV. Program Outcomes (Goals at time of graduation)

AAS MET Program Outcomes

At the time of graduation, AAS MET students will be able to:

1. apply engineering principles to technical problems
2. carry out an experimental study of a component including data collection, analysis, oral presentation, and written report
3. demonstrate communication skills, both oral, written, and visual
4. demonstrate ability to work on teams
5. demonstrate understanding of ethical issues in their discipline
6. broaden their background with study in humanities and social sciences
7. and understand options to continue their education.

BS MET Program Outcomes

At the time of graduation, BS MET students will be able to:

1. apply engineering principles to complex technical problems
2. carry out a capstone engineering project involving design, testing, analysis, presentation, and reporting
3. demonstrate communication skills, oral, written, and visual, including a formal oral presentation
4. demonstrate ability to work on teams
5. demonstrate proficiency in the modern tools of the discipline
6. demonstrate understanding of ethical issues in their discipline
7. relate issues in diversity, and globalization to their discipline
8. and understand options to continue their education.

The program aspires to accept the challenges stated in these goals and objectives. These program objectives and outcomes support the mission of the University.

> "Ferris State University will be a national leader in providing opportunities for innovative teaching and learning in career-oriented, technological and professional education."

B. HISTORY OF THE MET PROGRAM

The MET program was launched Fall quarter, 1970; the first graduates completed their studies in May 1972. This was the first engineering technology program at Ferris. At that time the majority of the programs in technology ran four quarters and granted certificates. These certificates included areas such as Welding, Machine Tool, Drafting, Auto Body, Auto Machine, Auto Service, along with Refrigeration, Heating-And Air-Conditioning Service, and others. There were several other associate degrees, but not in engineering technology: Building

Construction Technology, Highway Technology, Surveying and Topographical Drafting Technology, Industrial electronics Technology, Plastics Technology, Cosmetology, and others.

In 1977, a BS program in manufacturing engineering technology was initiated. Thus AAS MET graduates could ladder into a four-year degree program. Quite a few of them did. Today, alumni (AAS MET and BS MfgET) from the late 1970's and early 1980's have achieved success in the manufacturing industry. Many have "manager" in their job title.

In 1988, a BS program in Product Design Engineering Technology was added. This program attracted many of the AAS MET graduates. Many have achieved success in their careers with the combination of AAS MET and BS PDET degrees as well.

Throughout the 1990s AAS MET students, alumni, prospective students, and potential employers all expressed interest in a BS MET program. In fact many visitors and potential students were surprised to find out that FSU only offered a AAS in the discipline – and went elsewhere. Preliminary exploration for a BS MET program was begun by MET faculty in Fall 1998. A formal proposal was submitted in October 1999. Senate approval came in April 2000 with Board of Trustees and State Council of Academic Officers coming soon after.

The first classes for the BS MET program were offered in Fall 2001. The number of students starting the AAS MET has increased by over 50% since the inception of the BS degree. This will be substantiated in Section 10 of this report.

C. CURRICULUM DEVELOPMENT

AAS MET

A review of the history of the AAS MET curriculum and how it has evolved reveals that there has been little change in the core curriculum. The original core program courses, offered in the second year of study, are still represented by the current list[1]:

MECH 211 Fluid Mechanics	(3 lecture + 3 lab = 4 credits)
MECH 212 Kinematics of Mechanisms	(2 lecture + 0 lab = 2 credits)
MECH 221 Mech. Measurements w/ Computer Appl.	(3 lecture + 3 lab = 4 credits)
MECH 222 Machine Design	(4 lecture + 0 lab = 4 credits)
MECH 223 Thermodynamics and Heat Transfer	(3 lecture + 0 lab = 3 credits)
EEET 201 Electrical Fundamentals	(2 lecture + 2 lab = 3 credits)

An important support course is EEET 215, Electricity and Electronics for MET (3 lecture + 3 lab = 4 credits) was changed to two three credit courses, EEET 201 and EEET 301,by the Electrical/Electronics and Computer Networks and Systems Department. MET faculty had objected to this change as more credits with little increase in content were added to the MET curriculum if both courses were taken and students would need to pay for an additional two credits. As a result, the second course was made into a technical elective for the BS program. Electrical applications are used in the AAS capstone course, MECH 221 Mechanical Measurements.

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[1] The current MET program curriculum guide sheet is in Section 9.

The AAS MET program has a concentration of applied mathematics and science courses, includes

MATH 116 Intermediate Algebra and Numerical Trig.	(4 lecture + 0 lab = 4 credits)
MATH 126 Algebra and Analytic Trigonometry	(4 lecture + 0 lab = 4 credits)
MATH 216 Applied Calculus	(4 lecture + 0 lab = 4 credits)
PHYS 211 Introductory Physics 1	(3 lecture + 3 lab = 4 credits)
PHYS 212 Introductory Physics 2	(3 lecture + 3 lab = 4 credits)
or CHEM 114 Introduction to General Chemistry	(3 lecture + 3 lab = 4 credits)

Related introductory first year courses include:

ETEC 140 Engineering Graphics Comprehensive	(2 lecture + 3 lab = 3 credits)
MFGT 150 Manufacturing Processes	(1 lecture + 3 lab = 2 credits)
MECH 122 Computer Applications in Technology	(2 lecture + 0 lab = 2 credits)

MET students in two years spend 300 hours in various laboratory settings. This "hands-on" approach has been a Ferris hallmark.

During the semester conversion in process, (semesters began in Fall 1994), several courses had to be dropped to allow for additional hours in general education. These courses were Applied Calculus 1, and Physics 2. However, to meet the 1997 accreditation requirements, these courses were restored at the expense of MATL 240 Material Science and EEET 225 Electronic Technology for MET 2. The former is included in the BSMET program; some of the latter was moved into EET 215 Electronic Technology for MET 1, but this course was eventually deleted and replaced with EEET 201 Electrical Fundamentals.

The program includes the required distributions of English (6 credits) and other general courses education (6 credits).

The technical mathematics sequence was first developed within the MET program in 1983. At that time, the mathematics department did not offer technical math. For accreditation reasons, it was necessary to adopt math-prefix courses. This was accomplished in 1988 when the present technical math sequence was initiated.

BS MET

The BSMET curriculum was first proposed in Fall 1999. Several compromises were made. The first included using PDET 499 Product Design Senior Project as a capstone versus a separate MET capstone. Secondly, PDET 321 Applied Mechanics & Kinematics was used versus a more appropriate course in dynamics. All faculty, including Product Design faculty, agreed that PDET 321 would be of little value to MET students who successfully completed MECH 221 Kinematics of Mechanisms. An experimental course, MECH 390 Dynamics, was used in Winter 2002 and Winter 2003 in place of PDET 321. This later course is calculus bases – appropriate for juniors in an engineering technology program. A permanent course, MECH 360 Dynamics, was established by a curriculum proposal approved in 2003.

MECH 330 Heat Transfer	(3 lecture + 0 lab = 3 credits)
MECH 360 Dynamics	(3 lecture + 0 lab = 3 credits)

MECH 393 Industrial Internship	(400 hr practicum= 4 credits)
MECH 421 MET Senior Lab	(3 lecture + 3 lab = 4 credits)
MECH 440 Noise and Vibrations	(3 lecture + 0 lab = 3 credits)
PDET 422 Advanced Machine Design and FEA	(3 lecture + 3 lab = 4 credits)
PDET 499 Product Design Senior Project	(2 lecture + 3 lab = 3 credits)

The BS MET program has a concentration of applied mathematics and science courses, includes

MATH 226 Fourier Series and Applied Differential Eqn.	(4 lecture + 0 lab = 4 credits)
MFGE 341 Quality Science Statistics	(3 lecture + 0 lab = 3 credits)

CHEM 114 Introduction to General Chemistry	(3 lecture + 3 lab = 4 credits)
or PHYS 212 Introductory Physics 2	(3 lecture + 3 lab = 4 credits)
whichever was not taken in the AAS program.	

A minimum of 2 credits in computer programming is required. The most popular choice is:

ISYS 204 Visual BASIC Programming	(3 lecture + 0 lab = 3 credits)

Related technical courses include:

MATL 240 Material Science	(3 lecture + 2 lab = 4 credits)
MATL 341 Material Selection - Metals	(3 lecture + 0 lab = 3 credits)
MFGE 352 Design for Manufacturability	(2 lecture + 0 lab = 2 credits)
MFGE 423 Engineering Economics	(2 lecture + 0 lab = 2 credits)
MFGE 352 Design for Manufacturability	(2 lecture + 0 lab = 2 credits)

Five credits in technical electives are required – with at least 2 credits at or above the 300 level. Recent popular choices have included:

PDET 322 Modeling and Prototype Development	(1 lecture + 3 lab = 2 credits)
HVAC 337 Mechanical/Electrical Systems for Buildings	(3 lecture + 0 lab = 3 credits)

It should be noted that the BS MET program uses courses from many disciplines. This provides students depth of experience which will make them more adaptable as their careers evolve. It also keeps costs of the program to a minimum.

A survey of the twelve seniors taking PDET 499 Product Design Senior Project revealed that all believed the course was inappropriate capstone for the BSMET program – and that a separate course for the BS MET program should be developed. At present, some students complete both the BS Product Design ET and the BS MET degree with only one capstone. A separate capstone would alleviate this situation.

D. TAC OF ABET ACCREDITATION

As a result of advisory board, student, and faculty interest, the AAS MET program was first accredited in 1997 by the Technology Accreditation Commission of the Accreditation Board for Engineering and Technology (TAC of ABET). Only two other programs at the university were accredited by ABET: the BS in Electrical/Electronic Engineering Technology and Surveying Engineering (accredited by the Engineering Accreditation Commission). As discussed in the curriculum history section, section 1.C., a second course in physics and a course in applied calculus were restored to the curriculum in 1997 to meet accreditation requirements.

ABET is an umbrella organization with 30 member societies that set specific criteria for each discipline. The professional organization that develops the ABET criteria for mechanical-related curriculums is the American Society of Mechanical Engineers (ASME).

In January 2003 application was made to ABET for re-accreditation of the AAS MET program and for initial accreditation of the BS MET program. The BS Electrical/Electronics Engineering Technology (BS EEET) program was submitted for re-accreditation simultaneously.

Faculty were responsible for preparation of three 100+ page documents (one on the university, one on MET programs, one on EEET programs) in response to the ABET questionnaire. Course materials for all technical, math, and science courses needed to be collected for an entire year. Course materials included texts, syllabi, outlines, and examples of A, C, and F student work. Displays were set up in a room in the Swan Building. The three-day visit took place October 26-28, 2003.

Preliminary findings were issued at the conclusion of the visit. Official findings were sent to the Dean of the College of Technology on January 13, 2004. The findings are summarized below:

I. Institutional Issues

Institutional Strength

1. Lab experiences are strong

Institutional Weakness

1. Need for a continuous improvement process for programs. Evidence of assessment exists, but not evidence of a systematic plan to use this information.

Institutional Concerns

1. Instability in leadership in the College of Technology.
2. Future publications will provide the required ABET contact information. Full name of TAC/ABET, address, phone.

II. Program Issues

A. Electrical/Electronic Engineering Technology

Program Strengths

1. faculty
2. classroom and lab remodeling
3. student enthusiasm

Program Weakness

1. lack of written reports in first two years.

Program Concern

1. size of laboratories for future growth

B. Mechanical Engineering Technology

Program Strengths

1. faculty
2. student enthusiasm

Program Concerns

1. Faculty overloads, use of adjunct faculty, not time for updating skills
2. Adequate laboratories; small space limits experiments; comparison to laboratories for other programs
3. Phrasing of BSMET program curriculum: "...designed to meet TAC/ABET criteria..."

Responses:

Institutional Weakness 1: Lack of Continuous Improvement Planning

Continuous Improvement planning is in the process of being addressed by program faculty. New ABET criteria, mandatory commencing Fall 2004, stresses continuous improvement planning processes. To gain insight on what is expected, one MET faculty member attended the ABET "Workshop on Program Improvement" as well as the American Society for Engineering Education (ASEE) Conference in Salt Lake City in June 2004 (trip report in Appendix B). Upon return, the MET faculty met several times to develop a continuous improvement plan (Section 9). The plan was submitted to the accreditation visiting team chair before the July 2004 Commission meeting. Work remaining includes developing assessment tools and implementing the plan. A better understanding of developing assessment tools would be helpful.

Institutional Concern 2. FSU has changed the way it refers to TAC/ABET to meet current expectations.

MET Program Concern 1. Faculty overloads, use of adjunct faculty, and lack of time for updating skills

The self-study indicated high overloads for MET faculty. Additionally faculty from other programs and adjuncts are taking some of the MET loads. The response from COT Interim Dean Charles Matrosic indicated that overloads were not required – and that faculty should not accept them to leave time for development. Adjuncts can be used. Faculty did not agree entirely with this response noting that finding adjuncts has been very difficult due in part to low pay and the difficulty of finding interested and qualified people in the area. Relationships with potential adjuncts have been maintained for several years in hopes of being able to use them.

MET Program Concern 2. Adequacy of Lab Space

The visitors noted how small the MET lab space was – that only scaled down equipment could be used. At their request, visitors were given a tour of the Swan Complex. The visitors noted the abundant space available to other programs – notably Plastics and Rubber, Welding, Manufacturing Tooling, and Printing. (They did not see the Grainger Center, Heavy Equipment Building, or Automotive Center.)

It is noted that the MET faculty have brought this issue forward prior the visit. Until summer 2002 Swan 303 had many remnants of a chemistry lab – wet benches, phenolic counters, and fume hoods. A remodeling project removed all but one fume hood, replaced the flooring and lights, and walls were painted. Work benches were added. Requests for additional space were recently made when the Construction Management program moved its lectures from the Swan Building to the Grainger Center. Two rooms requested by MET were assigned to the Manufacturing Engineering Technology program. Swan 101 (1016.5 square feet), used as a computer lab by Construction Management, was requested as a computer lab to replace Swan 105A (735 square feet). 105A routinely holds 24 students with 24 desktop computers. Students cannot see the board or screen in 105A due to the poor room proportions and low ceiling. Swan 101 held no more than 16 students. Swan 101 was to be made into a laptop lab for Manufacturing students. The room is being made into a "resource room" – with no classes scheduled to date. Swan 207 was also requested by MET, but assigned to Manufacturing. No Manufacturing classes have been scheduled in the room to date. Swan 207 was assigned to the Surveying Engineering program. The programs receiving additional space have not shown growth in recent years.

A formal response, prepared by faculty, indicated that more space was possible if the proposed Swan Building Remodeling Project is funded by the State of Michigan. There is no commitment from the administration to support better lab space for the MET program. (see Appendix B).

MET Program Concern 3. Phrasing of BSMET program curriculum

The offending phrase, "...designed to meet TAC/ABET criteria..." was removed from all MET literature.

Ongoing activity: Faculty need to enhance their understanding of assessment techniques and put their continuous improvement plan into action. A report needs to be submitted to ABET during Summer 2005 to continue accreditation.

Bringing the MET program under the ABET umbrella has numerous benefits. It ensures transferability of students' credits to other institutions, it generates favorable publicity for the program, its graduates, and for Ferris. Students will find their education ore accepted since it has been reviewed externally. BS graduates, in addition to other requirements, may apply for Professional Engineer's licenses in many states thus becoming eligible for employment that requires such licensing. Additionally, accreditation supports the University in its accreditation dealings with the North Central Association of Colleges and Universities (NCA).

E. MET PROGRAM FACULTY

Resumes for current program faculty appear in Appendix C.

There have been only four tenured faculty associated with the MET program since its inception:

Kimberly Gillett, BSME, MSME, PE, Professor Emeritus	(1969-1993)
Hiram Herrick, BS, MS, PE, Professor Emeritus	(1978-1992)
George Olsson, BS, MS, PhD, Professor	(1979-1998)
Charles Drake, BS, MSME, PE, Professor	(1990-)
Thomas Hollen, BS, MSMET, Assistant Professor	(1998-)
Randy Stein, BS, MSME, Associate Professor	(1998-)

The continuity shown here has been an important factor in program success. Several other faculty, now associated with other programs, originally were hired in connection with the MET program:

David Anderson,	(Manufacturing Engineering Technology Program, emeriti)
Mark Hill	(CAD Drafting And Tool Design Program)
Charles Matrosic	(to Construction Mgmt. Prgm., currently Interim Dean, C.O.T.)

To cover the discrepancy between MET teaching loads and the availability of program faculty, others have been called in to fill the gap. Current examples of faculty borrowed to teach our courses include the following:

Richard Goosen, Product Design program	
MECH 340 (4 credits)	Fall 2004 (ea. Fall 1-2 sections)
MECH 222 (4 credits)	Winter 2005 (for many years)
Bill Koepf, Product Design program	
MECH 340 (4 credits)	Fall 2004 (and recent Fall semesters)
MECH 340 (4 cr × 2 sections)	Winter 2005 (& recent Winter semesters)
Adjunct	
ETEC 140 (3 credits, 5 contact hrs x 4)	Fall 2004 (similar in recent years)

Overloads for MET faculty during 2003-2004 included:

Chuck Drake, 8 contact hours
Tom Hollen, 4 credit hours
Randy Stein, 6 contact hours*
*course load for Winter 2004 was dropped due to illness.

Advising loads are high – with the MET faculty having between 38 and 44 advisees.

There is justification to increase the number of faculty in the MET program.

F. STUDENTS

Admission criteria for students entering the AAS MET program include meeting University admission requirements. Regular admission requires an ACT math score of 19+. Candidates with lower math scores may be admitted with pre-technical status (PMEC). Admission to the BS MET program requires completion of the AAS MET program with a 2.7 GPA in MECH courses, a 2.5 GPA in Math thru the first calculus course, and a 2.5 overall GPA.

About 90% of the students completing the AAS program continue their education. Of the 32 students in the AAS capstone last Winter semester, MECH 221, 28 either are continuing at FSU or graduated with a BS in another program (dual majors). Additionally, at least one is continuing elsewhere.

For many years, there was no organization of MET students. In the early 1990's new leadership appeared. The Mechanical Engineering Technology Association (META) was formed and it has provided a focus for student activities. Activities have included Adopt-A-Highway, FSU Spaghetti Bridge Contest, Homecoming Parade (1st place float four years in a row), overnight field trips, picnics, bowling, and an occasional intramural team. This fall a national chapter of the American Society of Mechanical Engineers (ASME) was established.

MET students and faculty have been very involved in college-wide activities including the successful Rube Goldberg team. This team involved students from several COT programs – and obtained some nice publicity for the university. Additionally, MET students and faculty are involved in starting a chapter of the national engineering fraternity, Theta Tau.

G. ALUMNI

Approximately 400 Ferris graduates have received an AAS degree in mechanical engineering technology. 27 students have completed the technical sequence for the BS MET program with 14 graduates to date. The remaining students are lacking math or gen ed classes, with plans to complete these at local community colleges.

Alumni participate in periodic surveys to allow faculty to gain insight into the program. These were reported in the ABET Self-Study.

H. SERVICE

The MET program provides service to the University, to the community and to the State and nation through its students, its faculty and its alumni.

Services provided by the faculty are detailed in resumes contained in Appendix C.

A number of services are provided by our students through META and ASME. Efforts of particular note include:

- Participation in the Michigan Department of Transportation (MDOT) Adopt a Highway program. The signs designating the two-mile stretch of US 131 roadway assigned to META appear at the 123 mile north and 125 mile south markers.
- Undergraduate students assisted with the Electrical/Electronic Engineering Technology / Mechanical Engineering Technology Senior Project open house at the Rankin Center this past spring.
- Constructed a test frame for the (high school) Spaghetti Bridge Contest.
- Have aided special programs of instruction for middle and high school students. (Monday night Technology; King-Chavez-Park Camp)
- Participated in Homecoming events..

ADMINISTRATIVE PROGRAM REVIEW 2003

Program/Department: Pre-Mech.Eng.Tech. / Mechanical Engineering Technology / Mechanical Design Dept.

Purposes of Administrative Program Review:

1. to make deans and department heads/chairs aware of important quantitative and qualitative information about the programs in their colleges
2. to make the Vice President for Academic Affairs' Office aware of important quantitative and qualitative programmatic information from across the University
3. to document annual information that will be useful in the University's accreditation efforts
4. to provide information for the Academic Program Review Council to use in its deliberations

Please provide the following information:

Enrollment

	Fall 1999	Fall 2000	Fall 2001	Fall 2002	Fall 2003
Tenure Track FTE	3	2.25	2.25	2.25	2.25
Overload/Supplemental FTEF	0.08			0.68#	0.94#
Adjunct/Clinical FTEF (unpaid)				0.50	0.75
Enrollment on-campus total*	5/47	10/49	11/78	14/97	9/105
Freshman	4/18	9/28	11/34	10/39	7/31
Sophomore	0/18	1/11	0/26	1/29	0/33
Junior	1/10	0/8	0/11	2/16	0/21
Senior	0/1	0/2	0/7	1/13	2/20
Masters					
Doctoral					
Pre-Professional Students					
Enrollment off-campus*	0	0	0	0	0
Traverse City					
Grand Rapids					
Southwest					
Southeast					

Note 1. Figure includes all – or part – of adjunct load required to teach ETEC 140
*Use official count (7-day)
Overloads for 02/03 and '03/04
If there has been a change in enrollment, explain why:

- The increase in enrollments is due to the offering of the BS degree in Mechanical Engineering Technology

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

- 80 students A.A.S.,
- 60 students B.S.

What factors limit program capacity?

- Faculty
- S&E for lab supplies

Financial

Expenditures*	FY 99	FY 00	FY 01	FY 02	FY 03
Supply & Expense					
Faculty Prof. Development					$ 439
General Fund	$ 8,611	$ 8,596	$ 11,675	$ 17,975	$ 11,320
Non-General Fund					$ 1,423
UCEL Incentives					
FSU-GR Incentives					$ 3,290
Equipment			$ 27,289	$ 41,056	
Voc. Ed. Funds	$ 48,000**	0	$ 26,685	$ 7,500	
General Fund			$ 604	$ 1,543	$ 31,998
Non-General Fund	$ 4,121			$ 30,000 &	
UCEL Incentives					
FSU-GR Incentives				$ 2,013	

*Use end of fiscal year expenditures.
** $48,000 in Voc Ed was actually spent on another department for their request.
& One-time equipment funds

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

Revenues	FY 99	FY 00	FY 01	FY 02	FY 03
Net Clinic Revenue					
Scholarship Donations					
Gifts, Grants, & Cash Donations	$ 6,200	$ 225	$ 225	$ 275	$ 846
Endowment Earnings					
Institute Programs/Services					
In-Kind	$ 8,922		$ 300		

Other

	AY 98-99	AY 99-00	AY 00-01	AY 01-02	AY 02-03
Number of Graduates* - Total	13	18	14	17	22
- On campus	13	18	14	17	22
- Off campus					
Placement of Graduates	100%	100%	100%	100%	100%
Average Starting Salary					
Productivity - Academic Year Average	431.69	496.56	348.36**	461.23**	591.20**
- Summer		121.21		132	75.75
Summer Enrollment		10		11	

* Use total for full year (S, F, W)
** ETEC courses are shared between CDTD, MECH, & PDET faculty. Productivity for ETEC was 601.26 for 00/01, 458.52 for '01/02, and 528.25 for 02/03.

1. a) Areas of Strength:

- Student interest
- Faculty
- Lab experiences
- Supportive industrial advisory board
- Meeting national standards set forth by TAC/ABET
- Low cost of program
- High productivity of faculty

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

- More lab space would enhance the program. Request has been entered into the university and COT planning processes.
- More program-specific marketing needs to be done. A programmatic marketing plan needs to be submitted.
- Lab equipment upgrading is needed. Voc Ed funding has been requested and some received. Faculty needs to reach out to outside sources more.

2. Future goals (please give time frame):

- Grow the BSMET program (first seniors Fall 2002).
- Expand and obtain more useable lab space (when Swan remodeling/addition occurs).

3. Other Recommendations:

- Expand opportunity for faculty development in the academic areas that they teach.
- Improve faculty support for clerical tasks.

4. Does the program have an advisory committee?

- The program has an active and very supportive industrial advisory committee.

a) If yes, when did it last meet?

- May 2003

b) If no, why not? By what other means do faculty receive advice from employers and outside professionals?

c) When were new members last appointed?

- April 2001

d) What is the composition of the committee (how many alumni, workplace representatives, academic representatives)?

- 8 A.A.S. alumni (6 have a BS in another FSU program, 2 have BSME degrees from other universities), 1 non-alum (Ph.D. Mech Eng.).
- All from industry.
- None currently from academia.

e) Please attach the advisory committee charge, if there is one.

n.a.

5. Does the program have an internship or other cooperative or experiential learning course?

- Yes

a) If yes, is the internship required or recommended?

- Required between junior and senior year.

b) If no, what is the reason for not requiring such an experience?

c) How many internships take place per year? What percentage of majors has internships?

- All juniors are expected to obtain an internship.

6. Does the program offer courses through the web?

- No

a) Please list the web-based courses (those delivered primarily through the internet) the program offered last year?

n.a.

b) Please list the web-assisted courses the program offered last year.

n.a.

7. What is unique about this program?

a) For what distinctive characteristics is it known, or should it be known, in the state or nation?

- The AASMET program is nationally accredited by TAC/ABET.
- The BSMET program has been through a TAC/ABET accreditation visit in 2003 and is awaiting accreditation (expected summer 2004).
- The program emphasizes practical application of engineering principles.

b) What are some strategies that could lead to (greater) recognition?

- National accreditation for the BSMET program (expected summer 2004).
- Successful internship experiences.
- Increased community college transfers.
- Participation in national competitions and other activities of the American Society of Mechanical Engineers (ASME).

8. Is the program accredited? By whom? If not, why? When is the next review?

- AAS is accredited by TAC/ABET. Reviewed in Fall 2003.
- BS had a TAC/ABET accreditation visit in Fall 2003. Accreditation is expected Summer 2004.

9. What have been some major achievements by students and/or graduates of the program? By faculty in the program?

Students have accepted the challenges of an accredited program -- and the challenge of being the first to take the new courses in the BSMET program. They have been recognized with membership in several honoraries including Tau Alpha Pi and Omicron Delta Kappa. At least nine are in the FSU Honors Program. Many have earned Dean's List honors. The student club META has won the Dean's Challenge during the last three years as well as the Homecoming Float contest. Our students participated in a multi-disciplinary effort to design a Rube Goldberg machine, and won Regional first place in February 2004 and will participate in the national Rube competition in April 2004.

Faculty have been very active in college and campus activities including the Academic Senate (2 members), Student Life Committee, University Professional Development Committee (chair), University Curriculum Committee (chair), the University General Education Committee, and the Academic Program Review Council (1 member). Two faculty received tenure effective Fall 2003. Outreach activities include Monday Night Technology, Project Lead the Way, and MathCounts.

10. Questions about Program Outcomes Assessment/Assessment of Student Learning at the Program Level (Attach additional sheets, if necessary.)

a) What are the program's learning outcomes?

MET students learn to make CAD drawings; apply mathematical and physical principles to the solution of technological problems; design mechanical components and machines; apply principles of fluid mechanics, fluid power, thermodynamics, and heat transfer; use engineering computer tools such as programming and finite element analysis; specify material selection and processing; perform engineering tests for such quantities as stress, strain, torque, pressure, and temperature; collect test data; and prepare technical reports. Students acquire written and verbal communication skills through the study of English, humanities, and behavioral sciences.

b) What assessment measures are used, both direct and indirect?

Students are assigned projects which are collected, evaluated, and saved. These include:

MECH 122 Computer applications in Technology

Commence assessment Winter 1998 (collect examples of computer usage such as engineering related spreadsheet applications)

MECH 211 Fluid Mechanics

Commence assessment Fall 1998 (collect student design projects)

Capstone Projects in the AAS degree

The student projects for the capstone course, MECH 221 Mechanical Measurements with Computer Applications, are collected and printed each year. The project presentations are videotaped. This activity commenced in Winter 1997 and continues.

MECH 421 Senior Lab

Collect reports of student projects. These involve creating systems which involve sensors, signal-processing, analog-to-digital conversion, programming in LabView language, and data acquisition.

PDET 422 Advanced Machine Design with Finite Element Analysis

Students prepare a report on their independent finite element analysis that generally will involve their senior project.

PDET 499 Product Design Project

This is the capstone class for the BSMET program. Students write a formal report and make a formal oral presentation of their senior project.

c) What are the standards for assessment results?

- Standards are set by faculty based on their industrial experience. The MET Industrial Advisory Board reviews capstone projects annually. In the past, this has included students briefly presenting and discussing their projects with board members.

d) What were the assessment results for 2002-03?

- AAS capstone project presentations and discussions with Advisory Board members went well. Overall project reports and formal presentations were very satisfactory.

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

- The results point out weaknesses to faculty – which guide them in the next course.

11. Questions about Course Outcomes Assessment:

a) Do all multi-sectioned courses have common outcomes?

- The key courses in the MET programs all have a common lecture – sometimes multiple lab sections.

b) If not, how do you plan to address discrepancies?

c) Do you keep all course syllabi on file in a central location?

- Yes, in the department office.

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

Randy J. Stein

Form Completed by Randy J. Stein, Dept. Chair / 08 Mar 04
Name and Title / Date

Reviewed by Dean_____
Name / Date

Comments by Dean:

SECTION 2

GRADUATE SURVEY

A. Introduction

Graduate follow-up survey: The purpose of this survey is to learn from the graduates their perceptions and experiences regarding employment based on program outcomes. The goal is to assess the effectiveness of the University and the program in terms of job placement and preparedness of the graduate for the marketplace.

The first four pages (2-2 thru 2-5) of this section are taken directly from the ABET accreditation report, which was referenced earlier (see footnote 3 on page ii). They were included as pages III-1 through III-4 of *Volume II – The Program.*

Pages 2-6 thru 2-16 are from a Summer 2003 survey of 371 alumni from the AAS program. The survey, a summary page, and data charts are included.
The alumni were well pleased with their career preparation, and are advancing in their careers. They are well paid. Half of the respondents have continued their education to a BS degree or higher, though phone conversations lead us to believe that number is much higher.

Pages 2-17 thru 2-20 are from a May 2004 survey of graduating second-year students (AAS degree). A survey form and summary pages are included.
Most plan to continue into the BS MET program. The students indicated they were helped in many areas, such as: understanding of specific MET topics, better understanding of what engineering is, writing, communication, group learning, and career goals. Negatives were: labs not well equipped, not enough time for final project, need more lab space, need more computer-based courses.

Pages 2-21 and 2-22 are from a May 2004 survey of graduating seniors (BS degree).
Their responses show very clearly the benefits of continuing past the AAS degree and obtaining the BS degree in MET.

III. FOLLOW-UP WITH GRADUATES AND EMPLOYERS

Note: The institution must be able to present data and documentation demonstrating the placement and satisfactory employment of its graduates in positions appropriate to the purpose of the program. Information is specifically required showing employer satisfaction with graduates, graduates' satisfaction with employment, career mobility opportunities, appropriate starting salaries, and appropriate job titles. No specific format is prescribed by ABET for the collection and presentation of such data, but information should be current and reasonably complete.

A. Employment history

Discuss the recent employment history of the graduates of the engineering technology program. What specific industrial organizations have recruited on campus? What has been the hiring history with respect to starting salaries, job titles, responsibilities assigned, and subsequent promotions? What percentage of graduates continues in advanced study? What percentage have not obtained satisfactory employment? Do the program faculty assist students in finding employment?

Companies recruiting on campus

Approximately 175 employers recruit at Ferris at least once per year. This includes two job fairs and campus interview visits. There were 56 employers seeking MET graduates[1]

Hiring history

Most Mechanical Engineering Technology (AAS MET) graduates (over 90% in the five years) continue their education and pursue bachelor's degrees. Until this past year, when the first BSMET graduations have taken place, these students have usually pursued bachelors degrees in Manufacturing Engineering Technology and Product Design Engineering Technology at Ferris State. The starting salaries of those AASMET graduates that have pursued the latter degrees is expected to be near the averages given below. While no significant data is available for BSMET graduates, their salaries are expected to be similar to those below.

BEGINNING ANNUAL SALARY DATA 2000-2001[2]

Bachelor's Degree Program	Respondents working in related field	Average Salary	NACE Average
Manufacturing Engineering Technology	20	50,099	46,650
Product Design Engineering Technology	10	46,300	43,145

For those few AASMET graduates who immediately seek employment (too few in number to form an adequate statistical sample), their potential starting salaries may be represented by the average beginning salaries for all associate degree graduates of the College of Technology. In 2000-2001 this was about $32,000.[3]

---

[1] Summary of employers seeking MET graduates from FSU Career Services,

[2] "2000-2001 Ferris State University Graduate Follow-Up Report,", Office of Institutional Research and Testing.

[3] Ibid.

Faculty assistance for students seeking employment
The faculty assists graduating students and alumni in finding employment in several ways:

1. Referral calls for companies seeking mechanical engineering technology (MET) graduates come through via the Career Planning and Placement Office and also directly from the companies themselves. This information is then relayed to interested students and alumni.

2. Students and alumni request faculty assistance in finding employment. Faculty supply suggestions of target companies for applications and write letters of recommendation, as needed.

3. The summer internship experience in the BSMET program, coordinated by a MET faculty member, provides students with excellent exposure to and contact with potential future companies.

4. Members of the Industry Advisory Committee have also provided leads and advice for MET students.

B. Surveys and records
Describe the extent of surveys and records available on the performance of graduates from this program. Who is responsible for such surveys? Also, describe how feedback information from employers and graduates is used to improve the educational program. Be specific.

Surveys and records of graduates
Surveys of graduates of the Mechanical Engineering Technology program are conducted at three levels:

1. Surveys prepared by Institutional Research and Testing. These annual surveys focus on current graduates from programs across the University. The most recent survey, "2000-2001 Ferris State University Graduate Follow-Up Report," appears at the end of the *Supplement to Volume I.*

2. Departmental surveys. These surveys are specially prepared and focus on particular programs. These are performed for an internal self-study Academic Program Review and for outside reviews such as accreditation and Perkins Act self-study (page IV-4).

Feedback from these surveys is use to assist faculty and advisory board members with decisions on future directions for the programs – especially curriculum.

PLANS OF THE MECHANICAL ENGINEERING TECHNOLOGY CLASSES OF 2003

AAS MET

FUTURE PLANS	Number*
Continuing to B.S. Program in	
Manufacturing Engineering Technology	0
Mechanical Engineering Technology	15
Product Engineering Technology	2
Completing AASMET	3
Employed/Seeking Employment	2
Changing Programs	1
Uncertain/Unknown	3
TOTAL	26

*Based on enrollment in MECH 221 Mechanical Measurements.

BS MET

FUTURE PLANS	Number*
Seeking Employment/Employed	10
Graduate School	1
Completing BS on campus	1
Uncertain/Unknown	0
TOTAL	12

*Based on those that have substantially completed the BSMET degree – including key Fall and Winter courses.

C. Graduate/employer follow-up procedures

Discuss the perceived strengths and limitations of the graduate/employer follow-up and feedback procedures. With each limitation indicate planned actions to improve the process.

Survey Instruments

Contacts between the program faculty and the graduates involve both survey instruments and word of mouth interactions. The survey instruments are designed to elicit feedback on the comparative value of the educational components of the program and to receive input regarding new directions. Typical topics in the surveys include:

Gender
Current annual salary

Employer's industry category
Job title/classification
Additional education
Ferris program effectiveness in preparation for employment
Satisfaction with educational experience at Ferris
Most/least valuable part of course work
Need for continuing education
Participation in continuing education

The MET programs have developed a simplified survey format hoping to increase response rates. Phone calls are also used to increase response rate. Employers are contacted by phone to ensure response.

Some highlights of the results of the Summer 2003 survey include:

- satisfaction with career preparation: 44% marked very high, 54% high, 2% fair
- satisfaction with employment opportunities: 38% marked very high, 50% high, 8% fair, 5% not satisfied.
- salaries: More that half of those responding reported salaries in the range of $70,000 to $80,000 or higher with several reporting a salary above $100,000.
- relevance of courses: Highest ratings were for computer applications and mathematics followed by Statics and Strengths of Materials, Engineering Graphics, Manufacturing Processes, Mechanical Measurements, and Machine Design. Lowest were Kinematics and Thermodynamics.
- area of employment: design: 38%, testing: 10%, manufacturing: 26%, R&D, 8%, sales: 18%.
- titles: Numerous. Engineer and manager, with many modifiers, were the most common. Vice-president, president/owner, technician, were among the others.

An employer survey is in progress. A report will be forwarded to the visiting team under separate cover.

The MET Industrial Advisory Committee provides additional student feedback to the MET programs. This committee meets informally with students each year – and shares their findings with faculty.

FERRIS STATE UNIVERSITY

MECHANICAL ENGINEERING TECHNOLOGY

GRADUATE SURVEY

MAY/JUNE 2003

DATE OF REPORT: OCTOBER 27, 2003

FERRIS STATE UNIVERSITY

May 29, 2003

Alumni
Mechanical Engineering Technology

Greetings from Big Rapids!!

A little news – and then a request –

The News

The MET program is moving along up here – and has experienced some growth in recent years. Our first seniors in the BSMET program walked across the stage this spring. This was gratifying. Our entering freshmen classes have been over 30 students recently – still small enough to be personal, yet reflecting some growth. We have recently had the highest ACT average in Math for the College of Technology – and have 5 Honors Program students coming this fall.

Last summer the Fluids Lab was remodeled. If you stop by, you may not recognize it as the room you spent many hours in. The chemistry benches and all but one fume hoods are gone. Workbenches have taken their place. The room is much, much more useable now. Additionally, we have been able to replace the hydraulic and pneumatic trainers that have been in use for over 30 years.

Both the AASMET and BSMET programs are going through an accreditation visit this coming Fall. (TAC/ABET Technology Accreditation Commission of the Accreditation Board for Engineering and Technology.) This is re-accreditation for the AAS program and first time accreditation for the BS program. This is where we need your help.

The Request

Enclosed you will find an alumni survey. The survey is being sent in two formats, postcard form and faxable form, for your convenience. We would appreciate your completing and returning one version at your earliest convenience. We would like to have them back by June 11 to compile them and include the results in our self-study.

Your assistance is appreciated!!

Yours truly,

Chuck Drake
Professor and Department Chair
drakec@ ferris.edu

enclosures(2)

MECHANICAL DESIGN DEPARTMENT
COLLEGE OF TECHNOLOGY
CAD Drafting Tool Design Technology
Mechanical Engineering Technology
Product Design Engineering Technolgoy
915 Campus Drive, SWN 405, Big Rapids, MI 49307-2291
Phone 231 591-2755 . . . 231 591-2271

Fax to: Chuck. Drake, Ferris State University, 405 Swan Building, Big Rapids, MI 49307
Fax #: 231-591-2271

MECHANICAL ENGINEERING TECHNOLOGY- ALUMNI SURVEY

Name_____ MET/AAS Year_____

Address_____

_____

Home Phone_____ Work Phone_____

Company Name_____

Position Title_____

Company Address_____

_____

E-mail Address_____

SALARY FOR PRESENT POSITION (OPTIONAL): check appropriate box.
< $30k☐ $30-39k☐ $40-49k☐ $50-60k☐ $60-70k☐ $70-80k☐ $80-90k☐ $90-100k☐ >100k☐

YOUR EDUCATION SINCE MET/AAS
College/University_____ Degree_____ Year_____

College/University_____ Degree_____ Year_____

SEMINARS/COURSES (List most recent)
Location_____ Topic_____

Location_____ Topic_____

CAREER AVENUES (Check which category best fits your current position)

Design__ Testing__ Manufacturing__ R&D__ Sales__ Other (describe)_____

RELEVANT SCIENTIFIC AND TECHNICAL TOPICS FOR YOUR CAREER
Mark as follows: **3 = Very Important, 2 = Necessary, 1 = Unimportant**

Computer Applications	3 2 1	Electricity and Electronics	3 2 1
Fluid Mechanics	3 2 1	Engineering Graphics/CAD	3 2 1
Kinematics of Mechanisms	3 2 1	Manufacturing Processes	3 2 1
Mechanical Measurements	3 2 1	Metallurgy/Material Science	3 2 1
Machine Design	3 2 1	Hydraulics and Pneumatics	3 2 1
Thermodynamics	3 2 1	Physics	3 2 1
Statics & Strength of Mat'ls	3 2 1	Mathematics	3 2 1

SATISFACTION W/ CAREER PREPARATION W/ MET/AAS: v. high ☐ high ☐ fair ☐ not satisfied ☐

SATISFACTION WITH EMPLOYMENT OPPORTUNITIES: v. high ☐ high ☐ fair ☐ not satisfied ☐

COMMENTS: _____

RECOMMENDATIONS: _____

RELEVANT SCIENTIFIC AND TECHNICAL TOPICS FOR YOUR CAREER
Mark as follows: 3 = Very Important, 2 = Necessary, 1 = Unimportant

Computer Applications	**3 2 1**	**Electricity and Electronics**	**3 2 1**
Fluid Mechanics	**3 2 1**	**Engineering Graphics/CAD**	**3 2 1**
Kinematics of Mechanisms	**3 2 1**	**Manufacturing Processes**	**3 2 1**
Mechanical Measurements	**3 2 1**	**Metallurgy/Material Science**	**3 2 1**
Machine Design	**3 2 1**	**Hydraulics and Pneumatics**	**3 2 1**
Thermodynamics	**3 2 1**	**Physics**	**3 2 1**
Statics & Strength of Mat'ls	**3 2 1**	**Mathematics**	**3 2 1**

ADDITIONAL COMMENTS/RECOMMENDATIONS: _____

_____

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL

FIRST-CLASS MAIL PERMIT NO. 8 BIG RAPIDS MI

POSTAGE WILL BE PAID BY ADDRESSEE

Mechanical Engineering Technology
SWN 405 (2-39420)
FERRIS STATE UNIVERSITY
111 W KNOLLVIEW DR
BIG RAPIDS MI 49307-9930

MECHANICAL ENGINEERING TECHNOLOGY- ALUMNI SURVEY

Name_____ MET/AAS Year_____

Address_____

_____

Home Phone _____ Work Phone_____

Company Name _____

Position Title _____

Company Address_____

_____

E-mail Address _____

SALARY FOR PRESENT POSITION (OPTIONAL): check appropriate box.
< $30k□ $30-39k□ $40-49k□ $50-60k□ $60-70k□ $70-80k□ $80-90k□ $90-100k□ >100k□

YOUR EDUCATION SINCE MET/AAS
College/University_____ Degree_____ Year_____

College/University_____ Degree_____ Year_____

SEMINARS/COURSES (List most recent)
Location_____ Topic_____

Location_____ Topic_____

CAREER AVENUES (Check which category best fits your current position)

Design__ Testing__ Manufacturing__ R&D__ Sales__ Other (describe)_____

SATISFACTION W/ CAREER PREPARATION W/ MET/AAS:
v. high □ high □ fair □ not satisfied □

SATISFACTION WITH EMPLOYMENT OPPORTUNITIES:
v. high □ high □ fair □ not satisfied □

COMMENTS: _____

RECOMMENDATIONS:_____

Summary

During Summer 2003 a survey instrument was mailed to 371 alumni of the AAS Mechanical Engineering Technology Program. 42 responses were received with many returned unopened.

The survey results showed alumni have a great variety of job functions. Most are working in technical positions – with titles such as engineer, engineering manager, or technician. Six titles appeared to be non-technical. All job titles reported are listed in Table 1 Job Titles (p. 3) with a general breakdown in Table 2 Job Title Categories (p.4).

The reported career paths strongly favored design then manufacturing and sales. A substantial number (10) reported career paths in a variety of other areas such as software, marketing, finance, and construction. Chart 1 Career Avenues (p. 4) summarizes these results.

Twenty-nine graduates reported salary information. Over half reported salaries in the $70-80k or higher range. Chart 2 Salary Ranges (p. 5) shows the distribution of salaries.

Graduates were asked to rate their satisfaction with their education as preparation for a career as well as their satisfaction with employment opportunities. Nearly all respondents reported either high or very high satisfaction with their career preparation with the AASMET program (Chart 3, p. 5). Similar, but slightly lower levels of satisfaction were reported for satisfaction with employment opportunities (Chart 4, p. 6).

Graduates were asked to rate the relevance of scientific and technical courses in their curriculum. Courses with the highest ratings were computer applications and mathematics followed by statics & strength of materials, manufacturing processes, mechanical measurements, and machine design. Chart 5 Relevance of Scientific and Technical Courses (p. 6) summarizes this data.

50% of the responds indicated that they had continued their education to a B.S. degree or higher. Based on phone interviews and personal knowledge of some of the respondents, it is believed that this number is substantially higher.

Finally, respondents added comments of their choosing. Many were complementary while others offered suggestions for the program. These are included in Table 3 Additional Comments (p. 7).

Copies of the survey instruments and transmittal letter are attached.

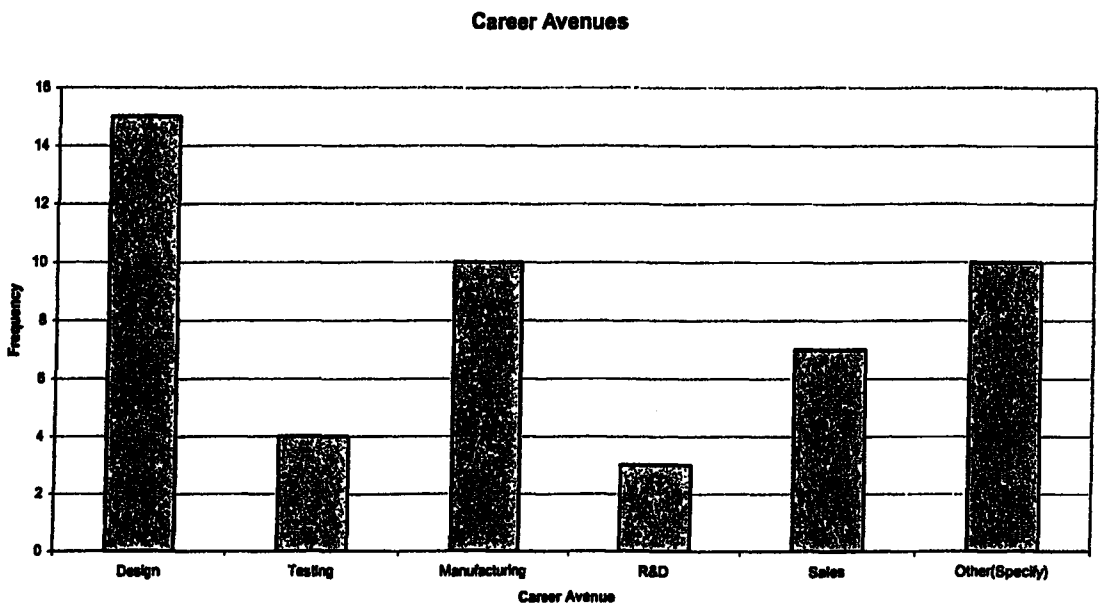
Table 1. Job Titles

The following job titles were given. (41 total)
Account Financial Manager
Test Eng. Intern (summer job)
Instrument Maker III
Project Manager
VP Engineering
President/Owner
Tooling Engineer
Product Release Engineer
Sr. Design Engineer
Product Engineer
Principal Consultant
Adv. Manuf. Eng. Manager
Product Devlop. Engin.
Marketing Mgr.
Sr. Manager, Product Design
Engineering Manger
Mechanical Eng. Technician
Designer
Project Engineer
Manufacturing Engineer
UP Operator
Director, Int'l Sales
Project Manager
Process Engineer
MFG Engineer
Design Responsible Engineer
Account Manager
Equipment Specialist
Region Technical Manager
Cost Estimator
Manager STA
SR. Manuf.. Eng.
Sr. Project Engineer
Project/ Process Engin.
Short Term Worker
Sr. Performance Technician
Fastener Engineer
Product Develop. Engin.
U.P Manufacturing
Lead Spec Engineer
Design Engineer

Table 2. Job Title Catagories

Engineer	17
Manager/VP Technical	8
Technical - Other	10
Manager/Director – Non-Technical	4
Non-Technical - Other	2

Chart 1. Career Avenues



Other career avenues included: science, Software, business software implementation, marketing, finance, construction, and R&D.

Chart 2. Salary Ranges

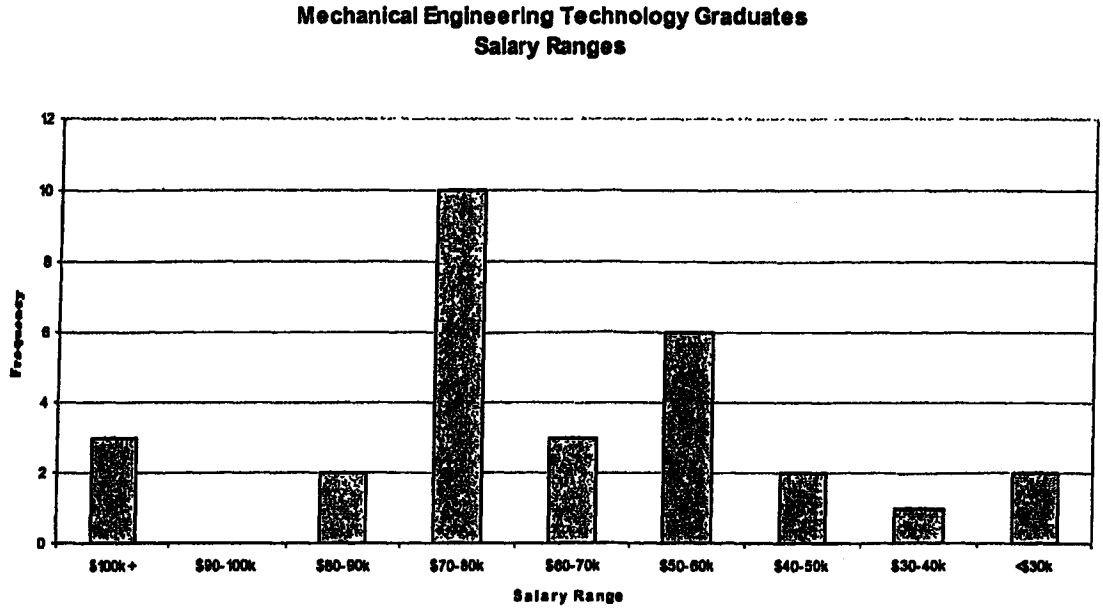


Chart 3. Satisfaction with Education

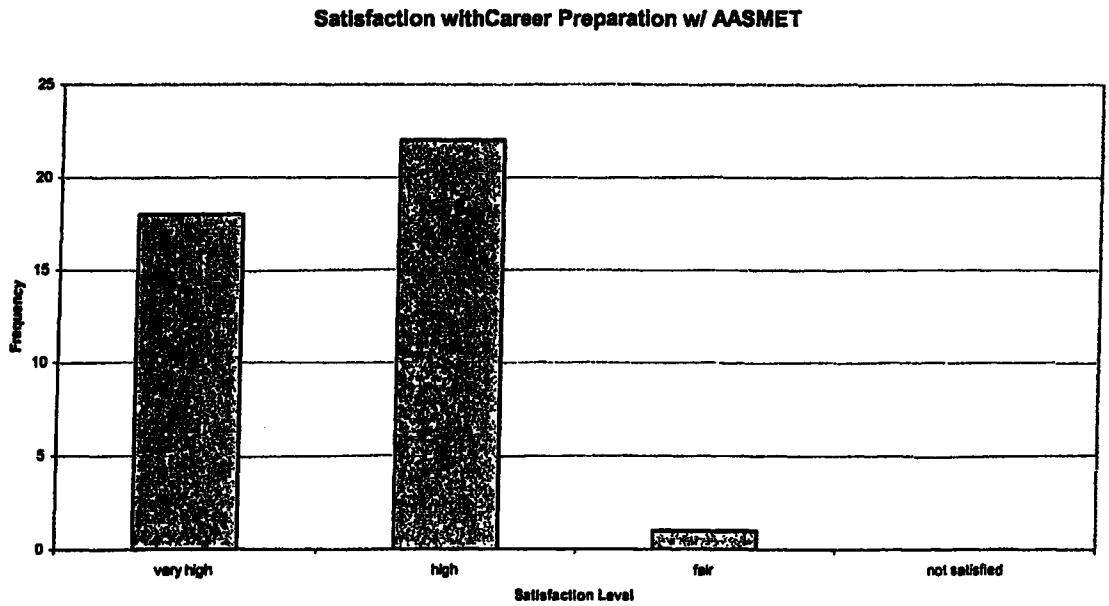


Chart 4. Satisfaction with Employment Opportunities

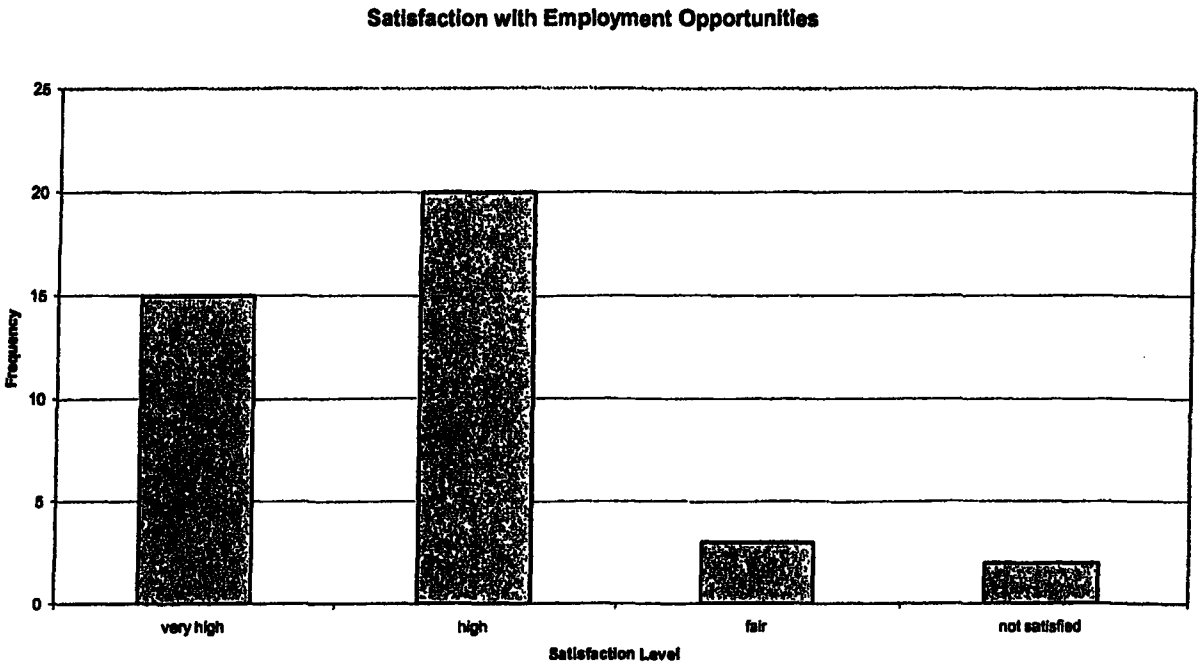


Chart 5. Relevance of Scientific and Technical Topics in Your Career

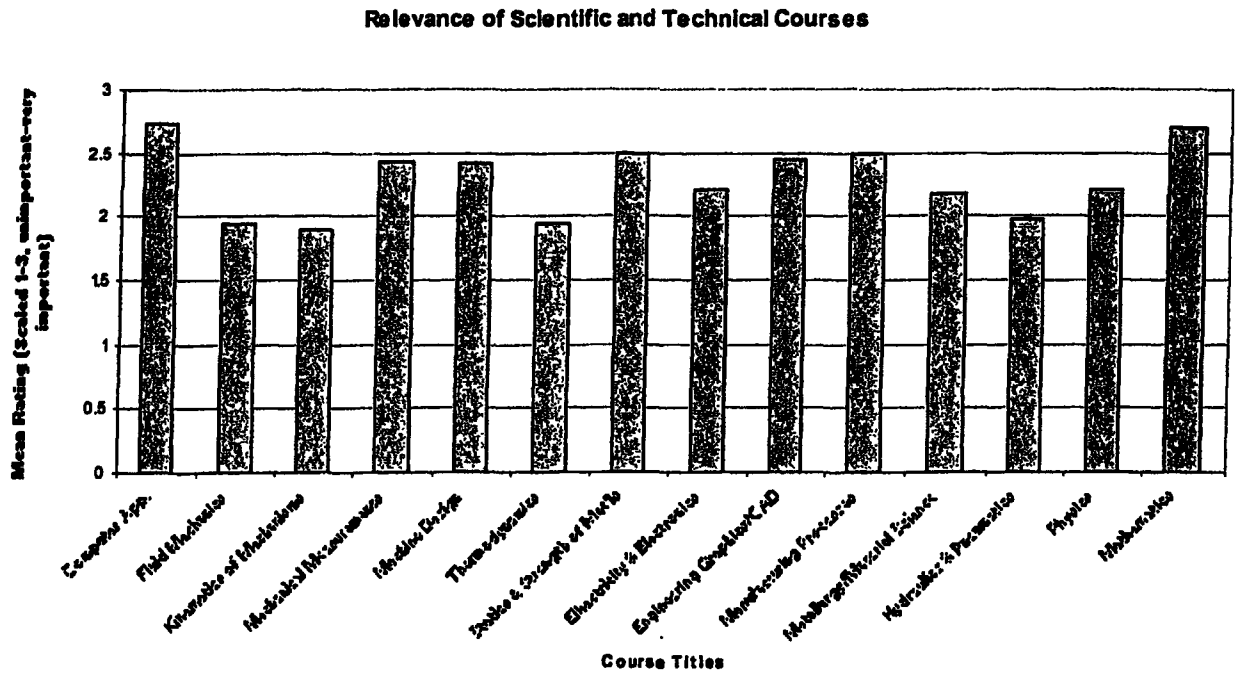


Table 3. Additional Comments

PLTS 341 should be required

Add some coverage on Planning/Org.

I feel that the MET program had the classes that best prepared me for what I do now. Very good program!

NICET Certified (Level I) Almost Level II

Began at AMG in 1975 as Specification Engineer

Include project management course

AAS in MECH TECH was a good addition to my B.S. in W.E.T

If the BSMET program had been available in 1974 I would have enrolled.

Working in Finance-Not too much is useful since MET & Finance

Great School

Group meetings w/ presentations are a norm for me. Recommend integrating some kind of format to include student presentations.

Courses in CAE would be a plus for any future graduate

Even with a BS degree in Product Design, I use almost everything from my AS in MET.

Always look ahead 3 to 5 years to see where technology is going and teach to that.

I was well prepared for my after-Ferris life.

GRADUATE SURVEY – SECOND YEAR STUDENTS May 2004

Name: _____

Summer Address: _____

_____

_____

Permanent Address: _____

_____

Employment Plans: _____

_____

_____

Plans fort Further Education: _____

_____

_____

Why did I enter the MET program?: _____

_____

_____

How has the MET program helped me?: _____

_____

_____

Have my expectations of this program been met?: _____

_____

Additional comments: _____

_____

GRADUATE SURVEY – SECOND YEAR STUDENTS
MAY 2004

Summer/Permanent City:

Fayetteville, NC, Canton, Standale, Trenton, Sterling Heights, Corunna, Iron Mountain, Adrian, Tecumseh, White Cloud, Baroda, St. Charles, Quincy, Hudsonville, Bad Axe, Scharmburg, IL, Benton Harbor, West Branch, Detroit, Nanica, Berkley, Rochester Hills, Flint, Clinton Twp., Hudsonville, Portage, Big Rapids, Fremont

Employment Plans:

Self employ. Working at a camp this summer then finding an internship for next summer. Federal Screw Works this summer. Hopefully Honda when graduated. ??? FANUC Robotics. Operating fork truck at a trucking company. Drag racing (NHRA, IHRA). To be obtained. Unknown. MACDEE Plastics, mold injection, print engineer and machinist. Crafts/construction while I look for an internship around the Rochester Hills area. Hill Electric. Not yet known. Own my own business. Looking for job in engineering field. Undecided. Unsure. Palasides Nuclear Plant in Covert, MI. Summer job in BR. None so far. Work, Grand Haven State Park. Retiling pools. Summer wherehouse work. Work at a restaurant. Test engineer for DCX or JD. Factory worker, then engineer at Smith Aerospace. Roofing with brother (independent). Federal Screw Works. Work on family farm this summer, internship next summer.

Plans for Further Education:

4-year program completion. BS in MET. BS, if location after college allows then masters while working. Not decided. Company training. Possible MBA or MS Eng. Management. BS at Ferris. Get my Bachelor's. BS degree in MET. Bachelor's in Mech. Engineering at Ferris State. Fall classes for BS or an internship. Bachelor in MET and possibly Product Design. PDET at FSU. University of Northwestern in Lima, Ohio. Continue on to BS. BS MET. BS in Mech. Eng. Dept. Going into Automotive and then into Automotive Engineering Tech. while finishing up my MET Assoc. 2 more years. N/A. BS MET. Bachelor in MET here. BSMET at Ferris. BS in MET. Bachelors, Masters. Go on to get my Bachelor's degree. BS-MET. Not sure yet, definitely FSU something engineering. BS at Ferris in MET.

Why did I enter the MET program:

Connection between HVAC/R and commercial work. I like to learn how things work then apply that knowledge. Very interesting, something I've wanted to do my whole life. Was interested. To pick up courses that I transferred in slack time. Challenging. Thought I would learn a lot. Which I have. I'm good at math and enjoy being creative. Seemed to have a lot to offer. I heard it was an excellent engineering school. More of hands-on than behind a computer. Interested in the design of things, friend of family interested me in the major. It seemed like something I would be interested in. To get an understanding of what Mech. Eng. was. Ferris is known for down to basics, hands-on approach. I liked mechanical things, cars especially. Found it interesting; wanted to learn more about the program. Sounded good at the time. Fall 2000. Because I like math, creating things, and figuring out how they work. To be an Engineer. Just looking online and it sounded like my thing. I like solving problems. Engineering has always interested me. Most fit my career goals. Because I have always wanted to do this. Appealed to career goals. Originally to continue in Quality Engineering. I found the subject interesting.

How has the MET program helped me?

A better understanding of all the Mech areas in how they come together. It has caused me to think about mechanisms differently. Educating me on things I need. Struggled but learned some important things. Better understanding of fluids, machine design, kinematics. Broaden my knowledge. Helps me problem solve better. Helps me write very good reports. I have learned many things to take with me to a job. I've learned a lot in the last two years that will help me in the future. In depth labs, good examples. I have learned a lot about engineering and materials and processes. It made me better able to get a job of my choice. Helped understand what it was. Hands-on learning. Showed me a wide range of what can be accomplished with a MET degree. Learned a lot about strains and stresses. Gave me a better understanding of what exactly a Mech. Engineer does. It has helped me understand what an Engineer does. In every way possible. Better at equations and with work in groups. Given me the tools to solve more problems. It has helped me problem solve and look needed information up in books. It educated me in what I wanted to learn. It has taught me a lot that I didn't know about this major. Know that I'm working towards a properly suited goal. I've learned a lot and have been able to use my knowledge at work. I have learned a lot of new info.

Have my expectations of this program been met?

Yes with a further understanding in general. Yes. Somewhat. No. Very much so. Yes. Not as much as I would have hoped. Yes. Not yet. Yes. Yes. Yes. Sort of,

not fully yet. Yes. Not yet. Yes. Yes. Yes. Yes. And surpassed. Yes. Yes, except I thought the labs would be better equipped. Yes. Yes they have. Yes. Yes, and then some. I have learned more than I though I would. An academic degree would be nice.

Additional comments:

Project for the final(?) need more time for competition. We need more lab space. I really hope the BS accreditation goes through! Would have liked to see more computer-based classes. More lab space. More variety of teachers. I enjoyed my time here, thanks to _ for being a great teacher and to all the other teachers. Not a one. N/A. None.

GRADUATE SURVEY – FOURTH YEAR STUDENTS May 2004

4/22/04

Name	**12 surveys**
Summer Address	-
Permanent Address	-
Employment Plans	- work 6 - finish BSMET 4 - complete BS PDET 1 - don't know 1
Plans for Further Education	- none 2 - maybe in future 2 - not now 1 - if available in N. Mich. 1 - masters in couple of years 1 - engineering mgmt after 2 yrs 1 - finish BS PDET next year 1 - (finish BSMET next year 3)
Why did I enter the MET program?	- employer said best grads come from FSU - wanted knowledge to compete in manufacturing world - sounded interesting, liked machines - love to design, build, test "stuff" growing up on a farm - interested in machines/mechanisms for a long time - $ - math/science strong points; only thing that interested me - hands-on approach; small school, teacher recommendation - like to know why things work the way they do (2) - like to work with mechanical things - liked the broadness of the engineering field
How has the MET program helped me?	- see the big picture of things; see what is involved in building and designing - opened my eyes to whole world of engineering - helped me broaden my interests & make me look at things a little different - better understanding of the designs of machines - showed me new concepts to design; helped me think out-of-

	the-box - made me a better student - have become a better thinker; analyze things a lot more - expanded my knowledge in the area of study; advanced critical thinking skills - learned design considerations; methods of industrial analysis; and material properties - good valuable resources & knowledge; good background in many different areas' increased presentation skills - lab time has proven more beneficial then most lectures; being able to use many instruments is important for competitiveness in the workplace - helped e prepare for my job, and the rest of my life
Have my expectations of this program been met?	- yes - 12 - for most part – more interesting tests/labs (1)
Recommendations	- replace PDET 499 Product Design Project with a MECH 499 capstone course - 11 - eliminate MFGE 423 Engineering Econ 4 - eliminate PSYC 326 2 - eliminate MFGE 352 Design for manufacturability 1 - less math 1 - more CAD/3D 1 - add GD&T 2 - more electrical 1 - more teachers 1 - rearrange scheduling of classes 1

SECTION 3

EMPLOYER SURVEY

A. Introduction

Employer follow-up survey: This activity is intended to aid in assessing the employers' experiences with graduates and their perceptions of the program itself.

A survey of companies that have employed Ferris MET graduates was conducted in October 2003. A copy of the survey form and summary pages are included.

Employers were found to be very satisfied with Ferris MET graduates. All except one would look to Ferris in the future for potential employees. Communications was cited often as an area for improvement.

B. Internships

Students in the MET program have a mandatory program requirement to successfully complete MECH 393 (Industrial Internship). To manage this type of an internship requires time and effort, not only by the students, but also by the faculty and the employer.

The internship experience is an opportunity for all participants to gain from (students, faculty and employer) and all three must be prepared to do their part if the internship is to be a successful experience. The ultimate responsibility of finding employment for the internship rests with the individual student, though the faculty advisor will make every attempt to assist the student.

See "MECH 393 Mechanical Engineering Technology Industrial Internship" in Appendix D.

A survey of companies that have hired MET interns, and some of their comments, are included in this section.

FERRIS STATE UNIVERSITY

MECHANICAL ENGINEERING TECHNOLOGY

EMPLOYER SURVEY

OCTOBER 2003

DATE OF REPORT: OCTOBER 27, 2003

ABET
Technology Accreditation Commission

Summary of Accreditation Actions
for the
2003-04 Accreditation Cycle

Ferris State University
Big Rapids, MI

Mechanical Engineering Technology (BS)

Accredit to September 30, 2006. A request to ABET by January 31, 2005 will be required to initiate a reaccreditation report evaluation. A report describing the actions taken to correct shortcomings identified in the attached final statement must be submitted to ABET by July 1, 2005. The reaccreditation evaluation will focus on these shortcomings. Please note that a visit is not required.

This is a newly accredited program. Please note that this accreditation action extends retroactively from October 1, 2002.

Electrical/Electronic(s) Engineering Technology (BS)
Mechanical Engineering Technology (AS)

Accredit to September 30, 2006. A request to ABET by January 31, 2005 will be required to initiate a reaccreditation report evaluation. A report describing the actions taken to correct shortcomings identified in the attached final statement must be submitted to ABET by July 1, 2005. The reaccreditation evaluation will focus on these shortcomings. Please note that a visit is not required.

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

Officers 2003-2004

John D. Lorenz, President
Kettering University

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Somat Engineering, Inc.

Allen I. Ormsbee, Treasurer
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at Urbana-Champaign

Richard C. Seagrave, Secretary
Iowa State University

Larry D. Nixon, Past-President
Bass, Nixon & Kennedy, Inc.

George D. Peterson
Executive Director

August 10, 2004

David Eisler
President
Johnson Hall 200
Ferris State University
1009 Campus Drive
Big Rapids MI 49307

Dear Dr. Eisler:

I am pleased to transmit to you the findings of the TAC of the Accreditation Board for Engineering and Technology (ABET) with respect to the evaluation conducted for Ferris State University during 2003-2004. Each of ABET's Commissions is fully authorized to take the actions described in the accompanying letter under the policies of the ABET Board of Directors.

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

Sincerely,

John D. Lorenz
President

Enclosure: Commission letter and attachments

Accreditation Board for Engineering and Technology

TECHNOLOGY ACCREDITATION COMMISSION

FINAL STATEMENT

on

FERRIS STATE UNIVERSITY

Big Rapids, Michigan

Dates of Visit:
October 26-28, 2003

The statement that follows consists of two parts: the first addresses the overall institution and its engineering technology operation, and the second addresses the individual engineering technology programs. A program's accreditation action will be based upon the findings summarized in this statement. Actions will depend on the program's range of compliance or non-compliance with the criteria. The range can be construed from the following wording:

Deficiency: A deficiency indicates that a criterion is not satisfied. Therefore, the program is not in compliance with the criteria and immediate action is required.

Weakness: A weakness indicates that a criterion is satisfied but lacks the strength of compliance that assures that the quality of the program will not be compromised prior to the next general review. Therefore, remedial action is required to strengthen compliance with the criteria.

Concern: A concern indicates that a criterion is currently satisfied; however, the potential exists for this situation to change in the near future such that the criterion may not be satisfied. Therefore, positive action is required to ensure continued full compliance with the criteria.

Observation: An observation is a comment or suggestion which does not relate directly to the criteria being used for evaluation but is offered to assist the institution in its continuing efforts to improve its programs.

FERRIS STATE UNIVERSITY

Big Rapids, Michigan

INSTITUTIONAL FACTORS AFFECTING THE ENGINEERING TECHNOLOGY UNIT

Introduction

The Technology Accreditation Commission of the Accreditation Board for Engineering and Technology, Inc. (TAC of ABET) has evaluated the Bachelor of Science degree program in Electrical/Electronics Engineering Technology, the Associate of Applied Science degree program in Mechanical Engineering Technology, and the Bachelor of Applied Science degree program in Mechanical Engineering Technology of Ferris State University. The visit findings were evaluated using the November 2, 2002 Conventional TAC Criteria for Accrediting Engineering Technology Programs, the ABET Policy and Procedures Manual, and applicable program criteria.

Ferris State University is a comprehensive, public four-year institution. The institution is recognized for its career-oriented educational programs that are designed to meet the technology and workforce demands of business and industry, the health-care professions, and society, in general, through applied research and practical education. Ferris State University is accredited by The Higher Learning Commission, which is a commission of the North Central Association of Colleges and Schools. The Electrical/Electronics Engineering program was initially accredited by TAC of ABET in 1995. The Associate of Applied Science degree program in Mechanical Engineering Technology was initially accredited by TAC of ABET in 1997. These two programs have held continuous accreditation since their initial accreditation and have been

submitted for reaccreditation evaluation. The Bachelor of Applied Science degree program in Mechanical Engineering Technology has been submitted for an initial accreditation evaluation.

Note: These findings apply to all of the programs evaluated, whether or not the findings are specifically cited within each program evaluation.

Institutional Strength

1. Laboratory experiences are a strong component of all the programs. Almost all applied courses have associated laboratories to demonstrate and teach the concepts in the course. This extensive laboratory experience enhances the students' learning of the basic technical material and ultimately enhances their career prospects.

Institutional Concerns

1. Criteria: Section I.H. of the TAC criteria states that the administration should demonstrate effective leadership for engineering technology, including supervision and support of the faculty and the interpretation of the college to members of the profession and to the public. The position of Dean (or Interim Dean) of the School of Technology has been occupied by seven different individuals since 1993. The last dean was replaced in 2003 after having occupied the position for approximately 13 months. Without stable leadership, the programs lack consistency in that part of their administrative structure that is vital to the provision of strategic guidance and the interpretation of the programs to their constituents. It is recommended that the institution employ a dean who will provide stable, effective leadership for the engineering technology programs, including consistent supervision and support of the faculty and interpretation of the programs to their constituents.

2. Criteria: Section II.L.6. of the ABET policy states that accredited programs should be specifically identified as "accredited by the Technology Accreditation Commission of the Accreditation Board for Engineering and Technology, 111 Market Place, Suite 1050, Baltimore, MD 21202-4012 – telephone: (410) 374-7700." Several publications that contain references to TAC of ABET accreditation do not provide the information needed to contact the accrediting agency. Both the 2002-2003 Ferris Career Guide and the Internet version of the Ferris catalog contain references to TAC of ABET accreditation without contact information. It is recommended that the institution include the required contact information in all future publications.

Due Process: The institution responded that future publications will contain the required contact information. The institution supplied evidence that the Internet version of the Ferris catalog has been appropriately amended.

Status: This finding has been resolved.

PROGRAM EVALUATION

ELECTRICAL/ELECTRONICS ENGINEERING TECHNOLOGY

Baccalaureate Degree

Introduction

The Electrical/Electronics Engineering Technology program is a 2+2 program that was developed in the early 1980s from an existing two-year program that had been offered since 1968. The first upper division classes were offered in the fall of 1984. The program prepares students for employment in research, manufacturing, and related industries. Job functions include testing, instrumentation, handbook design, customer relations and sales, supervision, and research and development of electrical/electronics systems.

The Program Criteria for Electrical/Electronic(s) Engineering Technology and Similarly Named Programs as published in the current TAC criteria document also were used to evaluate this program. Findings in meeting the provisions of the criteria and ABET policies are described below.

Note: Findings cited under Institutional Factors also apply to this program.

Program Strengths

1. The faculty is diversified, well-qualified, and enthusiastic about the direction of their program. Most are actively involved in curriculum development. This enthusiasm contributes to a strong program that has produced successful graduates that are valued by industry.

2. The program classrooms and laboratory facilities have recently undergone extensive remodeling and modernization. New presentation equipment has been installed in the classrooms to enhance instructional capabilities within the program. This has been viewed as a positive development by the faculty, students, and industrial advisory council members. It has resulted in a significant boost in the morale of the faculty and students and assists with their marketing of the program. It also provides substantial evidence of the administrative support for the program.

3. Students are very enthusiastic about their program and indicate that they would be willing to recommend the program to others. This is evident in an increase in the number of incoming freshman for the current academic year, reversing a previously declining trend.

Program Weaknesses

1. Criteria: Section I.C.2.a. of the TAC criteria requires that written documentation of laboratory work be graded with respect to both technical content and writing skills. A majority of the lower division laboratory exercises did not require any written formal laboratory reports. The laboratory reports that were presented offered very little evidence that student laboratory work is being graded for spelling and grammar. Without adequate feedback on their writing skills, students are hampered in their efforts to improve their technical writing. It is required that laboratory exercises include writing reports that could be graded with respect to both technical content and writing skills. Furthermore, evidence demonstrating the evaluation criteria, and its utilization, should be collected and presented to the visiting team.

Due Process: The institution responded by supplying modified catalog descriptions of seven courses in which written reporting will be critiqued for content and construction.

Status: This finding remains a weakness until evidence can be reviewed of written reports that have been graded for technical content and writing skills.

2. Criteria: Section I.A.2. of the TAC criteria states that "Programs must have plans for continuous improvement. The visiting team will be looking for evidence which demonstrates implementation of continuous improvement processes and procedures for each program." The continuous improvement plan, as presented, was incomplete and disconnected at best. Exhibits, offered as evidence of assessment, did not support program revisions, offered as evidence, of a working continuous improvement process. There was no evidence of plans to systematically measure and evaluate progress toward achieving the goals and implementing the indicated program improvements. Without plans for continuous improvement including quantified measurements of achievement, administration, faculty, staff, and students will have different ideas of how successful they are in achieving their goals. This leads to poor relationships between these groups and slower progress toward achieving stated goals. It is required that a plan for continuous improvement be developed for this program, including methods to demonstrate achievements.

Due Process: The institution presented evidence of program objectives and outcomes, assessment methods and instruments, and several instances of the use of assessment results to improve the program.

Status: This finding is reduced to a concern which will remain until evidence is presented of full implementation of the continuous improvement program.

Program Concern

1. Criteria: Section I.K.2. of the TAC criteria requires adequate laboratories. The size of the existing laboratory facilities, though adequate for the current size of the program, will not adequately support a substantial growth in enrollment. These facilities are also being used to support other programs. Only small laboratory classes can be accommodated in existing

laboratory facilities. This can serve as a hindrance to future growth and expansion of the program. It is recommended that additional laboratory facilities be provided to support future program growth and expansion.

Due Process: The institution responded by agreeing with the observation of the visiting team that the laboratories are currently sufficient. The institution also stated that enrollment increases could be accommodated by using the existing laboratories during currently unscheduled time periods.

Status: This finding has been resolved.

Observations for Improvement

1. Students are currently not allowed to choose the Communications option. Some courses in the option have not been offered in two years. It is suggested that the option either be eliminated or adequately supported by recruiting suitably qualified faculty specializing in this area.

2. Course outlines have not been updated since 1999. Many course outlines do not reflect the current course material being taught. In particular, the title of the Network Analysis course is inappropriate for the current course content, which is more suited to a controls course. Outdated outlines portray a misleading picture of the course content. It is suggested that course outlines be updated to reflect current course material and that they be so maintained.

3. The program secretary is shared between three programs. The existing level of secretarial support results in some tasks not being completed in a timely manner. It is suggested that additional secretarial support be provided to the program.

4. The program has had difficulty contacting graduates during graduate surveys. Lack of contact information affects the program's ability to obtain graduate feedback and employer satisfaction information. It is suggested that an exit interview process be established to assist the

department in acquiring contact information. This activity would also be useful for obtaining immediate student feedback on the program.

PROGRAM EVALUATION

MECHANICAL ENGINEERING TECHNOLOGY

Associate and Baccalaureate Degrees

Introduction

The Mechanical Engineering Technology programs prepare students for a broad range of occupations in the design of products, machines and processes, or in manufacturing, operations, and technical sales. Graduates are employed in the automotive and transportation areas, power generation, climate control, machine design, manufacturing, materials, and automation.

The Program Criteria for Mechanical Engineering Technology and Similarly Named Programs as published in the current TAC criteria document also were used to evaluate these programs. Findings in meeting the provisions of the criteria and ABET policies are described below.

Note: Findings cited under Institutional Factors also apply to this program.

Program Strengths

1. The faculty members of both programs are very involved with the students and the program development. Students noted that the faculty members are always available to help with problems and answer questions. Students can drop in to a faculty member's office anytime or call a faculty member at anytime of the day, night, or weekend (even at home). Faculty members have a strong sense of ownership of the programs, committing much of their personal

time and effort to improving the programs. As a result of this extraordinary dedication, graduates from the programs are sought by industry and are successful on the job.

2. Students in both programs are enthusiastic about their chosen field of study, the high level of faculty support they receive, and their expected career opportunities. In two separate groups, students said they "love this program." This creates an energetic learning environment and, ultimately, enhances their employability.

Program Weakness

1. Criteria: Section I.A.2. of the TAC criteria states that "Programs must have plans for continuous improvement. The visiting team will be looking for evidence which demonstrates implementation of continuous improvement processes and procedures for each program." The continuous improvement plan, as presented, was incomplete and disconnected at best. Exhibits, offered as evidence of assessment, did not support program revisions, offered as evidence, of a working continuous improvement process. There was no evidence of plans to systematically measure and evaluate progress toward achieving the goals and implementing the indicated program improvements. Without plans for continuous improvement including quantified measurements of achievement, administration, faculty, staff, and students will have different ideas of how successful they are in achieving their goals. This leads to poor relationships between these groups and slower progress toward achieving stated goals. It is required that a plan for continuous improvement be developed for this program, including methods to demonstrate achievements.

Due Process: The institution responded by presenting a "first draft" of a continuous improvement plan, which included outcomes and objectives, and general assessment methods. The institution indicated that the plan would be established and running by the fall 2004.

Status: The finding remains a weakness until evidence of an operational continuous improvement plan is presented.

Program Concerns

1. Criteria: Section I.F.4. of the TAC criteria states that the number of faculty members needed in a program depends, in part, on the duties assigned to the technical faculty. Although the previous section cites the faculty as a strength, it was observed that faculty members in both programs are teaching overload courses. In addition, two adjunct faculty members and one faculty member from another program are being used to teach mechanical engineering technology courses this semester. This limits the time that the faculty have available to perform non-core teaching tasks, such as professional development activities and the development of a continuous improvement program. More faculty time must be made available to maintain continued compliance with TAC criteria in these areas. It is recommended that support be provided to the programs so as to prevent any deterioration in faculty quality.

14-Day Response: The institution responded that the third sentence in the finding stated above should note that one adjunct member and two faculty members from another program are being used to teach mechanical engineering technology courses this semester.

Due Process: The institution responded that according to the current faculty contract, overloads are voluntary assignments with a right of first refusal by the full-time faculty, and that overloads cannot interfere with the full-time duties of the faculty.

Status: This finding has been resolved.

2. Criteria: Section I.K.2. of the TAC criteria requires adequate laboratories. Section I.K.4. of the TAC criteria states that "Laboratory equipment and computers should be of the type that

would be encountered in industry and practice..." The laboratory space available for use by both programs is very limited. Laboratory experiment is almost exclusively small table top experimental set ups. Though this arrangement is adequate for many types of experiments, there are also cases in which larger equipment is required to demonstrate the principles that are being instructed. The small laboratory space precludes conducting these experiments. The capstone sophomore and senior design projects are conducted in this limited space. This causes problems as students construct their projects as well as limiting the size of projects that can be undertaken. This limited laboratory space contrasts to the spacious laboratories maintained by other programs within the college. For example, the Manufacturing Technology Program and the Plastics Technology Program have spacious laboratory facilities. It is recommended that additional laboratory space be allocated to the department to allow more space for the capstone senior and sophomore design projects and to procure laboratory equipment of the type that would be encountered in industry.

3. Criteria: Section II.L.1. of the ABET policy states that institutions are required to represent the accreditation status of programs accurately and without ambiguity. Several publications that contain references to TAC of ABET accreditation provide information which could be misleading concerning the accreditation status of the baccalaureate degree program. In the description of the program on page 37 of the 2002-2003 Ferris Career Guide, the associate degree program is described as "designed to meet the standards set forth by the Technology Accreditation Commission..." This description is also used in the version of the college catalog available on the Internet. The institution is required to represent the accreditation status of the baccalaureate degree program accurately and without ambiguity in all publications.

Due Process: The institution responded that future publications will represent the accreditation status of the programs accurately and without ambiguity. The institution provided evidence that

references to the accreditation status of the baccalaureate program have been appropriately revised in the Internet catalog.

Status: This finding has been resolved.

ACCREDITATION FEES FOR 2004-05

The accreditation fees are effective for visits to be conducted between September 2004 and June 2005, and for progress reports due in 2005. Maintenance fees are due annually (see 5.)

Non-payment of fees may result in cancellation of the visit and removal from the list of accredited programs. Contact the ABET Accreditation Director for clarification (410-347-7700). Accreditation program invoices are payable within 90 days of issuance. Thereafter, a monthly interest charge of 1.5% will be added.

Base charge for a campus visit (see 1.(a)):	$2,650
Fee for each program evaluator (see 1.(b)):	$2,650
Additional fee when one evaluator covers two programs (special case, see 1.(b)):	$200
Charge for extra day, per visitor (see 1.(c)):	$150
Charge for each off-campus location to be visited (see 1.(d)):	$200
Fee for report evaluation (not involving a visit) (see 4.):	$1,030
Accreditation maintenance fee (annual)	(see 5.)
Cancellation fee, per institution	(see 2.)

1. POLICY ON ACCREDITATION FEES
   (a) A base fee ($2650) is charged for a campus visit, independent of the number of programs evaluated.
   (b) A fixed fee ($2,650) is charged for each program evaluator or additional team member beyond the team chair. Normally, one evaluator will be required for each program. However, in engineering technology, a single evaluator may evaluate two or more closely related programs; a single evaluator may also evaluate associate and baccalaureate-level programs in the same area of engineering technology; in such cases, the additional fee of $200 per program will apply. In cases where more than one evaluator is required for a single program that includes a dual title, multiple stems, or concentrations, the regular fee will be charged for each visitor. In unusual cases, the number of evaluators will be determined by the team chair after consultation with the institution to be visited. In general, a minimum of two team members and a team chair will be required. Accreditation of an option is considered the same as a program for billing purposes.
   (c) An evaluation visit normally is expected to take two full days and the evening prior to the first day. If, after consultation with the institution, it is deemed necessary to retain the team for any additional time, the institution will be charged at the rate of $150 per day or part thereof for each team member held over.
   (d) If more than one location must be visited in order to fully evaluate a program, there will be a charge of $200 for each off-campus location, in addition to the charge for any extra time required, as specified in (c) above. Also, the institution may be billed for any unusual transportation costs incurred by ABET in traveling to the off-campus locations.
   (e) ABET will invoice the institution for the full, estimated amount of the fee during May prior to visit, subject to later adjustment in accordance with (b), (c), or (d) above if necessary.

2. Cancellation fees will be charged when an institution cancels an evaluation visit:

(a) Prior to June 1:	$300
(b) Between June 1 and July 1:	$500
(c) Between July 1 and August 15:	$1000
(d) After August 15:	Half the visit fee
(e) After visiting team has commenced travel to the institution:	Full visit fee

   Individual programs may be canceled without penalty if the visit itself is not canceled.

3. It is ABET's policy to keep fees at the lowest possible level. Fees are intended to cover actual costs of accreditation. Based on present economic conditions, it is impossible to predict travel and housing costs for any extended period of time. Therefore, fees will be established on a yearly basis; however, they may be subject to change should there be unexpected fluctuations in travel or other costs.

4. FEES FOR PROGRESS (EXTENSION) REPORTS NOT INVOLVING A VISIT
   A report fee ($1030) is charged for each program that submits a progress report to extend the term of accreditation.

5. ANNUAL MAINTENANCE FEES
   The following fee structure covers expenses related to the continuing maintenance and upkeep of accreditation data files, review of institutional materials, and the publication and distribution of annual lists of accredited programs. The fee applies separately to listings of engineering, engineering technology, computing and applied science programs. Maintenance fees for programs accredited from October 2003 through September 2004 are listed below and invoiced in December 2004. Maintenance fees are subject to change.

Base fee per campus	$235
Fee for accredited program at each campus	$235

   Maintenance fee invoices are payable within 30 days. Thereafter, a monthly interest charge of 1.5% will be added.

6. CURRICULAR FEES FOR NON-TRADITIONAL PROGRAMS
   Normally, curricular fees are paid by the professional engineering or technical society assigned curricular responsibility for the program. However, non-traditional programs have no society with curricular responsibility. Therefore, the curricular fee per non-traditional program will be charged to the institution when the Maintenance Fees are billed. Curricular fees for the following fiscal year are approved by the Board of Directors in March of each year. Should a society assume the curricular responsibility, the fee will be charged to the new society in the future.

SUBJECT TO CHANGE WITHOUT PRIOR NOTIFICATION ABET Business Office (410) 347-7735

Accreditation Board for Engineering and Technology
111 Market Place, Suite 1050, Baltimore, MD 21202-4012

REQUEST FOR EVALUATION
Part 1
PROGRAM INFORMATION

INSTITUTION[2] _____

It is requested that the following programs be evaluated by the[3]:

- Engineering Accreditation Commission ☐
- Technology Accreditation Commission ☐
- Computing Accreditation Commission ☐
- Applied Science Accreditation Commission ☐

Evaluations by more than Commission are being requested and a simultaneous visit is desired[1]. ☐

Please read the enclosed instructions (see Part 3) before completing the following table.

Program or Option to be Evaluated[4]	Evaluation Type[5]	Degree[6]	No. of Years[7]	Initial[8]	Distance Ed.[9]	Basic/ Advanced[10]
	IR					

Please indicate below whether the following observers may visit your institution with the evaluation team (at no expense to your institution)[11]:

State Registration Board: Yes ☐ No ☐

ABET-affiliated society trainees: Yes ☐ No ☐

Signature _____ Date _____

Chief Administrative Officer[12]

A1se 11/22/03

Accreditation Board for Engineering and Technology
111 Market Place, Suite 1050, Baltimore, MD 21202-4012

REQUEST FOR EVALUATION
Part 2
CONTACT INFORMATION

Institution _____

Address _____

City _____ State _____ ZIP _____

General Phone No. _____ URL[13] _____

General correspondence will be addressed to the Dean or equivalent and will be copied to the ABET Liaison if one is assigned.

Official notification of accreditation actions will also be copied to the Chief Administrative Officer.

Chief Administrative Officer _____

Title _____ Phone _____

E-mail _____ FAX _____

Address (if different from above) _____

Dean (or equivalent) _____

Title _____ Phone _____

E-mail _____ FAX _____

Address (if different from above) _____

ABET Liaison (if assigned) _____

Title _____ Phone _____

E-mail _____ FAX _____

Address (if different from above) _____

Chief Financial Officer (for billing purposes) _____

Title _____ Phone _____

E-mail _____ FAX _____

Address (if different from above) _____

A1be 11/23/03

ABET
111 Market Place, Suite 1050, Baltimore, MD 21202-4012

REQUEST FOR EVALUATION
Part 3
INSTRUCTIONS

1. This form must be completed and received by ABET before January 31 for a visit to occur during the following Fall. A separate form is required for each Commission.
2. Enter the proper institution name. This is the name that will be used in lists of accredited programs distributed to the public.
3. Check only one Commission. If your institution has programs accredited by more than one Commission, submit a separate form for each Commission.
4. List the *exact* program title (not the department name). This should be the title shown consistently on student transcripts and in your institution's catalog.
5. Codes for evaluation types are: GR = general comprehensive review, IV = interim focused visit, IR = interim report, SC = show cause visit. New programs should enter GR.
6. List the abbreviation of the degree granted upon successful completion of the program, e.g., BS, MS, AS, BA, BSEE, etc.
7. List the number of years normally required for a full-time student to complete the program.
8. Enter an "X" if this will be an evaluation of a currently unaccredited program. Leave this entry blank if the program is currently accredited.
9. Enter an "X" if this program is offered at a branch campus or off-campus location. Provide a copy of Part 2 showing the address of the remote site and contact information if different from the contact information for the main campus. Enter a "D" if the program is offered to individual students by a distance education mode of instruction.
10. [EAC programs only] Enter a "b" or "a" indicating whether evaluation is desired at the basic or advanced level.
11. When observers are identified, your institution will be given the opportunity to decline any individual observer if there is a perceived conflict of interest.
12. This form must be signed by the Chief Administrative Officer. This is the individual responsible for the institution submitting the Request for Evaluation. This individual typically carries the title of president.
13. Enter the web site URL which should be shown for your institution in the list of accredited programs on the ABET web site (www.abet.org). Only one URL is permitted.

A1ce 11/23/03

FERRIS STATE UNIVERSITY
College of Technology

TO: Mike Robinson

FROM: Interim Dean C. Matrosic

SUBECT: ABET Visit Finding

DATE: December 4, 2003

I would like to take this opportunity to shed some light on the recent ABET Visiting Team Finding for the Mechanical Engineering Technology (MET) programs as pertains to the faculty teaching overload courses. This memo is meant to amplify and supplement the discussion you and I had when you presented the team's preliminary findings Tuesday morning of the visit.

The MET faculty are indeed teaching courses on an overload basis. Section 18 of the Ferris Faculty Association/Ferris State University Agreement (the "contract"), a copy of which was provided with the self-study materials, governs faculty overloads. Additional course sections required to meet student and program needs may be staffed by full-time faculty on a voluntary basis. Their "acceptance on a voluntary basis of such extra assignment shall not make the extra or additional assignment a part of the faculty member's workload." The contract establishes the rate of compensation for overloads.

The contract goes on to state that participation in this extra course responsibility will require the faculty member to already be carrying a full-time load, and that this added responsibility of the overload "shall not conflict nor interfere with the full-time duties of the applicant."

We agree that non-core teaching tasks, especially plans for continuous improvement and faculty professional development, are vital and important. However, faculty overloads by contract definition cannot conflict or interfere with the normal full-time duties of the faculty. In short, overloads are voluntary, compensated overtime.

The Visiting Team Finding states that it is required that support be provided to the MET program to allow all faculty members to focus on maintaining compliance with the ABET criteria. This action is not in agreement with the facts of the faculty bargaining unit contract, since taking on an overload is voluntary and is not to detract from the normal full-time responsibilities of the faculty (such as plans for continuous improvement and faculty professional development).

In addition, should the faculty choose to not volunteer to teach overloads, the support already exists. Funding for these extra courses is available in the annual budget, and is used to support the extra course sections through either the payment of the overload or the hiring of an adjunct faculty.

Thanks for your consideration. I would be glad to further discuss this issue with you if need be.

Attachment 5

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

JAN 1 9 2004

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

January 13, 2004

Charles Matrosic
Interim Dean
College of Technology
Johnson Hall 200
Ferris State University
1009 Campus Drive
Big Rapids MI 49307

Dear Dr. Matrosic:

A Draft Statement presenting the findings of the recent evaluation by the Technology Accreditation Commission of ABET is enclosed. Your institution is invited to submit a written response to this Draft Statement within thirty days following the receipt of this letter. Your response is particularly important if you believe any of the facts or observations presented in the Draft Statement are in error. Further, if the Draft Statement indicates that a program is considered to have weaknesses or deficiencies, you are encouraged to document any corrective actions that have been taken to remedy these shortcomings.

Please return the enclosed *Acknowledgement of Receipt of Draft Statement* to ABET Headquarters as quickly as possible. This form should indicate whether or not you intend to submit a written response to the enclosed Draft Statement.

Please limit any response to matters covered by the Draft Statement and affecting the potential accreditation of a program. If you agree with the assessment of the visiting team and wish to provide no response, please indicate this on the enclosed *Acknowledgement of Receipt of Draft Statement.*

It should be noted that a weakness or deficiency is considered to have been corrected only if the corrective action has been made effective during the academic year of the evaluation and is supported by official documentation. Where action has been initiated to correct a problem but has not yet taken full effect or where only indications of good intent are given, the effectiveness of the corrective action cannot always be presumed; in such cases, evaluation by the Commission at the time of the next evaluation may be required.

Your institution's response to the Draft Statement will be carefully reviewed by the Commission, and accreditation decisions will be determined by the Commission during its Summer Meeting in July. You should expect to receive official notification of accreditation actions together with the Final Statement during the period from mid-August to mid-September.

Neither the presence nor absence of a stated, projected accreditation action in any program discussion commits the Commission to a particular final action. The official accreditation action for each program is taken by vote of the entire Commission at its Summer Meeting following consideration of the team's findings along with the institution's response to the Draft Statement.

The Commission considers all Draft Statements to be unofficial documents distributed only for review and comment. The enclosed Draft Statement does not represent the final official views of the Commission; therefore, it should be handled confidentially. Please limit release of this document in whole or in part only to persons involved in the preparation of your response to the Commission.

Instructions for distribution of your response to the Draft Statements are enclosed. If you elect to provide a response, your response must be provided within 30 days to the addressees indicated in these instructions.

Sincerely,

Mark A. Pagano, Chair
Technology Accreditation Commission

Enclosures: Draft Statement
Acknowledgment of Receipt of Draft Statement
Instructions for Distribution of Response

cc: Michael A. Robinson, Team Chair
Joseph A. Tamashasky, Editor
William A. Sederburg, President

ABET
Technology Accreditation Commission

Instructions for Distribution of Response to Draft Statement

Please provide one copy of your response to each of the following addressees within 30 days:

Team Chair

Michael A. Robinson
Principal Engineer
Bettis Atomic Power Laboratory
PO Box 79
West Mifflin PA 15122-0079

Editor

Joseph A. Tamashasky
87 Lombard Street
New Philadelphia PA 17959

ABET Office

Technology Accreditation Commission
ABET
111 Market Place, Suite 1050
Baltimore, MD 21202

Accreditation Board for Engineering and Technology

TECHNOLOGY ACCREDITATION COMMISSION

DRAFT STATEMENT

on

FERRIS STATE UNIVERSITY

Big Rapids, Michigan

Dates of Visit:
October 26-28, 2003

The statement that follows consists of two parts: the first addresses the overall institution and its engineering technology operation, and the second addresses the individual engineering technology programs. A program's accreditation action will be based upon the findings summarized in this statement. Actions will depend on the program's range of compliance or non-compliance with the criteria. The range can be construed from the following wording:

Deficiency: A deficiency indicates that a criterion is not satisfied. Therefore, the program is not in compliance with the criteria and immediate action is required.

Weakness: A weakness indicates that a criterion is satisfied but lacks the strength of compliance that assures that the quality of the program will not be compromised prior to the next general review. Therefore, remedial action is required to strengthen compliance with the criteria.

Concern: A concern indicates that a criterion is currently satisfied; however, the potential exists for this situation to change in the near future such that the criterion may not be satisfied. Therefore, positive action is required to ensure continued full compliance with the criteria.

Observation: An observation is a comment or suggestion which does not relate directly to the criteria being used for evaluation but is offered to assist the institution in its continuing efforts to improve its programs.

FERRIS STATE UNIVERSITY

Big Rapids, Michigan

INSTITUTIONAL FACTORS AFFECTING THE ENGINEERING TECHNOLOGY UNIT

Introduction

The Technology Accreditation Commission of the Accreditation Board for Engineering and Technology, Inc. (TAC of ABET) has evaluated the Bachelor of Science Degree Program in Electrical/Electronics Engineering Technology, the Associate of Applied Science Degree Program in Mechanical Engineering Technology, and the Bachelor of Applied Science Degree Program in Mechanical Engineering Technology of Ferris State University. The visit findings were evaluated using the November 2, 2002 Conventional TAC Criteria for Accrediting Engineering Technology Programs, the ABET Policy and Procedures Manual, and applicable program criteria.

Ferris State University is a comprehensive public four-year institution. The institution is recognized for its career-oriented educational programs that are designed to meet the technology and work force demands of business and industry, the health-care professions, and society in general through applied research and practical education. Ferris State University is accredited by The Higher Learning Commission, which is a commission of the North Central Association of Colleges and Schools. The Electrical/Electronics Engineering program was initially accredited

by TAC of ABET in 1995. The Bachelor of Applied Science degree program in Mechanical Engineering Technology was initially accredited by TAC of ABET in 1997. These two programs have held continuous accreditation since their initial accreditation and have been submitted for reaccreditation evaluation. The Associate of Applied Science degree program in Mechanical Engineering Technology has been submitted for an initial accreditation evaluation.

Note: These findings apply to all of the programs evaluated, whether or not the findings are specifically cited within each program evaluation.

Institutional Strength

1. Laboratory experiences are a strong component of all the programs. Almost all applied courses have associated laboratories to demonstrate and teach the concepts in the course. This extensive laboratory experience enhances the students' learning of the basic technical material and ultimately enhances their career prospects.

Institutional Weakness

1. Criterion I.A.2. This criterion states that "Programs must have plans for continuous improvement. The visiting team will be looking for evidence which demonstrates implementation of continuous improvement processes and procedures for each program." The continuous improvement plan as presented was incomplete and disconnected at best. Exhibits offered as evidence of assessment did not support program revisions offered as evidence of a working continuous improvement process. There was no evidence of plans to systematically

measure and evaluate progress toward achieving the goals and implementing the indicated program improvements. Without plans for continuous improvement including quantified measurements of achievement, administration, faculty, staff, and students will have different ideas of how successful they are in achieving their goals. This leads to poor relationships between these groups and slower progress toward achieving stated goals. It is required that a plan for continuous improvement be developed for each program, including methods to demonstrate achievements.

Institutional Concerns

1. Criterion I.H. This criterion states that the administration should demonstrate effective leadership for engineering technology, including supervision and support of the faculty, and the interpretation of the college to members of the profession and to the public. The position of Dean (or Interim Dean) of the School of Technology has been occupied by seven different individuals since 1993. The last dean was replaced in 2003 after having occupied the position for approximately 13 months. Without stable leadership, the programs lack consistency in that part of their administrative structure that is vital to the provision of strategic guidance and the interpretation of the programs to their constituents. It is recommended that the institution employ a dean who will provide stable, effective leadership for the engineering technology programs, including consistent supervision and support of the faculty, and interpretation of the programs to their constituents.

2. Policy II.L.6. This policy states that accredited programs should be specifically identified as "accredited by the Technology Accreditation Commission of the Accreditation

Board for Engineering and Technology, 111 Market Place, Suite 1050, Baltimore, MD 21202-4012 – telephone: (410) 374-7700." Several publications that contain references to TAC of ABET accreditation do not provide the information needed to contact the accrediting agency. Both the 2002-2003 Ferris Career Guide and the internet version of the Ferris catalog contain references to TAC of ABET accreditation without contact information. It is recommended that the institution include the required contact information in all future publications.

PROGRAM EVALUATION

ELECTRICAL/ELECTRONICS ENGINEERING TECHNOLOGY

Baccalaureate Degree

Introduction

The Electrical/Electronics Engineering Technology program is a 2+2 program that was developed in the early 1980's from an existing two-year program that had been offered since 1968. The first upper-division classes were offered in the fall of 1984. The program prepares students for employment in research, manufacturing, and related industries. Job functions include testing, instrumentation, handbook design, customer relations and sales, supervision, and research and development of electrical/electronics systems.

The Program Criteria for Electrical/Electronic(s) Engineering Technology and Similarly Named Programs as published in the current TAC criteria document also were used to evaluate this program. Findings in meeting the provisions of the criteria and ABET policies are described below.

Note: Findings cited under Institutional Factors also apply to this program.

Program Strengths

1. The faculty is diversified, well qualified, and enthusiastic about the direction of their program. Most faculty members are actively involved in curriculum development. This

enthusiasm contributes to a strong program that has produced successful graduates that are valued by industry.

2. The program classrooms and laboratory facilities have recently undergone extensive remodeling and modernization. New presentation equipment has been installed in the classrooms to enhance instructional capabilities within the program. This has been viewed as a positive development by the faculty, students, and industrial advisory council members. It has resulted in a significant boost in the morale of the faculty and students, and assists with their marketing of the program. It also provides substantial evidence of the administrative support for the program.

3. Students are very enthusiastic about their program and indicate that they would be willing to recommend the program to others. This is evident in an increase in the number of incoming freshman for the current academic year, reversing a previously declining trend.

Program Weakness

1. Criterion I.C.2.a. This criterion requires that written documentation of laboratory work be graded with respect to both technical content and writing skills. A majority of the lower-division laboratory exercises did not require any written formal laboratory reports. The laboratory reports that were presented offered very little evidence that student laboratory work is being graded for spelling and grammar. Without adequate feedback on their writing skills, students are hampered in their efforts to improve their technical writing. It is required that laboratory exercises include written reports that could be graded with respect to both technical content and writing skills.

Furthermore, evidence demonstrating the evaluation criteria and its utilization should be collected and presented to the visiting team.

Program Concern

1. Criterion I.K.2. This criterion requires adequate laboratories. The size of the existing laboratory facilities, though adequate for the current size of the program, will not adequately support a substantial growth in enrollment. These facilities are also being used to support other programs. Only small laboratory classes can be accommodated in existing laboratory facilities. This can serve as a hindrance to future growth and expansion of the program. It is recommended that additional laboratory facilities be provided to support future program growth and expansion.

Observations For Improvement

1. Students are currently not allowed to choose the Communications option. Some courses in the option have not been offered in two years. It is suggested that the option either be eliminated or adequately supported by recruiting suitably qualified faculty specializing in this area.

2. Course outlines have not been updated since 1999. Many course outlines do not reflect the current course material being taught. In particular, the title of the Network Analysis course is inappropriate for the current course content, which is more suited to a controls course. Outdated outlines portray a misleading picture of the course content. It is suggested that course outlines be updated to reflect current course material and that they be so maintained.

3. The program secretary is shared between three programs. The existing level of secretarial support results in some tasks not being completed in a timely manner. It is suggested that additional secretarial support be provided to the program.

4. The program has had difficulty contacting graduates during graduate surveys. Lack of contact information affects the program's ability to obtain graduate feedback and employer satisfaction information. It is suggested that an exit interview process be established to assist the department in acquiring contact information. This activity would also be useful for obtaining immediate student feedback on the program.

PROGRAM EVALUATION

MECHANICAL ENGINEERING TECHNOLOGY

Associate and Baccalaureate Degrees

Introduction

The Mechanical Engineering Technology programs prepare students for a broad range of occupations in the design of products, machines and processes, or in manufacturing, operations, and technical sales. Graduates are employed in the automotive and transportation areas, power generation, climate control, machine design, manufacturing, materials, and automation.

The Program Criteria for Mechanical Engineering Technology and Similarly Named Programs as published in the current TAC criteria document also were used to evaluate these programs. Findings in meeting the provisions of the criteria and ABET policies are described below.

Note: Findings cited under Institutional Factors also apply to this program.

Program Strengths

1. The faculty members of both programs are very involved with the students and the program development. Students noted that the faculty members are always available to help with problems and answer questions. Students can drop in to a faculty member's office anytime or call a faculty member at anytime of the day, night, or weekend (even at home). Faculty

members have a strong sense of ownership of the programs, committing much of their personal time and effort to improving the programs. As a result of this extraordinary dedication, graduates from the programs are sought by industry and are successful on the job.

2. Students in both programs are enthusiastic about their chosen field of study, the high level of faculty support they receive, and their expected career opportunities. In two separate groups, students said they "love this program." This creates an energetic learning environment and ultimately enhances their employability.

Program Concerns

1. Criterion I.F.4. This criterion states that the number of faculty members needed in a program depends in part on the duties assigned to the technical faculty. Although the previous section cites the faculty as a strength, it was observed that faculty members in both programs are teaching overload courses. In addition, two adjunct faculty members and one faculty member from another program are being used to teach mechanical engineering technology courses this semester. This limits the time that the faculty have available to perform non-core teaching tasks such as professional development activities and the development of a continuous improvement program. More faculty time must be made available to maintain continued compliance with TAC criteria in these areas. It is recommended that support be provided to the programs so as to prevent any deterioration in faculty quality.

14-Day Response: The institution responded that the third sentence in the finding stated above should note that one adjunct member and two faculty members from another program are being used to teach mechanical engineering technology courses this semester.

Status: This finding remains a concern until appropriate action is taken.

2. Criterion I.K.2. This criterion requires adequate laboratories. Section I.K.4. of the TAC criteria states that "Laboratory equipment and computers should be of the type that would be encountered in industry and practice..." The laboratory space available for use by both programs is very limited. Laboratory experiments are almost exclusively small table top experimental set ups. Though this arrangement is adequate for many types of experiments, there are also cases in which larger equipment is required to demonstrate the principles that are being instructed. The small laboratory space precludes conducting these experiments. The capstone sophomore and senior design projects are conducted in this limited space. This causes problems as students construct their projects as well as limiting the size of projects that can be undertaken. This limited laboratory space contrasts to the spacious laboratories maintained by other programs within the college. For example, the Manufacturing Technology Program and the Plastics Technology Program have spacious laboratory facilities. It is recommended that additional laboratory space be allocated to the department to allow more space for the capstone senior and sophomore design projects and to procure laboratory equipment of the type that would be encountered in industry.

3. Policy II.L.1. This policy states that institutions are required to represent the accreditation status of programs accurately and without ambiguity. Several publications that contain references to TAC of ABET accreditation provide information which could be misleading concerning the accreditation status of the associate degree program. In the description of the program on page 37 of the 2002-2003 Ferris Career Guide, the associate

degree program is described as "designed to meet the standards set forth by the Technology Accreditation Commission..." This description is also used in the version of the college catalog available on the internet. The institution is required to represent the accreditation status of the associate degree program accurately and without ambiguity in all publications.

FERRIS STATE UNIVERSITY

College of Technology

EEET & CNS Department
BS Electrical/Electronics Engineering Technology

Mechanical Design Department
AAS Mechanical Engineering Technology
BS Mechanical Engineering Technology

Report Submitted in Response to the Draft Statement on
Ferris State University

Dates of Visit:
October 26-28, 2003

Report Date:
February 18, 2004

Charles A. Matrosic, PE, CPC
Interim Dean, College of Technology

The following response is presented in the same order as the findings are stated in the Draft Statement on Ferris State University. Findings for which the institution has no response are omitted.

Introduction.

As reads "The **Bachelor** of Applied Science program in Mechanical Engineering Technology was initially accredited by TAC of ABET in 1997" should read "The **Associate** of Applied Science degree....." Also, as reads "The **Associate of Applied Science** degree program in Mechanical Engineering Technology has been submitted....." should read "The **Bachelor of Science** in Mechanical....."

Institutional Concern 2 (Identification and contact information for accredited programs).

Future publications will provide the required TAC of ABET contact information. See attachment 1. The references to TAC of ABET in the internet catalog have been revised. See attachments 2, 3 and 4.

Electrical/Electronics Engineering Technology Concern 1 (Laboratories).

As this concern states, the laboratories are adequate for current enrollment. Over the past five academic years, enrollment in the program has been at or below capacity. Enrollment growth can be accommodated, however, through additional laboratory sections utilizing currently unscheduled times. Also, the university master plan includes a future capital outlay project to renovate and add new space to the Swan Building, and the needs of the BS EEET will be considered within this potential future project.

Mechanical Engineering Technology Concern 1 (Faculty overloads).

The institutional situation concerning faculty overloads was previously discussed in a December 4, 2003 communication to the Team Chair. See attachment 5. In summary, overloads are not part of normal workload. They are voluntary assignments with a right of first refusal before adjunct faculty can be hired, and overloads cannot by contract interfere with the full-time duties and responsibilities of the faculty. Overloads are compensated overtime. The concern states that it is recommended that support be provided to the programs so as to prevent any deterioration of the faculty. That support is in place in the form of funding for the hiring of adjunct faculty to teach these extra course sections should the permanent faculty chose to not teach overloads. In addition, faculty positions are actively reviewed across the college in view of enrollment, loads and other factors, consistent with vacancies and the availability of authorized positions. As the need for adjuncts or overloads increases, the program becomes a higher priority for the assignment of additional full-time faculty.

Mechanical Engineering Technology Concern 3 (Representation of accreditation status).

Future publications will represent the accreditation status of programs accurately and without ambiguity. The potentially misleading information has been revised in the internet catalog. See attachments 1 and 4. (Please note that this concern relates to the bachelor's degree program, not the associate degree program as stated in the fourth and ninth lines of this paragraph.)

Craig E Westman/FSU
02/17/2004 06:30 PM

To Charles A Matrosic/FSU@Ferris
cc Angela Garrey/FSU@Ferris, Chuck Drake/FSU@Ferris, Ronald A Mckean/FSU@Ferris
bcc
Subject Re: Career Guide

Got it--thanks! Angela will make the additions/corrections for the 04//05 Career Guide.

Craig

Charles A Matrosic/FSU

Charles A Matrosic/FSU
02/17/2004 12:52 PM

To Craig E Westman/FSU@Ferris
cc Angela Garrey/FSU@FERRIS, Chuck Drake/FSU@Ferris, Ronald A Mckean/FSU@Ferris
Subject Career Guide

Per our conversation today, please ensure that the following information be included in all future editions of the Ferris State University Career Guide and any other marketing/recruiting publications that pertain to these programs.

Page 58 of the current Career Guide, under the Mechanical Engineering Technology bachelor's degree: Delete the last sentence of the first paragraph and replace it with the following:

The B.S. Mechanical Engineering Technology has been submitted for initial accreditation to the Technology Accreditation Commission of the Accreditation Board for Engineering and Technology (TAC of ABET), 111 Market Place, Suite 1050, Baltimore, MD 21202-4012 – Telephone (410) 374-7700.

Page 57 of the current Career Guide, under the Electrical/Electronics Engineering Technology bachelor's degree: Insert the following at the end of the first paragraph:

The B.S. Electrical/Electronics Engineering Technology is accredited by the Technology Accreditation Commission of the Accreditation Board for Engineering and Technology (TAC of ABET), 111 Market Place, Suite 1050, Baltimore, MD 21202-4012 – Telephone (410) 374-7700.

Page 64 of the current Career Guide, under the Mechanical Engineering Technology associate's degree: Insert the following at the end of the first paragraph:

The A.A.S. Mechanical Engineering Technology is accredited by the Technology

Attachment 1

Accreditation Commission of the Accreditation Board for Engineering and Technology (TAC of ABET), 111 Market Place, Suite 1050, Baltimore, MD 21202-4012 – Telephone (410) 374-7700.

Thanks!

Chuck

Program Details

Title **Electrical/Electronics Engineering Technology EEET**

Degree Type **Bachelor of Science**

Career Path **Engineering/Manufacturing and Industrial Technology**

College **Technology**

Download PDF

Locate a **Course**
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Learn about a **Program**
Follow a **Career Path**

Why Choose Electrical/Electronics Engineering Technology?

With electronics' explosive expansion into many aspects of manufacturing, commercial, governmental and even personal life, there is a high demand for you as a bachelor of science graduate proficient in automation/controls, systems integration, computer and PLC programming, communications and networking, instrumentation or electronic hardware. With the Great Lakes/Midwest region being the nation's major center of manufacturing, there is a particularly strong demand for you as an industrial systems integrator.

The EEET program is based on structured electrical/electronics courses, mathematics, science and technical subjects leading to a B.S. degree with areas of concentration in industrial automation/systems integration, communications and technology integration.

The B.S. Electrical/Electronics Engineering Technology is accredited by the Technology Accreditation Commission of the Accreditation Board for Engineering and Technology (TAC of ABET), 111 Market Place, Suite 1050, Baltimore, MD 21202-4012; Telephone - 410-374-7700.

Prepare for a Great Career

The rapid technological advancements experienced throughout industry that knowledgable, skilled technology professionals will be needed in a wide range of businesses. Increased automation in manufacturing, intelligent systems and the need for energy efficiency will maintain this high demand for the foreseeable future.

Engineering technologists who graduate from this program are in demand to work for manufacturers, consultants and plant operations in areas of control system integration, design, research and development, customer relations and sales, testing, instrumentation and design, among others.

The EEET program at Ferris gives its graduates a broad background of fundamentals for a lifetime of advancement in a constantly and rapidly changing high-tech world.

Admission Requirements

Required Courses		**Credit Hours**
General		
COMM 121	Fundamentals of Public Speaking	3
ENGL 311	Advanced Technical Writing	3
MATH 216	Applied Calculus	4
MATH 226	Fourier Series & Appl Diff Equat	4
Electives:	CHEM or PHYS	4
	Cultural Enrichment	6
	Social Awareness	6
Major		
ECNS 310	C/C++ Prog Applications	1
EEET 321	Network Analysis	3
EEET 393	Internship	4
EEET 418	Project Management	2
EEET 428	Senior Project	2
Concentration Courses (choose 16 credits)		
ECNS	(See advisor)	
EEET 411	Advanced Communications 1	4
EEET 421	Advanced Communications 2	4
EEET 412	Advanced Digital 1	4
EEET 422	Advanced Digital 2	4

Students entering the program must have completed an associate degree (or equivalent) in a related program and have transferable courses in mathematics through pre-calculus with a minimum 2.0 GPA in the associate degree work.

If you don't meet these requirements when you apply, you may be accepted as a 'non-major.' Upon completion of all prerequisites, admission to the program will be approved. Admission counselors should be consulted for an evaluation of transferability.

Graduation Requirements

The Electrical/Electronics Engineering Technology program at Ferris leads to a bachelor of science degree. Graduation requires a minimum 2.0 GPA in core classes, in the major and overall. Students must complete all general education requirements as outlined in the General Education section of the University Catalog.

More Information

For more information about this program, contact:
EET & CNS Department
Ferris State University
915 Campus Drive/SWN 405
Big Rapids, MI 49307-2291
Phone: 231-591-2388
Email: eet&cns@ferris.edu

EEET 413	Electrical Power & Machines	4
EEET 423	Industrial Automation Controls	4

CAD Courses (choose 3 credits)

ETEC 140	Engineering Graphics, Comprehensive	3
EEET 312	Electronic Design Automation	3

Technical Science Electives (choose 4-6 credits)

MECH 211	Fluid Mechanics	4
MECH 223	Thermodynamics	3
MECH 340	Statics & Strength of Matls	4
MECH 250	Fluid Power With Controls	2
MFGE 341	Quality Science Statistics	3
MFGE 342	Statistical Process Engineering	3
MFGE 353	Statistical Quality Control	3

Directed Elective (choose 2-3 credits)

MFGE 423	Engineering Economics	2

(See advisor)

Minimum credit hours required for B.S. degree (after completion of an A.A.S. degree): 68

choose a program go

Title Search: Go

Ferris State University Catalog

Follow a **MI Career Pathway** | Learn about a **Program** | Find a **Degree** | Locate a **Course**
FSU Home | Catalog Home | Admissions | Search

Program Details

Title **Mechanical Engineering Technology MECH**

Degree Type **Associate in Applied Science**

Career Path **Engineering/Manufacturing and Industrial Technology**

College **Technology**

Download PDF

Locate a **Course**
Find a **Degree**
Learn about a **Program**
Follow a **Career Path**

Why Choose Mechanical Engineering Technology?

In this program students develop an understanding of how mechanical systems perform. They begin by taking classes in engineering graphics and CAD, manufacturing processes and computer applications along with applied mathematics and physics. Writing and general education courses are included in the first year as well. Students are then well prepared to take the applied engineering science courses which give them a solid technical background for a future in technology. Coursework is enhanced with hands-on lab experiences and real-world applications provided by faculty with extensive industrial experience.

The A.A.S. Mechanical Engineering Technology is accredited by the Technology Accreditation Commission of the Accreditation Board for Engineering and Technology (TAC of ABET), 111 Market Place, Suite 1050, Baltimore, MD 21202-4012; Telephone: 410-374-7700.

Prepare for a Great Career

Graduates of the Mechanical Engineering Technology program work with others to develop machinery, equipment, products and processes. They operate test equipment, prepare engineering drawings with CAD systems, review designs for specifications, build prototypes of new products and design new or modify existing products and equipment. Employment opportunities in this field are plentiful because manufacturers are continually introducing new products and processes as well as redesigning current ones.

Students leaving school after receiving their A.A.S. degree accept positions as test technicians, machine designers, product designers, production expediters, quality control technicians, engineering assistants, cost estimators, specifications writers and machinery maintenance technicians. Most graduates of the program continue into B.S. programs including Mechanical Engineering Technology, Product Design Engineering Technology and Manufacturing Engineering Technology.

Admission Requirements

Admission to the College of Technology is open to high school graduates who demonstrate academic preparedness, maturity and

Required Courses		Credit Hours
General Education		
ENGL 150	English 1	3
ENGL 250	English 2	3
MATH 116	Intermediate Algebra & Num Trig	4
MATH 126	Algebra & Analytic Trigonometry	4
MATH 216	Applied Calculus	4
PHYS 211	Introductory Physics 1*Z	4
PHYS 212	Introductory Physics 2*Z	4
Electives:	Cultural Enrichment	3
	Social Awareness	3
Major		
EEET 201	Electrical Fundamentals	3
ETEC 140	Engineering Graphics, Comprehensive	3
MECH 111	MET Seminar	1
MECH 122	Computer Applications in Tech	2
MECH 211	Fluid Mechanics	4
MECH 212	Kinematics of Mechanisms	2
MECH 221	Mechanical Measure/Computer Appl	4
MECH 222	Machine Design	4
MECH 223	Thermodynamics	3

Attachment 3

seriousness of purpose with backgrounds appropriate to their chosen program of studies. Among first-time students in our technical programs, the average high school GPA is 2.8, and the average ACT composite score is 20.

Students entering the Mechanical Engineering Technology program should have a strong interest in mechanical devices and seek to understand them better. A background in math and science and/or vocational studies can be a suitable starting point. Admission is open to high school graduates with a 'C' average or higher. A minimum ACT math subscore of 19 or completion of MATH 110 is also required for admission.

Students seeking to transfer into the second year of the program should have, at minimum, math through pre-calculus and a college level course in physics equivalent to PHYS 211 or PHYS 241. Courses in engineering graphics, CAD and computer applications are also of benefit but generally can be made up.

Graduation Requirements

The Mechanical Engineering Technology program at Ferris leads to an associate in applied science degree. Graduation requires a minimum 2.0 GPA in core classes, in the major and overall. Students must complete all general education requirements as outlined in the General Education section of the University Catalog.

More Information

For more information about this program, contact:
College of Technology
Ferris State University
1009 Campus Drive
Big Rapids, MI 49307-2280
Phone: 231-591-2890

MECH 340	Statics & Strength of Matls	4
MECH 341	Lab for Statics & Str Matls	1
MFGT 150	Manufacturing Processes	2
Minimum credit hours required for A.A.S. degree:		66

choose a program go

Title Search: Go

Ferris State University Catalog

Follow a **MI Career Pathway** | Learn about a **Program** | Find a **Degree** | Locate a **Course**
FSU Home | **Catalog Home** | **Admissions** | **Search**

Company Name:
Company Address:
Kind of Business:
Contact Person: *Phone No./Fax*:
1. *How many Ferris Grads do you employ? (rough estimate)*
2. *What percentage has the skills you require? (rough estimate)*
3. *What improvements are needed in the preparation (undergraduate education) of the group?*
4. *Would you consider hiring a Ferris graduate again in the future*?

Summary

This survey was a follow-up to the graduate survey taken during Summer 2003. For this survey, 29 of the respondents of the graduate survey were contacted by telephone. Each graduate contacted was asked to identify a person in their company, either supervisor or human resources person, who could answer some general questions about Ferris State graduates. The survey yielded 10 responses from employers – including one self-employed graduate.

Inferences include: employers are very satisfied with employees who have graduated from FSU; with one exception, all would hire FSU graduates in the future (another person in the same company disagrees); communication skills were mentioned by several as area for improvement.

Numerous messages were left throughout the survey process. Most were not returned – either by graduates or by the supervisors or human resource personal who were identified. The low response rate was not satisfactory.

A copy of the survey instrument is attached.

The results are summarized in the following table.

Business Type	Contact Person's Position	Number of FSU Graduates	Percentage of required skills – or percentage with required skills	Improvements needed in undergraduate preparation	Would you consider hiring a Ferris graduate again?
automotive supplier	HRD	4-5 at facility	high	1) basic skilla are good 2) not as well prepared for interviews as Purdue & UM graduates 3) need better communications skills, better personal presentation skills	yes
automotive components	engineering manager	10	all – very happy with graduates	not really any – marries personal skills with educational skills	yes
packaging manufacturer	engineering vice president (alumni)	1-2	-	1) engineering technology more appropriate for his company than traditional engineering 2) keep hands on 3) include hydraulic, PLC, ladder diagrams, sensors – trouble shooting skills	yes
metal fabricator	owner	1		1) attitudes make a big difference 2) FSU program is very well-rounded & practical 3) communications integrated into the curriculum – eventually must sell your ideas 4) financial side of business-esp. for future owners	yes

Business Type	Contact Person's Position	Number of FSU Graduates	Percentage of required skills – or percentage with required skills	Improvements needed in undergraduate preparation	Would you consider hiring a Ferris graduate again?
automotive supplier	HRD	no idea (too big)	most	1)importance of co-op (likes Kettering) 2) internships important 3) should foster cultural importance of internships	yes
automotive supplier	campus relations supervisor	unknown	majority	none given	unlikely. hires from 21 target universities.
automotive supplier – same as above, different location	unknown	unknown	75-80% 1) math good 2) manufacturing good 3) logical thinkers	none	yes
specialty vehicle manufacturer, out of state	HRD	unknown	unknown	(computer literacy is important for any university.)	yes
warehousing and distribution	VP operations (alumni)	1	-	encourage working with local companies to gain business and engineering experience	yes
automotive parts supplier	general manager	2	80-85% -sound mechanically and in their job function	1) communications with others 2) team work 3) documentation	yes

Ferris State University

Mechanical Engineering Technology

Summary of Internship Program Comments

Summer 2003

Ferris State University **Mechanical Engineering Technology Program**

INTERNSHIPS, SUMMER 2003

Questions	INTERNS 1	2	3	4	5	6	7	8	9	10	Average
A. Knowledge and performance relative to the tasks assigned	1	2	1	1	2	1	1	2	2	1	1.4
B. Employee attitude	1	2	1	1	2	1	1	1	1	1	1.2
C. Technical growth during internship	2	2	2	1	3	1	1	1	3	1	1.7
D. Productivity	1	2	1	1	2	1	1	1	1	1	1.2
E. Overall employee effectiveness	1	2	1	1	2	1	2	1	2	1	1.4
F. Performance relative to expectations	1	2	1	1	2	1	2	1	2	1	1.4
Would you hire an intern again	Yes	No[1]	Yes	Yes	Yes	Yes	N.A.	Yes	N.A.	Yes	

Note: Scale from 1 to 5, 1 being excellent

Notable Intern Deficiencies:

We have had the Intern working on specific design issues that are related to heating, ventilating systems and air conditioning of buildings – it would be great if he had been able to take some of the excellent HVAC courses that FSU has.

None, None None, etc.

General Comments

The Intern has demonstrated an excellent resiliency – he looks for work, he adjusts to different tasks, he has been willing to do "menial" tasks. He has completed all of these items with vigor and a positive attitude.

The Intern shows a willingness to learn. He has completed all assignments with limited supervision. He has been working on two new production launches helping with prototype parts, gaining some knowledge in design, APQP and production equipment.

The intern has continued demonstrating capabilities for Lear's development activities.

The Intern is a conscientious, hard working employee, who would be an asset to any company.

The intern did a great job for us this summer. He has experienced many different areas of the business, including: Quality, Production, Engineering, Process Engineering and Material Control. He progressed very well throughout the summer allowing us to give him more responsibilities.

The Intern has been a great asset to our department. Very enthusiastic and quick learner. Worked well with suppliers, hourly and salary employees. Used problem thinking to root cause quality issues.

We have not worked together long enough together to evaluate all of the skills that he learned during his class work. He did a very good job with his major projects, which demonstrated his training with AutoCAD.

Worked very well on his own, with very little direction

Intern was great at understanding and using concepts and retaining them for future use.

Capable of taking charge of a project and getting it done.

Companies

Bissell, Inc.
R. L. Deppman Company
Petoskey Plastics, Inc.
Delphi Saginaw Steering Systems
Northern Die Cast Corp.
Trident Retrofit Facility, Kings Bay, GA.
Lear, Inc.
GMB Architects Engineers
Avon Automotive
Meridian Magnesium Products of America

Footnotes:
1. Father owns company, and would not need another intern. Intern did not work under father's supervision

SECTION 4

STUDENT EVALUATIONS

A. Introduction

Student evaluation of instruction: Students are surveyed to obtain information regarding quality of instruction, relevance of courses, satisfaction with program outcomes based on their own expectations.

Pages 4-2 thru 4-5 are from a survey of incoming first-year (AAS MET) students taken at the start of Fall 2003.
Parents, friends, and high-school counselors were the strongest influencing factor on the students' decisions to enroll at Ferris. Parents and friends also had a very high influence on decisions to enroll in the MET program. 64% had a favorable or better impression of the application/admission/financial aid/registration process at Ferris. 70% believe they would continue on to the BS MET program.

Pages 4-6 thru 4-11 are from a survey of incoming first-year (AAS MET) students taken at the start of Fall 2004.
Parents, friends, and high school counselors provided the strongest influences on the students' decisions to enroll at Ferris. 58% had a favorable or better impression of the application/admission/financial aid/registration process at Ferris. 62% believe they would continue on to the BS MET program.

Pages 4-12 thru 4-16 are from a survey of incoming third-year (BS MET) students taken at the start of Fall 2004.
78% of the respondents had a favorable or better impression of their previous (AAS) education. 100% had a favorable or better impression of the College of Technology. 100% had a favorable or better impression of the MET program at Ferris.

MET PROGRAM SELF-TEST FOR ACADEMIC PROGRAM REVIEW

SURVEY OF INCOMING FIRST YEAR STUDENTS

FALL 2003

2. AGE: 17 2
18 25
19 9
20 2
21 1

3. MALE: 35
FEMALE: 4

5. TRANSFER STUDENT
NO: 35
YES: 4
-Grand Rapids Community college
-St.Clair Community College
-Michigan State University
-Oakland Community College

6. Who/What helped you decide to come to Ferris:

Counselors	9
Teacher	6
Advertisements	4
Parents	16
Friends	18
Other Relatives	8
Co-workers on job	3
Other:	15

- MET Program 2
- Good Engineering Program
- Close to home 2
- Program variety 2
- Liked what I heard
- Self decision
- Coach Sall Men's Basketball team 2
- Courses offered
- Agency

- Dual enrollment
- The Campus 2
- Own research
- Offer into a good program
- Size
- Reputation

7.Who/What helped you decide to enroll in the MET program

Counselor	6
Teacher	9
Advertisements	0
Parents	20
Friends	10
Other Relatives	8
Coworkers on job	1
Other:	13

- Past classes taken
- Experience in field
- Personal decision
- Being on high school robotics team
- Myself 6
- What they wanted to do forever
- Offered to me
- Ferris Course book

8.Impression of the Application/Admissions/Financial Aid

Very favorable	5
Favorable	20
Neutral	13
Unfavorable	1
Very unfavorable	0

Comments:

- Some problems with financial aid
- Need to be updated more on what still needs to and has to be done
-Issues with the FAFSA form
-Financial aid does not prefer international student
-Registration was awful, no one was there to answer questions, everything else was okay
-Registration went very smooth

9. Your first impression of the College of Technology/MET Program/MET faculty

Comments:

- Very helpful 5
- Easy to talk to, and work with
- Very helpful and want to see you succeed
- Very well put together
- Favorable
- Impressive, strong, no-nonsense program
- Nice 6
- Very well organized
- Great 4
- Very interesting 3
- Full of information
- Good 6
- Friendly people 4
- It was awesome
- Knowledgeable staff 5
- Welcoming
- Can't wait to get started
- Out going, willing to teach
- Needs air conditioning
- Really cool, not uptight which makes a big deal in teaching
- Courteous and professional
- Love my classes
- Building filled with latest programs

11. What are your plans after completing your AAS MET Degree?

Go to work	3
Work and attend school part time	3
Stay in school, enter a BS degree program	35

At Ferris 27

- BS Product Design Engineering Technology 4
- BS Manufacturing Engineering Technology 0
- BS Mechanical Engineering Technology 28
- BS Plastics Engineering Technology 1
- Other BS Program: 2
  - Secondary Education
  - Undecided

Transfer to another university: 3
- Michigan Tech
- U of M
- MTU

Don't Know 2

12a. Do you have a computer?

-Yes: 39
-No: 0

b. Do you have a computer where you live now?

-Yes: 30
-No: 9

c. Do you have access to the Internet where you live now?

- Yes: 34
- No: 5

SURVEY OF INCOMING FIRST YEAR STUDENTS
FALL 2004

PLEASE PRINT ALL CAPS

1. Name: _____ 2. Age: _____ 3. Sex: M F

4. High School: _____ City/town: _____

   Year Graduated: _____

5. Transfer Student: Yes No (If so) Where from? _____

6. Who/what helped you decide to come to Ferris (check all applicable):

   _____ Counselor _____ Parents _____ Other relatives

   _____ Teacher _____ Friends _____ Co-workers on job

   _____ Advertisements _____ Other (Explain): _____

   _____

7. Who/what helped you decide to enroll in the MET program (check all applicable):

   _____ Counselor _____ Parents _____ Other relatives

   _____ Teacher _____ Friends _____ Coworkers on job

   _____ Advertisements _____ Other (Explain): _____

   _____

8. Your impression of the Application/Admissions/Financial Aid/Registration process:

   _____ Very favorable _____ Favorable _____ Neutral

   _____ Unfavorable _____ Very unfavorable

   Comments: _____

9. Your first impression of the College of Technology/MET program/MET faculty

   Comments: _____

SURVEY OF INCOMING FIRST YEAR STUDENTS
FALL 2004

PLEASE PRINT ALL CAPS

Name: _____

11. What are your plans after completing your AAS MET degree?

_____ Go to work

_____ Go to work and attend school part time

_____ Stay in school and enter a BS degree program

_____ At Ferris

_____ BS Product Design Engineering Technology

_____ BS Manufacturing Engineering Technology

_____ BS Mechanical Engineering Technology

_____ BS Plastics Engineering Technology

_____ Other BS program: _____

_____ Transfer to another university (describe):

_____

_____ Don't know.

12.a. Do you have a computer at home?

Yes No

b. Do you have a computer in the room, apartment, or house where you live now?

Yes No

c. Do you have access to the Internet where you live now?

Yes No

MET PROGRAM SELF-STUDY FOR ACADEMIC PROGRAM REVIEW

SURVEY OF INCOMING FIRST YEAR STUDENTS
FALL 2004

PLEASE PRINT ALL CAPS

1. Name: _____ 2. Age: 18:16;19:9;20:5;21:1 3. Sex: M 29 F 2

4. High School: See Attachment City/town: See Attachment

Year Graduated: 2000:20;1999:5;1998:6

5. Transfer Student: Yes 7 No 24 (If so) Where from? MSU, ITT Tech Ft. Wayne, HFCC, Delta CC, Macomb CC, GVSU-NMC

6. Who/what helped you decide to come to Ferris (check all applicable):

9 Counselor	13 Parents	6 Other relatives
7 Teacher	14 Friends	4 Co-workers on job
1 Advertisements	7 Other (Explain): See Attachment	

7. Who/what helped you decide to enroll in the MET program (check all applicable):

8 Counselor	13 Parents	2 Other relatives
7 Teacher	8 Friends	4 Co-workers on job
0 Advertisements	10 Other (Explain): See Attachment	

8. Your impression of the Application/Admissions/Financial Aid/Registration process:

5 Very favorable	13 Favorable	12 Neutral
1 Unfavorable	0 Very unfavorable	

Comments: See Attachment

9. Your first impression of the College of Technology/MET program/MET faculty

Comments: See Attachment

SURVEY OF INCOMING FIRST YEAR STUDENTS
FALL 2004

PLEASE PRINT ALL CAPS

Name: _____

11. What are your plans after completing your AAS MET degree?

4 Go to work

2 Go to work and attend school part time

25 Stay in school and enter a BS degree program

20 At Ferris

7 BS Product Design Engineering Technology

2 BS Manufacturing Engineering Technology

16 BS Mechanical Engineering Technology

1 BS Plastics Engineering Technology

0 Other BS program: _____

2 Transfer to another university (describe):

Michigan Tech.

4 Don't know.

12.a. Do you have a computer at home?

Yes 24 No 6

b. Do you have a computer in the room, apartment, or house where you live now?

Yes 22 No 8

c. Do you have access to the Internet where you live now?

Yes 26 No 4

4. High School/City/Town

Reese High/Reese
Warren Mott/Warren
Lake City High/Lake City-3
Traverse City Central/Traverse City
Lumen Christi H.S./Jackson
Huron High School/New Boston
G.R. Central/Grand Rapids
Ogemaw Heights/West Branch/2
Frankenmuth/Frankenmuth
Rockford Senior/Rockford
Allegan H.S./Allegan
Reed City H.S./Reed City
Osborn H.S/Detroit
Petoskey High/Petoskey
Mt, Pleasant/Mt. Pleasant
St. Patrick's/Portland
Avondale H.S./Bloomfield Hills
Belleville/Belleville
Ferndale H.S./Ferndale
Chippewa Hills/Remus
Zeeland/Zeeland
Fremont H.S./Fremont
CMA/Detroit
Manistee Catholic Central/Manistee
Cedar Springs Pub. /Cedar Springs
Ithaca H.S./Ithaca
Schoolcraft H.S./Schoolcraft
Gwinn H.S./Gwinn

6. Other (Explain):

I talked myself into it. Close to home, good reputation of being a good school. Myself. Programs offered. Population. Me. Well known for MET program.

7. Other (Explain):

Mobility with the degree. I knew what I wanted to do. Myself. Looked through all the class info and saw what I wanted to do was automotive engineering and I needed MET to

start. Seemed like what I wanted to do. Internet major description. No one helped. Myself. Interest in mechanical design-Automotive.
8. Comments:

A lot of "you did this, but we have to do this before we can use it." Everything turned out better then I had planned. I really enjoyed registration because, it wasn't long at all. Repeating some lessons from ITT. Very quick and people are very helpful.

9. Comments:

It's pretty nice. Excited. Willing to help, friendly. I was thinking it was going to be a program to go into. Looks to be a good learning experience. Friendly and helpful. New Equipment. Very good, Meet first, excellent first impression. Seems like this is going to be fun. Cool. Not bad so far. Good. Comfortable. Liked the way classes are set up. Nice staff, very great. Everything is going fine. I though that it was going to be boring. It's OK. Professional. I've only met . so far, but he seems like a nice guy. Very professional, great faculty, people at FSU. I don't have any yet. Good. Unsure. Good first impression. Very helpful. Good. It was a nice person. It wasn't as big as I thought it would be, I thought there would be more students.

SURVEY OF INCOMING THIRD YEAR (BSMET) STUDENTS
FALL 2004

1. Name: _____ 2. Age: _____ 3. Sex: M F

4. High School: _____ City/town: _____

   Year Graduated: _____

5. Prior Higher Education: FSU : in _____ program

   Transfer from _____ in _____ program.

6. Who/what helped you decide to come to Ferris (check all applicable):

   _____ Counselor _____ Parents _____ Other relatives

   _____ Teacher _____ Friends _____ Co-workers on job

   _____ Advertisements _____ Other (Explain): _____

   _____

7. Who/what helped you decide to enroll in the MET program (check all applicable):

   _____ Counselor _____ Parents _____ Other relatives

   _____ Teacher _____ Friends _____ Coworkers on job

   _____ Advertisements _____ Other (Explain): _____

   _____

8. Your impression of your prior education:

   _____ Very favorable _____ Favorable _____ Neutral

   _____ Unfavorable _____ Very unfavorable

   Comments: _____

9. Your impression of the College of Technology:

   _____ Very favorable _____ Favorable _____ Neutral

   _____ Unfavorable _____ Very unfavorable

   Comments: _____

SURVEY OF INCOMING THIRD YEAR (BSMET) STUDENTS
FALL 2004

10. Your impression of the MET program:

_____ Very favorable _____ Favorable _____ Neutral

_____ Unfavorable _____ Very unfavorable

Comments: _____

_____

11. Your impression of the MET faculty:

_____ Very favorable _____ Favorable _____ Neutral

_____ Unfavorable _____ Very unfavorable

Comments: _____

_____

12. What are your plans after completing your BS MET degree?

_____ Go to work

_____ Go to work and attend school part time

_____ Stay in school and enter another program. Specify if known: _____

_____ Don't know.

13.a. Do you have a computer at home?

Yes No

b. Do you have a computer in the room, apartment, or house where you live now?

Yes No

c. Do you have access to the Internet where you live now?

Yes No

SURVEY OF INCOMING THIRD YEAR (BSMET) STUDENTS
FALL 2004

1. Name: _____ 2. Age: 20:10, 21:4, 22:4 3. Sex: M 17 F 1

4. High School: See Attachment City/town: See Attachment

   Year Graduated: 00:4, 01:2, 02:12

5. Prior Higher Education: FSU : in See Attachment program

   Transfer from _____ in _____ program.

6. Who/what helped you decide to come to Ferris (check all applicable):

5 Counselor	7 Parents	3 Other relatives
3 Teacher	3 Friends	1 Co-workers on job
0 Advertisements	7 Other (Explain): See Attachment	

7. Who/what helped you decide to enroll in the MET program (check all applicable):

3 Counselor	8 Parents	3 Other relatives
4 Teacher	1 Friends	1 Coworkers on job
0 Advertisements	5 Other (Explain): See Attachment	

8. Your impression of your prior education:

4 Very favorable	10 Favorable	4 Neutral
0 Unfavorable	0 Very unfavorable	

   Comments: _____

9. Your impression of the College of Technology:

7 Very favorable	11 Favorable	0 Neutral
0 Unfavorable	0 Very unfavorable	

   Comments: _____

SURVEY OF INCOMING THIRD YEAR (BSMET) STUDENTS
FALL 2004

10. Your impression of the MET program:

7 Very favorable 11 Favorable 0 Neutral

0 Unfavorable 0 Very unfavorable

Comments: _____

_____

11. Your impression of the MET faculty:

12 Very favorable 6 Favorable 0 Neutral

0 Unfavorable 0 Very unfavorable

Comments: _____

_____

12. What are your plans after completing your BS MET degree?

12 Go to work

5 Go to work and attend school part time

1 Stay in school and enter another program. Specify if known: _____

1 Don't know.

13.a. Do you have a computer at home? 18 Yes 0 No

b. Do you have a computer in the room, apartment, or house where you live now?
18 Yes 0 No

c. Do you have access to the Internet where you live now?
18 Yes 0 No

SURVEY OF INCOMING THIRD YEAR (BSMET) STUDENTS
FALL 2004

4. High School/City/Town

Plymouth-Salem – Canton
GR Central HS – Grand Rapids
Fremont HS – Fremont
Iron Mountain HS – Iron Mountain
Hudsonvill HS – Hudsonville
Berrien Springs HS – Baroda
Schoolcraft HS – Schoolcraft
Jenison HS – Jenison
Comstock HS – Kalamazoo
Tecumseh HS – Tecumseh
Spring Lake HS – Spring Lake
Berkley HS – Berkley
Morley Stanwood HS – Stanwood
Fremont HS – Fremont
Kearsley HS – Flint
St. Charles East HS – St. Charles, IL
Bad Axe HS – Bad Axe
Rochester HS – Rochester

6. Other (Explain):

Scholarships, honors program, PDET. Liked school and had lacrosse team. Searching the web. Myself. Sports. Friends' father.

7. Other (Explain):

PDET Assoc. required MET sounds like fun. My own thinking. Myself. came to my vocational school. Just always liked it.

SECTION 5

FACULTY PERCEPTIONS

A. Introduction

Faculty perceptions: The purpose of this activity is to assess faculty perceptions regarding the following aspects of the program: curriculum, resources, admissions standards, degree of commitment by the administration, processes and procedures used, and their overall feelings. Additional items that may be unique to the program can be incorporated in this survey.

The MET faculty were surveyed for the Program Review in Occupational Education (PROE) report, which is a report prepared for the Michigan Department of Career Development. This report is required to establish Perkins Funds eligibility for two-year programs. This survey, though generated for the AAS degree, applies to both AAS and BS degree programs since the same faculty teach in both programs. The findings are summarized below, and the complete PROE report is in Appendix E.

The faculty survey suggests strengths in the following areas:

1. The programs' objectives and outcomes are well defined.
2. The program adheres to high academic standards. It uses and meets the standards set forth by ABET.
3. Admissions are open to those who qualify based on demonstrated academic ability.
4. The program, with extensive assistance from the Disabilities Services Office, supports students with special needs – and has had successful outcomes.
5. Faculty academic advisors for the program are informed and available.
6. Faculty qualifications are excellent for the MET program.
7. Scheduling of labs and classroom areas works well.
8. Focus in the program is on real, practical applications. Faculty bring work experience to the classroom to support this.
9. Faculty are involved in university-wide activities including Academic Senate and key committees.
10. Students are enthused about the program – and get involved in extracurricular activities that enhance the university's reputation.

11. The programs annual cost is very low – lower than the university average and lower than any other program in the College of Technology.

12. The programs' Industrial Advisory Board is involved in and supportive of the program.

The faculty survey suggests the following weaknesses and concerns:

1. Faculty are not generally aware of central planning within the college.

2. The university's continuous improvement planning is at best fragmented.

3. Faculty feel that the program is not marketed adequately – that information on its value to students is not well known.

4. Lab space is tight and inappropriate (as cited by the ABET visiting team).

5. Additional faculty resources would reduce overloads and dependence on hard-to-find adjunct faculty.

6. There is no built-in budget for equipment replacement, repair, or acquisition. This includes computers for student labs as well as faculty. Very little funds for travel are allowed for this program.

7. There is a substantial disparity in support, both funding and staffing, for programs within the College of Technology.

8. The program needs to better utilize outside sources of funds and equipment – by making better use of its advisory board, grants, and other sources.

SECTION 6

INDUSTRIAL ADVISORY BOARD PERCEPTIONS

A. Introduction

Advisory committee perceptions: The purpose of this activity is to obtain information from the members of the program advisory committee regarding the curriculum, outcomes, facilities, equipment, graduates, micro- and megatrends that might affect job placement (both positively and adversely), and other relevant information.

As in Section 5, the members of the MET Industrial Advisory Board were surveyed for the Program Review in Occupational Education (PROE) report. The findings are summarized below, and the complete report is in Appendix E.

The industrial advisory board survey suggests strengths in the following areas:

1. The students leave the MET program with a very good understanding of engineering technology fundamentals.
2. Project work.
3. Focus on "hands on" problem-solving approach.
4. Smaller class size allows one-on-one time with students.
5. Dedicated, enthusiastic instructors.
6. Very practical teaching that applies directly to the day-to-day needs of a person beginning a career in engineering, while provident a broad, firm foundation in the basics of which a graduate can build a successful career.
7. Great effort put into keeping pace with the ever-changing technology, which is a fast moving target.
8. Material content is well chosen.

The survey suggests the following weaknesses, concerns, or needs for improvement:

1. I am not aware of any major deficiencies.
2. Lab facilities and new lab equipment.
3. Development of a 4-year Mechanical Engineering program.
4. Constant review of curriculum to strike balance between basics/fundamentals and adaptation of new technology.

5. Dangerous to teach students only how to run one brand of software in lieu of real understanding, because one becomes obsolete and one does not.

6. Provide students more access to real jobs/engineers in industry.

7. More up-to-date laboratory, computer and teaching material.

8. Not a "major" need, but additional communication-related studies are encouraged.

Additional comments, suggestions for the program or for utilization of the advisory committee

1. During the last couple of years, our focus has been on overall course structure for the BS MET degree. With this complete, perhaps our next focus should be to dig into the core classes to advise on their content and practical application.

2. Continue to evolve the program to keep pace with changing jobs/technologies in business.

3. Keep students apprised of the types of opportunities available with their education.

4. The program is an excellent program, but is always in need of improvement.

5. Changes in facilities and classrooms have definitely been a change for the positive.

6. Additional tools, test equipment, lab equipment and software necessary to keep pace with constantly changing industry.

7. Should have a yearly budget with some discretionary funds for instructors.

8. The allocation of studies according to the allotted time is a good compromise.

FERRIS STATE UNIVERSITY

Mechanical Engineering Technology
Advisory Board Membership

Revised 04/21/04

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Effective May 2003, Mr. Vince Ursini is the Advisory Board Committee Chair.

The College of Technology Department and Program Advisory Committees

Advisory committees are an important mechanism for connecting the university with industry and the professional communities. They bring external members' experience and perspectives to bear as the university considers future academic program options and monitors the quality of its existing academic programs. It is acknowledged that disciplinary and structural diversity is an essential element of the university. Some departments are characterized by a narrow range of disciplines, and some by interdisciplinary or even transdisciplinary approaches. There also are differing requirements for professional accreditation, and therefore departments are encouraged to create advisory committees that best suit their particular needs.

Terms of reference

Where a department is composed of several distinctive disciplinary groups that offer distinctive programs, the responsibility of the advisory committee may be devolved to program advisory committees.

The principal aims of a department or program advisory committee include:

- Assessing and commenting on department/program strategic directions
- Helping ensure that programs and departments are attuned to professional and community trends by acting as a strategic scanning mechanism and assisting the program or department in identifying needs and opportunities in teaching, and making timely responses to changes in industry, the professions or the community. Advisory committees also provide invaluable networking opportunities to benefit students and faculty of the university through the establishment and maintenance of strong industry connections. Where programs are characterized by a strong focus on learning outcomes, members may be invited to participate in validation of learning outcomes for graduating students.
- Providing early input in the course and program development process, as new courses and programs are being conceptualized. The advisory committee also will play an important role in the quality assurance of programs, and for each course or group of courses under its jurisdiction, will:

    - offer advice and evaluative comment on new course and program proposals in terms of industry relevance and professional practice
    - review the annual progress of continuing courses and programs, and the proposed course improvements contained therein
    - assess proposed major changes to a program
    - consider any other matter relating to course and program development or operation

- Offering advice on marketing, student recruitment, student internships, and job placement
- Providing advice and assistance on faculty recruitment, faculty development, and grant opportunities
- Helping to identify and create external teaching, consulting, advancement, and research opportunities

Membership

Membership should be such as to facilitate achievement of the principal aims of the committee as outlined above.

The advisory committee consists of external members only, and the membership should be reflective of the broad range of knowledge, skills and/or attributes represented by the department or program academic profile. Individual external members are not appointed as representatives of a specific constituency but for their individual contributions to an appropriate mix of perspectives across the committee. The advisory committee members are nominated by department chair and department/program faculty and approved by the Dean.

Membership must comprise

- An external academic familiar with the discipline(s)
- External members who broadly reflect the state of the industry, the interests of potential employers of program graduates, the professional or other relevant associations, practitioners in the particular area and, where appropriate, the broader community.

At a minimum, one of the members in the above categories will be a member of alumni of the department/program. Consideration should be given to including in the membership a recent graduate of the relevant program(s). However, the alumni members should not become a majority of committee.

In carrying out its functions, the advisory committee may, at its discretion, nominate to the dean persons with expertise in areas relevant to the committee's work as coopted members of the committee.

Diversity in committee memberships should be encouraged.

The Dean of the College of Technology or his representative will be invited to all advisory committee meetings. The department chair or program coordinator serves as the facilitator for the committee.

The department secretary is secretary of the committee.

Tenure and frequency of meeting

Advisory committees convene at least once a year, however, twice a year is preferred. In the advisory committee meeting, separate times should be allocated for the committee to meet with faculty and student groups. A brief status report should be presented by the department chair or program coordinator. All advisory committee recommendations must be addressed and responded to by the department/program in the next meeting.

Advisory committee members serve a three-year term. Membership is renewable, and staggered terms are suggested in order to ensure continuity.

The Chairperson serves a one-year renewable term, and is elected by the committee members.

This policy was approved at the College of Technology Department Chairs meeting on November 7, 2002 and is effective January 1st, 2003.

SECTION 7

LABOR MARKET ANALYSIS

A. Introduction

Labor market demand analysis: This activity is designed to assess the marketability of future graduates. Reports from the Department of Labor and from industry are excellent sources for forecasting demand on graduates.

Quoting from the U.S. Department of Labor's Bureau of Labor Statistics (www.bls.gov):

"In addition to the standard engineering degree, many colleges offer 2- or 4-year degree programs in engineering technology. These programs, which usually include various hands-on laboratory classes that focus on current issues, prepare students for practical design and production work, rather than for jobs that require more theoretical and scientific knowledge. Graduates of 4-year technology programs may get jobs similar to those obtained by graduates with a bachelor's degree in engineering. *Some employers regard technology program graduates as having skills between those of a technician and an engineer.*"

The U.S. Department of Labor Standard Occupational Classification (SOC) is a system in use by all Federal statistical agencies to classify workers into occupational categories for the purpose of collecting, calculating, or disseminating data. The SOC code for Mechanical Engineers is 17-2141 and for Mechanical Engineering Technicians is 17-3027.

Mechanical Engineering Technology graduates, for which there is no SOC code, may work in either, or possibly both, of these classifications depending on employers needs.

17-2141 Mechanical Engineers Perform engineering duties in planning and designing tools, engines, machines, and other mechanically functioning equipment. Oversee installation, operation, maintenance, and repair of such equipment as centralized heat, gas, water, and steam systems.

17-3027 Mechanical Engineering Technicians Apply theory and principles of mechanical engineering to modify, develop, and test machinery and equipment under direction of engineering staff or physical scientists.

Mechanical Engineer:

Mechanical Engineers held about 215,000 jobs in 2002, which was 14 percent of the 1.5 million engineering jobs in the United States.

Data from the Michigan Department of Career Development (MDCD), Office of Labor Market Information, estimates the job growth for mechanical engineers to be 12.7 percent through 2006. Nationally, employment of mechanical engineers is projected to grow more slowly (increase 3 to 9 percent) than the average for all occupations through 2012. Although overall employment in

manufacturing industries – where employment of mechanical engineers is concentrated – is expected to decrease slightly, employment of mechanical engineers in manufacturing should increase more rapidly as the demand for improved machinery and machine tools grows and as industrial machinery and processes become increasingly complex. Also, emerging technologies in biotechnology, materials science, and nanotechnology will create new job opportunities for Mechanical Engineers.

In Michigan, the average annual wage in 2001 of a mechanical engineer was $64,400.
On a national basis, the median annual earnings of a mechanical engineer were $62,880 in 2002. The middle 50 percent earned between $50,800 and $78,040. The lowest 10 percent earned less than $41,490, and the highest 10 percent earned more than $93,430.

According to a 2003 salary survey by the National Association of Colleges and Employers, bachelor's degree candidates in Mechanical Engineering received starting offers averaging $48,585 a year.

Mechanical Engineering Technician:

Mechanical Engineering Technicians held 55,000 jobs in 2002, which was 12 percent of the 478,000 engineering technician jobs in the United States.

Overall employment of engineering technicians is expected to increase about as fast (10 to 20 percent) as the average of all occupations through 2012. Competitive pressures will force companies to improve and update manufacturing facilities and product designs, resulting in more jobs for engineering technicians. However, the growing use of advanced technologies, such as computer simulation and computer-aided design and drafting will continue to increase productivity and limit job growth.

In Michigan, the average annual wage in 2001 of a mechanical engineering technologist was $45,020.
On a national basis, the median annual earnings of a mechanical engineering technologist were $41,280 in 2002.

Summary:

The labor market forecast data from both State of Michigan and the U.S. Government indicates very good projected growth in the demand for Mechanical Engineering Technology graduates through 2012. This is a predictable statistic, since the demand for better products and faster delivery of products will necessitate new engineering and manufacturing methodologies. These, in turn, will generate numerous job opportunities for Mechanical Engineering Technology graduates in the coming years.

COMPANIES WHO RECRUITED
STUDENTS FROM THE MECHANICAL ENGINEERING PROGRAM

ACSYS Technologies 25200 Telegraph Rd., 4th Floor Southfield, MI 48034 Ms. Julie Bellamy (248) 223-0323	A-Korn Roller 3545 S. Morgan St. Chicago, IL 60609 Ms. Celeste Goglia (773) 254-5700
American Axle and Manufacturing 1840 Holbrook Ave. Detroit, MI 48212 Ms. Tonya Babcock (313) 873-3552	Applied Manufacturing Technologies 1200 Harmon Rd. Auburn Hills, MI 48326-1550
ASG Renaissance 3000 Town Center, Suite 2237 Southfield, MI 48034 Ms. Jennifer Mellein (248) 353-0890	ATI Group 3419 Pierson Place Flushing, MI 48433 Mr. Jeremy Harrison (810) 230-6202
Atlantic Automotive Components 1285 N. Crystal Ave. Benton Harbor, MI 49022 Ms. Bertha Lillie (616) 927-8308	Autocam Corporation 4070 East Paris Ave. Kentwood, MI 49512 Ms. Sarah McNamara (616) 541-8519
Compuware Corporation 31440 Northwestern Highway Farmington Hills, MI 48334 Ms. Jamie Cox (248) 865-1739	Consumers Energy 212 W. Michigan Ave. Jackson, MI 49202 Ms. Mary Sitko (517) 788-0146
Creative Techniques, Inc. 2441 N. Opdyke Auburn Hills, MI 48326 Mr. Joseph Banfield, Jr. (248) 373-3050	Daxcon Engineering 26200 Lahser Rd., Suite 301 Southfield, MI 48034 Mr. James T. Vieaux (248) 304-8900
Denn-Co Construction, Inc. 13129 23 Mile Rd. Shelby Twp., MI 48315 Ms. Sheri Kaye (810) 726-8800	Denso Manufacturing One Denso Rd. Battle Creek, MI 49015 Ms. Jennifer Akers (616) 565-1534

Detroit Diesel 13400 Outer Dr., West Detroit, MI 48239-4001 Ms. Jenni Griffin (313) 592-7400	ESAB Welding and Cutting Products 411 S. Ebenezer Rd. Florence, SC 29501 Mr. Andrew Ross (843) 664-4200
Fredricks Design, Inc. 6 Sherman Ave. Grand Haven, MI 49417 Ms. Kaitlin Boyink (616) 850-4510	General Motors 100 Kirts Blvd. Troy, MI 48007 Mr. James Ankton (248) 696-3624
Gentex Corporation 600 N. Centennial St. Zeeland, MI 49464 Mr. Kurt Wassink (616) 772-1800	Grand Traverse Plastics 5780 Moore Rd. Williamsburg, MI 49690 Ms. Jackie Wittbrodt (231) 267-5221
Havel Brothers 8233 Neptune, Suite 1 Kalamazoo, MI 49009 Mr. Rod DeVries (616) 344-9646	Haworth, Inc. One Haworth Center, 2-29G Holland, MI 49426 Ms. Marsha Major 616-393-3525
Hi-Tech Mold and Engineering 2775 Commerce Dr. Rochester Hills, MI 48309 Mr. Jason Bonanno (248) 852-6600	Hyatt Hotels and Resorts 200 West Madison St., 39th Floor Chicago, IL 60606 Mr. Mike Falzone (312) 750-8438
Innotec Corporation 441 E. Roosevelt Zeeland, MI 49464 Mr. Todd Deroo (616) 772-3099	John Deere One John Deere Place. Moline, IL 61265 Ms. Claya Knupp (309) 765-4518
Johnson Controls - Holland One Prince Center Holland, MI 49423 Ms. Linda Carrigan (734) 254-5843	Johnson Controls - Milwaukee 507 E. Michigan St. Milwaukee, WI 53202 Ms. Julie Rader (414) 524-4739
Johnson Controls - Plymouth 49200 Halyard Dr. Plymouth, MI 48170	K.L. McCoy and Associates, Inc. 4888 Lakepointe Detroit, MI 48224 Mr. David McCoy (313) 882-9565

Kelly Technical Services 2650 E. Beltline SE, Suite L Grand Rapids, MI 48546 Ms. Judy Brodock (616) 942-7725	LDM Technologies 2500 Executive Hills Blvd. Auburn Hills, MI 48326 Ms. Megan Thurston (248) 858-2800
Lear Corporation - Dearborn 5200 Auto Club Dr. Dearborn, MI 48126 Ms. Lori Smith (313) 240-3085	Lochinvar Corporation 45900 Port St. Plymouth, MI 48170 Mr. Todd Slosser (734) 454-4480
Manpower Professional 2930 Broadmoor SE Grand Rapids, MI 49512 Ms. Susan Janis 616-957-0461 x120	Materials Testing Consultants 693 Plymouth NE Grand Rapids, MI 49505 Ms. Lisa Kirby (616) 456-5469
Mears, CPG, Inc. 4500 N. Mission Rosebush, MI 48878 Ms. Marlena Heffron (517) 433-2929	Michigan Automotive Compressor 2400 N. Dearing Rd. Parma, MI 49269 Ms. Alicia Sellen (517) 531-5657
Modern Engineering 1921 S. Alma School Rd., #108 Mesa, AZ 85210 Mr. Mike Nasir (480) 206-8926	Noble 20101 Hoover Detroit, MI 48205
Oxford Automotive, Inc. 1250 Stephenson Hwy. Troy, MI 48083 Ms. Laura Banaszak (248) 577-1400	Pilot Industries 5451 S. State Ann Arbor, MI 48108 Ms. Julia Yeagle (734) 352-1431
Rehrig Pacific Company 1738 W. 20th St. Erie, PA 16502 Mr. Matt Rutigliano (814) 455-8023	Sandvik 7700 E. Fouch Rd. Traverse City, MI 49684 Mr. Mike Walters (231) 313-3130
TIC - The Industrial Company 18801 E. Main St., Suite 240 Parker, CO 80134 Mr. Gerald Slagel, Jr. (720) 851-5987	Toledo Molding & Die, Inc. 1429 Coining Dr. Toledo, OH 43606 Ms. Sue Brewis (419) 470-3950

Transfer Tool Products, Inc. 14444 168th Ave. Grand Haven, MI 49417 Mr. Steve Knott (616) 846-8510	Troy Design, Inc. 2653 Industrial Row Dr. Troy, MI 48015 Ms. Terri Calabrese (800) 616-4383
Triple S Plastics 14320 Portage Rd. Vicksburg, MI 49097 (616) 649-5034	United McGill Corporation One Mission Park, PO Box 7 Groveport, OH 43125 Ms. Celeste Plamondon (614) 836-2302
V3 Infrastructure Services, Ltd. 3097 Prairie St., SW Grandville, MI 49418 Mr. Thomas Williams (616) 532-7300	VanBuren Technology Center 490 S. Paw Paw St. Lawrence, MI 49064 Ms. Su Vernon 616-657-8235
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Whiting-Turner Contracting Company 300 East Joppa Rd. Baltimore, MD 21283 Ms. Karen Lucas (410) 337-5743	York International - Troy 1019 Naughton Ave. Troy, MI 48083 Mr. Jim Hanson (248) 689-7277

SECTION 8

FACILITIES AND EQUIPMENT

A. INTRODUCTION

Evaluation of facilities and equipment: An analysis of present facilities and equipment as compared to program needs must be conducted. This analysis should also include an assessment of the availability to the program of technologies used in the workplace.

Facilities and equipment for the MET program were assessed as part of the 2003 ABET accreditation self-study and visit.

Recent funding for lab equipment and improvements is summarized in the following table:

year	fiscal yr	amt	for	spent on equipment		percent
Vocational Education Funds						
2004	2005					
2003	2004	30,000	data acq cards, sensors,connection boxes, software, etc	30,000		
2002	2003	0				
2001	2002	7,500	strain indicator, peak hold unit, lab PCs	7,500		
2000	2001	26,685	update lab equip	26,685		
1999	2000	0				
			sub-total		64,185	57.3%
General Fund (One-Time Allocations)						
	2004	0				
	2003	0				
	2002	30,000	hydraulic/pneumatic benches	30,000		
	2001					
			sub-total		30,000	26.8%
Ferris Foundation Excellence Grant						
2003	2004	5,000	sensors, computer controllable valves, heaters, pumps, data acquisition cards	5,000	5,000	4.5%
Remodeling (Planning Iniative Funds)						
2002-2003		25,000	approx expenditure. lab remodel - remove chem benches, etc.	6,573	est. for benches, carts, cabinets	
2001		minor caps	update lighting, paint. Provide 4 lab-style workbenches	1,200		
			sub-total		7,773	6.9%

year	fiscal yr	amt	for	spent on equipment		percent

Supply & Expense Budget Funds Used for Equipment

	2004	380				
	2003	4,171	note: $3500 programmatic marketing funds 'borrowed'	4,171		
	2002	295		295		
	2001	197		197		
	2000	382		382		
	1999					
			sub-total		5,046	4.5%
					$ 112,004	100.0%

The MET faculty deeply appreciate the support for lab upgrades that has been received from administrative sources!!

It should be noted that there is little or no regular funding (S & E) available for the MET program to keep lab equipment repaired and up-to-date. This applies to instructional equipment as well - and contrasts funding with other programs within the COT.

It should be noted here that the ABET visiting team cited the program on the adequacy of its lab space. Specifically, the visitors noted that the space does not lend itself to full size industrial equipment and that nearby programs (Plastics and Rubber, Welding, Manufacturing Tooling, and Printing – had much, much more space – and more suitable space. Recent enhancements to many other COT programs are discussed in Section 1, p. 1-8.

Summary of Facilities and Equipment (From the 2003 TAC/ABET Self-Study, Volume II:

The MET program laboratories occupy two adjoining rooms on the third floor of the five-story Swan Technical Building. The computer lab assigned to the department is located on the first floor, Swan 105A. It has twenty-five 500 MHz, 256 K RAM, 13 G personal computers available for instruction and student use. Classrooms for lectures are also located along a common hallway on the third floor of the Swan Building. These rooms are shared with other programs in the College of Technology. Faculty offices once housed in the Swan Building are now located nearby in Johnson Hall, a remodeled former dormitory. This allowed a significant gain in space for equipment used in experiments. Also, storage space was increased.

In summer 2002 a major renovation took place in Swan 303 – known as the Fluid Power/Fluid Mechanics Lab. Saving one fume hood, all of the remnants of the rooms past use as a chemistry lab were removed. This included four bulky, fixed wet lab benches which provided very little work space, four fume hoods, and a long black counter. These have been replaced

hardwood workbenches and two deep sinks making the space much more flexible and usable to the satisfaction of all.

These laboratory facilities are used primarily for courses offered by the MET programs. Occasional use includes enrichment programs and students taking Product Design courses.

In spite of substantial growth, there has been no change is lab space since the inception of the MET programs.

The Mechanical Engineering Technology (MET) Laboratory Areas and the Courses They Support

FLUID MECHANICS AND FLUID POWER LABORATORY - Room 303 Swan Building

Capacity = 12/16 students

MECH 211 Fluid Mechanics (12 student limit due to equipment)
3 hours lecture, 3 hour lab, 4 credits
Offered each Fall Semester, primarily for MET students
Usually, 1 lecture section and 2 lab sections

MECH 250 Fluid Power with Controls (16 students maximum)
1 hour lecture, 2 hour lab, 2 credits
Offered each Winter Semester, primarily for Plastics Technology students.
Usually, 2 lecture sections and 4-5 lab sections

MECH 421 MET Senior Lab (12 students max.)
3 hours lecture, 3 hour lab, 4 credits.
Offered in the Fall for MET seniors.

PDET 499 Product Design Project.
2 hours lecture, 3 hour lab, 3 credits.
Winter semester. Lab is used by many MET students for prototype construction.

MECHANICAL MEASUREMENTS LABORATORY - Room 302 Swan Building

Capacity = 12 students

MECH 221 Mechanical Measurements with Computer Applications
3 hours lecture, 3 hour lab, 4 credits
Offered each Winter Semester, primarily for MET students
Usually, 1 lecture section and 2 lab sections

MECH 341 Lab for Statics and Strengths of Materials
0 hours lecture, 2 hour lab, 1 credit
Offered in the Fall for MET majors.

MECH 421 MET Senior Lab
3 hours lecture, 3 hour lab, 4 credits
Also uses this space in Fall as well as Swan 303.

Major Items of Equipment in the MET Laboratories

EQUIPMENT SUMMARY - FLUID MECHANICS AND FLUID POWER LABORATORY

Low speed teaching wind tunnel:	Pitot-static tube slant manometers air foil with 16 orifices for static pressure measurement golf ball drag apparatus drag force balance apparatus drag force transducer bubble generator
Fluid mechanics bench:	venturi meter/demonstrator pipe friction apparatus flow through an orifice apparatus jet impact apparatus
Pressure gage/sensor calibration:	dead weight pressure tester Bourdon tube pressure gages pressure sensors
LabVolt Electro-Pneumatic bench:	quick-disconnect hoses and tubes filters, regulators manifolds valves cylinders motors electric controls sensors PLC controller
LabVolt Electro-hydraulic bench:	Reservoir pump pressure relief valve manifolds quick disconnect hoses valves cylinders motors power supply limit switches pressure switches timer solenoid operated valves sensors PLC controller

EQUIPMENT SUMMARY - FLUID MECHANICS AND FLUID POWER LABORATORY

Density measurement:	Hydrometers; calibrated graduates
Viscosity measurement	Brookfield DV-II+ rotating drum viscometer Saybolt viscosmeter
Fluidics bench:	filter and regulator manifold valves tubing air cylinder fluidic indicators AND/NAND, OR/NOR, and FLIP-FLOP logic gates fluidic capacitors and amplifiers
Prototyping Capability:	numerous hand tools drill press scroll saw band saw belt sander bench grinder
Other:	vacuum pumps including high vacuum portable air compressor

EQUIPMENT SUMMARY - MECHANICAL MEASUREMENTS LABORATORY

Length measurement:	meter sticks, micrometer calipers, micrometers access to height gage and set of gage blocks
Area measurement:	planimeters
Mass measurement:	mass balance, sets of standard masses,
Voltage, Current, Resistance measurement:	digital multimeters (8)
Force measurement:	hand held force gauges (5) commercial load cells (5)
Acceleration measurement:	accelerometers, x, x-y, x-y-z

EQUIPMENT SUMMARY - MECHANICAL MEASUREMENTS LABORATORY

Position measurement:	LVDTs (4)
Mass-moment of inertia measurement:	torsional pendulum
Strain measurement:	strain gage application kits tools and supplies instructional videotapes soldering stations with accessories strain gage installation circuit checker Wheatstone bridge circuit boxes 3 digital strain indicators peak-hold strain indicator attachment polariscopes (photoelasticity) reflective polariscope
Pressure measurement:	pressure transducers
Temperature measurement:	thermocouples, thermistors, RTDs, IC temperature sensors
Dynamic data acquisition systems:	4 - 1.70 MHz, 256 K RAM, 20 G tower PCs 1 - 233 MHz, 128 K RAM, 3 G PC 16 bit system Micro-Measurements analog signal acquisition system Micro-Measurements 16 bit analog-digital converter 16 bit GPIB bus and circuit board 3 NI data acquisition cards, 5 connector boxes Windaq data acquisition cards
Radio telemetry:	Binsfeld Engineering transmitter/receiver radio telemetry unit

Department	College/Unit	Division
MDSN	Technology	AA

Increase Laboratory Space for Mechanical Engineering Technology. MECH program priority 2.

Dept Priority	College/Unit Priority	Division Priority	Initiation Year
4			2004

Concise Description of Plan — Planning Cycle

Mechanical Engineering Technology needs more lab space. The program has turned down offers of equipment donations for lack of space and has little room for student projects. Labs are often important to potential incoming students. Space should be combined with Manufacturing Engineering Technology and/or other programs.

What value does this plan add to the University?

Additional space would help FSU compete with such schools as GVSU in attracting good students. Also, more space is necessary to provide adequate space for student projects.

How does this plan support the Strategic Plan?

AA Objective 1 Attract more high quality students - make FSU more competitive. Objective 3. Better serve employer needs - to enhance relationships. Objective 4: Enhance image by having more interesting and varied equipment and activities to show and increase enrollments. .

Dean/Director Comments

Vice President Comments

President Comments

President Priority	Recommendation
	Yes No Further Information

Department	College/Unit	Division
MDSN	Technology	AA

Update Mechanical Engineering Technology Lab Equipment. MECH program priority 2.

Dept Priority	College/Unit Priority	Division Priority	Initiation Year
2			2004

Concise Description of Plan

Planning Cycle

Enhance equipment in Mechanical Engineering Technology Lab to make the program more attractive to new students and support new BSMET program.

What value does this plan add to the University?

Increased enrollments in C.O.T. and FSU. Enhance the quality of education.

How does this plan support the Strategic Plan?

AA Objective 1 Attract more high quality students - make FSU more competitive. Objective 3. Better serve employer needs - to enhance relationships. Objective 4: Enhance image by having more interesting and varied equipment and activities to show and increase enrollments.

Dean/Director Comments

Vice President Comments

President Comments

President Priority	Recommendation
	Yes No Further Information

Department	College/Unit	Division
MDSN	Technology	AA

Develop a marketing plan for AAS & BS MET programs. MECH program priority 3.

Dept Priority	College/Unit Priority	Division Priority	Initiation Year
7			2004

Concise Description of Plan

Planning Cycle

Since there has been no individual program marketing for the MECH programs, a programmatic marketing plan should be established. Mechanical Engineering Technology attracts one of the largest number of inquiries for programs in the C.O.T. and a successful plan could substantially increase enrollment in an accredited and relatively inexpensive program.

What value does this plan add to the University?

Increased enrollments in C.O.T. and FSU. Spin-off should help other programs. The MET program attracts students with ACT scores higher than the average for FSU and COT. Marketing this program should be able to bring in more such students.

How does this plan support the Strategic Plan?

AA Goal 7. Enhance image and marketing.

Dean/Director Comments

Vice President Comments

President Comments

President Priority	Recommendation
	Yes No Further Information

SECTION 9

CURRICULUM EVALUATION

A. Introduction

Curriculum review: The purpose of this activity is to determine through a comprehensive review of the curriculum whether it meets the needs of the market.

Curriculum review takes place in several ways.

Academic Program Review
Accreditation Self-Study and Visit (TAC of ABET)
Student Surveys

Academic Program Review

One of the recommendations from the APRC process in 1997 was "The College of Technology should study the possibility of offering a baccalaureate-level degree yoking Mechanical Engineering Technology with related areas in the College of Technology" (Appendix F). A proposal was put forward in Fall 1999 to create a BS MET program. The proposal included many courses in existing BS programs – including courses used in Product Design and Manufacturing Engineering Technology. The program received final approvals in Summer 2000. The first students enrolled in the BS MET program in Fall 2001.

TAC of ABET Accreditation

An intensive curriculum review was conducted in conjunction with the ABET accreditation effort. The ABET standards for curriculums in mechanical engineering technology are developed in partnership with the American Society of Mechanical Engineers (ASME). Revisions to the criteria are made on a regular basis. Thus, maintaining program accreditation status also insures conformance with updated national standards. As mentioned in the history of the MET programs, the AAS program was initially accredited following a 1997 visit and reaccredited following a 2003 visit. The BS MET program received its initial accreditation following the 2003 visit.

A major finding in the 2003 ABET visit was concern over the institutions continuous improvement planning for the MET and EEET programs. In response to this finding, MET faculty received training and participated in the ASEE Conference in June 2004 to become better vested in this matter. The faculty needs to submit evidence of implementing the plan to ABET early this coming summer. The Continuous Improvement Plan for the MET programs is presented at the end of this section.

Student Surveys

The twelve seniors in last winters graduating class were generally satisfied with the curriculum. Difficulties with math were cited. The seniors unanimously felt that a separate capstone course for MET students was needed.

Recent Curriculum Changes

Initially, PDET 321 Kinematics and Dynamics was included in the BS MET program. However, due in part to objections from PDET faculty over imbalance in preparation of students, (MET vs PDET) and objections from MET faculty to duplication in content with another MECH course, an experimental course MECH 390 Dynamics was created. This calculus-based course became permanent with a curriculum proposal creating MECH 360 Dynamics in August 2003.

In light of ASME requirements for AAS MET programs, the check sheet for the AAS MET program was changed to allow PHYS 211 plus either PHYS 212 or CHEM 114 for the science requirements. Students going on to the BS MET program will need to take either CHEM 114 or PHYS 212 for a total of three physical science courses.

A number of curriculum revision ideas are currently under consideration. These include:

1. Splitting the current PDET 422 course (Advanced Machine Design with Finite Element Analysis) into separate sections for MET students and PDET students, possibly with the MET section having its own four-letter MECH prefix. This consideration stems from the PDET program requirement that students have their own laptops, which the MET program does not have. Additionally, it would allow the MET course to examine finite element analysis in greater depth and to apply FEA to courses such as MECH 330 Heat Transfer and MECH 440 Noise and Vibrations.

2. Creating a separate senior capstone course for BS MET students. Currently, both MET and PDET students enroll in PDET 499. PDET 499 is directed towards product design majors – including brief introductions to concepts in marketing, finance, manufacturing costs, patent searches accompanied with a major emphasis on a formal 'sales' presentation tied to COMM 336. (COMM 336 is not taken by BS MET students). Lectures include topics covered in PDET curriculum, but not covered in the MET program. One advantage of having separate courses is to allow the MET students to work on projects that are more closely aligned with typical mechanical engineering industry-type projects, and would be more relevant to the MET curriculum. Additionally, a number of students are doing both PDET and MET degrees – and applying the capstone course, PDET 499, to both degrees. with planning, a student is able to obtain the BS PDET degree with only 10 additional credits beyond the BS MET degree – and with no appropriate capstone.

3. Move the statistics course, MFGE 341, to the junior year. This would enhance the Senior Lab course, MECH 421, which is offered in the Fall of the senior year.

4. Moving the semester for the ENGL 321 requirement to coincide with the capstone project semester. This will enable an outside source of assessment on students writing and will strengthen the programs continuous improvement plan required for accreditation.

5. Other minor changes to the MET BS check sheet may be considered to more fully separate the MET and PDET programs.

The curriculum breakdown plus the curriculum check sheets appear on the following 11 pages as presented in the October 2003 Self-Study for ABET Accreditation, Volume II.

FERRIS STATE UNIVERSITY
COLLEGE OF TECHNOLOGY

MECHANICAL ENGINEERING TECHNOLOGY
ASSOCIATE IN APPLIED SCIENCE (AAS)
FALL SEMESTER
Curriculum Guide Sheet

Total semester hours required for graduation: 65

FIRST YEAR - FALL SEMESTER (16 cr. hrs.)			CREDITS
MECH	111	MET Seminar (admit to MECH)	1
MFGT	150	Manufacturing Processes	2
ETEC	140	Engineering Graphics	3
ENGL	150	English 1	3
MATH	116	Int. Algebra/Numerical Trig.	4
ELECTIVE		Cultural Enrichment/Social Awareness	3

FIRST YEAR - WINTER SEMESTER (16 cr. hrs.)			CREDITS
MECH	122	Computer Applications (MATH 116)	2
PHYS	211	Introductory Physics (MATH 116)	4
MATH	126	Algebra & Analytical Trig (MATH 116)	4
ENGL	250	English 2 (ENGL 150)	3
ELECTIVE		Social Awareness/Cultural Enrichment	3

SECOND YEAR - FALL SEMESTER (17 cr. hrs.)			
MECH	211	Fluid Mechanics (MATH 126,PHYS 211)	4
MECH	340	Sta. & Str. of Mat'ls. (MATH 126,PHYS 211)	4
MECH	341	Statics & Strength of Materials Lab	1
CHEM	114	Intro to General Chemistry (*)	4
MATH	216	Applied Calculus (MATH 126)	4

SECOND YEAR - WINTER SEMESTER (17 cr. hrs.)			
MECH	212	Kinematics of Mech. (MATH 216 or 220, PHYS 211)	2
MECH	221	Mech. Meas. (MECH 340,MECH 211,coreq EEET 201)	4
MECH	222	Machine Design (MECH 340)	4
MECH	223	Thermodynamics (MATH 216 or 220,PHYS 211)	3
EEET	201	Electrical Fundamentals (MATH 116)	3

MECHANICAL ENGINEERING TECHNOLOGY
BACHELOR OF SCIENCE DEGREE (BS)
Entrance Requirements: AAS Mechanical Engineering Technology; 2.7 GPA in MECH classes; 2.5 GPA in AAS MATH classes (MATH 216/220 compentency) and 2.5 GPA Overall

BS Degree Minimum General Education Requirements

(See the General Education webpage at www.ferris.edu/HTMLS/academics/gened/gened.html for details and acceptable courses in each program)

Communications Competence: 12 semester hours

Quantitative Skills: MATH 115 or ACT score

Scientific Understanding: 7/8 semester hours including at least one lab course

Cultural Enrichment: 9 semester hours including at least one course 200 level or higher.

Social Awareness: 9 semester hours, including at least one Foundation course and at least one 300 level or higher.

At least one Global Consciousness (G) course and one Race/Ethnicity/Gender (REG) course (within Cultural Enrichment or Social Awareness)

Meeting all requirements for graduation is the student's responsibility. Your advisor is available to assist

THIRD YEAR - FALL SEMESTER (18 cr. hrs.)			
MATL	240	Introduction to Material Science	4
PHYS	212	Introductory Physics 2 (*)	4
PSYC	150	Introduction to Psychology	3
MECH	330	Heat Transfer (MATH 216 or 220, MECH 223)	3
COMM	121	Public Speaking	3

THIRD YEAR - WINTER SEMESTER (18 cr. hrs.)			
PDET	422	Advanced Machine Design (PDET 322, MECH 340)	4
MECH	360	Dynamics (MATH 216 or 220, JR MECH)	3
MATH	226	Four. Series & Appl Dif. Eqn. (MATH 216 or 220)	4
ELECTIVE		Computer Programming Course	2 min.
ELECTIVE		Approved Technical Elective (300 or higher)	2 min.
ELECTIVE		Cultural Enrichment	3

THIRD YEAR - SUMMER SEMESTER			
MECH	393	Industrial Internship	4

FOURTH YEAR - FALL SEMESTER (16 cr. hrs.)			
MECH	440	Noise & Vibration (MATH 216)	3
MECH	421	MET Senior Lab (MECH 330, EEET 215)	4
MFGE	341	Quality Science Statistics (MATH 116)	3
ENGL311/321		Advanced COMM requirement	3
MATL	341	Material Selection-Metals(MATL 240)	3

FOURTH YEAR - WINTER SEMESTER (16 cr. hrs.)			
PDET	499	Product Design Project (Sen. Status)	3
MFGE	352	Design for Manufacturability	2
MFGE	423	Engineering Economics (MATH 126)	2
PSYC	326	Industrial Psychology (PSYC 150)	OR
PSYC	430	Interpersonal/Culture Perceptions	3
ELECTIVE		Approved Technical Elective	3 min.
ELECTIVE		Cultural Enrichment (200 or higher)	3

Transfer students should contact a Mechanical Engineering Technology faculty member to discuss options for starting points in the program

(*) Either may be taken in AAS degree; both required in BS.

Total semester hours - junior and senior years of BSMECH =72
Total semester hours AAS + BS = 137 (with internship).

10/03

CURRICULUM REQUIREMENTS
Mechanical Engineering Technology
Associate in Applied Science (AAS)

ENTRY CRITERIA:

1. 2.0 GPA (High School or College Transfer GPA).
2. High School Algebra (or MATH 110 or equivalent and MATH ACT of 19 or MATH 116 placement.

TECHNICAL			CREDIT HOURS
MECH	111	MET Seminar	1
MECH	122	Computer Applications	2
MECH	211	Fluid Mechanics	4
MECH	212	Kinematics of Mechanisms	2
MECH	221	Mechanical Measurements	4
MECH	222	Machine Design	4
MECH	223	Thermodynamics	3
MECH	340	Statics & Strength of Materials	4
MECH	341	Statics & Strengths of Mat'l Lab	1
Technical Related			
EBET	201	Electrical Fundamentals	3
ETEC	140	Engineering Graphics	3
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
*CHEM	114	Intro to General Chemistry	4
Quantitative Skills			
MATH	116	Intermediate Algebra/Num. Trig.	4
MATH	126	Algebra & Analytical Trigonometry	4
MATH	216	Applied Calculus	4
Cultural Enrichment			
Elective			3
Social Awareness			
Elective			3

Mechanical Engineering Technology
Bachelor of Science

ENTRY CRITERIA:

1. AAS in Mechanical Engineering Technology
2. 2.7 GPA in MECH classes
3. 2.5 GPA in AAS Math classes (MATH 216/220 compentency)

TECHNICAL			
MECH	330	Heat Transfer	3
MECH	360	Dynamics	3
MECH	393	Industrial Internship	4
MECH	421	MET Senior Lab	4
MECH	440	Noise & Vibration	3
PDET	422	Advanced Machine Design	4
PDET	499	Product Design Project	3
Related			
MATL	240	Intro to Material Science	4
MATL	341	Material Selection - Metals	3
MFGE	341	Quality Science Statistics	3
MFGE	352	Design for Manufacturability	2
MFGE	423	Engineering Economics	2
Elective		Computer Programming	2 min.
Elective		Approved Technical Elective	3 min.
Elective	3--	Apprv'd Technical Elective (300 or above)	2 min.

GENERAL EDUCATION			
Communication Competence			
ENGL	311/321	Adv. COMM requirement	3
COMM	121	Public Speaking	3
Scientific Understanding			
PHYS	212	Introductory Physics 2	4
Quantitative Skills			
MATH	226	Fourier Series & Appl. Diff. Equ.	4
Cultural Enrichment			
Elective			3
Elective (200+)			3
Social Awareness			
PSYC	150	Intro to Psychology	3
**PSYC	326	Industrial Psychology	3

***PHYS 212 may be taken in lieu of CHEM 114 in AAS degree; both must be taken for BS degree.**

****PSYC 430 (Interpersonal/Culture Perceptions) may be taken instead of PSYC 326 (Industrial/Organizational Psychology).**

From the ABET Self-Study:

II. CURRICULAR REQUIREMENTS FOR GRADUATION FROM THE PROGRAM

A. General

The response to this section applies to both the AASMET and BSMET programs.

Type of program: Day X Evening __ Cooperative__ Non-Traditional__

Length of school year 9 months. Credits: Semester X Quarters __

1 Lecture Credit= 1 Class Hour(s) 1 Laboratory Credit= **2 or 3** Class Hours

One credit hour normally represents a total of three preparation and class hours of work per week for a period of 14 to 16 weeks depending on the institution's academic year. Quarters are proportional.

General Teaching Load Averages
Indicate in the space provided, ranges and average data for program faculty members having full-time assignment in the engineering technology unit. Give actual data for the current semester or quarter.

Data are for X Semester ____Quarter

	Range	Average
Credit Hours	15-20*	16*
Contact Hours Per Week	19-34*	20.5
Laboratory Size	0-18	14
Class Size	12-30**	21**
Advisees	30-36	33

* Based on full-time faculty only. Mr. Drake at 0.25 load.
**Excludes two sections of MECH 340 taught off-campus.

Indicate the number of credit and contact hours per week that is considered a normal full teaching load.

credit hours: 12 credits contact hours: 18 contact

Explain how a full-time load is determined.

A full-time teaching load is determined, on a 9-month (two-semester) basis, by whichever maximum is reached first:

24 credits or 36 contact hours or 720 student credit hours.

B. Production of graduates

Have students been graduated from the program? (The Technology Accreditation Commission will not evaluate a program until students have been graduated.)

Mechanical Engineering Technology, A.A.S.: X Yes ___ No

Mechanical Engineering Technology, B.S.: X Yes ___ No

C. Curriculum

List the courses making up the curriculum required for graduation, according to the categories described in the ABET criteria.

Two separate sections begin below.

C.1. Mechanical Engineering Technology, A.A.S.

C.2. Mechanical Engineering Technology, B.S.

C.1. Mechanical Engineering Technology, A.A.S.

The check sheet for the AASMET program appears in Appendix A.

Technical Sciences (See ABET criteria, section I.C.1.)	**Required Hours**		
Courses (Title & No.)	**Lecture**	**Lab.**	**Credits**
EEET 201 Electrical Fundamentals	2	2	3
MECH 211 Fluid Mechanics	3	3	4
MECH 223 Thermodynamics	3	0	3
MECH 340 Statics and Strength of Material	4	0	4
MECH 341 Lab for Statics and Strength of Materials	0	2	1
Subtotal	**12**	**7**	**15**

Technical Specialties (See ABET criteria, section I.C.2.)	**Required Hours**		
Courses (Title & No.)	**Lecture**	**Lab.**	**Credits**
ETEC 140 Engineering Graphics	2	3	3
MECH 111 MET Seminar	1	0	1
MECH 212 Kinematics of Mechanisms	2	0	2
MECH 221 Mechanical Measurements with Computer Applications	3	3	4
MECH 222 Machine Design	4	0	4
MFGT 150 Manufacturing Processes	1	3	2
Subtotal	**13**	**9**	**16**

C.1. Mechanical Engineering Technology, A.A.S.

Technical Electives (See ABET criteria, section I.C.3.)

Courses (Title & No.)	Required Hours		
	Lecture	Lab.	Credits
None	0	0	0
Subtotal	**0**	**0**	**0**

Basic Sciences (See ABET criteria, section I.C.4.)

Courses (Title & No.)	Required Hours		
	Lecture	Lab.	Credits
PHYS 211 Introductory Physics 1	3	3	4
PHYS 212 Introductory Physics 2	3	3	4
Subtotal	**6**	**6**	**8**

Mathematics (See ABET criteria, section I.C.4.)

Courses (Title & No.)	Required Hours		
	Lecture	Lab.	Credits
MATH 116 Intermediate Algebra and Trigonometry	4	0	4
MATH 126 Advanced Algebra and Trigonometry	4	0	4
MATH 216 Applied Calculus	4	0	4
Subtotal	**12**	**0**	**12**

Written & Oral Communications (See ABET criteria, section I.C.5.a.)

Courses (Title & No.)	Required Hours		
	Lecture	Lab.	Credits
ENGL 150 English 1	3	0	3
ENGL 250 English 2	3	0	3
Subtotal	**6**	**0**	**6**

C.1. Mechanical Engineering Technology, A.A.S.

Humanities & Social Sciences (See ABET criteria, section I.C.5.b)	**Required Credits**
Courses (Title & No.)**	
Cultural Enrichment Elective [1]	**3**
ARCH 224 Architectural History (3)	
HUMN 100 Introduction to the Humanities (3)	
MUSI 221 Music Appreciation (3)	
HIST 152 Western Civilization: 1500 AD to the Present (3)	
Social Awareness Elective	**3**
GEOG 100 Geography of World Regions (3)	
ANTH 121 Introduction to Physical Anthropology (3)	
PSYC 150 Introduction to Psychology (3)	
SOCY 121 Introductory Sociology (3)	
Total Required Credits	**6**

Computer Courses (See ABET criteria, section I.C.6.)	**Required Hours**		
Courses (Title & No.)	**Lecture**	**Lab.**	**Credits**
MECH 122 Computer Applications in Technology	2	0	2
Subtotal	**2**	**0**	**2**

[1] General Education requirements may be found in the current catalog. This document is available only on-line. www.ferris.edu/catalog

C.1. Mechanical Engineering Technology, A.A.S.

Other Courses	Required Hours		
Courses (Title & No.)	**Lecture**	**Lab.**	**Credits**
None	0	0	0
Subtotal	**0**	**0**	**0**

Recap of AASMET Program Course Categories

Divisions of Courses	Lecture	Lab.	Credits
Technical Sciences	12	7	15
Technical Specialties	13	9	16
Technical Electives	0	0	0
Basic Sciences	6	6	8
Mathematics	12	0	12
Written & Oral Communication	6	0	6
Humanities & Social Sciences	6	0	6
Computer Courses	2	0	2
Other Courses	0	0	0
Subtotal	**57**	**22**	**65**

Note: The institution should review II. #. 3.c. (10) of the Accreditation Policy and Procedure Manual. Course outlines and textbooks must be available to the visitation team for all courses required for graduation. For technical, mathematics and science course there much also be sufficient examples of student work, in addition to course outlines and textbooks, available to the visitation team.

The check sheet for the BSMET program appears in Appendix B.

All courses in the AASMET program are required in the BSMET program.

Light gray shading is used in the tables below to designate courses in the BSMET program that are not in the AASMET program.

Technical Sciences (See ABET criteria, section I.C.1.)	**Required Hours**		
Courses (Title & No.)	**Lecture**	**Lab.**	**Credits**
EEET 201 Electrical Fundamentals	2	2	3
MECH 211 Fluid Mechanics	3	3	4
MECH 223 Thermodynamics	3	0	3
MECH 340 Statics and Strength of Material	4	0	4
MECH 341 Lab for Statics and Strength of Materials		2	1
MECH 330 Heat Transfer	3	0	3
PDET 321 Applied Mechanics & Kinematics*	3	0	3
MATL 240 Material Science	3	2	4
Subtotal	**21**	**9**	**25**

*In lieu of PDET 321, BS MET students have taken an experimental course, MECH 390 Dynamics (calculus based), during the past two academic years. A curriculum proposal to create a permanent course MECH 360 Dynamics was approved August 26, 2003. See Appendix C.

Technical Specialties (See ABET criteria, section I.C.2.)	**Required Hours**		
Courses (Title & No.)	**Lecture**	**Lab.**	**Credits**
ETEC 140 Engineering Graphics	2	3	3
MECH 111 MET Seminar	1	0	1
MECH 212 Kinematics of Mechanisms	2	0	2
MECH 221 Mechanical Measurements with Computer Applications	3	3	4
MECH 222 Machine Design	4	0	4
MFGT 150 Manufacturing Processes	1	3	2
MATL 341 Material Selection – Metals	3	0	3
MECH 393 Industrial Internship	*	*	4
MECH 421 MET Senior Lab	3	3	4
MECH 440 Noise and Vibrations	3	0	3
MFGE 352 Design for Manufacturability	2	0	2
MFGE 423 Engineering Economics	2	0	2
PDET 422 Advanced Machine Design (with FEA)	3	3	4
PDET 499 Product Design Project	2	3	3
Subtotal	**31**	**18**	**41**

*MECH 393 Industrial Internship requires ten 40-hour weeks of acceptable engineering-related experience.

Technical Electives (See ABET criteria, section I.C.3.)	**Required Hours**		
Courses (Title & No.)	**Lecture**	**Lab.**	**Credits**
Prior advisor approval required. A list of suggested courses is provided. Examples follow.	*	*	5
PDET 322 Model and Prototype Development (Pro-Engineer modeling)	1	3	2
PLTS 342 Plastic Material Selection	3	0	3
Subtotal	**4***	**3***	**5**

*Lecture and lab hours will vary with elective selection.

Basic Sciences (See ABET criteria, section I.C.4.)	**Required Hours**		
Courses (Title & No.)	**Lecture**	**Lab.**	**Credits**
PHYS 211 Introductory Physics 1	3	3	4
PHYS 212 Introductory Physics 2	3	3	4
CHEM 121 General Chemistry 1	4	3	5
Subtotal	**10**	**9**	**13**

*A proposal to replace CHEM 121 with CHEM 114 Introduction to General Chemistry (3 hours lecture + 2 hours lab = 4 credits) was approved August 26, 2003. Appendix C.

Mathematics (See ABET criteria, section I.C.4.)	**Required Hours**		
Courses (Title & No.)	**Lecture**	**Lab.**	**Credits**
MATH 116 Intermediate Algebra and Trigonometry	4	0	4
MATH 126 Advanced Algebra and Trigonometry	4	0	4
MATH 216 Applied Calculus	4	0	4
MATH 226 Fourier Series & Applied Differential Equations	4	0	4
MFGE 341 Quality Science Statistics	3	0	3
Subtotal	**19**	**0**	**19**

Written & Oral Communications (See ABET criteria, section I.C.5.a.)	**Required Hours**		
Courses (Title & No.)	**Lecture**	**Lab.**	**Credits**
ENGL 150 English 1	3	0	3
ENGL 250 English 2	3	0	3
ENGL 311/321 Advanced Technical Writing /Advanced Composition	3	0	3
COMM 121 Public Speaking	3	0	3
Subtotal	**12**	**0**	**12**

Humanities & Social Sciences (See ABET criteria, section I.C.5.b)	**Required Credits**
Courses (Title & No.)**	
Cultural Enrichment Electives [2] Examples are listed.	9
ARCH 224 Architectural History (3)	
HUMN 100 Introduction to the Humanities (3)	
MUSI 221 Music Appreciation (3)	
HIST 152 Western Civilization: 1500 AD to the Present (3)	
Social Awareness Requirements and Electives are listed	9
PSYC 150 Introduction to Psychology (3) [Required]	3
PSYC 326 Industrial Psychology (3) [Required][3]	3
GEOG 100 Geography of World Regions (3)	
ANTH 121 Introduction to Physical Anthropology (3)	
SOCY 121 Introductory Sociology (3)	
Total Required Credits	**18**

The university's general education policy requires B.S. candidates take a *Cultural Enrichment* course 200 level or higher and a *Social Awareness* course 300 level or higher. Other criteria including *Global Consciousness; Race, Ethnicity and/or Gender;* and *Social Foundations* must be met.

[2] General Education requirements are listed in the University Catalog , www.ferris.edu/catalog

[3] A curriculum proposal approved August 26, 2003 allows students to choose PSYC 430 Interpersonal/Cultural Perceptions. Appendix C.

Computer Courses (See ABET criteria, section I.C.6.)	Required Hours		
Courses (Title & No.)	**Lecture**	**Lab.**	**Credits**
MECH 122 Computer Applications in Technology	2	0	2
Computer programming course: ISYS 204 Visual BASIC Programming (3 credits) is commonly taken	varies	varies	2 min.
Subtotal			4 min.

Other Courses	Required Hours		
Courses (Title & No.)	**Lecture**	**Lab.**	**Credits**
None	0	0	0
Subtotal	0	0	0

Recap of BS MET Program Course Categories

Divisions of Courses	Lecture	Lab.	Credits
Technical Sciences	21	9	25
Technical Specialties	31	18	41
Technical Electives	4*	3*	5
Basic Sciences	10	9	13
Mathematics	19	0	19
Written & Oral Communication	12	0	12
Humanities & Social Sciences	18	0	18
Computer Courses	4	0	4
Other Courses	0	0	0
Subtotal	**119***	**38***	**137**

**Lecture and lab hours will vary with elective selection. Typical values are shown.*

Ferris State University
Mechanical Engineering Technology
Continuous Improvement Plan
July 9, 2004

I. Constituents

Students
State of Michigan

II. Mission Statement

The Mechanical Engineering Technology program seeks to provide a stimulating learning environment to prepare students for the broad array of technical careers associated with the discipline.

III. Program Early Career Objectives

AAS MET Early Career Objectives

In the first five years after completion of the AAS MET degree, graduates will be able to:

1. successfully complete a bachelor of science degree in a technical or other discipline
2. and find employment appropriate to the discipline.

BS MET Early Career Objectives

In the first five years after completion of the BS MET degree, graduates will be able to:

1. find employment appropriate to the discipline
2. further their education either by pursuing advanced degrees or with continuing education
3. and be able to advance to supervisory or other higher positions.

IV. Program Outcomes (Goals at time of graduation)

AAS MET Program Outcomes

At the time of graduation, AAS MET students will be able to:

1. apply engineering principles to technical problems
2. carry out an experimental study of a component including data collection, analysis, oral presentation, and written report
3. demonstrate communication skills, both oral, written, and visual
4. demonstrate ability to work on teams
5. demonstrate understanding of ethical issues in their discipline
6. broaden their background with study in humanities and social sciences
7. and understand options to continue their education.

BS MET Program Outcomes

At the time of graduation, BS MET students will be able to:

1. apply engineering principles to complex technical problems
2. carry out a capstone engineering project involving design, testing, analysis, presentation, and reporting
3. demonstrate communication skills, oral, written, and visual, including a formal oral presentation
4. demonstrate ability to work on teams
5. demonstrate proficiency in the modern tools of the discipline
6. demonstrate understanding of ethical issues in their discipline
7. relate issues in diversity, and globalization to their discipline
8. understand options to continue their education.
9. and relate their education to problems in industry.

V. Assessment Plans

A. Assessment Plan for Program Early Career Objectives

AAS MET

Objective	Assessment Methods	Frequency	Responsible Person	Evaluation
1. complete higher degree	exit survey	annual	faculty teaching MECH 221	faculty, advisory board
	university grad survey	annual	Institutional Research	"
	MET recent graduate survey	annual	annual	"
2. find appropriate employment	exit survey	annual	faculty teaching MECH 221	"
	university grad survey	annual	Institutional Research	"
	MET recent graduate survey	annual	annual	"

BS MET

Objective	Assessment Methods	Frequency	Responsible Person	Evaluation
1. find appropriate employment	exit survey	annual	faculty teaching capstone	faculty, advisory board
	university grad survey	annual	Institutional Research	"
	MET recent graduate survey	annual	annual	"
2. further their education	exit survey	annual	faculty teaching capstone	"
	university grad survey	annual	Institutional Research	"
	MET recent graduate survey	annual	annual	"
3. advance	MET recent graduate survey	annual	annual	"

B. Program Outcome Assessment

Assessment of goals for graduates at time of graduation.

AAS MET					
Outcome	**ABET Criteria 2 (a-k)**	**Assessment Methods**	**Frequency**	**Responsible Person**	**Evaluation**
1. apply engineering principles	a, b, f	MECH 212 Kinematics exam	annual	instructor	instructor, faculty, report to Advisory Board
		MECH 222 Mach. Des. exam	annual	instructor	"
		MECH 223Thermo exam	annual	instructor	"
2. experimental study of a component	a, c, d, f	MECH 221 project	annual	instructor	"
3. communication skills	g	MECH 221 written report	annual	instructor	"
		MECH 221 oral report	annual	instructor	"
		MECH 223 written report	annual	instructor	"
4. teamwork	e	MECH 211 design project	annual	instructor	"
		MECH 221 labs	annual	instructor	"
		MECH 223 project	annual	instructor	"

AAS MET					
Outcome	**ABET Criteria 2 (a-k)**	**Assessment Methods**	**Frequency**	**Responsible Person**	**Evaluation**
5. ethics	i	MECH 111 assignment	annual	instructor	"
6. humanities and social science	j	standardized exam, Cultural Enrichment	biannually	University Gen. Ed. Coord.	faculty, adv. brd. review
		standardized exam,. Social Awareness	biannually	University Gen. Ed. Coord.	faculty, adv. brd. review
7. continue education	h, k	written exit survey	annual	MECH 221 instructor	instructor, faculty, report to Advisory Board
		registration records	annual	faculty	"
		MET recent graduates survey	annual	Institutional Research	faculty, adv. brd. review

BS MET					
Outcome	**ABET Criteria 2 (a-k)**	**Assessment Methods**	**Frequency**	**Responsible Person(s)**	**Evaluation**
1. complex technical problems	a, b, f	capstone project review	annual	faculty	instructor, faculty, report to Advisory Board
		indiv. capstone project review	annual	advisory board	Adv. Brd. report to faculty
		reduced EIT exam or other std exam	annual	faculty	instructor, faculty, report to Advisory Board
2. capstone project	a, b, c, d, f, g, i, j, k	capstone project review	annual	faculty	"
		focus group – advisory board	annual	advisory board chair	Adv. Brd. report to faculty
		capstone poster session evaluation	annual	advisory board	instructor, faculty, report to Advisory Board
3. communications	g	capstone oral presentation evaluation	annual	faculty	instructor, faculty, report to Advisory Board
		capstone report writing evaluation	annual	capstone instructor	"
		capstone report writing evaluation	annual	English instructor	"
		survey – exit – self-evaluation	annual	capstone instructor	"
4. teamwork	e	Senior Lab project – instructor evaluation	annual	instructor	"

BS MET					
Outcome	**ABET Criteria 2 (a-k)**	**Assessment Methods**	**Frequency**	**Responsible Person(s)**	**Evaluation**
		Senior Lab project – peer evaluation	annual	instructor	"
5. modern tools of discipline	b	capstone project review	annual	capstone instructor	"
		software use in Senior Lab	annual	instructor	"
6. ethics	i	eval. ethic chapter in capstone	annual	capstone instructor	"
		consider: report from ethics course SURE 331	annual	SURE 331 faculty	faculty and Adv. Brd. review
7. diversity and globalization	j	university standardized exams	biannual	university General Educ. Coordinator	faculty and Adv. Brd. review
		capstone project – chapter	annual	capstone instructor	
8. continue education	h	exit survey	annual	advisors	faculty and Adv. Brd. review
		alumni survey – university	annual	Institutional Research	"

BS MET					
Outcome	**ABET Criteria 2 (a-k)**	**Assessment Methods**	**Frequency**	**Responsible Person(s)**	**Evaluation**
		MET recent graduate survey	annual	faculty	"
9. industry experiences	a, e, g	employer evaluation	annual	internship instructor	"
		student evaluation of self and internship experience	annual	internship instructor	"
		focus group	annual	interns, faculty	"

VI. Evaluation

Evaluation (defined as the interpretation of assessment data) is indicated in a separate column in the table in section V. Assessment. In general, faculty will evaluate results during and at the end of each semester. Reports will be created. Results will be shared with the faculty as a group with an annual report to the Advisory Board at the fall Advisory Board meeting.

As warranted, program and course changes will be initiated by faculty following Advisory Board input.

VII. Course Outcomes and Assessment

Assessable outcomes are identified in each course and a report format established. These are attached.

VIII. Assessment Tools

(list of identified tools – some to be developed)

Assessment Area	**Assessment Tools**	**Status**
course assessments	exams, projects, presentation	currently used
oral communications	common rubric to be used throughout curriculum	to be developed
teamwork	common rubric	faculty have their own, common rubric needed
written reports – grammar, spelling	common rubric to be used throughout curriculum	to be developed
senior project report grade	rubric	Needs review against assessment needs.
exit survey – AASMET	written survey	Current survey has been in use for many years; updating for required outcomes needed
exit survey – AASMET	written survey	Current survey has been in use for many years; updating for required objectives and outcomes needed

Assessment Area	Assessment Tools	Status
alumni survey – MET program	mail survey	Current survey has been used periodically; updating for required objectives and outcomes needed. Consider alternate format.
alumni survey – employers	phone survey	Update for required objectives and outcomes
advisory board survey	written, used periodically	Update for required objectives, outcomes
ethics	rubric to use with chapter in senior project report	Consideration given to a rubric or other means for chapter in senior project reports.
diversity and globalization	standardized testing and rubric to assess chapter in senior project report "	Use university assessment. Create rubric for chapter in senior project reports.
industry exposure	surveys: employers, students advisory board input focus group: students, faculty	Review current surveys for meeting needed assessment.

IX. Status of the MET Continuous Improvement Plan

The above plan is a first draft. It has been created in a very short amount of time with the intend of getting a plan established and running by Fall 2004.

Recognized Strengths in the MET Continuous Improvement Process:

recognition of the benefits of continuous improvement planning

faculty willing to work together as a team

recent training in program objectives and outcomes writing (June 2004)

participation in ASEE Conferences (2003, 2004)

recent TAC/ABET program evaluator training (June 2003)

Recognized Weaknesses in the MET Continuous Improvement Process:

Course assessment: Rubrics and creative means of assessment are needed. Assessment is this area is expected to evolve.

Consistency: Inconsistencies and omissions in this plan will become evident as it is used.

Lack of input from Advisory Board: time and seasonal limits have not permitted meaningful dialogue as of this date.

X. Acknowledged Resources

www.abet.org: policies, case study, training programs, recent presentations

Rose-Hulman Course Outcomes Assessment Workshop (April)

Catalyst Project, (teamwork, problem-solving), Bucknell University (July)

ABET staff and volunteers

ASEE Conference proceedings – www.asee.org

SECTION 10

ENROLLMENT TRENDS

INTRODUCTION

Enrollment in the MET program(s) has increased markedly since the early 90s. In 1993-94, the official fall enrollment for the AAS MET program was 53 students. This fell to 49 students the following year. Official enrollment for Fall 2003 was 105.

Originally, the goal of the program was to have one section of first-year students and one section of second-year students. With a retention rate of 60 percent, this meant 25 students entered in the Fall term of the first year and 15 students continued into the Fall term of the second year.

Enrollments have shown a steady climb since the inception of the BS MET program.

Enrollment (AAS and BS) for the past 6 years is shown in the table below. All are on-campus students.

Fall	1999	2000	2001	2002	2003	2004
Enrollment	52	59	89	111	114	128

Retention in the programs has been good. Retention is discussed below.

The following analysis is updated from the ABET Self Study, Volume II, section VI.

AAS MET PROGRAM ENROLLMENT AND RETENTION DATA

The table below is based on key course enrollment in MET, i.e. enrollment in courses normally taken only by METs. The retention rate for 2nd semester is based on net Fall enrollment in MECH 111 during the previous semester. The retention rate for 3rd, and 4th semester courses is based on enrollment in MECH 111 during the Fall of the previous academic year.

Please note: Each row consists of a sequence of semesters. For example, for Fall 1997: Semesters 1, 2, 3, and 4 are: Fall 1997, Winter 1998, Fall 1998, Winter 1999.

Class Starting	Semester: / Course:	1 MECH 111	2 MECH 122	3 MECH 211	4 MECH 221	Graduates
Fall 1997		29	30	22	17	
	Pre-Tech:	4	6			
	Net from 1st year:	**25**	26	22	17	13
	% Retention (index)	**100%**	**104%**	**88%**	**68%**	**52%**
Fall 1998		21	19	22	21	
	Pre-Tech:	1	1			
	Net from 1st Year:	19	18	22	21	18
	% Retention (index):	**100%**	**95%**	**116%**	**111%**	**95%**
Fall 1999		21	18	18	14	
	Pre-Tech:	2	0			
	Net from 1st Year:	**18**	18	18	14	14
	% Retention (index)	**100%**	**100%**	**100%**	**78%**	**78%**
Fall 2000		30	25	25	24	
	Pre-Tech:	2	3			
	Net from 1st Year:	**28**	22	25	24	17
	% Retention (index)	**100%**	**79%**	**89%**	**86%**	**61%**
Fall 2001		36	37	31	26	
	Pre-Tech:	1	7			
	Net from 1st Year:	**35**	30	31	26	37
	% Retention (index):	**100%**	**86%**	**89%**	**74%**	**106%**
Fall 2002		33	25	35	32	
	Pre-Tech:	1	5			
	Net from 1st Year:	**32**	20	35	32	n.a.
	% Retention (index):	100%	63%	109%	100%	**n.a.**
Fall 2003		39	31	32		
	Pre-Tech:	10	5	2		
	Net from 1st Year:	**29**	26	30		
	% Retention (index):	100%	90%	103%		
Fall 2004		33				
	Pre-Tech:	0				
	Net from 1st Year:	**33**				
	% Retention (index):	100%				

AAS MET Program Average Enrollment and Retention Rates for Classes beginning in 1997 to 2001

Semester:	1	2	3	4	Grads
Average Enrollment:	27.4	22.9	26.1	22.3	19.8
Average % Retention:	100%	88%	99%	86%	78%

There are several causes for the retention rate exceeding 100% for some semesters. These include the effects of students repeating classes, of transfer students who are not required to take MECH 111, and lags caused by pre-technical students catching up and by part-time students. These factors account for some fluctuation. Overall, retention, as measured as stated, is good.

The varying graduation rate also reflects the many variables in this analysis mentioned above. Many students finish the core of their AAS degree after two years, but are missing a general education requirement or one of the early technical courses and do not receive their AAS degree. As they continue towards a bachelor degree, these students may take one to two years to work the needed classes into their schedules and apply for graduation. This creates fluctuation in the graduation data as well.

BS MET PROGRAM ENROLLMENT AND RETENTION DATA

The retention rate for semester 6 is based on the enrollment in MECH 330 during the previous semester. The retention rate for the 7th and 8th semester courses is based on enrollment in MECH 330 during the Fall of the previous academic year.

As in the previous chart, each row consists of a sequence of semesters. For example, for Fall 2001: Semesters 5, 6, 7, and 8 are: Fall 2001, Winter 2002, Fall 2002, Winter 2003.

Class Starting	Semester: Course:	5 MECH 330	6 MECH 390	7 MECH 421	8 PDET 499	Graduates
Fall 2001		14	14	12	12	
	Other majors:	0	0	0	0	
	Net from 1st Year:	**14**	14	12	12	2
	% Retention (index)	**100**	**100**	**86%**	**86%**	**14%**
Fall 2002		18	20	15	15	
	Other majors:	0	3	0		
	Net from 1st Year:	**18**	17	15	15	
	% Retention (index):	**100%**	**94%**	**83%**	**83%**	
Fall 2003		16	15	18		
	Other majors:	1	1	1		
	Net from 1st Year:	**15**	14	17		
	% Retention (index):	**100%**	**93%**	**113%**		
Fall 2004		22				
	Other majors:	1				
	Net from 1st Year:	**21**				
	% Retention (index):	**100%**				

*Other majors are juniors in Product Design Engineering Technology – many of whom intend to dual major in MET and PDET.

For the Fall 2001 to Winter 2003 four semester time period, the first cycle of juniors and seniors in the BSMET program, the average semester-to-semester enrollment and retention values are shown below. Of the 12 that were enrolled in the key courses listed above, only 2 completed all degree requirements by August 2003. The remaining students, in general, need to complete general education, math, or industrial internship courses to complete their degrees. With the exception of one who failed PDET 499, all are within one semester of completing their degree.

Please note again that the seemingly skewed retention numbers are caused by transfer students and/or students who are off-track.

BS MET Program Average Enrollment and Retention Rate 1997-2001

Semester:	5	6	7	8	Grads
Average Enrollment:	17.0	15.0	14.7	13.5	2.0
Average % Retention:	100%	96%	94%	85%	14%

SECTION 11

PROGRAM PRODUCTIVITY, PROGRAM COSTS, AND PROGRAM FUNDING

Program Productivity

Productivity in the MET program is very high. It is the highest in the College of Technology and higher than the FSU mean.

Note that the productivity of the Mechanical Design Department, which included CDTD (CAD Drafting Tool Design) and PDET (Product Design) is lower.

Table 11.1 Faculty Productivity
COLLEGE OF TECHNOLOGY Productivity, SCH/FTEF, AY 2002-2003

By Course Prefix:

MECH	**591.20**
MATL	577.00
PHOT	546.00
CONM	532.56
ETEC	**528.25**
AHEM	487.08
MFGE	460.85
BCTM	458.99
FSU	*439.43*
PDET	416.33
HVAC	375.81
HSET	370.73
ABOD	350.98
COT	*342.87*
EEET	341.58
WELD	337.46
PLTS	328.55
CDTD	303.76
SURE	296.46
AUTO	290.69
ARCH	275.67
HEQT	273.52
ECNS	269.71
MFGT	268.51
FMAN	242.39
PTEC	241.65
CETM	205.26
RUBR	186.38
PMGT	156.37

By Department:

CTMG	491.02
FSU	439.43
MDSN	433.10
MFGE	384.89
HVAC	375.81
COT	*342.87*
WELD	337.46
AUTO	330.51
EECN	326.61
PLRU	298.11
SURE	296.46
HEET	294.60
ATFM	264.37
PDGI	227.70

NMPP 129.26

Program Costs

The most recent data comes from "Degree Program Costs, 2001-2002" from Institutional Research. The report contains the following:

Table 11.2 Program Costs

Group	Total Average Cost per SCH ($)	Comparative Group	Total Average Cost per SCH ($)
FSU	205.71		
College of Technology	226.96	All Colleges	158.08 to 612.85
Mechanical Design Department	**185.16**	All Departments in C.O.T.	**185.16** to 258.05
AAS, Mechanical Engineering Technology	**162.96**	All AAS Programs in C.O.T.	**162.96** to 325.48
BS, Mechanical Engineering Technology	**161.47**	All BS Programs in C.O.T.	**161.47** to 267.04

*Note that the cost for the BS MET program used estimates for MECH 393, MECH 421, and MECH 440 as these courses had not been taught. This estimated cost was $217/SCH.

The cost for the BS MET may change once the last three courses are included in the calculation.

As can be seen, the costs of the MET programs are very low.

College of Technology Funding

The table below is based in Fall 2003 enrollments and FY 03 budgets.

Please note the following:

- In some departments, there is a budget for each program. Other departments have a single budget for all programs. In the Mechanical Design Department, each program has its own budget (Product Design PDET, Mechanical Engineering Technology MECH, and CAD Drafting Tool Design CDTD).
- Enrollments: Enrollment in the Mech. Eng. Tech. program matches or exceeds the total enrollment in 6 of the 12 departments. These include ATFM, HEQ, MFG, G ARTS, SURV, WELD.
- Note the S&E budgets for these departments with the same or fewer students range from $28,087 (HEQ) to $50,979 (MFG). These budgets are many times that provided for MET ($9,936) – again, for the same number, or fewer students.
- An FSU-GR Incentive Fund allocation of $3,333 is shown for FY03 for the MET program. This amount is not guaranteed – and is higher than average.
- The last column provides an "allocation per student" comparison. The student count used includes all on-campus students plus 0.5 times the number of off-campus students enrolled in each program. The 0.5 multiplier is used to reflect the part-time nature of off-campus students.
- Figure 11.1 provides a graphic illustration of the "allocation per student" comparison. MECH again is the lowest. with Product design being very close.

Table 11.3 S&E budgeting per Student and (S&E plus FSU-GR Incentive Funds) per Student

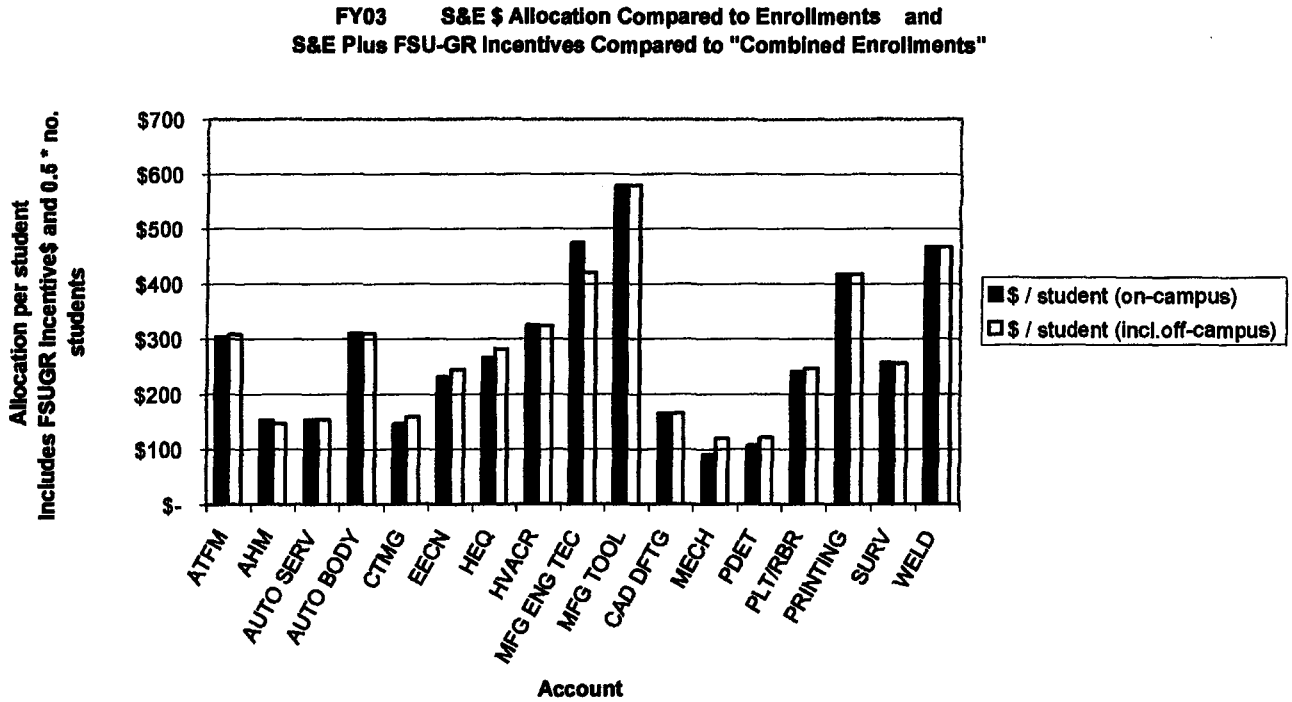
Dept	Budget (Department or Program)	FY03 S&E	FY03 FSU_GR Incentive Funds	F '02 Enroll. On-Campus	F '02 Enroll Off-Campus	Total Enroll. Combined (Note 1.)	$ Per Student on-campus (Note 2.)	$ Per Student incl. off-campus (Note 3.)
ATFM	ATFM	$ 32,519	$ 2,544	107	14	114.0	$ 304	$ 308
AUTO	AHM	$ 14,631		96	9	100.5	$ 152	$ 146
	AUTO SERV	$ 33,631		220		220.0	$ 153	$ 153
	AUTO BODY	$ 12,389		40		40.0	$ 310	$ 310
CTMG	CTMG	$ 42,599	$ 5,267	292	22	303.0	$ 146	$ 158
EECN	EECN	$ 37,232	$ 2,232	161	1	161.5	$ 231	$ 244
HEQ	HEQ	$ 28,087	$ 1,726	106		106.0	$ 265	$ 281
HVACR	HVACR	$ 46,643	$ 119	144	1	144.5	$ 324	$ 324
MFG	MFG ENG TEC	$ 18,024	$ 19,343	38	102	89.0	$ 474	$ 420
	MFG TOOL	$ 32,955		57		57.0	$ 578	$ 578
MDSN	CAD DFTG	$ 12,485		76		76.0	$ 164	$ 164
	MECH ENG TECH	**$ 9,936**	**$ 3,333**	**111**		**111.0**	**$ 90**	**$ 120**
	PDET	$ 5,402	$ 3,080	51	38	70.0	$ 106	$ 121
PLT/RBR	PLT/RBR	$ 57,751	$ 1,205	240		240.0	$ 241	$ 246
GR ARTS	PRINTING	$ 43,335		104		104.0	$ 417	$ 417
SURV	SURV	$ 28,119		110		110.0	$ 256	$ 256
WELD	WELD	$ 50,899		109		109.0	$ 467	$ 467
							$ 275	$ 277
		from intranet	from COT	from fact book				

Note 1. Total Enrollment: On-campus + 0.5 * off-campus count is used here to reflect the part-time nature of off-campus students.

Note 2 S & E per student on-campus uses S & E budget divided by on-campus enrollment.

Note 3. This column represents (S & E + FSU-GR Incentive Funds) divided by (on-campus + 0.5 * off-campus enrollments.

Figure 11.1 Allocation per Student, FY03, COT.



Use of S&E funds: The disparity demonstrated above allows some programs to:

- spend over $1000 on a single software license for faculty to try out
- spend $3-4,000 for computer projectors – nearly half of the budget for MET
- purchase new faculty computers on a regular basis in some program/departments (e.g. $3000 for laptops with docking stations). MET has purchased one faculty computer in the past 5 years and one 3-in-1 printer.
- provide substantial faculty development is funded with S&E in some programs/departments. Grants and donations fund such travel for MET faculty.
- pay for professional dues, subscriptions, books are purchased for faculty in some areas.

Summary

There are serious discrepancies in program funding.

Faculty per Student

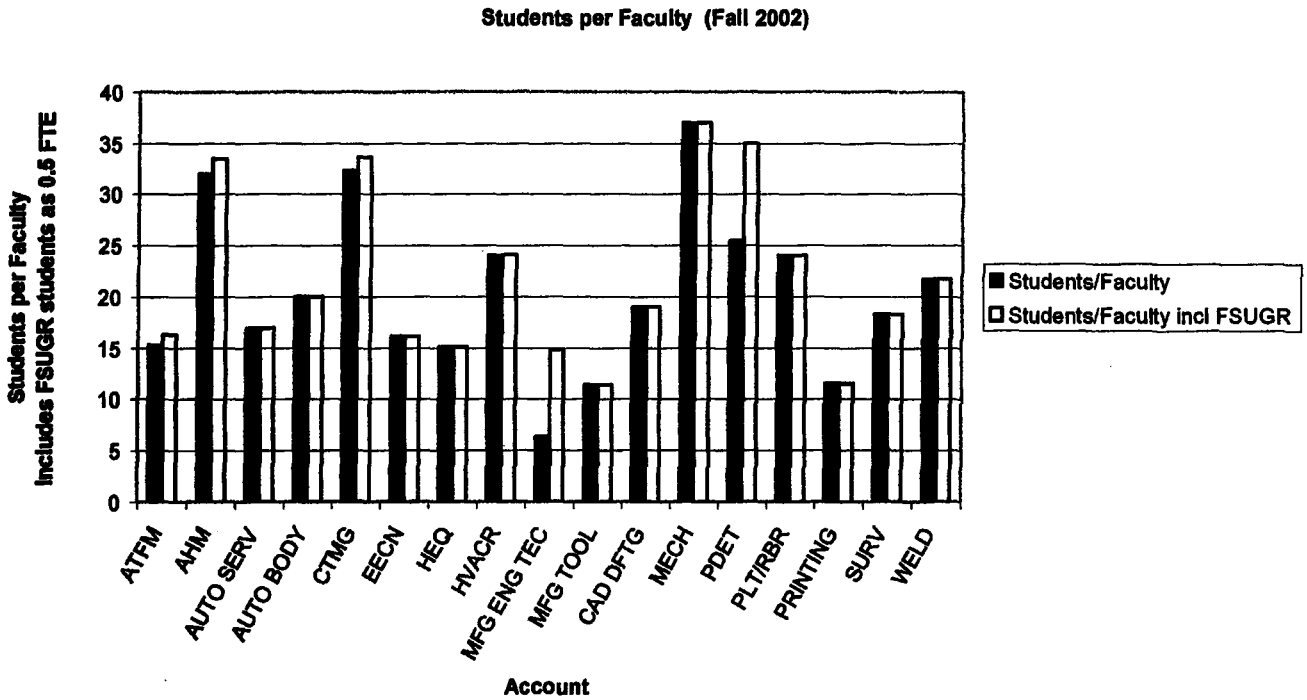
The table below provides a comparison of the number of students enrolled in programs or departments to the number of faculty assigned. Note the release time has not been included – and significantly affects the MET program. (3 faculty – 0.75 release time = 2.25 faculty). Again, this is not reflected in the table.

Figure 11.2 provided a graphic illustration of program students per faculty.

Table 11.3. Student/Faculty Ratios

Dept	Budget (Department or Program)	No. Faculty Ignoring Adjuncts and Release Time	Students/Faculty On-Campus	Students/Faculty incl on campus + 0.5 * Off-Campus
ATFM	ATFM	7	15	16
AUTO	AHM	3	32	34
AUTO	AUTO SERV	13	17	17
AUTO	AUTO BODY	2	20	20
CTMG	CTMG	9	32	34
EECN	EECN	10	16	16
HEQ	HEQ	7	15	15
HVACR	HVACR	6	24	24
MFG	MFG ENG TEC	6	6	15
MFG	MFG TOOL	5	11	11
MDSN	CAD DFTG	4	19	19
MDSN	**MECH ENG TECH**	**3**	**37**	**37**
MDSN	PDET	2	26	35
PLT/RBR	PLT/RBR	10	24	24
G ARTS	PRINTING	9	12	12
SURV	SURV	6	18	18
WELD	WELD	5	22	22

Figure 11.2 Student/Faculty Ratios.



The data clearly shows that the MET program is at the highest student to faculty ratio for the College

Other Comparisons

a. Staff Support

Staff support for the MET program consists of 1/6th of a secretary. This compares to ½ to 1 secretary for the 6 departments mentioned above. While no summary table is presented here, it is noted that at least one of these departments has a full time technician along with a full time technician ((HEQ), one has a total of 1.9 supplementary staff persons – including a 9 month clerk to dispense equipment (SURE), others have one-half time technician. Some of the slightly larger departments have quite a bit of supplemental help: HVACR has 5 supplementary people, Automotive has 3 supplemental people plus twice as much faculty release time as other departments.

b. Faculty Chair Release Time

Background: The COT reorganization that started in Fall 2000 created 12 departments with 11 department chairs (faculty) and one department head. This was later changed to 12 department chairs. This reorganization created departments, with a 0.75 release time chair, that focused on only one program: Heavy Equipment, Surveying, and Welding are clearly in this category. Departments with very similar programs – or one main program – include: Construction Management, Plastics/Rubber, and Graphic Arts (Printing). Others have no more than two programs with exception of Automotive with three programs and Mechanical Design with three programs.

Result: This arrangement, objected to by Mechanical Design faculty from the onset, provided substantial faculty release time support the single-program areas - while those programs in the Mechanical Design Department at best splitting the 0.75 FTE release time between three programs. (Note that the Automotive Department has three programs as well, but, in addition to the chair, there are three faculty with 0.25 FTE release time as program coordinators.

Single program departments also are at an advantage with publicity and ease of prospective students finding their programs.

c. Student Wage Support

These monies are awarded to select departments each year. Mechanical Engineering Technology has been able to get "leftover" funds at the end of the Fiscal year several times recently, but has not been able to obtain student wage funding for lab support. Work-study grant students have been used, when available, with limited success. Student wages go to other program areas in the college.

Summary

Please note that all of the above are good programs that are consistent with the mission of the college and university.

Documentation is provided here to show that there is simply a large disparity in program support that should be addressed.

SECTION 12

CONCLUSIONS

The Associate and Bachelor degrees are discussed together due to their overlap.

Strengths

1. The implementation of the BS degree in Mechanical Engineering Technology in the 2001-2002 academic year was a significant improvement to the program. This has not only provided a path for AAS students to continue their studies in MET but has also been a chief reason for an increase in AAS student enrollment. This puts Ferris on par with other universities in Michigan that offer the MET program, such as Michigan Tech, Central Michigan, Eastern Michigan, Northern Michigan, Wayne State, and Lawrence Tech.

2. Successful ABET accreditation for both the AAS and BS degrees is attractive to potential students, benefits our graduates, and increases Ferris' reputation among employers. By securing accreditation by ABET, the MET program at Ferris joins a unique group of 240 ABET accredited engineering technology programs (many disciplines) nationwide. With its well-qualified and experienced faculty and in spite of the limited laboratory facilities, the program has established a strong position in technical education. Industry in Michigan increasingly looks to MET graduates as valuable employees.

3. The MET program provides the hands-on technical education central to the University's stated mission. Its graduates have productive careers in industry. Significant numbers of graduates are moving into leadership positions.

4. Services to state and nation are provided by MET alumni, faculty and students. The program provides service by generating a supply of well-educated and trained engineering technologists. Graduates are advancing into industrial leadership positions and are helping build and improve the industrial base.

5. The MET program admits first-year students each Fall semester. Transfer students may begin their studies at Ferris any semester, and are handled on a case-by-case basis. Typical first-year enrollment is in the 35-45 range. There exists a network of former students, relatives, friends, employers, and co-workers that spread the word about the value of the MET program at Ferris. Many of the students arrive with clear educational goals. The MET program often is the key element in their plans.

6. There are a number of elements involved that promote the quality of the instruction for MET students. These include factors relating to curriculum, laboratories, faculty, and other resources of the College of Technology and the University.

   The curriculum meets national standards set by ABET in coordination with the American Society of Mechanical Engineers (ASME). These standards are regularly reviewed and updated. The program undergoes periodic reviews to insure that these standards and criteria continue to be met.

The MET laboratories permit the student to enhance their classroom experiences via hands-on learning and through use of industry-standard computer software. They explore technical applications of applied science with solids, liquids, gases, and electricity. They learn to work together as teams. They are expected to prepare laboratory reports. For their capstone projects, they make both oral and written presentations.

The MET faculty are well-qualified. Present and past program faculty have had more than ten years of industrial experience. Their academic credentials meet ABET standards.

The College of Technology provides computer resources which are available to all students. These have become an important part of the MET program course work. A recent survey of computer usage and software in use by other engineering technology programs shows that the Ferris MET program is on par with its use of AutoCAD, Excel, LabView, and other engineering specific software.

7. Labor market studies show a steady demand in Michigan for engineering technologists. These graduates provide the technical talent necessary for the capital goods industries in Michigan and in the Midwest. Recent on-campus job fairs bear this out.

8. The MET program offers service courses for a number of other programs. These include;

Electrical and Electronic Engineering Technology BS	(electives in MET)
Manufacturing Engineering Technology BS degree	(MECH 340)
Plastics Technology AAS degree	(MECH 340, MECH 250)
Plastics Engineering Technology	(MECH 340, MECH 250)
Welding Engineering Technology	(MECH 340)
Most technology programs in the COT	(ETEC 140)

These support courses serve as essential components of these programs.

9. The campus laboratory facilities available to MET students include the following:

Machine shop	(MFGT 150)
Computer labs	(ETEC 140, MECH 122)
Chemistry labs	(CHEM 114)
Physics labs	(PHYS 211, PHYS 212)
Fluid mechanics laboratory	(MECH 211, MECH 421)
Mechanical measurements laboratory	(MECH 221, MECH 421)
Electrical and electronics laboratory	(EEET 201)

These laboratories provide an excellent hands-on experience for the student. The lab activities complement and enhance the course textbook and lecture material.

10. The MET program has been fortunate on occasion to qualify for vocational-technical education funds and College of Technology/Academic Affairs one-time funding.

11. The FLITE library resources are adequate for the MET program. The MET program liaison librarian periodically forwards lists of possible titles to faculty. The liaison assists with senior projects, including training and assistance with patent searches. The liaison

along with the Systems and Operations Department head were of great assistance in preparation for and during the ABET accreditation visit to the university in October 2003.

Limitations

1. The MET program has low visibility since it is included in a department with two other programs (Product Design Engineering Technology and CAD Drafting Tool Design). This program arrangement in the College of Technology makes some programs very visible, with an accompanying increase in S&E funding for the more visible programs. The MET program suffers in this respect.

2. Faculty resources are tight. Overloads leave little time for anything else, such as professional development or publishing in professional journals. The MET program budget does not allow for faculty development or equipment replacement/repair.

3. Funding continues to be a problem. Although the MET labs have received significant support in the past, there remain problems in this area. The University and College of Technology do not have in place a regular budget for equipment repair and replacement. They also do not regularly budget for capital equipment acquisition.

4. The S&E budget given to the MET program is paltry relative to that given to other COT programs. There are serious discrepancies in program funding within the College of Technology which must be addressed.

5. Even with the advent of the BS MET program, there was no increase in program resources from the College of Technology or Academic Affairs.

6. There is very limited technical support for the MET program. There is no full-time technician to set-up or repair laboratory equipment. Assistance has been provided by the EET/CNS and Manufacturing technicians, but they are very busy and not generally available to serve other programs. Most of these needs are handled by MET faculty and student workers.

7. Program specific marketing is lacking. This again references the lack of faculty time due to overloads. Given adequate time to prepare program marketing brochures and make personal visits to high school and career centers, enrollment in the MET program would flourish.

8. Laboratory space is severely limited, as noted by the ABET accreditation team. This is especially true for senior capstone projects, which require much larger space to accommodate industry-type projects. The MET faculty this past year attempted to obtain additional space in Swan Building, but were unsuccessful.

9. Computer projectors are not readily available in most classrooms used by MET faculty. Using new teaching technologies is at best an inconvenient endeavor.

SECTION 13

RECOMMENDATIONS

The Associate and Bachelor degrees are discussed together due to their overlap.

1. More laboratory space is needed. The current space is adequate for small projects, but more space is needed to enable the program to support larger and more relevant industrial-type projects (this was cited by the ABET accreditation team as a 'concern'). Projects of a larger magnitude are necessary for FSU to compete with other universities for prospective students. More space is crucial if the program is to grow in enrollment and stature among employers. This will require administration support.

2. The College of Technology needs to re-examine its S&E funding practice to ensure that funds are distributed on an equitable basis throughout the twelve departments of the COT. At present, departments in which enrollment is decreasing are awarded the same S&E budgets as in the past, while programs that are growing are also awarded the same S&E budgets as in the past. The MET program added the BS degree, and received no additional S&E funds.

3. Greater resources are required to obtain new equipment for the Mechanical Engineering Laboratory, which will enhance the students training and experience in the lab. Possible sources include an increase in S&E allowance, one-time FSU dollars (the program was unsuccessful this year in obtaining this funding), Voc-ed funds, and industrial donations. Specific needs will also be communicated to the MET Industrial Advisory Board.

4. One additional faculty member is needed to alleviate the overload on the current faculty and the need each Fall semester for a "full-time" adjunct. This adjunct position is quite difficult to fill given the geographical location of Ferris and the lack of technical talent in the Big Rapids area.

5. A replacement plan for faculty and laboratory computers which are capable of running the newest software. This will result in increased exposure of our students to the latest software being used in industry.

6. For the senior capstone project in the BS program, further efforts are necessary to clearly differentiate the types of projects undertaken by Mechanical Engineering Technology students and those done by the Product Design Engineering Technology students. Students in both programs currently take PDET 499 which is inadequate for the MET students. A MECH 499 course needs to be implemented to complete the division of the degrees.

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

August 10, 2004

Charles A. Matrosic
Interim Dean
College of Technology
Johnson Hall 200
Ferris State University
1009 Campus Drive
Big Rapids MI 49307

Dear Dr. Matrosic:

The Technology Accreditation Commission (TAC) of the Accreditation Board for Engineering and Technology (ABET) recently held its 2004 Summer Meeting to act on the program evaluations conducted during 2003-2004. Each evaluation was summarized in a report to the Commission and was considered by the full Commission before a vote was taken on the accreditation action. The results of the evaluation for Ferris State University are included in the enclosed Summary of Accreditation Actions. The Final Statement to your institution that discusses the findings on which each action was based is also enclosed.

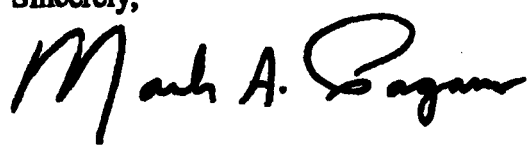
The policy of ABET is to grant accreditation for a limited number of years, not to exceed six, in all cases. The period of accreditation is not an indication of program quality. Any restriction of the period of accreditation is based upon conditions indicating that compliance with the applicable accreditation criteria must be strengthened. Continuation of accreditation beyond the time specified requires a reevaluation of the program at the request of the institution as noted in the accreditation action. ABET policy prohibits public disclosure of the period for which a program is accredited. For further guidance concerning the public release of accreditation information, please refer to Section II.L. of the enclosed *2004-2005 Accreditation Policy and Procedure Manual.*

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

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

Please note that appeals are allowed only in the case of *Not to Accredit* actions. Also, such appeals may be based only on the conditions stated in Section II.G.7. of the *2004-2005 Accreditation Policy and Procedure Manual.*

Sincerely,



Mark A. Pagano, Chair
Technology Accreditation Commission

Enclosures: Summary of Accreditation Actions
Final Statement
2004-2005 Accreditation Policy and Procedure Manual

cc: David Eisler, President
Michael A. Robinson, Visit Team Chair

AUTHORITY: PL 105-332 COMPLETION: Voluntary (Consideration for funding will be possible only if form is returned).	Michigan Department of Career Development Office of Postsecondary Services COMMUNITY COLLEGE SERVICES UNIT 201 N. Washington Square - Victor Building - 4th Floor Lansing, Michigan 48913	Direct questions regarding this form to the Community College Services Unit, (517) 373-3360.

COMMUNITY COLLEGE SUMMARY REPORT FOR SELF-STUDY EVALUATION OF OCCUPATIONAL PROGRAMS

July 1, 2002 through June 30, 2003

SUBMITTING EDUCATIONAL AGENCY	College: **Ferris State University**	Date: **February 17, 2003**
	Contact Person: **Thomas E. Oldfield**	
	Title: **Interim Vice President for Academic Affairs**	
	Telephone: **231 591 2553**	Fax: **231 591 3592**
	E-Mail: **Thomas_E_Oldfield@ferris.edu**	

GENERAL INSTRUCTIONS

- This report is available on the internet at http://www.michigancc.net>On-Line Documents>Perkins>Final Reports>FY03 Self-Study Evaluation.
- **Complete this Summary Report using the form provided for EACH occupational program to be reviewed according to the college evaluation schedule.** Exception: In special circumstances similar programs with different CIP codes may be evaluated together, however separate demographic pages (1 and 2 of 6) must be completed for each program. Submit it as the program evaluation is completed, but no later than June 30, 2003. **DO NOT SUBMIT COPIES OF COMPLETED SURVEY INSTRUMENTS.**
- A complete copy of the total evaluation document for **EACH** program must be kept on file at the college. This document may be requested at a later date for state or federal audit purposes. Specific definitions, guidelines, program components, and reporting requirements related to this Summary Report are found in Section 5.0 of the Dean's Guide to Federally Reimbursed Community College Occupational and Technical Education Programs.

CIP CODE (6 DIGIT) **15.0805**	LEVEL(s) **2**
PROGRAM NAME(S) **Mechanical Engineering Technology (A.A.S.)**	

PART I. SUMMARY REPORT FORMAT

The following data and comments are recorded to summarize the results of the college Self-Study Evaluation. Refer to the *Dictionary of Community College Terminology* on the website http://www.michigancc.net/old/ref/ for definitions.

A. **PROGRAM ENROLLMENT** (Previous Three-Year Figures)

YEAR	UNDUPLICATED HEADCOUNT	STUDENT CREDIT HOURS FOR SPECIALTY COURSES	STUDENT CONTACT HOURS
2001-2002	77	1,250	1,415
2000-2001	59	1,134	1,198
1999-2000	52	1,067	1,153

B. PROGRAM GRADUATES & PLACEMENT DATA (Previous Three-Year Figures)

YEAR	# of Awards Conferred	# Students That Received at Least one Award	# Employed	# Continuing Education	# Entering Military
2001-2002	17	17	0	17	0
2000-2001	14	14	0	14	0
1999-2000	18	18	15 est.	3 est.	0 est.

*If a student is employed and attending school, default to report the student as employed.

C. PERKINS III CORE PERFORMANCE INDICATORS FY 2001-2002

CORE INDICATOR	2001-2002 Performance Levels		
	State Performance Level Expected	College	Program
1P1A: % occupational concentrators who receive GPA of 2.0 or better in academic courses taken during 2000-2001	78.22%	81.24 %	66.67%
1P2A% occupational concentrators who received of 2.0 or better in occupational specialty courses taken during 2000-2001	84.60%	81.98 %	68.67%
2P1A: % of first-time, full-time degree-seeking occupational students who entered Fall 1999 and who received an award by August 20, 2002	16.55%	26.22%	20.00%
3P1: % 2000-2001 completers who responded to the 2001-2002 Follow-up survey and reported being employed, entering military service, or continuing their education within 180 days of graduation.	91.01%	100.00	100.00%
3P2: % who reported being employed and who were still employed 3 months later.	87.73%	98.74%	100.00%
4P1: % men and women enrolled in programs considered nontraditional for their gender as compared to total enrollment in nontraditional Programs	18.24%	9.26%	7.7%
4P2: % men and women who received awards in programs considered non-traditional for their gender as compared to total students that received an award in nontraditional programs	13.50%	8.99%	5.88%

D. DATA ANALYSIS. Provide a brief analysis of your data and explain what ramifications these data have for program improvement, especially in the areas of the Perkins Core Indicators.

The analysis suggests that students have more than average academic difficulty. This may be in part due to the inclusion of pre-technical students in the study. The problems may occur mostly during the first year when students take courses such as pre-calculus and physics – and become discouraged. While courses in the program are challenging, very few students fall below a 2.00 or fail courses in the Mechanical Engineering Technology program during their second year.

The universities efforts to increase retention should benefit students in this program.

E-1. SUMMARY OF EVALUATION PERCEPTIONS BY ADMINISTRATORS AND FACULTY

COMMENTS:

Number of Administrators and Faculty Participating: 5

A copy of the questionnaire plus a summary of the faculty survey results appears in the appendix along with question specific comments. The full statistical analysis on the survey is available on request.

The faculty survey suggests strengths in the following areas:

- The programs objectives and outcomes are well defined.
- The program adheres to high academic standards. It uses and meets the standards set forth by the Technology Accreditation Commission of the Accreditation Board for Engineering and Technology (TAC/ABET).
- Admissions are open to those who qualify based on demonstrated academic ability.
- The program, with extensive assistance from the Disabilities Services Office, supports students with special needs – and has had successful outcomes.
- Academic advisors for the program are informed and available.
- Administrators for the program are well qualified.
- Faculty staffing is adequate and faculty qualifications are excellent for the MET program.
- Scheduling of labs and classroom areas works well.
- Focus in the program is on real, practical applications. Faculty bring work experience to the classroom to support this.

The survey suggests the following weaknesses and concerns:

- Faculty are not generally aware of central planning within the college.
- Faculty feel that the program is not marketed adequately – that information on its value to students is not well known.
- Lab space is tight.
- There is no built-in budget for equipment replacement, repair, or acquisition. This includes computers for student labs as well as faculty. Very little funds for travel are allowed for this program.
- The program needs to better utilize outside sources of funds and equipment – by making better use of its advisory board, grants, and other sources.

RECOMMENDATIONS:

Conclusions:

The faculty in the program will continue to hold to high standards and to maintain the practical application nature of the ASMET program.

The faculty will pursue additional space for labs and sources of lab equipment including private donations, grants, and internal funding.

E-2. SUMMARY OF EVALUATION PERCEPTIONS BY STUDENTS

COMMENTS:

Number of Students Participating: 51

A copy of the questionnaire plus a summary of the student survey results appears in the appendix along with question specific comments. The full statistical analysis on the student survey is available on request.

The student survey suggested the following strengths:

- Satisfaction with scheduling issues.
- Course objectives are presented and are clear.
- Instructors are knowledgeable and are available for help.
- Labs and lecture rooms are safe, maintained, and functional.
- Lab equipment is in good condition and is safe.

The student survey showed the following areas of concern:

- Work experience in the local area is not readily available.
- Students are not aware of university job placement services.
- Lab space can be crowded.

RECOMMENDATIONS:

Conclusions:

Overall, it appears that the students are satisfied with the program. Most continue towards B.S. degrees – and thus, during their first two years, are not especially aware of the services of the universities Career Services Office. Many do use the Job Fair and an industrial internship as required in the B.S. Mechanical Engineering Technology program.

The students' lab space concern is shared by faculty and others familiar with the program.

E-3. SUMMARY OF EVALUATION PERCEPTIONS BY ADVISORY COMMITTEE MEMBERS

COMMENTS:

Number of Advisory Committee Members Participating: 5

A copy of the questionnaire plus a summary of the advisory board survey results appears in the appendix along with question specific comments. The full statistical analysis on the survey is available on request.

Responses to the three specific questions on the advisory committee survey are included below.

1. What are the major strengths of the college's occupational program in your field(s)?

- The students leave this program with a very good understanding of engineering fundamentals.
- Project work. Focus on "hands on" problem-solving approach. Good engineering fundamentals. Dedicated instructors. Smaller class size allows 1 on 1 time with students.
- The college provides very practical teaching that applies directly to the day to day needs of a person beginning a career in engineering, while providing a broad, firm foundation in the basics of which a gradate can build a successful career.
- In addition, the college has strived hard to keep pace with the ever-changing technology, which is a fast moving target.
- Hands-on training to the students. Highly enthusiastic teaching staff.
- Material content is well chosen.

2. What are the major needs for improvement in the college's occupational program in your field(s)?

- I am not currently aware of any major deficiencies.
- Lab facilities upgrades and new lab equipment.
- Development of a 4 year Mechanical Engineering program.
- Constant review of curriculum to strike balance between basics/fundamentals and adaptation of new technology.
- Dangerous to teach students only how to run one brand of software in lieu of real understanding, because one becomes obsolete and one does not.
- Provide students more access to real jobs/engineers in industry.
- More up-to-date laboratory, computer and teaching material.
- Not a "major" need, but additional communication-related studies are encouraged.

3. Do you have additional comments or suggestions for the program or for utilization of the advisory committee? If so, please state briefly.

- During the last couple of years, our focus has been on overall course structure for a four-year program. With this complete, perhaps our next focus should be to dig into the core classes to advise on their content and practical application.
- Continue to evolve the program to keep pace with changing jobs/technologies in business.
- Keep students apprised of the types of opportunities available with their education.
- The program is an excellent program, but is always in need of improvement.
- Changes in facilities and classrooms have definitely been a change for the positive.
- Additional tools, test equipment, lab equipment and software necessary to keep pace with constantly changing industry. Should have a yearly budget with some discretionary funds for instructors.
- The allocation of studies according to the allotted time is a good compromise.

RECOMMENDATIONS:

The Advisory Board strongly feels that the course content and expectations of the curriculum are high. The board strongly supports continuous review and improvement through such activities as accreditation. More contact with persons working in their field in industry is strongly recommended. Additionally, the board feels that lab equipment needs upgrading as well as the lab space.

F. COMMUNITY COLLEGE ACTION PLAN

(Include comments on goals and objectives, timelines and resources. Use additional sheets if necessary. Include actions required to increase low performance in any of the Core Indicators. See Section 3.2 for Review Criteria)

Goals/Objectives: (please be concise)

The Mechanical Engineering Technology program seeks to provide a stimulating learning environment to prepare students for the broad array of technical careers associated with the discipline

AAS MET graduates will be able to:

a. apply mathematical and physical principles to the solution of technological problems
b. design mechanical components and machines
c. apply principles of fluid mechanics, fluid power and thermodynamics
d. specify material selection and processing
e. perform engineering tests for such quantities as stress, strain, torque, pressure and temperature
f. collect test data
g. prepare technical reports
h. use computers to prepare reports, reduce data, and assist with presentations
i. use the principles of electricity to solve circuit problems involving basic circuit problems and become familiar with basic electrical and electrical components
j. make and interpret engineering drawings including the use of CAD
k. specify basic machining processes
l. develop written and verbal communication skills
m. obtain breadth in their education through the study of humanities and behavioral sciences.

Labs, tutoring, and the structured learning assistance program are used to upgrade student performance.

Future goals of the M.E.T. program include:

- increased emphasis in the areas of sensors, data acquisition, and controls.
- Improvement of facilities to permit more and better student projects
- Increased contact with industry
- Increased marketing of the M.E.T. program.

Timelines: (including anticipated completion date)

The increased emphasis on sensors and controls has begun with the acquisition of updated pneumatic and hydraulic trainers. The program will use university advancement and other resources to obtain additional needed equipment in this area.

The Fluid Power/Fluid Mechanics Lab was updated in the past year with the removal of residual chemistry lab benches and fume hoods. Additional space has been requested as part of upcoming reallocation opportunities (FY2004) as well as being part of the proposed Swan Technical Building remodeling project. The latter, should it be funded, is several years away.

Faculty will attempt to increase filed trips and bring in several outside speakers/visitors in the coming year to increase industry exposure for students.

The College of Technology has just been assigned a recruiting specialist whom faculty will work with in the coming year to increase enrollment.

Resources: (materials and staff, etc.)

As discussed above, the program is in need of funds/donations for equipment needs as well as supplemental space for labs and projects.

NOTE: ***THIS DOES NOT CONSTITUTE THE FINAL NARRATIVE REPORT OR THE FINAL EXPENDITURE REPORT FOR THE EVALUATION ACTIVITY.***

CERTIFICATION

I certify that the information submitted on this report is accurate and complete to the best of my knowledge.

PRESIDENT'S SIGNATURE _____ DATE _____
(Signature)

PROJECT EVALUATOR _____ DATE _____
(Signature)

OCCUPATIONAL EDUCATION
CONTACT PERSON _____ DATE _____
(Signature)

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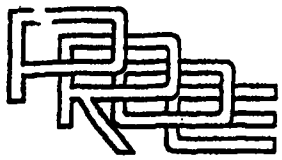

COLLEGE_____

FACULTY PERCEPTIONS OF OCCUPATIONAL EDUCATION PROGRAMS

INSTRUCTIONS TO RESPONDENTS

On the following pages you are asked to give your perceptions of your occupational program (such as registered nursing, automotive technology, secretarial science). The items you are asked to rate are grouped into the major components of the Program Review in Occupational Education (PROE) system, namely:

- Goals and Objectives
- Processes
- Resources

Rate each item by checking your best judgment on a five point scale ranging from poor to excellent. Only check one answer per item. A "Don't Know" column has been provided in the event you really don't have sufficient information to rate an item. Space has been provided for you to note comments that may help to clarify your ratings or to indicate modifications of a standard to make it more relevant for your program.

Criteria for excellent and poor ratings are provided for each item. *Excellent* represents a nearly ideal or exemplary situation; *poor,* one of serious inadequacy. As a guide, ratings may be made with the following in mind:

EXCELLENT means ideal, top 5 to 10%
GOOD is a strong rating, top 1/3rd
ACCEPTABLE is average, the middle 1/3rd
BELOW EXPECTATIONS is only fair, bottom 1/3rd
POOR is seriously inadequate, bottom 5 to 10%

This form may be completed as a *consensus* evaluation by the principal persons involved with a specific occupational program. Examples of such persons would be instructors, department or division chairpersons, program coordinators, and administrators such as occupational dean. If preferred, respondents may complete individual forms.

To help with tabulation of responses, please provide the information requested below before completing your rating.

'ROGRAM TITLE_____ USOE CODE #___ ___.___ ___ ___ ___ ___ ___

'ERSONS PARTICIPATING IN CONSENSUS EVALUATION OR INDIVIDUAL COMPLETING THIS FORM:

ame_____ Title _____

_____ _____

_____ _____

_____ _____

_____ _____

anks for your cooperation!

PROE

FACULTY PERCEPTIONS OF OCCUPATIONAL EDUCATION PROGRAMS

		Keypunch Instructions	Poor 1	Below Expectations 2	Acceptable 3	Good 4	Excellent 5	Don't Know	COMMENTS (Please note explanatory remarks or needs for improvement)
GOALS AND OBJECTIVES									
1. Participation in Development of College Occupational Education Program Plan *Excellent*—Administrators and/or other supervisory personnel involved in developing and revising the college plan for this occupational program seek and respond to faculty, student and community input. *Poor*—Development of the plan for this program is basically the work of one or two persons in the college.	1								
Program Goals *Excellent*—Written goals for this program state realistic outcomes (such as planned enrollments, completions, placements) and are used as one measure of program effectiveness. *Poor*—No written goals exist for this program.	2								
Course Objectives *Excellent*—Written measurable objectives have been developed for all occupational courses in this program and are used to plan and organize instruction. *Poor*—No written objectives have been developed for courses in this program.	3								
Competency Based Performance Objectives *Excellent*—Competency based performance objectives are on file in writing, consistent with employment standards, and tell students what to expect and help faculty pace instruction. *Poor*—Competency based performance objectives have not been developed for courses in this program.	4								
Use of Competency Based Performance Objectives *Excellent*—Competency based performance objectives are distributed to students and used to assess student progress. *Poor*—Competency based performance objectives are not used with students for progress evaluation nor are students aware that they exist.	5								
Use of Information on Labor Market Needs *Excellent*—Current data on labor market needs and emerging trends in job openings are systematically used in developing and evaluating this program. *Poor*—Labor market data is not used in planning or evaluation.	6								
Use of Information on Job Performance Requirements *Excellent*—Current data on job performance requirements and trends are systematically used in developing and evaluating this program and content of its courses. *Poor*—Job performance requirements information has not been collected for use in planning and evaluating.	7								

FACULTY PERCEPTIONS OF OCCUPATIONAL EDUCATION PROGRAMS

		Keypunch Instructions	Poor 1	Below Expectations 2	Acceptable 3	Good 4	Excellent 5	Don't Know	COMMENTS (Please note explanatory remarks or needs for improvement)
GOALS AND OBJECTIVES (Continued)									
8. Use of Profession/Industry Standards *Excellent*—Profession/industry standards (such as licensing, certification, accreditation) are consistently used in planning and evaluating this program and content of its courses. *Poor*—Little or no recognition is given to specific profession/industry standards in planning and evaluating this program.	8								
9. Use of Student Follow-Up Information *Excellent*—Current follow-up data on completers and leavers (students with marketable skills) are consistently and systematically used in evaluating this program. *Poor*—Student follow-up information has not been collected for use in evaluating this program.	9								
PROCESSES									
10. Adaptation of Instruction *Excellent*—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, open entry/open exit, credit by examination). *Poor*—Instructional approaches in this program do not consider individual student differences.	10								
11. Relevance of Supportive Courses *Excellent*—Applicable supportive courses (such as anatomy and physiology, technical communications, technical mathematics) are closely coordinated with this program and are kept relevant to program goals and current to the needs of students. *Poor*—Supportive course content reflects no planned approach to meeting needs of students in this program.	11								
12. Coordination with Other Community Agencies and Educational Programs. *Excellent*—Effective liaison is maintained with other programs and educational agencies and institutions (such as high schools, other community colleges, four year colleges, area vocational schools, proprietary schools, CETA) to assure a coordinated approach and to avoid duplication in meeting occupational needs of the area or community. *Poor*—College activities reflect a disinterest in coordination with other programs and agencies having impact on this program.	12								
13. Provision for Work Experience, Cooperative Education or Clinical Experience. *Excellent*—Ample opportunities are provided for related work experience, cooperative education, or clinical experience for students in this program. Student participation is well coordinated with classroom instruction and employer supervision. *Poor*—Few opportunities are provided in this program for related work experience, cooperative education, or clinical experience where such participation is feasible.	13								

ACULTY PERCEPTIONS OF CCUPATIONAL EDUCATION PROGRAMS

		Approach Instructions	Poor 1	Below Expectations 2	Acceptable 3	Good 4	Excellent 5	Don't Know	COMMENTS (Please note explanatory remarks or needs for improvement)
ROCESSES (Continued)									
4. Program Availability and Accessibility *Excellent*—Students and potential students desiring enrollment in this program are identified through recruitment activities, treated equally in enrollment selection, and not discouraged by unrealistic prerequisites. The program is readily available and accessible at convenient times and locations. *Poor*—This program is not available or accessible to most students seeking enrollment. Discriminatory selection procedures are practiced.	14								
5. Provision for the Disadvantaged *Excellent*—Support services are provided for disadvantaged (such as socioeconomic, cultural, linguistic, academic) students enrolled in this program. Services are coordinated with occupational instruction and results are assessed continuously. *Poor*—No support services are provided for disadvantaged students enrolled in this program.	15								
. Provision for the Handicapped. *Excellent*—Support services are provided for handicapped (physical, mental, emotional, and other health impairing handicaps) students enrolled in this program. Facilities and equipment adaptations are made as needed. Services and facilities modifications are coordinated with occupational instruction and results are assessed continuously. *Poor*—No support services or facilities and equipment modifications are available for handicapped students enrolled in this program.	16								
. Efforts to Achieve Sex Equity *Excellent*—Emphasis is given to eliminating sex bias and sex stereotyping in this program: staffing, student recruitment, program advisement, and career counseling; access to and acceptance in programs; selection of curricular materials; instruction; job development and placement. *Poor*—Almost no attention is directed toward achieving sex equity in this program.	17								
Provision for Program Advisement *Excellent*—Instructors or other qualified personnel advise students (day, evening, weekend) on program and course selection. Registration procedures facilitate course selection and sequencing. *Poor*—Instructors make no provision for advising students on course and program selection.	18								
Provision for Career Planning and Guidance *Excellent*—Day, evening, and weekend students in this program have ready access to career planning and guidance services. *Poor*—Little or no provision is made for career planning and guidance services for students enrolled in this program.	19								

FACULTY PERCEPTIONS OF OCCUPATIONAL EDUCATION PROGRAMS

		Key punch instructions	Poor	Below Expectations	Acceptable	Good	Excellent	Don't Know	COMMENTS (Please note explanatory remarks or needs for improvement)
			1	2	3	4	5		
PROCESSES (Continued)									
20. Adequacy of Career Planning and Guidance	20								
Excellent—Instructors or other qualified personnel providing career planning and guidance services have current and relevant occupational knowledge and use a variety of resources (such as printed materials, audiovisuals, job observation) to meet individual student career objectives. *Poor*—Career planning and guidance services are ineffective and staffed with personnel who have little occupational knowledge.									
21. Provision for Employability Information.	21								
Excellent—This program includes information which is valuable to students as employees (on such topics as employment opportunities and future potential, starting salary, benefits, responsibilities and rights). *Poor*—Almost no emphasis is placed on providing information important to students as employees.									
22. Placement Effectiveness for Students in this Program	22								
Excellent—The college has an effectively functioning system for locating jobs and coordinating placement for students in this program. *Poor*—The college has no system or an ineffective system for locating jobs and coordinating placement for occupational students enrolled in this program.									
23. Student Follow-up System	23								
Excellent—Success and failure of program leavers and completers are assessed through periodic follow-up studies. Information learned is made available to instructors, students, advisory committee members and others concerned (such as counselors) and is used to modify this program. *Poor*—No effort is made to follow up former students of this program.									
24. Promotion of this Occupational Program	24								
Excellent—An active and organized effort is made to inform the public and its representatives (such as news media, legislators, board, business community) of the importance of providing effective and comprehensive occupational education and specific training for this occupation to gain community support. *Poor*—There is no organized public information effort for this program.									
RESOURCES									
25. Provision for Leadership and Coordination	25								
Excellent—Responsibility, authority, and accountability for this program are clearly identified and assigned. Administrative effectiveness is achieved in planning, managing, and evaluating this program. *Poor*—There are no clearly defined lines of responsibility, authority, and accountability for this program.									

ACULTY PERCEPTIONS OF CCUPATIONAL EDUCATION PROGRAMS

		Key/punch instructions	Poor	Below Expectations	Acceptable	Good	Excellent	Don't Know	COMMENTS (Please note explanatory remarks or needs for improvement)
			1	2	3	4	5		
ESOURCES (Continued)									
6. Qualifications of Administrators and/or Supervisors *Excellent*—All persons responsible for directing and coordinating this program demonstrate a high level of administrative ability. They are knowledgeable in and committed to occupational education. *Poor*—Persons responsible for directing and coordinating this program have little administrative training, education, and experience.	26								
7. Instructional Staffing *Excellent*—Instructional staffing for this program is sufficient to permit optimum program effectiveness (such as through enabling instructors to meet individual student needs, providing liaison with advisory committees, and assisting with placement and follow-up activities). *Poor*—Staffing is inadequate to meet the needs of this program effectively.	27								
3. Qualifications of Instructional Staff *Excellent*—Instructors in this program have two or more years in relevant employment experience, have kept current in their field, and have developed and maintained a high level of teaching competence. *Poor*—Few instructors in this program have relevant employment experience or current competence in their field.	28								
1. Professional Development Opportunities *Excellent*—The college encourages and supports the continuing professional development of faculty through such opportunities as conference attendance, curriculum development, work experience. *Poor*—The college does not encourage or support professional development of faculty.	29								
. Use of Instructional Support Staff *Excellent*—Paraprofessionals (such as aides, laboratory assistants) are used when appropriate to provide classroom help to students and to ensure maximum effectiveness of instructors in the program. *Poor*—Little use is made of instructional support staff in this program.	30								
. Use of Clerical Support Staff *Excellent*—Office and clerical assistance is available to instructors in this program and used to ensure maximum effectiveness of instructors. *Poor*—Little or no office and clerical assistance is available to instructors; ineffective use is made of clerical support staff.	31								
Adequacy and Availability of Instructional Equipment. *Excellent*—Equipment used on or off campus for this program is current, representative of that used on jobs for which students are being trained, and in sufficient supply to meet the needs of students. *Poor*—Equipment for this program is outmoded and in insufficient quantity to support quality instruction.	32								

FACULTY PERCEPTIONS OF OCCUPATIONAL EDUCATION PROGRAMS

		Keypunch Instructions	Poor 1	Below Expectations 2	Acceptable 3	Good 4	Excellent 5	Don't Know	COMMENTS (Please note explanatory remarks or needs for improvement)
RESOURCES (Continued)									
33. Maintenance and Safety of Instructional Equipment *Excellent*—Equipment used for this program is operational, safe, and well maintained. *Poor*—Equipment used for this program is often not operable and is unsafe.	33								
34. Adequacy of Instructional Facilities *Excellent*—Instructional facilities (excluding equipment) meet the program objectives and student needs, are functional and provide maximum flexibility and safe working conditions. *Poor*—Facilities for this program generally are restrictive, disfunctional, or overcrowded.	34								
35. Scheduling of Instructional Facilities *Excellent*—Scheduling of facilities and equipment for this program is planned to maximize use and be consistent with quality instruction. *Poor*—Facilities and equipment for this program are significantly under- or over-scheduled.	35								
36. Adequacy and Availability of Instructional Materials and Supplies *Excellent*—Instructional materials and supplies are readily available and in sufficient quantity to support quality instruction. *Poor*—Materials and supplies in this program are limited in amount, generally outdated, and lack relevance to program and student needs.	36								
37. Adequacy and Availability of Learning Resources *Excellent*—Learning resources for this program are available and accessible to students, current and relevant to the occupation, and selected to avoid sex bias and stereotyping. *Poor*—Learning resources for this program are outdated, limited in quantity, and lack relevance to the occupation.	37								
38. Use of Advisory Committees *Excellent*—The advisory committee for this program is active and representative of the occupation. *Poor*—The advisory committee for this program is not representative of the occupation and rarely meets.	38								
39. Provisions in Current Operating Budget *Excellent*—Adequate funds are allocated in the college operating budget to support achievement of approved program objectives. Allocations are planned to consider instructor budget input. *Poor*—Funds provided are seriously inadequate in relation to approved objectives for this program.	39								
40. Provisions in Capital Outlay Budget for Equipment *Excellent*—Funds are allocated in a planned effort to provide for needed new equipment and for equipment replacement and repair, consistent with the objectives for this program and based on instructor input. *Poor*—Equipment needs in this program are almost totally unmet in the capital outlay budget.	40								

FACULTY PERCEPTIONS OF OCCUPATIONAL EDUCATION PROGRAMS

Please answer the following: (Use back of page and extra sheets if necessary).

1. What are the chief occupational education strengths of your program?

2. What are the major needs for improvement in your program and what action is required to achieve these improvements?

EASE IDENTIFY THE POSITION OF THE PERSON COMPLETING THIS FORM AND THE OCCUPATIONAL PROGRAM
ich as registered nursing, data processing).

Check One:

Division/Department Chair _____
Faculty _____
Counselor _____
Other, please specify: _____ _____

Program:

_____

2003 Winter PROE

Mechanical Engineering Technology, AAS...Faculty

Frequencies

Prepared by: Institutional Research & Testing, 02/03

Statistics

	N		Mean	Median	Std. Deviation
	Valid	Missing			
Q1 Goals/Objectives-Participation	4	1	2.75	3.00	1.258
Q2 Goals/Objectives-Program Goals	3	2	4.33	5.00	1.155
Q3 Goals/Objectives-Course Objectives	4	1	3.75	3.50	.957
Q4 Goals/Objectives-Compet. Based Perform. Object's.	4	1	3.75	3.50	.957
Q5 Goals/Objectives-Use of Compet. Based	3	2	4.67	5.00	.577
Q6 Goals/Objectives-Info Labor Mkt Needs	4	1	3.75	4.00	1.258
Q7 Goals/Objectives-Info Job Performance	3	2	4.00	4.00	1.000
Q8 Goals/Objectives-Profession/Indust. Stand's.	5	0	4.40	4.00	.548
Q9 Goals/Objectives-Student Foll.-Up Info	4	1	3.75	4.00	1.258
Q10 Processes-Instruction Adaptation	5	0	4.00	4.00	1.000
Q11 Processes-Supportive Courses Relevance	5	0	3.40	4.00	1.342
Q12 Processes-Coordination Other Agenc./Prog's.	3	2	3.33	3.00	.577
Q13 Processes-Work/Clinical Experience, Co-op Ed	5	0	4.40	4.00	.548
Q14 Processes-Program Avail./Accessibility	5	0	4.40	4.00	.548
Q15 Processes-Provisions for Disadvantaged	4	1	4.50	5.00	1.000
Q16 Processes-Provisions for Handicapped	4	1	4.50	5.00	1.000
Q17 Processes-Achieve Sex Equity Efforts	4	1	3.50	3.50	1.732
Q18 Processes-Program Advisement	5	0	4.80	5.00	.447
Q19 Processes-Career Plan/Guid. Provision	4	1	4.00	4.50	1.414
Q20 Processes-Career Plan/Guid. Adequacy	5	0	4.20	4.00	.447
Q21 Processes-Employability Info Provision	5	0	4.00	4.00	.707
Q22 Processes-Placemt Effectiveness	5	0	4.20	5.00	1.304
Q23 Processes-Student Follow-up System	5	0	3.40	4.00	.894
Q24 Processes-Promotion of this Occupat'l Program	4	1	2.75	3.00	1.500
Q25 Resources-Leadership/Coordination Provision	4	1	3.25	3.00	1.258
Q26 Resources-Admin/Super Qualifications	5	0	4.20	5.00	1.095
Q27 Resources-Instructional Staffing	5	0	4.60	5.00	.894
Q28 Resources-Instructional Staff Qualifications	5	0	4.80	5.00	.447
Q29 Resources-Profes'l Developmt Opportunities	4	1	3.50	3.00	1.000
Q30 Resources-Instruct'l Support Staff Use	4	1	2.50	2.00	1.732
Q31 Resources-Clerical Support Staff Use	5	0	3.00	3.00	1.225
Q32 Resources-Equip. Adequacy/Availability	5	0	3.40	4.00	.894
Q33 Resources-Equip. Maint./Safety	5	0	4.00	4.00	.707
Q34 Resources-Facilities Adequacy	5	0	2.80	3.00	.837
Q35 Resources-Facilities Scheduling	5	0	4.20	4.00	.837
Q36 Resources-Mat'ls/Supplies Adeq./Avail.	5	0	3.40	3.00	.548
Q37 Resources-Learning Resource Adeq./Avail.	4	1	3.50	3.50	.577
Q38 Resources-Advisory Committee Use	4	1	3.50	3.50	.577
Q39 Resources-Current Operating Budget Provisions	4	1	2.75	2.50	.957
Q40 Resources-Capital Outlay Budget Equip.	4	1	3.25	3.00	1.500

RESPONSES TO SPECIFIC QUESTIONS:

1. What are the chief occupational education strengths of your program?1

-- Focus on real, practical applications. Faculty with work experience and the ability to effectively communicate.

-- High standards. Faculty qualifications and enthusiasm. Student interest.

-- Work experience of faculty. Current (or nearly so) lab facilities/equipment. Current texts/software. Faculty dedication to student success. ABET accreditation. Good computer facilities.

2. What are the major needs for improvement in your program and what action is required to achieve these improvements?

-- Improved administrative support especially in the areas of recruitment and facilities.

-- Budget for supplies, equipment (new and replacement), faculty development.

-- Better advisory board for equipment donations and advice on changing trends. Too many former students – we need more "outside" opinions of our program.

3. Course Objectives
-- 5 year lab uses

4. Competency Based Performance Objectives
-- outcome assessments

7. Use of Information on Job Performance Requirements
-- use of Advisory Board

8. Use of Profession/Industry Standards
-- TAC/ABET

13. Provision for Work Experience, Cooperative Education or Clinical Experience
-- internship available

15. Provision for the Disadvantaged
-- note takers, help center, signers, SLA

16. Provision for the Handicapped
-- labs, lecture areas are wheelchair accessible

21. Provision for Employability Information
-- on-campus recruiting info mentioned in classes, job fair

30. Use of Instructional Support Staff
-- lab assistants and SLA

College_____

Title of Your Program_____

'UDENT PERCEPTIONS OF :CUPATIONAL EDUCATION PROGRAMS

eck statement that best describes your objective for attending the college:

- Prepare to get a job ..... ____
- Improve job skills for present occupation ..... ____
- Prepare for transfer to another college ..... ____
- Personal interest ..... ____
- Other (Describe) ..... ____

STRUCTIONS: Rate each item using the following guide:
ELLENT means nearly ideal, top 5 to 10%
)D is a strong rating, top one-third
EPTABLE is average, the middle-third
OW EXPECTATIONS is only fair, bottom one-third
R is seriously inadequate, bottom 5 to 10%
mment column has been provided if you wish to explain your rating

		Keypunch Instructions	Poor	Below Expectations	Acceptable	Good	Excellent	Don't Know	COMMENTS
			1	2	3	4	5		
ase rate each item below:									
Courses in your occupational program are:									
•Available and conveniently located.	1								
•Based on realistic prerequisites.	2								
•Available at moderate cost.	3								
Written objectives for courses in your occupational program:									
•Are available to students.	4								
•Describe what you will learn in the course.	5								
•Are used by the instructor to keep you aware of your progress.	6								
Teaching methods, procedures and course :ontent:									
•Meet your occupational needs, interests and objectives.	7								
•Provide supervised practice for developing job skills.	8								
Related courses (such as English, Mathematics, Science) are:									
•Pertinent to occupational instruction.	9								
•Current and meaningful to you.	10								
Work experience (or clinical experience) in your)ccupational program is:									
Readily available at convenient locations.	11								
Readily available to both day and evening students.	12								
Coordinated with classroom instruction.	13								
Coordinated with employer supervision.	14								
Career planning information:									
Meets your needs and interests.	15								
Helps you plan your program.	16								
Helps you make career decisions and choices.	17								

STUDENT PERCEPTIONS OF OCCUPATIONAL EDUCATION PROGRAMS

		Keypunch Instructions	Poor 1	Below Expectations 2	Acceptable 3	Good 4	Excellent 5	Don't Know	COMMENTS
6. Career planning information (Continued):									
• Helps you understand your rights and responsibilities as an employee.	18								
• Helps you evaluate job opportunities in relation to salary, benefits and conditions of employment.	19								
• Is provided by knowledgeable, interested staff.	20								
• Explains nontraditional occupational opportunities for both sexes.	21								
7. Job success information on former students in your occupational program:									
• Is provided to help you make career decisions.	22								
• Indicates how many job opportunities there are in your occupation.	23								
• Identifies where these job opportunities are located.	24								
• Tells about job advancement opportunities.	25								
8. Placement services are available to:									
• Help you find employment opportunities.	26								
• Prepare you to apply for a job.	27								
9. Occupational instructors:									
• Know the subject matter and occupational requirements.	28								
• Are available to provide help when you need it.	29								
• Provide instruction so it is interesting and understandable.	30								
10. Instructional support services (such as tutoring, lab assistance) are:									
• Available to meet your needs and interests.	31								
• Provided by knowledgeable, interested staff.	32								
11. Instructional lecture and laboratory facilities:									
• Provide adequate lighting, ventilation, heating, power, and other utilities.	33								
• Include enough work stations for the number of students enrolled.	34								
• Are safe, functional, and well maintained.	35								
• Are available on an equal basis for all students.	36								
12. Instructional equipment is:									
• Current and representative of industry.	37								
• In sufficient quantity to avoid long delays in use.	38								
• Safe and in good condition.	39								
13. Instructional materials (e.g., textbooks, reference books, supplies) are:									
• Available and conveniently located for use as needed.	40								
• Current and meaningful to the subject.	41								
• Not biased toward "traditional" sex roles.	42								
• Available at reasonable cost.	43								

2003 Winter PROE

Mechanical Engineering Technology, AAS...Students

Frequencies

Prepared by: Institutional Research & Testing, 02/03

Statistics

	N				
	Valid	Missing	Mean	Median	Std. Deviation
Q1 Courses-available/conveniently located	50	1	4.10	4.00	.614
Q2 Courses-realistic prerequisites	50	1	4.04	4.00	.669
Q3 Courses-available at moderate cost	50	1	3.20	3.00	.700
Q4 Written objectives-available to students	49	2	4.04	4.00	.735
Q5 Written objectives-describe what will learn	51	0	4.04	4.00	.599
Q6 Written objectives-keeps aware of progress	49	2	3.63	4.00	.727
Q7 Teach'g-meet needs, interests, objectives	50	1	3.88	4.00	.594
Q8 Teach'g-provide supervised practice	50	1	3.90	4.00	.789
Q9 Related courses-pertinent to occ. instruct.	49	2	3.57	4.00	.736
Q10 Related courses-current/meaningful	50	1	3.44	3.50	.993
Q11 Work exper-available at conven. loc's	41	10	3.15	3.00	.963
Q12 Work exper-available day/eve students	34	17	3.09	3.00	1.138
Q13 Work exper-coord class instruction	37	14	3.00	3.00	1.106
Q14 Work exper-coord employer supervision	33	18	3.15	3.00	1.202
Q15 Career plan'g-meets needs/interests	48	3	3.42	3.50	.794
Q16 Career plan'g-helps plan program	47	4	3.55	4.00	.829
Q17 Career plan'g-career decisions/choices	47	4	3.51	4.00	.831
Q18 Career plan'g-understand rights/respons	40	11	3.25	3.00	.870
Q19 Career plan'g-eval job opportunities	39	12	3.31	3.00	.950
Q20 Career plan'g-knowledgeable staff	45	6	3.64	4.00	.957
Q21 Career plan'g-explains nontrad opportunities	36	15	3.28	3.00	.974
Q22 Job succ info-help career decisions	40	11	3.33	3.00	1.023
Q23 Job succ info-no. job opp's in field	44	7	3.27	3.00	.924
Q24 Job succ info-location of job opportunities	40	11	3.00	3.00	.934
Q25 Job succ info-job advancemt opportunities	39	12	3.05	3.00	1.025
Q26 Placemt Svcs-help find employmt oppotunities	35	16	3.66	4.00	.968
Q27 Placemt Svcs-prepare to apply for job	37	14	3.62	4.00	1.037
Q28 Occupat'l instruct's-know subj matter/requiremts	48	3	4.02	4.00	.863
Q29 Occupat'l instruct's-available to help	48	3	3.94	4.00	.909
Q30 Occupat'l instruct's-interest'g/understandable	48	3	3.81	4.00	.842
Q31 Instruct'l support svcs-avail./meet needs/interests	48	3	3.54	4.00	.988
Q32 Instruct'l support svcs-staff knowledg/interested	46	5	3.61	4.00	1.064
Q33 Lec/lab facil's-adequate utilities	49	2	3.73	4.00	.974
Q34 Lec/lab facil's-enough work stations	49	2	3.31	4.00	1.262
Q35 Lec/lab facil's-safe, fxnl, maintained	49	2	3.96	4.00	.789
Q36 Lec/lab facil's-avail. equal basis all students	49	2	3.88	4.00	.904
Q37 Equipmt-current/represents industry	48	3	3.56	4.00	.943
Q38 Equipmt-sufficient quantity/no delays	47	4	3.47	4.00	1.100
Q39 Equipmt-safe/good condition	49	2	3.94	4.00	.747
Q40 Mat'ls-available/conveniently located	50	1	3.74	4.00	.922
Q41 Mat'ls-current/meaningful to subject	50	1	3.62	4.00	.987
Q42 Mat'ls-not biased toward "trad'l" roles	44	7	3.75	4.00	.918
Q43 Mat'ls-avail. reasonable cost	50	1	2.16	2.00	1.235

RESPONSES TO SPECIFIC QUESTIONS:

10. Instructional support services (such as tutoring, lab assistance) are:

- never visited tutor

11. Instructional lecture and laboratory facilities:

- they are a little small
- lab is too small also not enough equipment
- a little more light needed; lab is small
- lab too small
- lab too small
- why can't we sit in the machine lab?
- we could use a bigger lab
- sometimes labs are cramped

13. Instruction materials (e.g., textbooks, reference books, supplies) are:

- books are expensive
- book prices are outrageous
- too damn expensive!
- they are ours

College_____

Advisory Committee
(Specify field)_____

ADVISORY COMMITTEE PERCEPTIONS OF OCCUPATIONAL EDUCATION PROGRAMS

NSTRUCTIONS: Rate each item using the following guide:
XCELLENT means nearly ideal, top 5 to 10%
OOD is a strong rating, top one-third
CCEPTABLE is average, the middle-third
ELOW EXPECTATIONS is only fair, bottom one-third
OOR is seriously inadequate, bottom 5 to 10%

comment column has been provided if you wish to explain your rating.

	Keymarch Instructions	Poor 1	Below Expectations 2	Acceptable 3	Good 4	Excellent 5	Don't Know	COMMENTS
Please rate each item below:								
I. Instructional program content and quality are:								
• Based on performance objectives that represent job skills and knowledges required for successful entry level employment.	1							
• Designed to provide students with practical job application experience.	2							
• Responsive to upgrading and retraining needs of employed persons.	3							
• Periodically reviewed and revised to keep current with changing job practices and technology.	4							
. Instructional equipment is:								
• Well maintained.	5							
• Current and representative of that used on the job.	6							
. Instructional facilities:								
• Provide adequate lighting, ventilation, heating, power, and other utilities.	7							
• Allocate sufficient space to support quality instruction.	8							
• Meet essential health and safety standards.	9							
Placement:								
• Services are available to students completing the program.	10							
• Job opportunities exist for students completing the program or leaving with marketable skills.	11							
Follow-up studies on program completers and leavers (Students with marketable skills):								
• Demonstrate that students are prepared for entry level employment.	12							
• Collect information on job success and failure of former students.	13							
• Provide information used to review and, where warranted, revise the program.	14							

PROE

3

ADVISORY COMMITTEE PERCEPTIONS OF OCCUPATIONAL EDUCATION PROGRAMS

College _____

Advisory Committee
(Specify field)_____

Please answer the following:

1. What are the major strengths of the college's occupational program in your field(s)?

2. What are the major needs for improvement in the college's occupational program in your field(s)?

3. Do you have additional comments or suggestions for the program or for utilization of the advisory committee? If so, please state briefly.

2003 Winter PROE

Mechanical Engineering Technology, AAS...Advisory Board

Frequencies

Prepared by: Institutional Research & Testing, 02/03

Statistics

	N		Mean	Median	Std. Deviation
	Valid	Missing			
Q1 Prog cont/qual based on perform. objectives	5	0	4.40	4.00	.548
Q2 Prog cont/qual provides practical job app.	5	0	4.60	5.00	.548
Q3 Prog cont/qual responsive to upgrading/retraining	4	1	4.00	4.00	.816
Q4 Prog cont/qual reviewed/revised to keep current	5	0	4.80	5.00	.447
Q5 Instructional equipment is well maintained	5	0	4.20	4.00	.447
Q6 Instruct. equip. current/representative	5	0	3.60	4.00	.548
Q7 Instruct. facil's provide adequate utilities	5	0	4.00	4.00	.707
Q8 Instruct. facil's allocate sufficient space	5	0	4.00	4.00	.707
Q9 Instruct facil's meet health standards	4	1	3.75	3.50	.957
Q10 Placemt svcs available to students	5	0	4.20	4.00	.447
Q11 Placemt job opportunities exist for students	5	0	4.40	4.00	.548
Q12 Foll-up studies demo students prepared	5	0	3.80	4.00	.447
Q13 Foll-up studies collect info-job succ/fail	3	2	3.67	4.00	.577
Q14 Foll-up studies provide info for prog review/revision	5	0	4.20	4.00	.447

RESPONSES TO SPECIFIC QUESTIONS:

(These remarks are included in the report itself.)

1. What are the major strengths of the college's occupational program in your field(s)?

- The students leave this program with a very good understanding of engineering fundamentals.
- Project work. Focus on "hands on" problem-solving approach. Good engineering fundamentals. Dedicated instructors. Smaller class size allows 1 on 1 time with students.
- The college provides very practical teaching that applies directly to the day to day needs of a person beginning a career in engineering, while providing a broad, firm foundation in the basics of which a gradate can build a successful career.
- In addition, the college has strived hard to keep pace with the ever-changing technology, which is a fast moving target.
- Hands-on training to the students. Highly enthusiastic teaching staff.
- Material content is well chosen.

2. What are the major needs for improvement in the college's occupational program in your field(s)?

- I am not currently aware of any major deficiencies.
- Lab facilities upgrades and new lab equipment.
- Development of a 4 year Mechanical Engineering program.
- Constant review of curriculum to strike balance between basics/fundamentals and adaptation of new technology.
- Dangerous to teach students only how to run one brand of software in lieu of real understanding, because one becomes obsolete and one does not.
- Provide students more access to real jobs/engineers in industry.
- More up-to-date laboratory, computer and teaching material.
- Not a "major" need, but additional communication-related studies are encouraged.

3. Do you have additional comments or suggestions for the program or for utilization of the advisory committee? If so, please state briefly.

- During the last couple of years, our focus has been on overall course structure for a four-year program. With this complete, perhaps our next focus should be to dig into the core classes to advise on their content and practical application.

APPENDIX - ADVISORY BOARD PERCEPTIONS

- Continue to evolve the program to keep pace with changing jobs/technologies in business.
- Keep students apprised of the types of opportunities available with their education.
- The program is an excellent program, but is always in need of improvement.
- Changes in facilities and classrooms have definitely been a change for the positive.
- Additional tools, test equipment, lab equipment and software necessary to keep pace with constantly changing industry. Should have a yearly budget with some discretionary funds for instructors.
- The allocation of studies according to the allotted time is a good compromise.

M E M O R A N D U M

DATE: November 8, 1997

TO: Academic Senate

FROM: Academic Program Review Council

RE: Recommendations for the A.A.S. in Mechanical Engineering Technology program

CC: George Olsson, Doug Chase, Mark Curtis, Tom Oldfield

We recommend that the Mechanical Engineering Technology program be enhanced.

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

- It is central to Ferris' mission.
- By virtue of its placement in a cluster of engineering technology programs in the College of Technology, it is an asset to the University.
- Through the placement of graduates in employment and in baccalaureate engineering technology programs, it provides a service to the state and nation.
- Quality of instruction is high.
- Quality of students is high.
- Comments from graduates, employers, and the advisory board are favorable.
- Teaching costs per student credit hour, at $134.35, are only slightly above the Ferris average of $127.21.
- APRC would like to commend the Mechanical Engineering Technology program for the thoroughness of its Program Review Panel report and to congratulate the program on achieving ABET accreditation status.

(2) The following steps should be taken to maintain the high quality of this program:

- The temporary-full time position now used to meet the program's instructional needs should be converted to a tenure-track position and filled. The program now has two regular faculty; it is our recommendation that the program have three regular faculty.
- The programs need to develop and carry out a plan for marketing and recruitment.

- APRC endorses the curriculum suggestions made by the Program Review Panel.
- The program should initiate regular and timely discussions with the Departments of Languages and Literature and Mathematics to make sure that the remedial basic skills needs of its students are being addressed.
- The College of Technology should study the possibility of offering a baccalaureate-level degree yoking Mechanical Engineering Technology with related areas in the College of Technology.

Program Details

Title **Mechanical Engineering Technology MECE**

Degree Type **Bachelor of Science**

Career Path **Engineering/Manufacturing and Industrial Technology**

College **Technology**

Download PDF

Locate a **Course**
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Learn about a **Program**
Follow a **Career Path**

Why Choose Mechanical Engineering Technology?

Were you a 'Legos kid'? Are you curious about how things work? Do you like to take things apart—and fix them? Do you like to use math to solve practical problems?

The Mechanical Engineering Technology program prepares students for a broad range of occupations and challenges. Beginning with foundation courses in math, applied science, CAD, manufacturing processes and communication, students move on to the applied engineering courses that give them a solid technical background for their careers. Students develop strong analytic and problem-solving skills. Their understanding of the principles taught in the classroom is enhanced with many hands-on labs and real-world applications provided by faculty with extensive industrial experience.

The B.S. Mechanical Engineering Technology has been submitted for initial accreditation to the Technology Accreditation Commission of the Accreditation Board for Engineering and Technology (TAC of ABET), 111 Market Place, Suite 1050, Baltimore, MD 21202-4012; Telephone: 410-374-7700.

Prepare for a Great Career

Due to the broad nature of their studies, graduates of the B.S. Mechanical Engineering technology program will find a great variety of jobs open to them. Many will work in the design and development of products, machines and processes. Others will be involved in manufacturing, operations and technical sales. Their areas of employment will include automotive and transportation, power generation, climate control, machine design, manufacturing, materials and automation.

Admission Requirements

Students entering the program should have a strong interest in mechanical devices and seek to understand them better. They should have completed the A.A.S. in Mechanical Engineering Technology at Ferris (or a similar program elsewhere) with a minimum 2.5 GPA overall and a minimum 2.75 GPA in the major. Pre-engineering programs also make good starting points. Transfer candidates should contact the Mechanical Engineering Technology faculty to discuss options.

Required Courses		Credit Hours
General Education		
ENGL 150	English 1	3
ENGL 250	English 2	3
CHEM 121	General Chemistry 1 *Z	5
COMM 121	Fundamentals of Public Speaking	3
MATH 116	Intermediate Algebra & Num Trig	4
MATH 126	Algebra & Analytic Trigonometry	4
MATH 216	Applied Calculus	4
MATH 226	Fourier Series & Appl Diff Equat	4
PHYS 211	Introductory Physics 1*Z	4
PHYS 212	Introductory Physics 2*Z	4
PSYC 150	Introduction to Psychology* S	3
PSYC 326	Indust-Organizat'l Psych* R	3
Choose one:		
ENGL 311	Advanced Technical Writing	3
ENGL 321	Advanced Composition	3
Electives:	Cultural Enrichment	3
	Cultural Enrichment	3
	Cultural Enrichment at 200 level	3

Graduation Requirements

The Mechanical Engineering Technology program at Ferris leads to a bachelor of science degree. Graduation requires a minimum 2.0 GPA in core classes, in the major and overall. Students must complete all general education requirements as outlined in the General Education section of the University Catalog.

More Information

For more information about this new program, contact:
Mechanical Engineering Technology
Ferris State University
915 Campus Drive, Swan 405
Big Rapids, MI 49307
Phone: 231-591-2755 or 231-591-2890

	Social Awareness	3
Major		
EEET 215	Electronic Technology for MET 1	4
ETEC 140	Engineering Graphics, Comprehensive	3
MATL 240	Introduction to Material Science	4
MATL 341	Material Selection Metals	3
MECH 111	MET Seminar	1
MECH 122	Computer Applications in Tech	2
MECH 211	Fluid Mechanics	4
MECH 212	Kinematics of Mechanisms	2
MECH 221	Mechanical Measure/Computer Appl	4
MECH 222	Machine Design	4
MECH 223	Thermodynamics	3
MECH 330	Heat Transfer	3
MECH 340	Statics & Strength of Matls	4
MECH 341	Lab for Statics & Str Matls	1
MECH 393	Industrial Internship	4
MECH 421	MET Senior Lab	4
MECH 440	Noise & Vibrations	3
MFGE 341	Quality Science Statistics	3
MFGE 352	Design for Manufacturing	2
MFGE 423	Engineering Economics	2
MFGT 150	Manufacturing Processes	2
PDET 321	Applied Mechanics & Kinematics	3
PDET 422	Advanced Machine Design	4
PDET 499	Product Design Project	3
Electives:	Approved technical elective	3
	Approved technical elective at 300 level	2

Computer programming course	2	

choose a program go

Title Search: Go

Ferris State University Catalog

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FERRIS STATE UNIVERSITY

Final Response for the

Bachelor of Science Degree Program in
ELECTRICAL/ELECTRONICS ENGINEERING TECHNOLOGY

Associate of Applied Science Degree Program in
MECHANICAL ENGINEERING TECHNOLOGY

and

Bachelor of Science Degree Program in
MECHANICAL ENGINEERING TECHNOLOGY

in reference to the
October 26-28, 2003 Visit of TAC of ABET

Submitted to the Visiting Team Chair:
July 12, 2004

July 12, 2004

Michael A. Robinson, PhD
Principal Engineer
Bettis Atomic Power Laboratory
PO Box 79
West Muffin PA 15122-0079

re: Additional Response to January 13, 2004 ABET Letter to Ferris State University

October 26-28, 2003 Visit of Electrical Engineering Technology and Mechanical Engineering Technology

Dear Dr. Robinson:

This letter, with attachments, provides further response to the subject letter.

From the subject letter:

I. Institutional Weakness

1. Criterion I.A.2. This criterion states that "Programs must have plans for continuous improvement. The visiting team will be looking for evidence which demonstrates implementation of continuous improvement processes and procedures for each program." The continuous improvement plan as presented was incomplete and disconnected at best. Exhibits offered as evidence of assessment did not support program revisions offered as evidence of a working continuous improvement process. There was no evidence of plans to systematically measure and evaluate progress toward achieving the goals and implementing the indicated program improvements. Without plans for continuous improvement including quantified measurements of achievement, administration, faculty, staff, and students will have different ideas of how successful they are in achieving their goals. This leads to poor relationships between these groups and slower progress toward achieving stated goals. It is required that a plan for continuous improvement be developed for each program, including methods to demonstrate achievements.

Response:

Upon review of the subject letter, faculty applied for funding to obtain training on program objectives and outcomes. University resources provided most of the funding needed to send a representative to the *ABET Workshop for Program Improvement* and the *ASEE 2004 Annual Conference and Exposition* in June 2004. The events proved to be enlightening. Trip notes for each event are included here as Attachments 1 and 2.

Following the conference, faculty in the MET program began a rewrite of their program objectives and outcomes, and developed a rough plan for assessment and evaluation (attached). Comments on the status of the plan are included in paragraphs IX and X at the end of the current plan. This document, *Mechanical Engineering Technology Continuous Improvement Plan July 9, 2004,* is attached along with first draft course assessment sheets. (Attachment 3.) The faculty recognizes that this is the beginning of an ongoing process – with much to be learned and gained along the way.

The continuous improvement plan for the EEET program was originally submitted during the visit. Since the conference, the plan has been revised to include evaluation processes. The current version is included as Attachment 4.

From the subject letter:

Mechanical Engineering Technology Program Concerns

> *2. Criterion I.K.2. This criterion requires adequate laboratories. Section I.K.4 of the TAC criteria states that "Laboratory equipment and computers should be of the type that would be encountered in industry and practice..." The laboratory space available for both programs [referring to AAS MET and BS MET] is very limited. Laboratory experiments are almost exclusively small table top experimental set ups. Though this arrangement is adequate for many types of experiments, there are also cases n which larger equipment is required to demonstrate the principles that are being instructed. The small laboratory space precludes conducting these experiments. The capstone sophomore and senior design projects are conducted in this limited space. This causes problems as students construct their projects as well as limiting the size of projects that can be undertaken. This limited laboratory space contrasts to the spacious laboratories maintained by other programs within the college. For example, the Manufacturing Technology Program and the Plastics Technology Program have spacious laboratories facilities. It is recommended that additional laboratory space be allocated to the department to allow more space for the capstone senior and sophomore design projects and to procure laboratory equipment of the type that would be encountered in industry.*

Response:

Physical facilities for the MET programs are discussed in Volume II, section VI. C. It was noted here that the main lab space, Swan 303, was remodeled during summer 2002. This 30 by 43 foot space had originally been a chemistry lab. Wet lab benches and all but one fume hood were removed during remodeling; this has opened the space up considerably. The space is limited by its size, its 36-inch doors, low ceilings, and limited access.

As submitted, neither Volume I nor Volume II include the university's effort to improve facilities in the Swan Technical Building. In recognition of the need for additional space for MET and other programs, the university submitted a Capital Outlay Project Request to the State of Michigan in Fiscal 2003 to address this need. This request, titled, "College of Technology Additions and Renovation," calls for remodeling and adding space to the Swan Technical Building. MET along with seven other programs housed in the present structure are to be enhanced with this project. $38,000,000 is requested. (Attachment 5.)

Capital Outlay Project Requests from state universities are collected by the state and awarded in an annual cycle. The Swan Building remodeling and expansion request is currently the university's second priority – behind a $40,000,000 request to construct a new optometry college building and convert the current structure into an educational and professional development center. Recent capital outlay funded projects at the university that have benefited the College of Technology include: National Elastomer Center, $6.65M opened 1998; new library, $50M, opened 2001; and the Granger Construction and HVACR Center, $18M, opened 2003. State funding has been typically 75% for these projects. A statewide summary of capital outlay projects can be found at the Michigan Senate Fiscal Agency's website. http://www.senate.michigan.gov/sfa/Departments/DepartmentPublications/HEprojects.pdf

Please contact us if there are questions.

Respectfully submitted,

Charles A. Matrosic, PE
Interim Dean

Attachments:

trip report: *ABET Faculty Workshop for Continuous Program Improvement*
trip report: *ASEE 2004 Annual Conference and Exposition*
Mechanical Engineering Continuous Improvement Plan
Electrical Electronics Engineering Technology Continuous Improvement Plan
FY 2003 Capital Outlay Project Request: College of Technology Additions and Renovations

Trip Report: *ABET Workshop for Program Improvement*
Salt Lake City, June 18-20, 2004
Chuck Drake, June 28, 2004

The purpose of the workshop was to provide training in Continuous Improvement Processes for academic programs. 50 people from multiple divisions of ABET participated. Leaders for the event were:

Dave Holger, Iowa State**
Dennis George, Western Kentucky***
Dave Hornbeck, Southern Polytechnic*
Jerry Jakubowski, Loyola Marymount**
Jack Rutherford, The Boeing Co**
Gloria Rogers, Rose-Hulman Inst. of Technology
Maryanne Weiss, ABET staff
*ABET commissioner, Technology Accreditation Commission (TAC)
**ABET commissioner, Engineering Accreditation Commission (EAC)
*** ABET Applied Science Accreditation Commission (ASAC)

Following an introduction on the goals of accreditation and workshop expectations, the workshop proceeded with a mix of presentations and small group work sessions. Sessions were focused on understanding terminology and a recommended procedure for developing continuous improvement plans along with exercises in developing program objectives, program outcomes, and selection of assessment methods.

Some highlights:

- Understanding terminology is important. There are many terms for the same concepts. After much discussion, ABET selected terminology that is used in their documents. These definitions are attached.
- Teams of attendees worked through several exercises on developing objectives, outcomes, and considering assessment methods.
- Much information is available.
  - www.abet.org
  - www.abet.org/info_prgs.html
  - www.assessmentplan.com
  - www.rose-hulman.edu/irpa
  - www.engtng.pitt.edu/~ec2000
- 12 assessment options were presented and discussed. Samples of assessment tools were given.
- Charts for indicating how outcomes will be developed were presented. The process of establishing program objectives, outcomes, assessment, and evaluation is potentially a bottomless pit.
- Advice included keeping outcomes assessable, start small, get all on board.
- Speakers, presenters are available at no cost other than travel.
- ABET offers training in assessment each spring.

attachment

Trip Report: *ASEE 2004 Annual Conference and Exposition*
Salt lake City, Utah. June 20-23, 2004
Chuck Drake, June 28, 2004

These notes are categorized generally by session title. The conference took place over three days with sessions beginning at 7 AM. Often over 25 paper presentations and/or meetings took place simultaneously. Approximately 1300 persons attended the conference. Proceedings are available on disk – and will soon be available on-line at ASEE.org.

Accreditation

1149

- IUPUI has capstones in its ASEET and BSEET programs. P.Lin's paper has cont improve plan also on website.
- PSU-Erie allows internships to substitute for capstone courses if program outcomes are met. 2 semester capstone sequence (D.Roth)
- Purdue-Calumet has long history of university-wide cont qual improve. Many tables of present plan for MET, more on web. Susan Scachitti is on TAC. Stressed documentation.
- From Pittsburg State (Kansas). Small, rural town. No major local employer; broad-based. Program objectives should involve Ind Adv Board, possibly faculty retreat. Adv brd meets twice per year. Helps select capstone projects in fall, helps evaluate in spring. Faculty buy-in and teamwork are essential. Randy Winzer will e-mail paper & presentation.

2149

- Purdue U. advises to keep notebooks of assessment on each program outcome. Have displays to support outcomes assessment. Show your assessment plan. Faculty development must be shown. Vitae for last 5 yrs. Ind Avd brd twice per year w/ active participation. Display materials by outcome. Review each course each year.
- John Wise, Penn State, presented an on-line assessment tool used to track and document course assessment thus ready for visit. Teach teamwork. Break each course into weekly outcomes to assess. Keeps notes on-line to give record – study over years to determine changes needed. Don't establish baseline immediately - go thru several annual cycles first.
- Tim Skvarenina, Purdue, gave an excellent overview of TC2K.

3650

- RIT discussed organizational changes, costs for TC2K including release time. Stressed teamwork, commitment, advisory board, university support. Annual process – report to dean.
- A paper from Miami U gave examples of writing assignments for a circuits course. (EE or EET?)

Capstone Courses

2225 Capstone Design & Assessment

- Michael Trevison presented survey of 190+ institutions. Most capstones are 2 semester sequence. Trend is towards more multidisciplinary projects. Team participation varies with discipline.
- Kathy Kramer, San Diego U, EE, uses capstone to assess each outcome. Wanted practicing engineers on Ind Adv Brd – who would be involved in projects. Mentoring worked only when project came from the Adv Brd member. Used small teams, competitive proposals (i.e. not all accepted), definite deliverables, intermediate progress presentations.

2425

- Montana State presented 2 instruments or assessing outcomes in capstones.
- U. Oklahoma has 2 semester design capstone sequence. First includes studying design process, do a project, start senior project. 2nd course is just senior project. (Both 3 credits.) Projects expected to be design-build-test in nature. Max 6 per team, students bid on possible projects, some from industry, also ASME (human powered vehicle, other), SAE vehicles. Very good paper.
- EE at U. Conn. Recommended Bucknell's workshop on team projects. Used team contracts. Has chart with capstone assessment vs ABET a-k criteria.

Engineering Design Projects

3546

- Washington State uses a model Ekranoplan (Russian vehicle that flies just above the surface of water) as a capstone – also used for technology education short courses.
- U.Toledo (EET) course intro to controls used a soil moisture control project – student built sensors and control units.
- BS Electromechanical at Penn State - Berks uses a simple process control project with LabView, 1-Wire serial addressable sensors, low cost. Button family programmable data recorders (compact, low cost). Handout with contacts.
- Cleveland State uses a robotics project as a capstone.

Main Plenary Speaker

Woodie Flowers, MIT. Noted for freshmen projects for MEs, co-founder of FIRST. Suggested less emphasis on math – more on communications, entrepreneurship, social aspects, - and get back to basics (e.g. battery, bulb, wire problem). More visuals. More empathy. Gave quiz on units.

Distinguished Speakers

Roy Tennant, Calif. Digital Library, UC-Davis.

- Mostly directed on where information needs to come from – make web searches easier – more like Google, but need sources with better information. Some sites:
- Google – add "find in library" to searches
- EEVL (www.eevl.ac.uk) directs user to engineering sites
- eScholarship (U. Cal.) – digital repository of published papers, over 1500 books digitized
- redlightgreen.com is good.

John Schneiter, Pres., GlobalSpec, Inc.

- Spoke on how internet is changing engineering. His Globalspec site provides a good search engine for sources of components, equipment, etc plus built-in calculators. Future will include links to published papers. Websites mentioned: eFunda.com, techonline.com (mostly electronics), knowledgestgorm.com(software), knovel.com (books, hot equations, graphs w/ users data). Also MIT's Open Courseware Initiative puts classnotes, syllabi, exams, etc are open to everyone.

MET (Mechanical Engineering Technology) Issues

2468

- Paul Steif, Carnegie Mellon, uses a very basic but visual FEA program for visualization in strengths of materials. Could be good intro to FEA. Will share. ASEE/Mechanics division site has ideas.

2547

- Milwaukee College of Eng BSMET program FEA with Experimental Stress course. Starts with basic models (bar in tension, bending, symmetric stress risers) – verifies by hand and with strain gages. Does more complex stress risers – verifiable only with experiment. Includes buckling – columns, beams (torsional) – modeling and experiment. Very happy with Algor.
- Middle Tenn State teams freshmen with seniors for projects – ASME? Moon Buggy some years ago. Has moved on to Solar Cars, mini-Baja. Done well – good PR. Such competitions are capstone options. 3 credits largely independent study.
- Penn State – Erie has a very involved intro to manufacturing processes course – machine, cast, weld, etc – that is tied to engineering principles – tolerancing, teams, measurement, reverse engineering, more. Students built an air motor (Nimco Pipsqueak engine). (Started by METs in MFGT150 some years ago.)
- Purdue teaches vibrations with a hands-on course called MET317 "Machine Diagnostics." 4 weeks theory, rest includes testing, data acquisition, industry demonstrations, also lubrication analysis, balancing, alignment. Indiana Chapter of Vibration Institute has been a big help.

2647 Applications in MET

- Northeastern U supplements statics and dynamics course with labs. Students are given kits to build experiments like those found in text. (Similar to MECH 341.) Proposal to NSF to make the lab class multidisciplinary (MET, EET, Comp Sci) – include others to do sensors and data acq. Was pointed out that METs can do all of above.
- ODU uses Automation Studio in its automation course – students start with kits, drawings, includes PLCs.

MET Dept Heads Business Meeting

- New MET promotional materials will be coming from ASME. $ available. Is website for group on ASME site. ASME's "Professional Practice Curriculum Online" has over 40 modules available to educators, students, and practicing engineers – on diverse topics including meetings, presentations, product development, patents, leadership, design process, more. Survey of chairs revealed that recruiting/retention and sources of outside funds were top concerns.

1368 Statics and Dynamics Courses

- A common misconception in dynamics concepts questionnaire was developed by faculty from multiple institutions – for before & after.

Poster Sessions

- Tim Cooley, Purdue-New Albany – is developing a 30 rpm engine to enhance understanding of Otto cycle. NSF sponsored.
- Hofstra U presented a senior team project – student designed/built heat exchanger test stand (done at FSU at one time.)

U. Dayton kinematics-dynamics-machine design sequence includes 3 cr kinematics (Myszka), 3 cr dynamics (last chap in Myszka + notes), 3 cr machine design (Mott).

Liberal Education

3461

- One paper suggested integrating liberal educ into capstones – getting students to look at the bigger picture – using concepts from humanities and social sciences. Students must "scale up" their projects. Suggested that humanities and social sciences be integrated throughout the curriculum.

Engineering Graphics

1338

- A survey by U. Texas-Austin indicated that 2-D sketching and 3-D modeling were high on the list of outcomes in engineering graphics.
- Ohio State integrates engineering graphics into a one year, 3 quarter sequence on intro to engineering. A nationally normed test is being developed.

3649

- Dave Myszka, U. Dayton, brings 'design' into basic engineering graphics with a series of open-ended problems where students must visualize and create brackets, etc to meet a need.

VOLUME I

THE INSTITUTION AND ENGINEERING TECHNOLOGY UNIT

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SUPPLEMENT TO VOLUME I

THE INSTITUTION AND ENGINEERING TECHNOLOGY UNIT

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MECHANICAL ENGINEERING TECHNOLOGY PROGRAMS

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VOLUME II

MECHANICAL ENGINEERING TECHNOLOGY PROGRAMS

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APPENDICES

MECHANICAL ENGINEERING TECHNOLOGY FACULTY VITAS

	Name	**Charles G. Drake**
2.	*Department/ Section/ Program*	**Mechanical Design Department** **Mechanical Engineering Technology Program**
3.	*Date hired or assigned to department/section/program*	**9/2/1990**
4.	*Number of years of service to department/ section/program*	**14 years**
5.	*Present academic rank and date obtained*	**Professor, 2002**
6.	*Degrees*	**B.S. Mathematics, Lake Superior State College, 1974** **M.S. Mechanical Engineering,** **Michigan Technological University, 1992**
7.	*Other teaching experience*	**Graduate Teaching Assistant 1974-1977** **Taught engineering graphics and statics** **Mechanical Engineering- Engineering Mechanics Dept.** **Michigan Technological University** **Houghton, Michigan**
8.	*Full – time industrial experience*	**Test Engineer, 1985-1989** **Engineering Test Section** **Product Development Laboratory** **Reynolds Metals Company** **Richmond, Virginia** **Design Engineer, 1977-1985** **Engineering Dept.** **Product Development Laboratory** **Reynolds Metals Company** **Richmond, Virginia**
9.	*Part-time industrial experience*	**None**
10.	*Consulting work*	**Finite element analysis on a failed thermoforming machine,** **February 1998** **Brown Machine Division** **Trafalgar House, Inc.** **Beaverton, Michigan**

	Name	**Charles G. Drake**
		CD Review: Statics Tutor by DeVore Prentice- Hall November 1999 **The Knowledge Company** **Examine work experiences for educational equivalence of person's seeking to immigrate or work in the U.S. Several cases per year. 1998 to 2001** **CD Review: Statics** **Simon & Schuster March 1999** **Wedin International** **Review ball screw installation problem with product designed to raise 165-ton platform used on telescopes. No contract evolved.** **Review: Statics and Strength of Materials, 4th ed. Morrow, H. : Prentice Hall January 2002** **Review: Applied Fluid Mechancics , 5th ed. Mott, R. : Prentice-Hall June 2003** **Chapter Review: Measurement Systems, 5th ed. Doebelin: McGraw-Hall June 2003**
11.	*Professional recognition*	**Registered Professional Engineer** **State of Michigan** **Commonwealth of Virginia**
12.	*Principal publications during the last five years*	**None**
13.	*Scientific and technical societies of which a member*	**American Society of Mechanical Engineers, Member** **Society of Manufacturing Engineers, Senior Member** **American Society of Engineering Educators, Member** **Fluid Power Society, Member** **American Solar Energy Society, Member** **Michigan Society of Professional Engineers, Big Rapids Chapter,** **Scholarship Chair, 1995 to present** **Mathcounts Coordinator, 2000 to present**

14. *Honors and awards*

Graduated with High Honors, 1974
Lake Superior State College

Alpha Chi Honorary, 1974
Lake Superior State College

Pi Tau Sigma, Mechanical Engineering Honorary, 1975
Michigan Technological University

15. *Specific programs and activities to maintain and enhance professional competence in which participated during the last five years*

National Instruments Seminar
Harley Hotel, Grand Rapids June 2, 1998- same

"Workshop on Electromechanical and Electropnematic Course Development" NSF sponsored through Purdue University
Macomb Community College June 28- July 1, 1999

Self- study for "Certified Fluid Power Pneumatic Specialist" exams from Fluid Power Society. Exams passed:
Pneumatics Specialist, May 6, 2000
Hydraulic Specialist, May 26, 2000

"Prior Learning Assessment" Workshop, Academic Affairs
Holiday Inn & Conference Center, June 9, 2000

CISM 590 Visual Basic with PLC Applications
Ferris State University, 3 semester hours, July 10-14, 2000

"Trends in Occupational Studies" Conference
Kellogg Center, East Lansing
October 26-27, 2000

Attend the Project Lead the Way Master Teacher/Affiliate Professor Retreat/Review Sessions
Rochester Institute of Technology, Rochester, NY
January 2001; January 2002, April 2002
Staff for PLTW teacher training, FSU, June 2001, 2002

Short Course on National Instruments LabVIEW Data Acquisition & Control Software
Pittsburgh, PA, July 29-31, 2002

TAC/ABET Program Evaluator training
Nashville, TN June, 2003

ASEE Annual Conference and Exposition
Nashville, TN June 2003

ASEE Regional Conference, Kalamazoo, MI April 2004

		ABET Faculty Workshop For Continuous Program Improvement, Salt Lake City, UT June 2004 **ASEE Annual Conference and Exposition Salt Lake City, UT June 2004**
16.	*Other duties performed for regular base salary during academic year, with average hours per week*	**College and university liaison and coordinator for TAC/ABET Accreditation visit for three programs, June through October 2004.** **Responsible for Mechanical Engineering Technology Laboratories (2 hours/week)** **Student Tutoring and Advising (4 hours/week)** **University General Education Committee (occasional)** **Academic Senate (1 hour/ week)** **Industrial Advisory Board for MET** **Arrange annual visits, conduct meetings, some contact throughout year**
17.	*Other duties performed for extra compensation during academic year, with average hours per week*	**Chair, University Curriculum Committee (4 hours/week)**
18.	*Recent summer or other assignments not shown above*	**Taught MECH 240 (now 340) Statics and Strength of Materials, 1998** **CAD Camp, two 4-hour sessions June 2002, one 4-hour session June 2003 and June 2004** **Summer Technology and Math Camp, July 2003, one 3-hour session** **King-Chavez-Park Camp, 4 hour session July 2003, 2 hour session July 2004** **FSU Summer University** **2000, 2001, 2002, 2003**
19.	*Any other pertinent information related to teaching effectiveness, professional activities or service to the engineering technology unit.*	**Continue as advisor to META student club. Annual overnight trips including GM Proving Grounds, National Auto Show, Design Engineering Show; homecoming float; "Spaghetti Bridge" competition; Adopt-A-Highway.** **Instrumental in establishing a national chapter of ASME (American Society of Mechanical Engineers).**

Co-advisor for establishing a colony of a national engineering fraternity on campus, Theta Tau.

Presenter for "Monday Night Technology," a local enrichment program for middle school students in. One to two nights annually.

Advisor for high school student science projects, 1999 and 2003.

"Structures Coach" for middle school and high school Science Olympiad teams, 1999-2001.

Provided 2-week mechanical engineering internship experiences for local Math-Science-Technology Center students May 1999, May 2000, May 2003.

Prepared proposal for BSMET program, 1999-2000.

Received Faculty "Excellence Award" for $5,000 towards developing MET Lab, April 2003.

Received College Faculty Development awards for LabVIEW training July 2002 to attend ASEE Conference and TAC/ABET Visitor Training June 2003, and to attend ABET Continuous Improvement training and ASEE Conference June 2004.

	Name	**Thomas W. Hollen**
2.	*Department/ Section/ Program*	**Mechanical Design Department** **Mechanical Engineering Technology Program**
3.	*Date hired or assigned to department/section/program*	**January, 1998**
4.	*Number of years of service to department/ section/program*	**5 ½ years**
5.	*Present academic rank and date obtained*	**Assistant Professor, January 1998**
6.	*Degrees*	**B.S. Automotive Engineering Technology,** **Western Michigan University, Kalamazoo, Michigan, 1968** **M.S. Mechanical Engineering Technology,** **Western Michigan University, Kalamazoo, Michigan, 1971**
7.	*Other teaching experience*	**Western Michigan University, 1971-72, Adjunct Professor** **Western Michigan University, Fall 1989, Adjunct Professor**
8.	*Full – time industrial experience*	**Hollen Associates, Inc., Grand Rapids & Lansing, 1996 to 1997, President, Operating Commercial & Industrial rebate program for Consumers Energy** **ANCO Engineers, Inc., Okemos, Michigan, 1992-96, General Manager - Michigan Division, Operating Commercial/Industrial Rebate Programs for Consumers Energy.** **Hollen Associates, Grand Rapids, Michigan, 1987 – 1992, President, Business Engineering Consultant for various companies.** **Research & Technology Institute of West Michigan, Grand Rapids, Michigan, 1990-1991. Program Manager, Manufacturing Systems** **BDO Seidman - CPA, Grand Rapids, Michigan, 1978 – 1987, Senior Manager, Engineering Business Services** **Federal Mogul Corporation, St. Johns, Michigan, 1976 -1978, Facility Engineer** **Belden Corporation, Automotive Division, Geneva, Illinois, 1972**

	Name	**Thomas W. Hollen**
		– 1974, Product Development Engineer
9.	*Part-time industrial experience*	**None**
10.	*Consulting work*	**Hollen Associates, as shown above.** **Consumers Energy Co., 1997 – 2000, Energy Consultant on open contact as needed.** **The Advisory Group, Principal, 2000 – present. , current work includes member of advisory board to BirdTec, Inc. in Heresy, Michigan.**
11.	*Professional recognition*	**Registered Professional Engineer, Michigan, 1977** **Registered Professional Engineer, Minnesota, 1994**
12.	*Principal publications during the last five years*	**None.**
13.	*Scientific and technical societies of which a member*	**American Society of Mechanical Engineers, member**
14.	*Honors and awards*	**None**
15.	*Specific programs and activities to maintain and enhance professional competence in which participated during the last five years*	**Attended Extended Orientation for new faculty presented by CTL&FD, Ferris State University (FSU). 1998-1999.** **Lilly West Conference on College & University Teaching, UCLA Training Center, 1999** **Completion of Harassment /Sensitivity Training, by Office of Affirmative Action, FSU, 1999** **Conducted Self Study CD-ROM Fluid Power course 2002** **Attended Ferris Summer University, university development program, Summer 2000, 2001, 2002** **Attended COMDEX 2000, in Chicago, April 2000** **Lilly North Conference on College & University Teaching, 2002** **Department WEB Page Training, January 2002.**
16.	*Other duties performed for regular base salary during academic year, with*	**Member Student Life Committee, Faculty Senate sub-committee 1999-2003, Chair 2002-2003 (1 hour/week)**

	Name	**Thomas W. Hollen**
	average hours per week	**Department Curriculum Committee, 2001-2003, Chair, 2002-2003 (< 1 hour/week)** **Primary developer of proficiency test for ETEC 140 Engineering Graphics** **Advising and tutoring students, (4 hours/week)**
17.	*Other duties performed for extra compensation during academic year, with average hours per week*	**None**
18.	*Recent summer or other assignments not shown above*	**Responsible for MECH 393, Mechanical Engineering Technology Industrial Internships, Summer 2002 and Summer 2003.**
19.	*Any other pertinent information related to teaching effectiveness, professional activities or service to the engineering technology unit.*	**Completed 60 hrs of doctoral course work, Mechanical Engineering Systems, Michigan State University, Lansing, Michigan 1978** **Participated in every commencement ceremony since May 1998.** **Arranged Annual MET Student Golf Outing 1999 - 2003** **Assisted as server at College of Technology Picnic, September 2001-03** **Participated in Autumn Adventure 1999 - 2001** **Alternate Advisor for Mechanical Engineering Technology Association (META).** **Accompanied META students to Detroit Auto Show, January 2000** **Accompanied META students to Design Engineering Show, Chicago 1999, 2002, 2003** **Worked with META students on float for Homecoming and Chili Cook-Off, 2002-2003**

	Name	**Randy J. Stein**
2.	*Department/ Section/ Program*	**Mechanical Design Department** **Mechanical Engineering Technology Program**
3.	*Date hired or assigned to department/section/program*	**August 1998**
4.	*Number of years of service to department/ section/program*	**6 years**
5.	*Present academic rank and date obtained*	**Associate Professor, August 2004**
6.	*Degrees*	**B.S. Mechanical Engineering,** **Michigan Technological University, 1974** **M.S. Mechanical Engineering** **Michigan Technological University 1981**
7.	*Other teaching experience*	**Graduate Teaching Assistant:** **Michigan Technological University (1973-1977)** **Pennsylvania State University (1980-1984)**
8.	*Full – time industrial experience*	**John Deere Company, Waterloo, IA (1977-1979)** **Noise, Vibration, Stress Analysis of Agricultural Tractors** **IBM, Endicott, NY (1984-1990)** **Noise, Vibration, Heat Transfer of mainframe computers** **Caddtech, Rochester, NY (1997-1998)** **Sales, Technical Service of CAD (Solid Edge), CAM (Esprit) software**
9.	*Part-time industrial experience*	**None**
10.	*Consulting work*	**None**
11.	*Professional recognition*	**None**
12.	*Principal publications during the last five years*	**None**
13.	*Scientific and technical societies of which a member*	**American Society of Mechanical Engineers, Member** **American Society for Engineering Education, Member** **Acoustical Society of America, Member**

	Name	**Randy J. Stein**
14.	*Honors and awards*	**Phi Kappa Phi (National Honor Fraternity) while at Penn State**
15.	*Specific programs and activities to maintain and enhance professional competence in which participated during the last five years*	**New faculty training program (Fall 1998-Winter 1999)** **Lilly- North Teachers Conference:** **September 2001** **September 2002**
16.	*Other duties performed for regular base salary during academic year, with average hours per week*	**FSU Professional Development Committee** **Chair: 1999-2002** **FSU Academic Program Review Council (APRC)** **2000- present** **Academic Senate, Fall 2002 to Spring 2004** **College of Technology Graduate Program Committee: 2002-present** **College of Technology Scholarship Committee: 2003-present** **Mechanical Design Department Chair: commence Fall 2003** **Advising and tutoring students, (4 hours/week)**
17.	*Other duties performed for extra compensation during academic year, with average hours per week*	**Mechanical Design Department Chair - summer 2004 duties**
18.	*Recent summer or other assignments not shown above*	**Taught MECH 340 (formerly 240) Statics and Strength of Materials, Summer 2000, 2002** **Taught PDET 422 Advanced Machine Design (w/ FEA) Summer 2002**
19.	*Any other pertinent information related to teaching effectiveness, professional activities or service to the engineering technology unit.*	**Recent graduate courses:** **ME 561- Finite Element Theory (3 credits)** **Western Michigan University (Fall 2000)** **ME 661- Advanced Finite Element Theory (3 credits)** **Western Michigan University (Winter 2001)** **ME 665- Sound and Structural Interaction (3 credits)** **Western Michigan University (Fall 1999)**

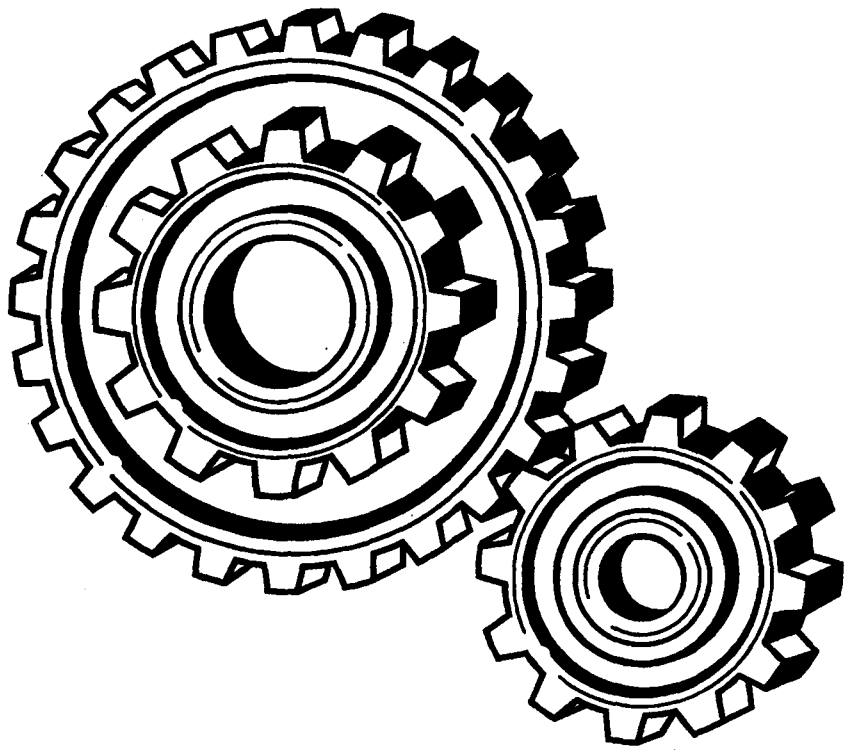
Name **Randy J. Stein**

WebCT Seminar – Winter 2003

Penn State, Graduate study in Acoustics, 1980-84, abd

MECH 393

MECHANICAL ENGINEERING TECHNOLOGY INDUSTRIAL INTERNSHIP



Mechanical Engineering Technology
Mechanical Design Department
College of Technology
Ferris State University

FORWARD

This student Internship Training Guide has been developed to make your Internship a profitable and rewarding educational experience. It strives to answer questions you may have, and gives common guidelines for everyone to follow.

Comments and suggestions as to possible improvements in this guide are always welcome.

Note: MECH 393 is only offered during the Summer Session.

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Section I.

INTRODUCTION

Students in the Mechanical Engineering Technology program have a mandatory program requirement to successfully complete MECH 393 (Industrial Internship). You will find this course to be valuable. To manage this type of an Internship requires time and effort, not only by the students, but also by the faculty and the employer.

The internship experience is an opportunity for all participants to gain from (students, faculty and employer) and all three must be prepared to do their part if the internship is to be successful experience. The ultimate responsibility of finding employment for the internship rests with the individual student. The faculty advisor will make every attempt to assist the student, but the student is responsible for obtaining employment.

The student, employer, and faculty, as well as Ferris State University have much to gain from an internship.

WHY THE REQUIREMENT FOR AN INDUSTRIAL INTERNSHIP?

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

THE VALUE OF AN INTERN FOR AN EMPLOYER

1. Reduce recruiting and training cost of full-time professional employees.
2. Free high salaried professionals from some of their more routine tasks.
3. Preview a potential full-time professional, without commitment.
4. Acquire an "experienced" professional employee after the intern graduates.

BENEFITS TO FERRIS STATE UNIVERSITY

1. Offers a better course of instruction, utilizing the facilities and personnel of many employers.

2. Produces a Mechanical Engineering Technology student, with hands-on experience, who is much better prepared to take a place in society.

3. Provides feedback to keep our program relevant to industry's needs.

Section II.

PRE-INTERNSHIP REQUIREMENTS

Prior to actually going out and finding an internship, there are several requirements:

1. Must be accepted into the MET program and have Junior standing.

2. Submit a typed Resume to the Student Employment & Career Center for review and posting on the Center's web site. See: http://www.ferris.edu/careerservices/

3. Assistance with resumes, job searching, interviewing, etc., can be found on their web site. Use it!

4. Resume should be submitted no later than November 30.

5. Submit a copy of your resume to the MET Internship coordinator, Prof. Hollen

6. Successfully complete all Mechanical Engineering Technology courses required in the junior year. Pre-requisites for MECH 393 is Junior status.

Note: MECH 393 is only offered during the Summer session.

WHERE DO YOU START TO FIND AN INTERNSHIP

Develop a Resume: Use Career Services

- Determine what you want to gain from your internship. Establish some objectives.
- Realize the importance of interviewing and resume writing skills.
- Start targeting several companies. Start with 10 or 20.

Where to find companies – Utilize all resources

- Fall & Winter Job Fairs
- Career Services web site. Get registered and post your resume. They will notify you by e-mail of new postings.
- Network - Talk to other students, friends, parents, about companies they might know of a company that hires interns, or may be potential companies to contact.

- A list will be provided of past companies that have hire our interns and expressed an interest in another.

- Use the WEB. Check job search locations, search for companies offering internships Check the WEB pages of companies you are interested in to see if they discuss internships. Check newspapers. Check publications of professional associations – available in FLITE. If member of ASME, then use their job postings area.

- Contact the H.R. department of companies that interest you.

What to do after finding companies

- Check their WEB page to get an understanding of the companies operations.

- Write or phone the company to obtain information about an internship.

- Send your resume and request an interview.

- Check the Career Services web site for Do's and Don'ts of interviewing. Those listed are the results of surveys conducted of interviewers from companies who have visited Ferris in the past.

- Get your best clothes together and polish your image.

Section III

RULES GOVERNING INTERNSHIP

In order for the Industrial Internship program to function and work successfully, a number of rules and procedures have been developed. The student is responsible to know and follow these rules. It should be kept in mind that everything a student does reflects on the student, the Mechanical Engineering Internship Program, and Ferris State University.

1. Students must be conscientious and work to the best of their ability.

2. Any serious employment difficulties, or serious misunderstandings, must be reported immediately to the intern coordinator.

3. Interns are required to comply with all conditions of employment, including rules of the employer, federal, state, and local regulations.

4. The Internship site supervisor must be notified immediately in the event the student is unable to report to work. If the absence from work extends more than three days, the intern coordinator must be notified.

5. A student may not abandon a job! Employment can be terminated only after consultation with both the intern coordinator and the employer.

6. The internship experience is a paid work experience. Typically hourly wages are commensurate with those of an incoming engineer in training.

GETTING THE MOST OUT OF YOUR INTERNSHIP

How can you get the most out of your job? How can you succeed on the job? What can you do to establish a good "on-the-job reputation?" The answers to these questions are related. When you are able to answer one question you will often find you will have an answer to another.

Before offering a number of suggestions, we presume that as an employee you (I) want to do a good job, and (2) are receptive to advice and criticism.

When you are new on a job, you will have some latitude because you are a beginner, but don't count on your period of grace lasting forever.

1. Find out what your work is; what your responsibilities are. Ask questions.

2. Make sure you understand when being given instructions. Concentrate.

3. Know who can give you information, advice or help.

4. Read the literature pertaining to your place of employment.

5. Read the instructions for operating equipment and machinery.

6. Read and follow the company rules. They are usually posted. If not - ask.

7. Work as accurately, safely, and quickly as you can. Set high standards for yourself

8. Learn from your mistakes. Don't try to cover up.

9. Remember that most of your work will be routine - but important. Do the routine things as capably as you do the more complex and sophisticated work.

10. Try to do more than you are required to do. Keep productively busy.

11. Observe everything. Watch how the "old hands" operate. Why are some individuals more effective and efficient than others?

Later on, after you have been around a while and have gained a measure of experience and stature, many things will start to change. You'll find that others have ambition, pride, jealousies, fears, hates, etc. You'll have to get along with all kinds of people.

1. Be tactful, don't offend others. Show respect and politeness.

2. Be friendly. Avoid being aloof or over bearing.

3. Avoid cliques, do not gossip, and do not be nosy.

4. Be appreciative of advice and help.

5. Be completely honest.

6. Be considerate of others in all ways.

7. Ask as few favors as possible. Restrain yourself from borrowing, but offer your services often.

8. Give praise or credit when they are due, but avoid false flattery.

9. Be humble.

10. Have confidence in your ideas. Present them at appropriate times.

11. Do not show annoyance at criticism.

12. Learn the art of friendly humor.

13. Smile

Section IV.

INDUSTRIAL INTERNSHIP REOUIREMENTS

To success fully complete the internship course MECH-393, you must demonstrate the ability to work in an engineering position out in industry. The following are requirements of the course and all must be successfully completed.

1) The student will:
   a) **Be employed in an engineering capacity for 10 weeks or 400 hours.**
   b) Submit consecutive, weekly status reports to the Internship coordinator and a copy to your supervisor.
   c) Provide a final evaluation of the internship.

2) The employer will:
   a) Provide meaningful engineering work assignments.
   b) Evaluate the intern twice during his/her internship.

3) The Ferris Internship Coordinator will:
   a) Visit the intern at his/her work site.
   b) Review weekly status reports from interns.
   c) Act as liaison between intern and employers.
   d) Evaluate the intern on his/her internship.
   e) Review employer evaluations.
   f) Assign student grade upon semester completion. (class is Credit/No Credit)

Section V

GRADING

The assigning for grades to the intern will result in either a Credit/No Credit situation. All course work must be completed satisfactorily - both for the training site supervisor and the intern coordinator.

The intern will be evaluated on the following:

1. Weekly reports submitted to the intern coordinator.
2. Visit by the Internship coordinator.
3. Training site supervisor mid-term & final evaluations

SUPERVISORY EVALUATION SHEET – MID-TERM

Intern's Name: _____ Company Name: _____

Company Address: _____

Name/Title of Person Making Evaluation _____

Please circle the number that best rates the intern's performance for the item. Use the following relationships when making your judgement.

1. Excellent
2. Above Average
3. Average
4. Below Average
5. Unacceptable (Poor)

		Excellent		Average		Poor	N/A
A.	Knowledge and performance relative to the tasks assigned	1	2	3	4	5	
B.	Employee attitude	1	2	3	4	5	
C.	Technical growth during internship	1	2	3	4	5	
D.	Productivity	1	2	3	4	5	
E.	Weekly reports for FSU	1	2	3	4	5	
F.	Final report for internship	1	2	3	4	5	
G.	Overall employee effectiveness	1	2	3	4	5	
H.	Performance relative to expectations	1	2	3	4	5	

Notable Deficiencies:

General Comments, Recommendations or Points of Excellence

Signature of Evaluator: _____ Date: _____

Please return this evaluation by June 30, 2004, to:

Attn: Thomas Hollen
Ferris State University
Mechanical Design Department
915 Campus Drive, Swan 405
Big Rapids, Michigan 49307
or E-mail to: Hollent@ferris.edu

Thank You for Your Cooperation!

SUPERVISORY EVALUATION SHEET - FINAL

Intern's Name: _____ Company Name: _____

Company Address: _____

Name/Title of Person Making Evaluation _____

Please circle the number that best rates the intern's performance for the item. Use the following relationships when making your judgment.

1. Excellent (Outstanding in every respect)
2. Above Average
3. Average
4. Below Average
5. Unacceptable (Poor)

	Excellent		Average		Poor	N/A
A. Knowledge and performance relative to the tasks assigned	1	2	3	4	5	
B. Employee attitude	1	2	3	4	5	
C. Technical growth during internship	1	2	3	4	5	
D. Productivity	1	2	3	4	5	
E. Weekly reports for FSU	1	2	3	4	5	
F. Final report for internship	1	2	3	4	5	
G. Overall employee effectiveness	1	2	3	4	5	
H. Performance relative to expectations	1	2	3	4	5	

Would you interested in another intern next Summer? _____

Notable Deficiencies:

General Comments, Recommendations or Points of Excellence:

Signature of Evaluator/Date _____

Please return this evaluation as soon as possible, to:

Attn: Thomas Hollen
Ferris State University
Mechanical Design Department
915 Campus Drive, Swan 405
Big Rapids, Michigan 49307

Thank You for Your Cooperation!

or E-mail to: Hollent@ferris.edu

WEEKLY REPORT

MECH 393, INDUSTRIAL INTERNSHIP

Report is to be submitted weekly

Name: _____

Company: _____

Dates Covered by Report: _____

Date of Report: _____

Activities:	
Monday	
Tuesday	
Wednesday	
Thursday	
Friday	

Signed: _____

Please return this report to:

Attn: Thomas Hollen
Ferris State University
Mechanical Design Department
915 Campus Drive, Swan 405
Big Rapids, Michigan 49307

Thank You for Your Cooperation!

or E-mail to: h949831@aol.com

STUDENT INTERNSHIP DATA SHEET

Intern's Name: _____ Company Name: _____

Company Address: _____

_____

_____

Phone to contact you at Company: _____

E-mail address to contact you at: _____

Starting Date: _____

Name/Title of Supervisor _____

I will need to meet with you and supervisor during 3 or 4th week of Internship, to see what you job function is and how things are going. If you know of a good date for this, please let me know, or I will be contacting you.

Comments or other information I should know: _____

Please return to:

Attn: Thomas Hollen
Ferris State University
Mechanical Design Depart.
915 Campus Drive, Swan 405
Big Rapids, Michigan 49307
or E-mail to: h949831@aol.com

Thank You for Your Cooperation!

INTERN'S EVALUATION SHEET

To be completed at the end of your internship

Intern's Name: _____ Company Name_____

Company Address: _____

Name/Title of Supervisor: _____

Please circle the number that best rates your evaluation of your internship for the items listed below. Use the following relationships, when making your judgment.

6. Excellent **(YES)**
7. Above Average
8. Average
9. Below Average
10. Unacceptable **(NO)**

All comments will be kept confidential

	Excellent		Average		Poor	N/A
A. Did you have the knowledge or education to perform the tasks assigned	1	2	3	4	5	
B. Did the position provide direction and training?	1	2	3	4	5	
C. Management's attitude towards you as an intern.	1	2	3	4	5	
D. Technical growth during internship?	1	2	3	4	5	
E. You're Productivity during internship?	1	2	3	4	5	
F. Were your expectation met?	1	2	3	4	5	

Would you recommend the position for someone else looking for an Internship? _____
(if no, why not)

Any Concerns:

General Comments, Recommendations or Points of Excellence:

Please return this evaluation as soon as possible, to:
Attn: Thomas Hollen
Ferris State University
Mechanical Design Department
915 Campus Drive, Swan 405
Big Rapids, Michigan 49307

Thank You for Your Cooperation!

or E-mail to: Hollent@ferris.edu