2006-1985: LESSONS LEARNED: REFLECTIONS ON A DEPARTMENT'S FIRST TC2K EVALUATION

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Lessons Learned:
Reflections on a Department's First TC2K Evaluation

Abstract

The department's first accreditation visit under the TC2K criteria was completed in fall, 2005. The philosophy of continuous improvement requires an assessment of the results -- an "after action report" so to speak to assess how the department's presentation was received by the visiting team, how well the preparation accomplished what was necessary, and what could be improved next time. This paper is a follow up to our analysis on the implementation of TC2K and our department's preparations over the past six years[1-9]. In particular we show how it was demonstrated that students met the department program outcomes and the Technology Accreditation Commission (TAC) of the Accreditation Board for Engineering and Technology (ABET) "a through k" program outcomes before graduation. Concrete examples will be provided that may be useful for other programs nearing an ABET visit.

Introduction

The department has six full-time engineering technology faculty members serving the mechanical engineering technology (MET) and industrial engineering technology (IET) programs. All were fully engaged over the last several years preparing for the visit. There were no slackers in the department. Administrative leadership was largely responsible by fostering a continuous quality improvement atmosphere and communication within the department[8,9]. Departmental faculty members from two non-ABET accredited programs in the department and non-faculty staff members also helped out significantly. Also responsible was the value the university places on continuous improvement and accreditation. For example, both IET faculty members teach and consult in the area of total quality management and three of the six engineering technology faculty in the department are TAC/ABET commissioners or alternates with accreditation team chair experience. Insights from these individuals will be presented in the paper.

Associate Degree

One insight realized during the visit preparation was that the department's associate degree level engineering technology programs would have more difficulty meeting the requirements of the TC2K criteria than the four year programs. The criteria require demonstrating that graduates meet the same "a through k" outcomes whether they have experienced four years of course work or only two. It was difficult or impossible to add new courses to cover any of the so-called "soft" ABET program outcomes "h, i, j, and k" that were not covered before TC2K. Simultaneously, Purdue University Calumet added a new general education graduation requirement requiring all programs teach a one to three credit hour freshman experience course to improve retention, an Academic Quality Improvement Program (AQIP) goal and project for the Higher Learning Commission of the North Central Association of Colleges and Schools. In response, the department modified the title and contents of an existing three credit freshman level computer course. Our sister MET program at Purdue West Lafayette found that most students were getting adequate preparation using computer software such as Microsoft Office in

high school anyway prompting them to eliminate their freshman computer course. A new textbook[10] focusing on student success was adopted along with material on ethics, workplace diversity, quality, and lifelong learning. Ethics is introduced in the course text but material from the free, web based American Society of Mechanical Engineers (ASME) Professional Practice Curriculum (PPC) was predominantly used. Workplace diversity came from the same source. Both topics have a quiz on the ASME PPC web site[11] that students can take for practice. A multiple choice test was prepared over the material, modifying some of the web questions and adding questions dealing with course text book material and local content, for example the university's honor code, cheating, and student conduct. The quiz was administered using the university's course management system WebCT Vista. The text book chapter on lifelong learning provided an opportunity to assign a paper on this topic. Continuous improvement was also covered in the course text book. A PowerPoint lecture, practice quiz, and test were prepared over quality and continuous improvement concepts and terms using Society of Manufacturing Engineers (SME) certification practice material. Average test scores and paper grades were presented as course embedded assessment measures to demonstrate the respective "soft" ABET outcomes were achieved. Table 1 shows sample results for the course imbedded assessments in the fourth through seventh columns. The same form is used for bachelors' degree level courses.

Multiple assessment measures are required to show that outcomes are satisfied, so questions asking to what extent students felt they mastered applicable outcomes were added to the course assessment/ teacher evaluation survey administered in Vista at the end of the semester. Sample results are shown in Table 2 for the applicable local MET program outcomes and in Table 3 for the applicable ABET outcomes.

Data Collection and Presentation

Outcomes Each faculty member in the department has developed assessable course objectives for all of their courses. Generally the course objectives support one or more of the TAC/ABET "a through k" outcomes along with one or more of the Purdue Calumet MET or IET program outcomes. Course embedded assessment measures usually consist of graded work such as projects, labs, papers, tests, homework, or presentations. Some faculty members find it necessary to grade and record scores on individual questions or homework problems separately depending on the degree of specificity of the related course objective. At the end of the semester the instructor gives a paper based or Vista course assessment questionnaire to the class. These tend to be 25 to 30 questions long but students are required to fill them out. A spreadsheet with tabs similar to Tables 1, 2, and 3 is filled out using an Excel template customized for each course. Print outs were included with the display material for the visiting accreditation team. About half of the MET courses also have outcome assessment files posted on the Internet in PDF format[12].

Program Educational Objectives Data demonstrating that program objectives are achieved three to five or more years after graduation comes from alumni surveys, employer surveys, industrial advisory committee meetings, informal alumni interviews, and phone or web surveys. Surveys are kept short, no longer than one side of one page or equivalent to maximize return rate. It may take several years to cover every program educational objective and to get a reasonable number of replies.

Table 1

MET161 Introduction to Engineering Technology Course Assessment Tool – Instructor and Student Course Objective Assessment													
Semester:	**Spring 2005**				**Instructor:**	**Neff**							
Course Objective	**Supported ABET Outcome**	**Supported Related Program Outcome**	**Course Embedded Assess.**				**Student Evaluation (%)**					
			Assess. Tool 1	**Score (%)**	**Assess. Tool 2**	**Score (%)**	**E**	**G**	**A**	**P**	**NA**	**Avg.**
(1) A specific objective of this course is to find information or do research using the Internet, library, and department resources. How well did the course meet this objective?	a MET skills	1.3 Computer Applications	Internet Homework	86%			30	40	30	0	0	**4.0**
(2) A specific objective of this course is to construct tables and graphs of engineering calculation output using spreadsheets. How well did the course meet this objective?	a MET skills	1.3 Computer Applications	Homework	91%			20	50	30	0	0	**3.9**
(3) A specific objective of this course is to create web-based materials from a combination of sources, including tables, drawings, text, and imported graphics. How well did the course meet this objective?	a MET skills	1.3 Computer Applications	Web page (see exhibits)	81%			50	30	20	0	0	**4.3**
	b Apply knowledge	1.2 Math & Science										
(4) A specific objective of this course is to communicate and work effectively with others to accomplish set tasks and goals. How well did the course meet this objective?	e Teamwork	3.4 Assist Others in Groups	Team Assignment (part of web site)	NA			30	40	20	10	0	**3.9**
	g Communication	3.3 Communicate Effectively										
(5) A specific objective of this course is to become familiar with campus resources, campus facilities, campus organizations, and the campus computer network including email. How well did the course meet this objective?	a MET skills	1.3 Computer Applications	Email assignment	99%			30	50	20	0	0	**4.1**
	h Lifelong learning	2.4 Self-Learning										
(6) A specific objective of this course is to develop an understanding of quality improvement terms and quality improvement practices. How well did the course meet this objective?	k Cont. improvement	2.4 Self-Learning	Quality test	89%			40	30	20	10	0	**4.0**
		3.1 Personal Responsibility										
(7) A specific objective of this course is to develop an appreciation for others and their differences. How well did the course meet this objective?	j Diversity	3.2 Human Differences	Diversity test	93%			60	30	10	0	0	**4.5**
(8) A specific objective of this course is to develop recognition of the need to prepare for life long learning opportunities. How well did the course meet this objective?	h Lifelong learning	2.4 Self-Learning	3 year academic plan	92%	Lifelong learning paper	90%	30	70	0	0	0	**4.3**
		2.2 Exposed to Prof. Societies										
(9) A specific objective of this course is to develop an understanding of professional and ethical responsibilities. How well did the course meet this objective?	i Ethics	3.1 Personal Responsibility	Vista Ethics Test	86%			70	10	20	0	0	**4.5**
		2.2 Exposed to Prof. Societies										
(10) A specific objective of this course is to develop an understanding of the engineering technology discipline; its relationship to engineering and relevant professional societies. How well did the course meet this objective?	e Teamwork	2.2 Exposed to Prof. Societies	# of student chapter applications	NA			60	20	20	0	0	**4.4**
	j Diversity											
Instructor Comments for needed changes: A course embedded assessment measure is needed for Course Objective (#8). More teaching material for this objective needs to be found also. More work on scheduling speakers' needs to be done early in the semester which should be more possible once a course schedule with time required for various topics settles out. Students who give up need to be administratively dropped. 40% F grades is incompatible with the course purpose of teaching how to be successful in ET. Need more effort recruiting student chapter members or a different assessment measure. Note that students rated accomplishing this objective (#10) between good & excellent.											**10**	
										Average =	4.2	

Table 2

MET161 Introduction to Engineering Technology Purdue Calumet MET Program Educational Outcome Assessment							
Instructor: Neff			**Semester: Spring 2005**				
Educational Program Outcome	**Student Evaluation (%)**						**Evidence that Supports the Educational Program Outcome**
	E=5	**G=4**	**A=3**	**P=2**	**NA=1**	**Avg.**	
1.2. As a result of this course my proficiency in applied mathematics and science can be rated as:	60	20	20	0	0	**4.4**	Four graded Excel homework assignments.
1.3. As a result of this course my proficiency in computer applications can be rated as:	30	30	30	10	0	**3.8**	Email, web page, Vista course management system, web search assignment, PowerPoint presentation, and Excel problems.
2.2. As a result of this course my exposure to the value of professional societies in my career can be rated as:	30	40	30	0	0	**4.0**	Student lab tours & demos by student chapter members of SME, ASME, and SAE. Used society material.
2.3. As a result of this course my proficiency in managing projects can be rated as:	20	70	10	0	0	**4.1**	Many course assignments must be managed.
2.4 As a result of this course my understanding of the advantages of self-learning can be rated as:	30	70	0	0	0	**4.3**	Lab assignments employed discovery learning. Lifelong learning chapter in text. Power Point before paper.
3.1 As a result of this course my exposure to situations that develop a sense of personal responsibility and accountability for my actions and performance can be rated as:	40	50	10	0	0	**4.3**	Ethics assignment using ASME PPC material and 10 question quiz. Quality assignment & 10 question quiz.
3.2. As a result of this course my exposure to situations that develop their philosophy and appreciation for human differences can be rated as:	30	40	30	0	0	**4.0**	Workplace diversity assignment using ASME PPC material and 10 question quiz
3.3 Students will be able to demonstrate the ability to communicate in individual and team settings can be rated as:	70	10	20	0	0	**4.5**	PowerPoint team presentation assignment, web page, continuing education paper
3.4 As a result of this course my proficiency in assisting others in a group can be rated as:	50	40	0	10	0	**4.3**	PowerPoint team presentation assignment, lab assignments emphasized helping others
Instructor Comments: Lifelong learning assessment fallback is a short paper intended to be graded using a rubric. Rubric needs to be developed.							
Average = 4.2							

Table 3

Instructor: Neff		**Semester: Fall 2004**					**Evidence that Supports the TAC/ABET Outcome**
	Student Evaluation (%)						
TAC/ABET Outcome	**E=5**	**G=4**	**A=3**	**P=2**	**NA=1**	**Avg. Score**	
i. As a result of this course, my ability to understand professional, ethical, and social responsibilities can be rated as:	21	74	5	0	0	4.16	Student lab tours & demos by student chapter members of SME, ASME, and SAE. Used society material and practice quizzes for ethics, diversity, and quality/continuous improvement course objectives.
h. As a result of this course, my recognition of the need for, and an ability to engage in lifelong learning can be rated as:	32	58	11	0	0	4.21	Lifelong learning chapter in text. Lifelong learning PowerPoint served as part of preparation for paper.
k. As a result of this course, my commitment to quality, timeliness and continuous improvement can be rated as:	37	53	11	0	0	4.26	Ethics assignment using ASME PPC web material and 10 question quiz. Quality assignment, PowerPoint & 10 question quiz.
j. As a result of this course, my respect for diversity and knowledge of contemporary professional, societal, and global issues can be rated as:	37	53	11	0	0	4.26	Workplace diversity assignment using ASME PPC material and 10 question quiz
g. As a result of this course, my ability to communicate effectively can be rated as:	37	47	11	5	0	4.16	PowerPoint team presentation assignment, web page, continuing education paper
e. As a result of this course, my ability to function effectively on teams can be rated as:	37	53	11	0	0	4.26	PowerPoint team presentation assignment, lab assignments emphasized helping others
Average =	4.22						

Exit Surveys A program evaluator (PEV) is required to consult with an adequate number of students to learn about students' perception of the program. A PEV often has trouble finding adequate time to ask students about the issues which are raised in the TC2K criteria. In an attempt to provide this information as well as to capture opinions of graduating students taking capstone courses, senior students are required to fill out an exit survey which consists of 45 questions. These include all the ABET "a through k" outcomes, all the MET or IET Purdue Calumet program outcomes, and many of the questions asked on the T4 program evaluator report when students are likely to have an opinion, or on requirements in the body of the TAC accreditation criteria not referenced in the TC4 questionnaire. Results and raw data are presented to the visiting team in a notebook in the display room. The exit questionnaire and results from the two senior project capstone courses are shown in an appendix at the end of this paper. Students do not see the first column which is provided for reference to the TAC TC2K criterion to the reader of this paper. The grand totals include associate degree student results not shown in the appendix.

The web was used as much as possible for communication among department faculty members and for presenting material to the visiting team. Six types of documents mostly relating to continuous improvement and to industrial advisory committees were placed on department web pages as discussed in Scachitti et al[1]. These included department strategic plan, program strategic plans, continuous improvement plan, department assessment tools, and advisory committee membership and minutes.

MET Program Self-Evaluation T4 Report A TAC program evaluator has a responsibility to represent the program being evaluating fairly. There is a regrettable difficulty, however, in finding evidence using publicly available documentation along with the self study questionnaire provided by the program to answer the questions in the T4 program evaluator report. The administrator for the program being visited often needs to lead the PEV through the material and frantically fill in the holes with evidence at the last minute. There are several reasons this occurs. First, few faculty or administrators know that it is possible to look at the T4 questions which are freely available on the web before the visit. Secondly, the self study questionnaire does not ask its questions in a way likely to elicit the evidence needed to answer the questions in the T4 program evaluator report. There is little similarity in order or emphasis between the two. To answer the T4 questions, a TC2K program self evaluation T4 report with hyperlinks was also placed on the web.

Self Study Report A paper self study questionnaire was provided ABET by the July 1st deadline, but a web based version with hyperlinks to evidence was placed on the web and updated continuously until the visit.

Results

While TAC does not act on accreditation teams' recommendations until the summer of the following year, the level of findings presented at the exit interview and provided to the university was very positive for the department; as was the interim report. The MET and IET program assessment data adequately demonstrated that outcomes were being met and program educational objectives were in place with the curriculum satisfying them. Neither program had any deficiencies or weaknesses.

Future Improvements Our department is planning to consider altering our assessment plan (assessing every course every time offered) to assessing each course once per year in order to limit the time required for assessment[14]. Another potential improvement would be to reconsider how the SME Fundamental of Manufacturing Exam[4] is used. Students are required to take this exam as seniors to involve them in lifelong learning. Currently faculty members are having difficulty using exam results since student certification test results from other colleges and universities while available may not be comparable since few if any other schools require the exam of all graduating students in an MET or IET program. Since the accreditation visit, one of the non faculty staff members in the department who is a six sigma black belt has analyzed the results from the last six test administrations and has been able to make suggestions that we hope will help continuously improve student scores. A positive note; following the campus assessment visit, Professor James Higley, MET program coordinator, provided the TAC forms committee with a revision of the instructions for the preparation of the self study. These are currently under consideration.

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Appendix -- TAC Criterion	Exit Survey Question	Spr 04 Avg MET495	Spr 04 Avg MET497	Fall 04 MET495	Fall 04 MET497	Spr 05 Avg MET495	Spr 05 Avg MET497	Fall 05 MET495	Fall 05 MET497	Weighted Average
Criterion 1 **Program Educational Objectives** Each engineering technology program must have in place a documented process by which the objectives are determined and periodically evaluated based on the needs of constituencies served by the program. Criterion 3. Assessment and Evaluation Each program must demonstrate that the results of the assessment of program objectives and outcomes are being used to improve and further develop the program in accordance with a documented process.	1. From my observations and experience as a student, the extent my program obtained and used evaluation information from me to improve and develop the program can be rated as:	4.50	4.60	3.70	4.67	4.20	3.92	4.00	4.29	4.21
Criterion 2 Program Outcomes a. to k. An engineering technology program must demonstrate that graduates have: **a.** an appropriate mastery of the knowledge, techniques, skills and modern tools of their disciplines	2. – a. My mastery of the knowledge, skills, and tools of my discipline can be rated as:	4.33	4.20	3.91	4.33	4.80	4.38	4.20	4.43	4.35
b. an ability to apply current knowledge and adapt to emerging applications of mathematics, science, engineering and technology,	3. – b. My ability to apply current knowledge and adapt to emerging applications of mathematics, science, engineering, and technology can be rated as:	4.67	4.20	4.27	4.17	4.60	4.31	4.10	4.57	4.35
c. an ability to conduct, analyze and interpret experiments and apply experimental results to improve processes,	4. – c. My ability to conduct, analyze, and interpret experiments and apply results to improve processes can be rated as:	4.50	4.60	4.09	4.50	4.40	4.31	4.20	4.57	4.42
d. an ability to apply creativity in the design of systems, components or processes appropriate to program objectives,	5. – d. My ability to apply creativity in the design of systems, components, or processes appropriate to program objectives can be rated as:	4.50	4.60	4.27	4.67	4.60	4.31	4.10	4.71	4.47
e. an ability to function effectively on teams,	6. – e. My ability to function effectively on teams can be rated as:	4.83	5.00	4.00	4.67	5.00	4.54	4.40	4.71	4.47
f. an ability to identify, analyze and solve technical problems,	7. – f. My ability to identify, analyze, and solve technical problems can be rated as:	4.83	4.40	4.27	4.67	4.60	4.38	4.30	4.71	4.47
g. an ability to communicate effectively,	8. –g. My ability to communicate effectively can be rated as:	4.67	5.00	4.09	4.17	4.40	4.31	4.00	4.29	4.35
h. a recognition of the need for, and an ability to engage in lifelong learning,	9. – h. My recognition of the need for, and an ability to engage in lifelong learning can be rated as:	4.50	4.60	4.36	4.67	4.60	4.77	4.70	4.70	4.59
i. an ability to understand professional, ethical and social responsibilities,	10. – i. My ability to understand professional, ethical, and social responsibilities can be rated as:	3.57	4.80	4.18	4.50	4.80	4.69	4.30	4.86	4.46
j. a respect for diversity and a knowledge of contemporary professional, societal and global issues, and	11. – j. My respect for diversity and a knowledge of contemporary professional, societal, and global issues can be rated as:	3.33	4.80	3.73	4.17	4.60	4.46	4.40	4.57	4.31
k. a commitment to quality, timeliness, and continuous improvement.	12. – k. My commitment to quality, timeliness and continuous improvement can be rated as:	4.83	4.40	4.27	4.33	4.40	4.77	4.20	4.57	4.52

TAC Criterion	Exit Survey Question	Spr 04 MET495	Spr 04 MET497	Fall 04 MET495	Fall 04 MET497	Spr 05 MET495	Spr 05 MET497	Fall 05 MET495	Fall 05 MET497	Overall Weighted
Criterion 4. **Program Characteristics** Communications a. The communications content must develop the ability of graduates to plan, organize, prepare, and deliver effective technical reports in written, oral, and other formats appropriate to the discipline and goals of the program.	13. My ability to plan, organize, prepare, and deliver effective technical reports in written, oral, and other formats can be rated as:	4.33	5.00	4.45	4.17	4.80	4.31	4.20	4.29	4.46
Criterion 4. **Program Characteristics** Communications b. The communications content must develop the ability of graduates to incorporate communications skills throughout the technical content of the program.	14. My ability to incorporate communications skills in technical contexts can be rated as: Note: Compare program outcome g. ability to communicate effectively, student response from question 8 above.	4.17	5.00	4.18	4.33	4.60	4.46	4.22	4.43	4.40
Criterion 4. **Program Characteristics** Communications c. The communications content must develop the ability of graduates to utilize the appropriate technical literature and use it as a principal means of staying current in their chosen technology.	15. My ability to utilize appropriate technical literature as a principal means of staying technically current can be rated as:	4.50	5.00	3.64	4.00	4.20	4.08	4.20	4.57	4.25
Criterion 4. **Program Characteristics** Communications d. The communications content must develop the ability of graduates to utilize the interpersonal skills required to work effectively in teams.	16. My ability to utilize the interpersonal skills required to work effectively in teams can be rated as: Note: Compare program outcome e. ability to function effectively on teams, student response from question 6 above.	4.50	5.00	4.18	4.83	4.60	4.46	4.30	4.71	4.49
Criterion 4. **Program Characteristics** Mathematics The level and focus of the mathematics content must provide students with the skills to solve technical problems appropriate to the discipline and the program objectives.	17. My mathematical skills for solving technical problems can be rated as:	4.50	4.00	4.55	4.33	4.40	4.31	4.30	4.29	4.41
Criterion 4. **Program Characteristics** Technical Content b. Laboratory activities must develop student competence in the use of analytical and measurement equipment common to the discipline and appropriate to the goals of the program.	18. My competence in the use of analytical and measurement equipment common to the discipline can be rated as:	4.83	4.60	4.27	4.50	5.00	4.38	4.10	4.57	4.48
Criterion 4. **Program Characteristics** Technical Content c. Technical courses must develop student knowledge and competence in the use of standard design practices, tools, techniques, and computer hardware and software appropriate to the discipline and goals of the program.	19. My knowledge and competence in the use of standard design practices, tools, techniques, and computer hardware and software can be rated as:	4.67	4.80	4.27	4.50	4.60	4.15	4.40	4.57	4.48

TAC Criterion	Exit Survey Question	Spr 04 MET495	Spr 04 MET497	Fall 04 MET495	Fall 04 MET497	Spr 05 MET495	Spr 05 MET497	Fall 05 MET495	Fall 05 MET497	Overall Weighted
Criterion 4. **Program Characteristics** Technical Content d. Capstone or other integrating experiences must draw together diverse elements of the curriculum and develop student competence in focusing both technical and nontechnical skills in solving problems.	20. The extent my capstone or senior project experience drew together diverse elements of the curriculum and developed my competence in focusing both technical and nontechnical skills in solving problems can be rated as:	3.50	4.80	4.18	4.67	4.40	4.38	3.90	4.71	4.22
Criterion 5. **Faculty** The number of faculty members must be sufficient to provide program continuity, proper frequency of course offerings, appropriate levels of student-faculty interaction, and effective student advising and counseling.	21. The adequacy of the number of faculty and staff members to provide program continuity, proper frequency of course offerings, appropriate levels of student-faculty interaction, and effective student advising and counseling can be rated as:	4.50	4.80	4.09	4.33	4.40	4.00	4.20	4.86	4.35
Criterion 6. **Facilities** a. Adequate facilities and financial support must be provided for each program in the form of suitable classrooms, laboratories, and associated equipment necessary to accomplish the program objectives in an atmosphere conducive to learning,	22. The adequacy of facilities and financial support provided for my program in the form of suitable classrooms, laboratories, and associated equipment necessary to accomplish the program objectives in an atmosphere conducive to learning can be rated as:	4.50	4.60	3.91	4.50	4.40	3.92	4.30	4.29	4.25
Criterion 6. **Facilities** b. Adequate facilities and financial support must be provided for each program in the form of laboratory equipment characteristic of that encountered in the industry and practice served by the program.	23. The adequacy of facilities and financial support provided for my program in the form of laboratory equipment characteristic of that encountered in industry can be rated as:	3.83	4.20	3.18	3.50	3.60	4.00	4.10	4.29	3.93
Criterion 6. **Facilities** c. Adequate facilities and financial support must be provided for each program in the form of modern computing equipment and software, characteristic of that encountered in the industry and professional practice served by the program.	24. The adequacy of facilities and financial support provided for my program in the form of modern computing equipment and software, characteristic of that encountered in industry can be rated as:	4.67	4.60	3.55	3.67	3.60	4.23	4.20	4.57	4.16
Criterion 6. **Facilities** d. Adequate facilities and financial support must be provided for each program in the form of Internet and information infrastructures, including electronic information repositories, equipment catalogs, professional technical publications, and manuals of industrial processes and practices adequate to support the educational objectives of the program and related scholarly activities of students and faculty.	25. The adequacy of facilities and financial support provided for my program in the form of Internet and information infrastructures, including electronic information repositories, equipment catalogs, professional technical publications, and manuals to support related scholarly activities of students and faculty can be rated as:	4.33	4.60	3.91	3.50	4.00	4.15	4.10	4.71	4.19
Criterion 7. **Institutional and External Support** ADMINISTRATION The administration must be effective in the operation of support facilities for faculty and students.	26. The extent program and campus administration are effective in the operation of support facilities for faculty and students can be rated as:	4.33	4.60	3.82	4.67	4.00	4.00	4.40	4.71	4.23

TAC Criterion	Exit Survey Question	Spr 04 MET495	Spr 04 MET497	Fall 04 MET495	Fall 04 MET497	Spr 05 MET495	Spr 05 MET497	Fall 05 MET495	Fall 05 MET497	Weighted Average
Criterion 7. **Institutional and External Support** INSTITUTIONAL SUPPORT c. Institutional support must include sufficient financial and human resources to acquire, maintain, update and operate facilities and equipment appropriate for the program.	27. The adequacy of financial and human resources to acquire, maintain, update and operate facilities and equipment for the program and campus can be rated as:	4.33	4.60	3.64	3.67	4.20	3.69	4.20	4.57	4.11
Criterion 7. **Institutional and External Support** INSTITUTIONAL SUPPORT d. Institutional support must include procedures for selecting students, advising students, and assuring that all graduates have met all curricular requirements,	28. The adequacy of procedures for selecting students, advising, and assuring that I have met all curricular requirements can be rated as:	4.33	4.20	3.73	4.67	4.60	3.85	4.00	4.57	4.20
Criterion 7. **Institutional and External Support** INSTITUTIONAL SUPPORT e. Institutional support must include services to assist students in finding employment upon graduation.	29. The adequacy of program and campus services to assist me in finding employment upon graduation can be rated as:	3.17	4.00	2.73	3.67	3.25	3.23	3.30	4.14	3.31
MET Program Outcome Objective 1 1.1 Students will demonstrate proficiency in mechanical design, materials, manufacturing processes, mechanics, and fluid power.	30. My proficiency in mechanical design, materials, manufacturing processes, mechanics, and fluid power can be rated as:	4.67	4.60	4.18	4.50	4.60	4.31	4.30	4.71	4.48
1.2 Students will demonstrate proficiency in applied mathematics and science.	31. My proficiency in applied mathematics and science can be rated as: Compare questions 2 and 3 above.	4.50	4.20	4.55	4.33	4.40	4.38	4.30	4.57	4.36
1.3 Students will demonstrate proficiency in computer applications.	32. My proficiency in computer applications can be rated as:	4.83	4.60	4.36	4.33	4.40	4.46	4.60	4.71	4.50
1.4 Students will demonstrate proficiency in solving open-ended problems requiring multiple areas of knowledge.	33. My proficiency in solving open-ended problems requiring multiple areas of knowledge can be rated as:	4.67	4.20	4.09	4.50	4.60	4.33	4.40	4.71	4.44
MET Program Outcome Objective 2 2.1 Students will demonstrate a level of effectiveness expected by employers when they produce written documents, deliver oral presentations, and develop, prepare and interpret visual information.	34. My effectiveness in producing written documents, delivering oral presentations, and developing, preparing and interpreting visual information can be rated as: Compare questions 8 and 13.	4.33	4.80	4.09	4.50	4.80	4.50	3.80	4.57	4.34
2.2 Students will be exposed to the value of professional societies in their careers.	35. My appreciation of the value of professional societies in my career can be rated as:	3.83	4.60	4.18	4.67	4.40	3.92	4.20	4.57	4.27

TAC Criterion	Exit Survey Question	Spr 04 MET495	Spr 04 MET497	Fall 04 MET495	Fall 04 MET497	Spr 05 MET495	Spr 05 MET497	Fall 05 MET495	Fall 05 MET497	Weighted Average
2.3 Students will demonstrate proficiency in managing projects.	36. My proficiency in managing projects can be rated as:	3.67	4.40	4.27	4.33	4.40	4.38	3.80	4.57	4.25
2.4 Students will understand the advantages of self-learning.	37. My understanding of the advantages of self-learning can be rated as: Compare question 9 above	4.33	4.50	4.45	4.17	4.60	4.77	4.70	4.86	4.60
MET Program Outcome Objective 3 3.1 Students will have exposure to situations that develop a sense of personal responsibility and accountability for one's individual actions and performance.	38. My exposure to situations that develop a sense of personal responsibility and accountability for one's individual actions and performance can be rated as:	4.50	4.80	4.36	4.33	4.60	4.46	4.60	4.86	4.54
3.2 Students will have exposure to situations that develop their philosophy and appreciation for human differences.	39. My exposure to situations that develop a philosophy and appreciation for human differences can be rated as:	2.83	4.40	4.10	3.83	4.60	4.31	4.20	4.86	4.20
3.3 Students will be able to demonstrate the ability to communicate in individual and team settings.	40. My ability to communicate in individual and team settings can be rated as: Compare questions 8 and 16 above	4.33	5.00	4.18	4.83	4.80	4.46	4.30	4.57	4.47
3.4 Students will demonstrate proficiency in assisting others in a group.	41. My proficiency in assisting others in a group can be rated as: Compare questions 6 and 16 above	4.67	5.00	4.45	4.67	4.80	4.62	4.30	4.86	4.58
MET Program Outcome Objective 4 4.1 Students will demonstrate proficiency in mechanical design, materials, manufacturing processes, mechanics, fluid dynamics, and heat and power.	42. My proficiency in fluid dynamics, heat and power can be rated as:	4.50	4.00	4.00	4.17	4.40	4.38	4.10	4.43	4.20
4.2 Students will demonstrate proficiency in applied mathematics and science.	Use answer to question 31 above.	4.50	4.20	4.55	4.33	4.40	4.38	4.30	4.57	4.36
4.3 Students will demonstrate proficiency in computer applications.	Use answer to question 32 above.	4.83	4.60	4.36	4.33	4.40	4.46	4.60	4.71	4.50
4.4 Students will demonstrate proficiency in solving open-ended problems requiring multiple areas of knowledge.	Use answer to question 33 above.	4.67	4.20	4.09	4.50	4.60	4.33	4.40	4.71	4.44
	43. My proficiency in computer-aided engineering, industrial operations, thermodynamics,	4.50	4.00	4.45	4.50	4.60	4.38	4.20	4.43	4.45
	44. The breadth and depth of my technical knowledge can be rated as:	4.67	4.40	4.27	4.40	4.60	4.33	4.30	4.71	4.42