PURDUE SCHOOL OF ENGINEERING AND TECHNOLOGY 2007 ASSESSMENT REPORT

Prepared by the School's Assessment Committee and Elaine M Cooney, Chair

July 2007

Table of Contents

PURDUE SCHOOL OF ENGINEERING AND TECHNOLOGY 2007 ASSESSMENT REPORT

Prepared by the School's Assessment Committee and Elaine Cooney, Chair

July 28, 2007

Introduction

The Purdue School of Engineering and Technology, IUPUI (E&T) continues its tradition of reporting its outcomes assessment activities department by department. As in the past, different departments are at different stages of maturity in their processes. At one extreme, some of the departments' reports are very complete and report historical information from prior years, while at the other extreme, others newer to the process present only current year assessment or only a narrative of their current progress in defining their outcomes assessment processes.

Every department has supplied a brief (approximately one page) assessment plan that includes departmental mission, constituents, early career objectives and program learning outcomes. Some departments have more than one degree program, but since the assessment process is integrated, results for all programs within each department are summarized. The reports continue with details of assessment results and improvements for the *calendar* year 2006. (The first data presented is from spring, 2006 and concludes with fall, 2006. Results from spring 2007 will be included in next year's report.)

In addition to department assessment reports, we include our report to the IUPUI campus on "Assessing General Education Outcomes in the Disciplines." This report is a brief summary of each the work done of each academic department and academic program during the calendar year 2006 in assessing student learning and using the results to make changes in their respective curricula to improve student learning.

If you are interested in reading reports for 2004 year and earlier, please log on to http://www.planning.iupui.edu/43.html and scroll down to "School Assessment Reports." Then click the year of interest.

The E&T 2006-2007 Assessment Committee

The school's assessment committee has been very active since its inception in the fall semester of 1996. Charles Yokomoto, Professor of Electrical and Computer Engineering, served as the committee chair until his retirement. Starting with the 2006-2007 academic year, Elaine Cooney, Professor of Electrical and Computer Engineering Technology, now chairs the committee. The members of the 2006-2007 committee were the following:

Hasan Akay, Mechanical Engineering
Karen Alfrey, Biomedical Engineering
William Conrad, Dean's Office
Elaine Cooney, Electrical and Computer Engineering Technology
Tim Diemer, Organizational Leadership and Supervision
Russ Eberhart, Electrical and Computer Engineering
Eugenia Fernandez, Computer and Information Technology
Becky Fetterling, Technical Communications
Laura Lucas, Construction Technology
Emily McLaughlin, Design Technology
Janet Meyer, Freshman Engineering
Kenneth Reid, Electrical and Computer Engineering Technology
Kenneth Rennels, Mechanical Engineering Technology

Sam White, Dean’s Office
H. Öner Yurtseven, Dean

E&T 2006 Assessment Milestones

A five member Accreditation Board for Engineering and Technology (ABET) team visited our school to evaluate our ART-AS, CNT-BS, EET-BS, and MET-BS degree programs for reaccredidation and CpET-BS program for initial accreditation during September 30-October 2, 2006. The visit went well according to the Exit Interview and draft report. Final accreditation results will not be available until September.

The IUPUI Review of our Technology programs took place at the end of November 2006. The team made recommendations for refocusing and reorganizing technology departments and some school services.

Assessment Process in the School’s Departments

Table 1 characterizes the differences in ways that our eight departments have chosen to implement our common assessment plans. This table was revised by the assessment committee in preparation for this report. Column 2 of the table describes the whether a department’s process is based on its professional accreditation or the IUPUI Principles of Undergraduate Learning (PUL). Three of the departments have developed their assessment programs around the engineering accreditation criteria of the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology (ABET/EAC), and three by the by the technology accreditation criteria of the Technology Accreditation Commission of ABET (ABET/TAC). CIT uses the ABET/CAC (Computing Accreditation Criteria). Design Technology uses a combination of ABET, PUL’s and CIDA (Council for Interior Design Accreditation). OLS has chosen to be guided by the IUPUI Principles of Undergraduate Learning (PULs).

Engineering and technology faculty write Program Outcomes and assess student learning in these outcomes for professional accreditation. The Program Outcomes for engineering programs and technology outcomes are similar to each other, but they are not the same, and they map quite well into IUPUI’s PULs. Rather than developing a complex outcomes assessment process where both the ABET outcomes and PUL outcomes are assessed, the ABET directed departments have chosen a strategy of assessing their ABET Program Outcomes and demonstrating through a relational matrix that they cover the PULs.

To show that the eleven ABET outcomes for EAC, TAC CAC/IT map into the PULs, two tables were developed, Table 2 for engineering programs, Table 3 for engineering technology programs, and Table 4 for Computing Accreditation Criteria. The engineering mapping differs slightly from the other matrices in that it demonstrates the quality of the linkage, rating the linkage as strong, moderate, or mild. All tables show that the eleven ABET outcomes adequately cover the PULs.

Table 1. Characterization of Departmental Assessment Processes.

DEPARTMENT	BASIS	PRIMARY STRATEGY	SUPPLEMENTAL SOURCES OF ASSESSMENT DATA
Biomedical Engineering (BME)	ABET/EAC	Assessment of student learning through evidence collected on the measurable learning outcomes developed to meet ABET Criteria and IUPUI's Principles of Undergraduate Learning	Student feedback on their experiences in our new BME courses, including self-assessment of learning and understanding. Assessment of industry's satisfaction using both a survey form that is currently being developed and focus groups (PROPOSED) Assessment of alumni satisfaction through feedback using a process similar to that being developed for industry feedback (PROPOSED) Assessment of success of the program by tracking matriculation rates, graduation rates, successful job placement, graduate school admissions, and advancements. (PROPOSED)
Computer and Information Technology (CIT)	ABET/TAC	Assessment in selected courses that cover the department's outcomes	Student self reports of well they feel they have learned the course outcomes using surveys Retention rates, graduation rates, and number of degrees conferred Continuing students satisfaction using in-house survey Alumni satisfaction Employer satisfaction
Construction Technology (CNT)	ABET/TAC	Assess actual learning in all courses taught by full-time faculty and selected courses taught by associate faculty. Each course is assigned one or more of the department's outcomes for assessment.	Student self reports of well they feel they have learned the course outcomes using surveys Retention rates, graduation rates, and number of degrees conferred Continuing students satisfaction Alumni satisfaction Employer satisfaction
Design Technology (DST)	ABET/PUL	Assess actual learning in all courses taught by full-time faculty and selected courses taught by associate faculty. Each course is assigned one or more of the department's outcomes for assessment; and, utilize assessment done in service courses for all courses required in the plan of study.	Student self reports of how well they feel they have learned the course outcomes using surveys
Electrical and Computer Engineering (ECE)	ABET/EAC	Assess selected courses with strong emphasis on the senior capstone design course and the senior ethics course.	Focus group discussion with seniors Retention rates, graduation rates, and number of degrees conferred Continuing students satisfaction using in-hours survey Alumni satisfaction Employer satisfaction
Electrical and Computer Engineering Technology (ECET)	ABET/TAC	Assess how well students feel they have learned the course objectives/ outcomes using surveys; use rubrics to assess student communication, teamwork, design; targeted exam questions.	Continuing students satisfaction Senior capstone project Student works in selected courses Retention rates, graduation rates, and number of degrees conferred Alumni satisfaction Employer satisfaction
Mechanical Engineering (ME)	ABET/EAC	Course learning outcomes surveys conducted at the	Industrial Advisory Board that provides input on performance and expected qualifications of

		end of each semester to determine self-assessment of students on how well the course outcomes are met Exit survey on program outcomes conducted at the time of graduation to obtain self-assessment of the graduates on how well the program outcomes are met Feedback forms prepared by the faculty teaching the courses on course outcomes survey results Jury evaluations in key courses, including the capstone design and technical communication courses, that involve final project reports or presentations in front of faculty, industry guests, and fellow students	graduates Undergraduate Student Advisory Board that provides input on student satisfaction and needs Employer survey for measuring effectiveness of the program outcomes in the work force Alumni survey for measuring the impact of program outcomes in the performance of graduates Fundamentals of Engineering (FE) exam results on students who take it in their senior year. This is a nationalized exam, which gives comparisons of our students' sores against the national averages Presentations of co-ops and interns to faculty and fellow students on their experiences to get credit for their co-op and internship sessions. A jury evaluation system is practiced for the presentations Annual student satisfaction survey conducted annually to determine student satisfaction with the program Instructor's assessment of student performance in course outcomes via evaluation of key exams, projects and homework against the course outcomes Exit interviews (in addition to the exit surveys)
Mechanical Engineering Technology (MET)	ABET/TAC	Assess actual learning in selected courses, through a comprehensive graduation exam (MET, CIMT) and through an extensive portfolio review (CGT).	Student works (artifacts) in selected courses. Graduation examination results. Portfolio review results. Course evaluations. Continuing student satisfaction survey. Alumni survey. Employer survey.
Organizational Leadership and Supervision (OLS)	PUL	Assess actual learning in selected courses, including the required senior research project course	Graduating senior survey Passing rate on certificate program Retention rates, graduation rates, and number of degrees conferred Continuing students satisfaction Alumni satisfaction Employer satisfaction

TABLE 2. PULS COVERED BY ABET/EAC CRITERION 3 FOR ENGINEERING PROGRAMS

Updated With Wording From the ABET 2005-2006 Criteria

3 = strong linkage, 2 = moderate linkage, 1 = mild linkage	PULs COVERED BY THE ABET/EAC a-k																			
	PUL 1					PUL 2					PUL 3			PUL 4			PUL 5			PUL 6	
ABET/EAC CRITERIA 3 Engineering programs must demonstrate that their students attain:	Core Communication and Quantitative Skills					Critical Thinking					Integration and Application of Knowledge			Intellectual Depth, Breadth, and Adaptiveness			Understand Society and Culture			Values and Ethics	
	a	b	c	d	e	a	b	c	d	e	a	b	c	a	b	c	a	b	c	a	b
(a) an ability to apply knowledge of mathematics, science and engineering				3		2	2		2	2	2	3	2	3	2						
(b) an ability to design and construct experiments, as well as to analyze and interpret data						3	3	3	2			2		3	1	2					
(c) an ability to design a system, component, or process to meet desired needs within the realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability						2	2	3	3	1	3	2	3	3		3					
(d) an ability to function on multi-disciplinary teams			2												1	3			2		
(e) an ability to identify, formulate and solve engineering problems		2		3		3	3	3	3	3	3	3	3	3	1	2					
(f) an understanding of professional and ethical responsibility						2	3					2	1		3	2	1	1	2	3	1
(g) an ability to communicate effectively	3		3																		
(h) the broad education necessary to understand the impact of engineering solutions in global, economic, environmental, societal context											1	2	2			2	2	2		2	
(i) a recognition of the need for and an ability to engage in life-long learning		3			2		2														
(j) a knowledge of contemporary issues		2								1					1			2			2
(k) an ability to use the techniques, skill and modern engineering tools necessary for engineering practice					3							3	2	3							

TABLE 3. PULS COVERED BY ABET/TAC CRITERION 2 FOR ENGINEERING TECHNOLOGY PROGRAMS

Developed by W. David Bostwick

Modified by Eugenia Fernandez and Becky Fitterling – February 2007

ABET OUTCOMES *TAC CRITERION 2—PROGRAM OUTCOMES* An engineering technology program must demonstrate that graduates have:
(a) an appropriate mastery of the knowledge, techniques, skills and modern tools of their discipline
(b) an ability to apply current knowledge and adapt to emerging applications of mathematics, science, engineering and technology
(c) an ability to conduct, analyze and interpret experiments and apply experimental results to improve processes
(d) an ability to apply creativity in the design of systems, components or processes appropriate to program objectives
(e) an ability to function effectively on teams
(f) an ability to identify, analyze and solve technical problems
(g) an ability to communicate effectively
(h) a recognition of the need for, and an ability to engage in lifelong learning
(i) an ability to understand professional, ethical and societal responsibilities
(j) a respect for diversity and a knowledge of contemporary professional, societal and global issues
(k) a commitment to quality, timeliness and continuous improvement

PRINCIPLES OF UNDERGRADUATE LEARNING - ***<u>Require</u> <u>All</u> <u>Students</u> <u>to</u> <u>Demonstrate</u> <u>An</u> <u>Ability</u> <u>to</u>:***	***TECHNOLOGY OUTCOMES - TAC CRITERIA #1; items (a) to (k)***										
	a	**b**	**c**	**d**	**e**	**f**	**g**	**h**	**i**	**j**	**k**
1(a) - Express ideas and facts effectively in written formats							x				
1(b) - Comprehend, interpret, and analyze tests			x			x		x			
1(c) - Communicate orally in one-on-one and group settings					x		x				
1(d) - Solve problems that are qualitative in nature	x		x			x					
1(e) - Make efficient use of information resources and technology for personal and professional needs	x							x			x
2(a) - Analyze complex issues and make informed decisions		x	X	x		x			x		
2(b) - Synthesize information in order to arrive at reasoned conclusions		x		x		x		x			
2(c) - Evaluate the logic, validity, and relevance of data		x	x			x					
2(d) - Solve challenging problems		x	x	x		x					
2(e) - Use knowledge and understanding to generate		x	x								x

PRINCIPLES OF UNDERGRADUATE LEARNING - <u>Require</u> <u>All</u> <u>Students</u> <u>to</u> <u>Demonstrate</u> <u>An</u> <u>Ability</u> <u>to</u>:	***TECHNOLOGY OUTCOMES - TAC CRITERIA #1; items (a) to (k)***										
	a	**b**	**c**	**d**	**e**	**f**	**g**	**h**	**i**	**j**	**k**
and explore new questions											
3(a) - Apply knowledge to enhance personal lives							x	x			
3(b) - Apply knowledge to meet professional standards and competencies	x	x		x					x	x	x
3(c) - Apply knowledge to further the goals of society		x		x					x		
4(a) - Display substantial knowledge and understanding of at least one field of study	x			x		x					
4(b) - Compare and contrast approaches to knowledge in different disciplines										x	
4(c) - Modify their approach to an issue or problem based on contexts and requirements of particular situations		x	x	x		x					x
5(a) - Compare and contrast the range of diversity and universality in human history, societies, and ways of life										x	
5(b) - Analyze and understand the interconnectedness of global and local concerns									x	x	
5(c) - Operate with civility in a complex social world					x		x			x	
6(a) - Make informed and principled choices regarding conflicting situations in their personal and public lives and to foresee the consequences these choices									x	x	x
6(b) - Recognize the importance of aesthetics in their personal lives and to society				x							

TABLE 4. PULS COVERED BY ABET/TAC CRITERION 2 FOR CAC/IT PROGRAMS
Developed by W. David Bostwick
Modified by Eugenia Fernandez and Becky Fitterling – February 2007

CAC/IT Outcome
ABET CAC Outcome (a) Use and apply current technical concepts and practices in the core information technologies
ABET CAC Outcome (b) Analyze, identify and define the requirements that must be satisfied to address problems or opportunities faced by organizations or individuals
ABET CAC Outcome (c) Design effective and usable IT-based solutions and integrate them into the user environment
ABET CAC Outcome (g) Demonstrate an understanding of best practices and standards and their application
ABET CAC Outcome (h) Demonstrate independent critical thinking and problem solving skills
ABET CAC Outcome (i) Collaborate in teams to accomplish a common goal by integrating personal initiative and group cooperation
ABET CAC Outcome (j) Communicate effectively and efficiently with clients, users, and peers both verbally and in writing, using appropriate terminology
ABET CAC Outcome (k) Recognize the need for continued learning throughout their career

PRINCIPLES OF UNDERGRADUATE LEARNING - Require All Students to Demonstrate An Ability to:	***TECHNOLOGY OUTCOMES - TAC CRITERIA #1; items (a) to (k)***										
	a	**b**	**c**	**d**	**e**	**f**	**g**	**h**	**i**	**j**	**k**
1(a) - Express ideas and facts effectively in written formats				x						x	
1(b) - Comprehend, interpret, and analyze tests		x	x		x		x	x			
1(c) - Communicate orally in one-on-one and group settings				x					x	x	
1(d) - Solve problems that are qualitative in nature								x			
1(e) - Make efficient use of information resources and technology for personal and professional needs	x			x	x		x				
2(a) - Analyze complex issues and make informed decisions		x	X	x	x			x			
2(b) - Synthesize information in order to arrive at reasoned conclusions		x	x	x	x			x			
2(c) - Evaluate the logic, validity, and relevance of data		x			x			x			
2(d) - Solve challenging problems		x	x					x			
2(e) - Use knowledge and understanding to generate and explore new questions		x						x			
3(a) - Apply knowledge to enhance personal lives	x										x
3(b) - Apply knowledge to meet professional standards and competencies	x	x	x				x				

PRINCIPLES OF UNDERGRADUATE LEARNING - <u>Require</u> <u>All</u> <u>Students</u> <u>to</u> <u>Demonstrate</u> <u>An</u> <u>Ability</u> <u>to</u>:	***TECHNOLOGY OUTCOMES - TAC CRITERIA #1; items (a) to (k)***										
	a	**b**	**c**	**d**	**e**	**f**	**g**	**h**	**i**	**j**	**k**
3(c) - Apply knowledge to further the goals of society		x	x								
4(a) - Display substantial knowledge and understanding of at least one field of study	x										
4(b) - Compare and contrast approaches to knowledge in different disciplines											
4(c) - Modify their approach to an issue or problem based on contexts and requirements of particular situations		x	x								x
5(a) - Compare and contrast the range of diversity and universality in human history, societies, and ways of life											
5(b) - Analyze and understand the interconnectedness of global and local concerns						x					
5(c) - Operate with civility in a complex social world									x	x	
6(a) - Make informed and principled choices regarding conflicting situations in their personal and public lives and to foresee the consequences these choices							x	x		x	
6(b) - Recognize the importance of aesthetics in their personal lives and to society							x				x

Departmental and Program Annual Reports for 2006

The 2007 departmental and program assessment reports included in this school report represent the collected works of the following:

Biomedical Engineering (BME)
Computer and Information Technology (CIT)
Construction Technology (CNT)
Design Technology (DT)
Electrical and Computer Engineering (ECE) (report missing at this time)
Electrical and Computer Engineering Technology (ECET)
Freshman Engineering
Mechanical Engineering (ME)
Organizational Leadership and Supervision (OLS)
Technical Communications (TCM)

ASSESSING GENERAL EDUCATION OUTCOMES IN E&T—ICHE REPORT
Prepared for the Indiana Commission on Higher Education
Purdue School of Engineering and Technology
May 30, 2007

Department or Program	Learning Goals for Majors that Encompass PULs are Specified	Multiple Assessment Measures are in Place	Assessment Findings are Used (What Changes Have You Made During the Reporting Year?)
a. Biomedical Engineering	Course outcomes, available on the BME website and in individual course handouts, are associated with specific ABET program outcomes, which in turn are mapped to university PULs. Program outcomes and objectives have been defined and submitted to our constituents for feedback.	Ultimately our assessment process will use four key measurements: • Student learning through student works, including homework, laboratory, and exam performance; • Industry's satisfaction with our graduates using surveys and focus groups; • Alumni satisfaction using surveys and focus groups; and • Matriculation rates, graduation rates, job placement, graduate school admissions, and advancements. Our first undergraduate degrees will be awarded in May 2008. Because we do not yet have any graduates, at present (1) is being used as our primary assessment tool, supplemented with student feedback on their experiences in our new BME courses and university/peer feedback from continued communication with our advisory board and other constituents. This summer we will select several courses for more targeted assessment of ABET outcomes/PULs.	We continue to be guided by feedback from last year's BME department review: • The recommendation to *increase diversity hiring* (especially female) has led to the hiring of a new minority female faculty member and will continue to influence search and screen activities. • The recommendation for *improved allocation of space* has led to an increase and consolidation in a centralized area of department laboratory and teaching space; • The recommendation to *infuse entrepreneurship into BME courses* will shape some of the topics covered in our capstone design course, to be taught for the first time this fall; and • The recommendation to *clarify elective course offerings* has led to the development of a more comprehensive approved depth area electives list, and has influenced the planning of appropriate courses for the elective stream. Student performance on measures of course outcomes continues to influence the development and refinement of courses. Most of our courses were offered for the first time this year; over the summer we will discuss the student learning outcomes as a faculty to determine changes for next year.

Department or Program	Learning Goals for Majors that Encompass PULs are Specified	Multiple Assessment Measures are in Place	Assessment Findings are Used (What Changes Have You Made During the Reporting Year?)
b. Computer and Information Technology			
c. Construction Technology	Each course syllabus contains the learning goals which are linked to both the PULs and our Program Outcomes for ABET accreditation. Departmentally, matrices are developed and reviewed to match up courses with outcomes to ensure complete coverage of all PUL's at introductory and intermediate level.	Formative and Summative measures used for both course and the departmental overall review • Individual and group projects • Capstone project presentations • Laboratory reports • Final exams • Student evaluations • Dept Committee Meetings • Industrial Advisory Board discussions • Interviews of Industry that hires our students • Student Feedback in focus groups	Changes have been made in both courses offered and in the sequencing of course of the plan of study to better meet the needs of industry and students to meet the learning outcomes • Renewed emphasis on meeting course outcomes in each class to reinforce prerequisite knowledge before starting next course • New Plan of Study implemented with several new courses in response to Industry Advisory Board expectations of student preparedness • Content changes have resulted from Advisory Board discussions concerning current usage and relevance of course content once students become workers. • Increased use of Technology in teaching, including several more online courses to meet the needs of working students. This included improved outcomes assessment of student learning. • Teaching method changes have included more case studies, real life examples and lab experiences to aid integration of course content to industry applications. • Hiring of part-time faculty with specific expertise (construction accounting) to supplement full time faculty and specialized training for full time faculty (i.e. safety)

Department or Program	Learning Goals for Majors that Encompass PULs are Specified	Multiple Assessment Measures are in Place	Assessment Findings are Used (What Changes Have You Made During the Reporting Year?)
d. Design Technology	Syllabi for each course (and each of its sections) specify at least one PUL and one ABET program outcome. Instructors are charged with assessing any PUL and ABET program outcome noted for a given course, reporting the findings and recommending actions for course improvement. At least one course is identified to assess each PUL and ABET program outcome.	• Homework assignments, lab reports, projects and presentations, final exams in courses • Capstone project reports • Student satisfaction surveys • Student exit surveys • Alumni surveys • Employer surveys • Industrial Advisory Board appraisals • Faculty end-of-semester reflections • Internship reports done by Graduates We have mapped these onto the IUPUI Principles of Undergraduate Learning to show that all PULs are thus assessed and have found patterns that indicate students are meeting or exceeding our expectations. We continue to refine the connection between work items and measurable outcomes to better substantiate this data.	Design Technology full and part-time faculty are educated in and involved in the collection of work items and outcomes data. Courses assess all of our accreditation-based program outcomes and we think will prove to be good indicators of student learning as we stabilize the administrative groups of both areas. We were reviewed and recommended for full ABET accreditation for ART (6 years); were recommended for full NASAD accreditation (10 years); participated in an external review of technology; and have completed extensive self-study for a CIDA visit in October of 2007.

Department or Program	Learning Goals for Majors that Encompass PULs are Specified	Multiple Assessment Measures are in Place	Assessment Findings are Used (What Changes Have You Made During the Reporting Year?)
e. Electrical and Computer Engineering	Our learning goals are embedded in our assessment of our Program Outcomes for ABET accreditation. Each of the Program Outcomes is mapped onto the PULs.	• Capstone project reports • Laboratory reports • Final exams • Hourly exams • Student satisfaction surveys • Alumni surveys • Employer surveys • Industrial Advisory Board appraisals • Oral presentations • Term papers/project reports	There are three types of improvements that are made in the ECE department. The first type is related to individual courses, the second type is related to the curriculum, and the third type is related to operations. First type--changes in individual courses, recommended or planned, based on assessment data or instructor's reflections: • ECE 401: The engineering ethics course was revised to be more case-based. A new text emphasizing the case approach was adopted. Second type--changes in the curriculum: • ECE400 Senior Seminar is being discontinued and reconstituted as ECE 200 Sophomore Seminar to give students earlier exposure to subjects such as interviewing, resume writing, entrepreneurship, and internships. • ECE 492 Senior Design is being converted to a two-semester course. It will still be 3 credit hours total, but will now be 1 Cr the first semester and 2 Cr the second semester. Students will receive project assignments about one-half of the way through the first semester. • A new interdisciplinary course that emphasizes the integration of knowledge from a number of technology areas such as ASIC, MEMS, and PCB has been established. Third type--changes in operations of the department: • There were no changes this year.

Department or Program	Learning Goals for Majors that Encompass PULs are Specified	Multiple Assessment Measures are in Place	Assessment Findings are Used (What Changes Have You Made During the Reporting Year?)
f. Electrical and Computer Engineering Technology	Every course has specific objectives that are linked to the Program Outcomes as required for ABET accreditation. Each of the Program Outcomes is mapped onto the PULs.	• Reports assessed using rubrics: o Course project reports (written & oral) o Capstone project reports (written & oral) o Research reports o Formal laboratory reports • Design & build project (assessed using rubrics) • Final exam questions targeted to specific objectives • Student satisfaction survey • Student & faculty course objective surveys. • Industrial Advisory Board appraisals • ABET accreditation visit and report	Every semester, course coordinators are required to review all assessment data and propose changes to each course as indicated. In addition to changes in individual courses, the following changes were made that affected the curriculum as a whole: • To improve problem solving: added recitation session to ECET 107; retention and student GPA increased within course • To improve critical thinking: added course objectives regarding writing laboratory conclusions to support program outcome, and developing rubric to assess conclusions • To improve team work: added course objectives and assessment activities in targeted classes; added lecture content in project course. • To improve attention quality and timeliness: added course objectives and assessment activities in targeted classes • To improve written communication: grader was hired to grade grammar on targeted assignments throughout the curriculum; tablet PC were purchased for faculty to facilitate grading of electronically submitted reports

Department or Program	Learning Goals for Majors that Encompass PULs are Specified	Multiple Assessment Measures are in Place	Assessment Findings are Used (What Changes Have You Made During the Reporting Year?)
g. Freshman Engineering	The learning community course is built on the University template and learning objectives are mapped to PULs. In all freshman courses, objectives are mapped both to ABET criteria and PULs. The Freshman Engineering Program is a service unit for the other engineering departments. Program goals encompass adjustment to college life and mastery of strategies for student success as well as preparation for advanced courses in the engineering curriculum.	• Hourly and final exams • Online quizzes • Oral presentations • Project reports • Student satisfaction surveys • Course outcome surveys • Peer evaluations	Curricular changes are made in response to assessment findings from the engineering departments as well as results of assessment of the freshman courses. Results from course outcome surveys, project report evaluations, and peer evaluations have produced changes in project design, instruction of teamwork, and teaching methods. Significant changes in freshman engineering courses during 2006 include: • Taking Matlab out of ENGR 196 & 197 and creation of a separate Matlab course, ENGR 297 • Using online quizzes in the DD 190 courses taught at Butler • Providing report writing instruction in ENGR 196 • Using “fruit drops” – a simple team-building/engineering design project - in ENGR 195

Department or Program	Learning Goals for Majors that Encompass PULs are Specified	Multiple Assessment Measures are in Place	Assessment Findings are Used (What Changes Have You Made During the Reporting Year?)
h. Mechanical Engineering	Our learning goals are embedded in our assessment of our Program Outcomes for accreditation by the Accreditation Board of Engineering and Technology (ABET). Each of the Program Outcomes is mapped onto the PULs. The correspondence maps, relating our program outcomes to PULs, prepared jointly with the ECE department, are depicted at our assessment web site from http://www.engr.iupui.edu/me/fpuls.shtml. With the assessment measures that are in place, we are continuously monitoring the effectiveness of the curriculum established in Fall 2003.	• Capstone design project reports • Laboratory reports • Final exams • Hourly exams • Term papers/project reports • Oral presentations and jury evaluations • Student satisfaction surveys • Alumni surveys • Employer surveys • Course outcomes surveys • Exit surveys • Faculty feedback mechanism • Industrial Advisory Board appraisals • Student Advisory Board appraisals	• The exit surveys showed that the expected improvements in the fall 2003 curriculum are mostly being met, with the exception of the outcomes of the new statistics course. Measures are planned to address this finding. • The student satisfaction survey results led to: 1 More tutoring sessions have been instituted for lower level courses in the curriculum. The effects have been assessed by interviewing the tutors. 2 More emphasis has been placed upon co-op, internship, and job placement services. Regular oral presentations have been scheduled each semester to assess quality. 3 Recitations have been scheduled in key sophomore level courses. The effects have been assessed in the Student Satisfaction Survey, indicating need for improvement to make them more effective. • Jury evaluation of capstone design projects led to: 1 More emphasis on project evaluation. 2 More emphasis on impact statement of design. • Course outcomes surveys led to: 1 Addition of term papers/technical writing exercises in certain classes to improve research and writing skills. 2 Increased faculty supervision during the first six weeks, inter-group evaluations, and more project management rules were implemented in the capstone design project in ME 462. 3 Emphasis on solving more examples in various classes.

Department or Program	Learning Goals for Majors that Encompass PULs are Specified	Multiple Assessment Measures are in Place	Assessment Findings are Used (What Changes Have You Made During the Reporting Year?)
i. Mechanical Engineering Technology	• Learning goals for major are specified by Program Outcomes which are based on program accreditation requirements (ABET). • Each of the major's Program Outcomes is mapped to the Principles of Undergraduate Learning and to the ABET student learning outcomes requirements. • Course learning objectives are mapped to Program Outcomes.	Assessment measures include: • Laboratory written and oral project reports. • Capstone design project written and oral reports. • Assessed homework assignments linked to course learning objectives. • Assessed exam questions linked to course learning objectives. • Student satisfaction survey linked to Program Outcomes. • Graduation examination questions linked to Program Outcomes. • Alumni surveys linked to Program Outcomes. • Employer surveys linked to Program Outcomes • Feedback from Industrial Advisory Board. • Faculty End of Semester Reflection documents.	Full-time faculty reviewed courses and prepared End of Semester Reflections indicating the following changes were made based on course assessments: • MET 111 – online reference material added to clarify difficult topic. • MET 141 – revised course content to include additional basic chemistry theory. Three new laboratory experiments added and existing laboratories revised to reflect course revisions. Additional emphasis placed on phase diagrams as a result of assessment of MET 344 learning objectives. • MET 211 – multimedia animations added to clarify difficult material. New experiment added. • MET 214 – supplemental material added and exam revised to better assess learning objective related to a topic which students do not fully comprehend. • MET 310 – In response to industry feedback, Finite Element Analysis software utilized extensively by course changed from Algor to ANSYS. • MET 344 – prerequisite course, MET 141 revised (see above). Additional homework, assignments, quizzes and examinations incorporated to better assess student learning objectives. Course transferred to PowerPoint with supplemental audio files and offered on-line for first time.

Department or Program	Learning Goals for Majors that Encompass PULs are Specified	Multiple Assessment Measures are in Place	Assessment Findings are Used (What Changes Have You Made During the Reporting Year?)
j. Organizational Leadership and Supervision	• Syllabi for all courses include goals that embed one or more of the PUL. • Specific assignments within each course are designed to measure competence in the specified PUL[s] for that course. • The department maintains and updates a list showing that all PUL outcomes are measured at several points in the sequence of core courses.	• Quizzes. Midterm exams. Final exams. • Evaluation of oral and written reports. Reports draw content from research, multiple assigned readings, community involvement activities, group projects, simulations, analysis of case studies, or other structured assignments. • Surveys of student attitudes toward progress in meeting course objectives; Students' self evaluation of performance in meeting PUL outcomes. • Alumni surveys. • Industrial Advisory Board appraisals.	• Reformat of final exams to improve measurement of the ability to "comprehend, interpret and analyze" text. • Introduction of audio conference chat into online classes to improve measurement of the ability to "communicate effectively... in small and large group settings." • Departmental re examination of the sequence PUL competency levels with the core courses to improve the potential for progressive skill development from basic to intermediate to advanced. • Addition of a required course in technical writing.

Department or Program	Learning Goals for Majors that Encompass PULs are Specified	Multiple Assessment Measures are in Place	Assessment Findings are Used (What Changes Have You Made During the Reporting Year?)
k. Technical Communications	Technical Communications does not have majors. The program assesses oral presentations and written reports for the departments in the school.	1. Oral presentations for engineering majors 2. Written reports for lower level technology majors 3. Oral presentations for upper-level technology majors	TCM has done some self-evaluation and reflection on the assessment tools and techniques used for our program, resulting in the following: • For the engineering students, we have reworked the assessment tool used by the outside jurors for the oral presentations, making the form and categories simpler for jurors to use. • With increasing demand on faculty's time, we are frankly concerned about the number of outside jurors participating in assessing the students' final presentations. We are therefore reevaluating our strategies for assessment. • A long-term goal is to interact more effectively during the semester with engineering and technology faculty so that the communication component of the curriculum seems less isolated. • As part of the above goal, we offer to participate as jurors for senior design presentations for both engineering and technology students., • For technology students, we continue to educate our adjunct faculty about the importance of consistent assessment and the results of our efforts as part of our strategy for improvement. • Ongoing projects involve creating an effective method to evaluate TCM 340, Correspondence in Business and Industry, as it has become a required class for many technology majors. • We continue to look at curricular changes that may need to be made to stay current with the demands of the modern workplace. Those may include Wikis, collaborative software, and podcasts.

DEPARTMENT OF BIOMEDICAL ENGINEERING 2006 ASSESSMENT REPORT NARRATIVE
Written By Karen Alfrey
June, 2007

The Biomedical Engineering (BME) Program was formally established on our campus with the initiation of the MS and PhD degrees in 1996. Our formal degree request to the Higher Education Commission for an undergraduate degree in BME was approved in the Spring of 2004. Our goal was to establish a new Department of Biomedical Engineering with 12 full time faculty members who will support a BS through PhD degree suite and whose research mission will primarily coincide with the current programs in the School of Medicine.

We are well on our way to meeting our goals of evolving the BME Program into a new Department of Biomedical Engineering and of offering a new BS level degree in Biomedical Engineering, in addition to the MS and joint PhD degrees. Our first class of undergraduates will enter the senior year in August of 2007, and the first BS degrees are planned to be awarded in May of 2008. The new BS degree is being developed in a way which will allow for eventual accreditation by the Accreditation Board for Engineering and Technology (ABET).

There are two categories for evaluation of our success. The first will be based on achieving our goals as a functioning department and the other will be the assessment of our new BS degree program.

<u>Department Goals</u>

BME currently has 10 full time tenure/tenure track faculty members, including a senior faculty member filling the endowed chair funded by the Guidant Foundation and a new recruit joining the faculty this summer. We seek to recruit 1 more tenure track faculty in the near term to strengthen the department’s research potential and academic offerings. In addition, the department has one Lecturer responsible for undergraduate teaching and curriculum development, assessment, and student advising; and in the fall will gain one Clinical Associate Professor, a researcher in residence from Medtronic, Inc. who will oversee the BME Senior Design course as well as collaborating on faculty research projects.

Faculty recruitment has kept pace with the needs of the department in growing our undergraduate program and expanding our research potential. Our search has been guided in part by feedback from the internal BME departmental review of Fall 2005. In particular:

- The recommendation to *increase diversity hiring* (especially female) has led to the hiring of a new minority female faculty member and will continue to influence search and screen activities; and
- The recommendation to *infuse entrepreneurship into BME courses* influenced our choice to bring in an industry leader in device development to oversee the capstone design course, to be taught for the first time this fall.

<u>Assessment of the BSBME degree</u>

Assessment of the success of the BSBME degree program will follow the model developed by the School of Engineering and Technology’s Assessment Committee for its Accreditation Board for Engineering and Technology (ABET) and North Central Association outcomes assessment processes. As with the other engineering programs, assessment of the success of the program will have the following components: (1) assessment of student learning through evidence collected on the measurable learning outcomes developed to meet ABET Criteria and IUPUI's Principles of Undergraduate Learning, (2) an assessment of industry's satisfaction using both a survey form that is currently being developed and focus groups, (3) an assessment of alumni satisfaction through feedback using a process similar to that being developed for industry feedback, and (4) assessment of success of the program by tracking matriculation rates, graduation rates, successful job placement, graduate school admissions, and advancements.

The first BS degrees will be awarded in May of 2008. Because we do not yet have any graduates from our undergraduate program, at present our primary assessment tool is measurement and assessment of student learning (1), supplemented with student feedback on their experiences in our new BME courses. As a result of student performance and feedback, laboratory assignments for our sophomore-level Biomeasurements course (BME 222) were retooled last summer. Course content in sophomore- and junior-level courses is being assessed based on student performance and streamlined to provide clearer and more cohesiveness development of ideas across courses in the curriculum. In addition, we are making steady progress toward establishing assessment practices and meeting ABET requirements: Our Program Outcomes and Objectives (included below) has been provided to our External Advisory Board as well as a newly-formed Undergraduate Advisory Committee, and if necessary will be revised based on their feedback. Course outcomes have now been specified for all of the junior and most of the senior curriculum, and the courses approved by the school's Undergraduate Education Committee. Our next step toward program assessment, planned for this summer, will be selection of courses to target for assessment of ABET outcomes a-k.

The new BME Department has also taken advantage of the internal review process directed by Vice Chancellor Banta's office during the Fall of 2005. The review process resulted in several recommendations which are being addressed. Motivated in part by the recommendation for improved allocation of space, this summer the department will move into a new, larger space, allowing for consolidation of departmental office, laboratory and teaching spaces in a centralized location.

We are on track with establishing our department and implementing our new curriculum. We will continue to develop and implement appropriate assessment strategies as our first undergraduate class progresses through the BME curriculum.

IUPUI BME Draft Objectives:

The BME department at IUPUI strives to produce graduates who:

… apply critical thinking and the analytical tools of engineering to produce innovative solutions to problems in medicine and the life sciences

…function well on interdisciplinary teams

…communicate effectively in speech and in writing

…contribute to the community through civic engagement

…maintain their scientific curiosity and engage in lifelong learning

IUPUI BME Draft Outcomes:

Upon completing the BME degree, our students will possess:

a. an ability to apply knowledge of mathematics, science, and engineering
b. an ability to design and conduct experiments (b1), as well as to analyze and interpret data (b2)
c. an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
d. an ability to function on multi-disciplinary teams
e. an ability to identify, formulate, and solve engineering problems
f. an understanding of professional and ethical responsibility
g. an ability to communicate effectively
h. the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context
i. a recognition of the need for, and an ability to engage in life-long learning
j. a knowledge of contemporary issues
k. an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice
l. an understanding of biology and physiology
m. the capacity to apply advanced mathematics (including differential equations and statistics), science and engineering to solve problems at the interface of engineering and biology
n. the ability to make measurements on and interpret data from living systems, addressing the problems associated with the interaction between living and non-living materials and systems

BME Department Mission and Vision:

The **vision** of the Biomedical Engineering Department is to be a global leader in biomedical engineering research and education. Our faculty, staff and students work together as a team to complete our missions of: progressive and innovative biomedical research; excellence in graduate and undergraduate education; and service to the field of biomedical engineering.

The **mission** of the Biomedical Engineering Department is to strive to attain world-class research and to provide the highest quality educational experience for our students. We expect and value excellence conducting research, and training students to participate in research activities and professional practice.

Constituents:

We identify four constituencies that will benefit from this active mode of education: the students, the faculty, industry, and our community. We expect that our students will be identified as very competent professionals with the highest level of ethical behavior, loyalty to their employer and community, and a life long habit of self-improvement.

Early Career Objectives:

Because we do not yet have any graduates on whom to collect data, Early Career Objectives are not yet being assessed. The stated objectives of the undergraduate BME program at IUPUI are to produce graduates who:

- apply critical thinking and the analytical tools of engineering to produce innovative solutions to problems in medicine and the life sciences
- function well on interdisciplinary teams
- communicate effectively in speech and in writing
- contribute to the community through civic engagement
- maintain their scientific curiosity and engage in lifelong learning

Approximately a year after our first class graduates, we will assess these objectives using a combination of alumni and employer surveys and focus groups, as well as data on matriculation rates, graduation rates, job placement, graduate school admissions, and advancements.

Program Learning Outcomes:

BME has adopted as its learning outcomes the ABET outcomes a-k as well as:

- (l) an understanding of biology and physiology
- (m) the capacity to apply advanced mathematics (including differential equations and statistics), science and engineering to solve problems at the interface of engineering and biology
- (n) the ability to make measurements on and interpret data from living systems, addressing the problems associated with the interaction between living and non-living materials and systems

These outcomes are primarily assessed through evidence collected on the measurable learning outcomes developed to meet ABET Criteria and IUPUI's Principles of Undergraduate Learning, supplemented with student feedback on their experiences in our new BME courses, including self-assessment of learning and understanding. Courses in the core curriculum are being selected this summer for targeted assessment of individual outcomes.

CIT Assessment Process

Assessment within the Department of Computer and Information Technology [CIT] is a methodology and a process that provides documentation of instructional goals and learning outcomes. The process also helps to identify needed improvements in teaching and learning and to demonstrate the effect of those improvements.

<u>CIT Program Educational Objectives:</u>

- Our students will master the basic principles of their discipline and be educated in the state-of-the-art technologies.
- Our students will be competent in problem solving and able to complete technology design tasks.
- Our students are expected to develop and maintain modern technological skills, effective oral and written communication skills, and the ability to perform well in team-oriented professional experiences.
- Our students will be able to integrate mathematics, science, humanities and social studies into their primary work.
- Our students are expected to understand and appreciate ethics and diversity, and deal with their cultural implications in their profession.
- Our students are expected to develop the habits of life-long learning.

<u>Data sources:</u>

Data are drawn from the following sources: classroom data, surveys of student satisfaction, Graduating senior survey, Retention rates, graduation rates, and number of degrees conferred, Alumni satisfaction surveys, Employer satisfaction surveys.

<u>Collection and reporting of classroom data:</u>

Instructors of selected courses are asked to select a course objective that meets one or more of the ABET IT Outcomes, measure student performance in meeting the objective, and report the findings. Compliance has been haphazard. Starting in Fall 2007, CIT will adopt the model used by the Department of Organizational Leadership and Supervision (OLS) as follows:

The instructor of record for each section of CIT courses is responsible for the following:

- Specify course objectives that meet one or more of the ABET IT Outcomes
- Devise methodology that brings students to a specified level of competence for each ABET IT objective.
- Measure student performance in meeting the objectives.
- Report the results. Keep records to compare performance between sections and from one semester to the next.
- Analyze the results. Make recommendations for improvements, if a substantial number of students did not meet the specified level of competence for a given ABET IT objective.

<u>Semester reports:</u>

At the end of each semester, CIT instructors provide a report of assessment activities by completing a "CIT Assessment Checklist and Report." to be modeled on the one used by OLS (found at http://www.iupui.edu/~team8CIT/assess/)

<u>Long term use of assessment data:</u>

Data gathered during the assessment process provide essential documentation required for successful reviews by campus administration and by external accreditation agencies. Continuous improvement of CIT programs is driven by assessment data.

August 1, 2007

ABET IT Outcome and a selection of OLS classes where ABET IT Outcome was assessed.	Examples of methods used to measure ABET IT Outcome performance.	Scoring rubric on file?	Performance goal.	Findings.	Recommendations.
a. Use and apply current technical concepts and practices in the core information technologies					
CIT 112, 214, 307	Final Exams	NA	For CIT 112, the instructional objective was to have 70% of the students score 70% or higher on the exam. For CIT 214 and 307, the objective was to have 70% of the students score 75% or higher on the exam.	85% of the students in CIT 112 scored 70% or better on the exam. 70% of the studnets in CIT 214 and 307 scored 75% or higher on the exam.	None. Objectives are being met.
b. Analyze, identify and define the requirements that must be satisfied to address problems or opportunities faced by organizations or individuals					
CIT 213	Homework assignment on creating an activity diagram for a given Use Case Scenario.	Y	70% of the students score a 3 or higher on a 5 point rubric.	Only 39% of the students scored 3 or higher on the rubric.	Spend additional time during class on activity diagrams.
c. Design effective and usable IT-based solutions and integrate them into the user environment					
CIT 214	Midterm Exam on Database Design & Concepts	NA	The objective for this assignment was to have 70% of the students score 75% or higher on the exam.	71% of the students earned 75% or higher on the exam.	None. Objectives are being met.

ABET IT Outcome and a selection of OLS classes where ABET IT Outcome was assessed.	Examples of methods used to measure ABET IT Outcome performance.	Scoring rubric on file?	Performance goal.	Findings.	Recommendations.
CIT 388 and 412	Software Projects	Y	The objective for this assignment was to have 80% of the students score 80% or higher on the exam.	In CIT 388, only 67% of the students scored 80% or higher. In CIT 412, only 75% scored 80% or higher.	Provide more iterative instruction on object persistence for CIT 388. Assign and work through more practice problems on XLST in 412.
h. Demonstrate independent critical thinking and problem solving skills					
CIT 410	Ethical Analysis of Case Study	Y	80% of the students score a 3 or higher on a 5 point Holistic Critical Thinking Scoring Rubric.	Only 63% of the students scored 3 or higher on the rubric.	Spend more time on ethical analysis & critical thinking

Department of Construction Technology:

2007 Assessment Summary of 2006

VISION STATEMENT

The Department of Construction Technology will be the leader in construction education in the Greater Indianapolis region.

MISSION STATEMENT

It is the mission of the Department of Construction Technology to provide a productive learning environment that:

- will enable students to become productive professionals;
- will ensure that the students have critical thinking and problem solving skills;
- will provide the students with a fundamentally sound education;
- will provide the students with strong communication and leadership skills;
- will instill in students responsible citizenship.

For complete mission statement including Goals and Objectives click the following link https://oncourse.iu.edu/access/content/user/lalucas/Assessment/CNT.Self_Study.pdf

Constituencies of the Program

The constituencies of the CNT program are: CNT students and potential students, CNT faculty, Potential and current employers of CNT students, Alumni; Industrial Advisory Board; School (E&T) and University (IUPUI); The national engineering technology community

Assessment Process and Implementation Expectations for Faculty

COLLECT THE FOLLOWING FOR EACH OF YOUR CLASSES

☐ ☐ **SYLLABUS:** LISTING ABET AND PUL's

☐ ☐ **INSTRUCTIONAL OBJECTIVES**

Collect a copy of teaching materials/instructions given to the student's to complete this work item

☐ ☐ **SCORING/EVALUATION CRITERIA of work item**

Collect a copy of the scoring rubric/criteria used to score/grade the work items

☐ ☐ **SAMPLES OF STUDENT WORK ITEMS**

Collect 3 examples of scored/graded work items (evaluations included); include poor, fair and good

☐ ☐ **SCORING DATA FOR WORK ITEMS & COURSE**

Provide grades/scores for this work item and final course grades. ie. Printouts from oncourse grade book, final grade roster or spreadsheets

☐ ☐ **COMPLETE CHECKLIST FOR EACH CLASS**

INCLUDE a completed copy of the checklist (from handbook), you should have what you need from the items you have collected in this folder.

IMPLEMENTATION SCHEDULE

Prior to starting classes-

- Review Assessment Handbook
- Include on syllabus ABET/PUL learning objectives for each class
- Determine work item/s to be used to measure at least one objective

Doing Assessment Activities
Weeks 1 thru 15

- Discuss with students the ABET/PUL objectives as listed on syllabus
- Develop work item/s to be assessed
- Assign, collect and grade work items
- Save instructional materials (assignment instructions, and grading information or rubric)
- Save actual student work items (graded by professor)

Document Assessment Activities
Weeks 15 & 16

- Assemble all collected materials
- Record data collected from work item onto the data collection checklist

Faculty assess selected student work from selected courses that are linked to Early Career Objectives and Program Learning Outcomes, Data is reduced and Analyzed by Departmental Committees and Chair with feedback to faculty for continuous improvement.
https://oncourse.iu.edu/access/content/user/lalucas/Assessment/Program Obj linked to Prog Objectives.doc

DESIGN TECHNOLOGY 2007 ASSESSMENT REPORT
Prepared by Emily McLaughlin
June 2007

Overview

The underlying objective of the Design Technology (DST) programs is to create multidisciplinary individuals with the necessary skills to enter the technology driven industries of the new millennium. Classroom knowledge links applications to the field through multiple service-learning activities with community partners, and student learning is regularly measured and assessed using PUL and ABET/CIDA outcomes, as well as industry feedback.

During the 2006 academic year, the unit labeled Design Technology demonstrated the commitment to best practices by examining the IUPUI Principles of Undergraduate Learning, ABET criteria and CIDA professional standards, as well as evaluating assessment techniques used to measure learning outcomes related to these principles.

Design Technology split off from Construction Technology in January 2006. As the new organizational structure took shape, a renewed focus on the assessment data collection process has been initiated and should prove to be beneficial. In addition, design technology programs over went an extensive external review in the spring of 2006, and the interior design technology completed an elaborate self study in preparation for a CIDA accreditation site visit in 2007.

Evaluation of Previous Assessment Initiatives

As of June 2006, DST maintained more than 12 part-time and 6 full-time faculty members instructing a rich curriculum including over 26 undergraduate courses, with one stand-alone certificate, two associates degrees, and a fairly young 135 credit BS degree in Interior Design Technology. The strategy of monitoring and assessing learning consistently across all sections of DST classes is embedding the IUPUI Principles of Undergraduate Learning [PUL] into all instructional objectives.

Prior to 2006, our full-time and associate faculty met the challenge of providing assessment data to help determine if the department achieved its ongoing objective of imbedding the PUL approach in classes required by ABET accredited programs and coursework mandated by CIDA. Syllabi for each course (and each of its sections) were collected and examined in addition to the following evidence:

1. Homework assignments, lab reports, projects and presentations, final exams
2. Capstone project reports
3. Student satisfaction surveys
4. Student exit surveys
5. Alumni surveys
6. Employer surveys
7. Industrial Advisory Board appraisals
8. Faculty end-of-semester reflections
9. Internship reports done by graduates

Previous department improvements and initiatives were assessed at a spring 2006 department meeting. An ongoing evaluation of student performance at the senior-level continues to mandate further modifications to the DST curriculum, particularly as we only witnessed 6 graduates from our new B.S. degree program in interior design technology.

2006 Assessment Initiatives

As our programs have matured, we have adopted a self-study process involving systematic assessment practices and elaborate self-study. The following chronology of continuous improvement describes the ongoing evaluation of data for the program inputs and outcomes, summarizes the results from this periodic evaluation. Later we explain how the results are being used to improve the effectiveness of the program.

1. Determined Assessment Objectives

From the very beginning, the primary and leading objective of our programs has been to successfully secure and retain accreditation from our accrediting bodies. In order to properly prepare for this complex task, it has become extremely important for us to continually educate ourselves on successful assessment practices and self-study methods. As a result, one faculty member from our program has attended the Council for Interior Design Accreditation workshop offered in conjunction with the Interior Design Educators Council International Conference each year since 2004. In addition, Gail Shiel attended a Technological Education Initiative Regional Faculty Workshop in 2006. Emily McLaughlin attended the Best Assessment Processes VIII Symposium at the Rose Hulman Institute of Technology in 2006.

2. Created a Plan and Timetable for Completion

The faculty and advisory board identified educational objectives and goals for our programs. It was strongly desired to create a unique graduate, capable of varied technical abilities. A timeline for implementation and accreditation was completed.

3. Identified Self-Study Criteria

Undoubtedly, the ABET/CIDA Professional Standards and indicators were identified as the primary criteria by which to measure curriculum success and student achievement. These clearly identified guidelines were applied to courses within our curriculum even prior to the creation of our degrees in some cases, allowing a distinct level of clarity with relation to the placement of student outcomes. In addition, the specific educational goals set forth for our program were related to PUL indicators to ensure compliance and fulfillment.

4. Identified Self-Study Measures and Methods

Multiple measures to evaluate achievement were used, including the compilation of complete lesson plans and materials for every course in our curriculum. All course inputs were assembled in a binder for review and analysis. Student work, including projects, exams and papers among others, were collected for every course. In addition, the methods which were used to collect and organize these materials were explained early to all faculty, and instructors were asked to save all documentation associated with their course, including juror comments and student surveys.

5. Implemented Self-Study Measures and Methods

Firm deadlines were set for the collection of assessment materials from faculty at the end of each semester. Advisory board meetings have been held consistently, and exit surveys have been systematically distributed. Curriculum meetings and retreats were used as opportunities to further report on progress.

6. Analyzed Gathered Information and Planned and Implemented Improvements

Strengths and gaps in the curriculum were primarily identified through a yearly exhibition of student work assembled in a week long display (sponsored by the Student Design Organization) which is viewed and analyzed by faculty, students and local design professionals. It is here that student performance is closely evaluated, and inconsistencies or overlaps in student work are detected and discussed. Curriculum changes are proposed and implemented as a result of this intensive exercise.

Our program has been religious in facilitating a curriculum retreat each fall, at which examination of student work, open discussion and dialogue regarding outcomes, industry expectations and curriculum concerns are aired. Conclusions are drawn from the discussion and further changes to the program are executed.

The comments of local professionals who have served as jurors for student presentations, reviewed portfolios and participated in mock interview situations with students to further determine the legitimacy of our program and the readiness of our graduates were reviewed by faculty.

Our highly involved advisory board, consisting of both local and national authorities, provides invaluable criticisms on a bi-yearly basis. It is with their insight and recommendations that the program of study is consistently scrutinized and revised to ensure validity with professional practice and to make certain that program goals remain current

Exit interview surveys were analyzed by the faculty and have brought about simple changes based on the recommendations of those who have completed our entire curriculum. Changes to the exit survey's themselves have been completed bi-yearly as the faculty and institution seek new and revised information.

Each semester, individual student commentary and feedback are given to faculty at mid-semester which provides valuable criticism, allowing each to take note of student concerns and consider modifications to individual courses based on this important student commentary.

Within our University setting, yearly evaluations are conducted including systematic institutional assessment data such as enrollment figures, retention rates, minority student participation and academic progress. Faculty effectiveness, achievement, awards, activities, and teaching ability are reviewed according to normal campus guidelines. Student assessment of the program is an ongoing process through course evaluations. This feedback and quantitative data has been used to modify curriculum in conjunction with ABET/CIDA and PUL's.

Identification of strengths and gaps in curriculum has been a regular department meeting topic of discussion. In addition to these almost weekly discussions, multiple retreats which included all full and part-time instructors who teach courses in our curriculum have been held to solicit the input of every single individual associated with the program. The information gathered has been used to precisely identify key indicators of student outcomes.

7. Evaluated the Quality of Self-Study Methods

The self-study process has proved to be a comprehensive examination of our programs. Most methods used were demonstrated to be incredibly useful in analyzing strengths and gaps within the curriculum. While all deadlines were met for this study, the majority of this study was completed on an accelerated timeline as to eliminate delay in securing accreditation for our young program, and to accommodate CIDA's availability to complete a site visit for the interior design technology program in the fall of 2007. This in mind, when completing future self-study, the programs concludes that a similar process should be followed.

DST Program/Department Analysis

Much evidence has been collected to assess whether or not the program is meeting its stated educational goals. Some of this data includes examination of student work, inspection of internship papers and employer feedback, analysis of exit interviews and surveys, feedback of the advisory board and student placement rates. Close analysis of these items suggest that a strong understanding of our educational goals prior to the creation of the degree was an integral factor in the success of our curriculum and our graduates.

Through self-study we identified numerous strengths in meeting our educational goals. The response of graduates and industry boasts the ability of our students to understand and apply knowledge to multiple disciplines in the field, while also retaining extensive technical capabilities useful in many arenas. Our nearly 100% job placement rate is further evidence that our students possess the skill sets needed to work in collaborative environments and enthusiastic to continue their education through commitment to the profession. Student work indicates that students retain a powerful understanding of environmental and cultural issues both regionally and internationally.

Minor gaps could be observed through self-study with relation to meeting our educational goals. Slight overlaps and inconsistencies among students with relation to oral and written communication skills was observed. In addition, the ability to prove that students are acting as responsible citizens was found difficult to measure.

Our educational goals have evolved over recent years. Consideration of changes to departmental structure and industry trends has stimulated us to modify our goals to fit contemporary criteria. Initially, we had ten educational goals. However, we found in many cases that multiple goals desired the same outcome. In some instances this led to strengths and gaps, especially as it related to measuring the outcomes significance toward success or failure in meeting the criteria. As the assessment committee discussed this further, it attempted to focus on ways to specifically measure and relate outcomes as they related to CIDA outcomes. Thus, while multiple courses may touch on several criteria, the intent is to make sure that specific courses are charged and assessed per these criteria, even though instances of every course could be cited as meeting some level of each.

During the self-study process, where strengths and weaknesses are found as a result of our evaluation process, faculty members and the department assessment committee first discuss possible remedies. Faculties then implement changes as required; and, where appropriate seek additional input from industry. Changes then are evaluated using surveys, project reviews, tests, quizzes, homework assignments, papers, course and instructor evaluation and other tools to determine if further improvements and adjustments are required. In essence, a continual and closed loop system is employed to insure continuous improvement.

The Design Technology programs at IUPUI have been successful in creating degrees built upon already established sets of guidelines for education and the industry. This plan has provided a strong foundation on which to build unique degrees with traits which are vastly desired in both the Indianapolis community as well as around the country. Through extensive self-study and assessment of the program, we recognize several areas of success in our curriculum, as well as areas which can and will be strengthened through the implementation of continuous improvements. It is our ultimate goal and aspiration to secure accreditation, and continue to provide graduates who are highly employable and motivated to continue a lifetime of service and benefit to the profession.

We have reached many conclusions regarding the overall quality of our program.

1.   We have discovered that our multidisciplinary curriculum is arming our graduates with skills needed to enter an ever changing and technological workforce. These students are capable of functioning in traditional roles, or able to create their own vocation based on industry needs and trends. A strong understanding of the architectural and construction industries, as well as knowledge of computer graphics, fine arts and organizational leadership have made our alumni invaluable and highly desired, hence our nearly100% placement rate and surplus of positive industry feedback.

2. A positive characteristic of our program which we have observed is our supportive, urban setting. With an extremely active advisory board, plethora of field trip locations, unending sources of information and multiplicity of local practitioners, the quality of our program has been greatly enhanced. The willingness of local professionals to assist in course instruction, juried presentations and internships lends credibility and depth to our curriculum, creating for the student a connection between academia and professional practice. In addition, local (as well as global) service opportunities introduce concepts of public service and social responsibility to our student population.

3. We have discovered that one of the measures of success of our program is our ability to see when and where change is needed. Our faculties are not afraid of using modification and experimentation as tools. By regularly examining and evaluating the validity of the curriculum based on ABET/CIDA standards and the PUL's, industry expectations and program goals, consistent improvement can be seen. This ultimately improves overall program quality, keeping our students marketable. When the provided education is relevant and modern, students are much better prepared to enter the practicing profession, and more likely to be successful in their occupation.

While we remain confident in the distinguished quality of our program, we remain fully conscious of several areas which are in need of further strengthening and enhancement.

1. While our faculties remain diverse in background and specialty, we recognize that the credentials of our current faculty can be improved. Further professional certification and the securing of advanced degrees is desired in order to set a positive example for our student body, as well as provide faculty members with the highly developed qualifications that are required in academia. In addition, more faculties are needed to deliver an excellent education to a program of our size.

2. Upgraded equipment, software and additional resources are needed if the program is to retain a reputation as a technology leader, capable of producing students with a diverse range of abilities. Based on the speed of the development of our degree and the large number of students which we instruct, additional studio space and laboratories would greatly benefit the delivery of our curriculum, and more modern, efficient computers would ensure that student work remain accurate, competitive and appropriate. The launch of a laptop requirement for all incoming students is currently being considered, yet further development and investigation are needed.

3. A proper evaluation tool needs to be explored in order to hold the quality of student work to a high standard. While our current policy does not allow students to progress in our programs with a grade lower than a C-, the creation of a portfolio review process would further permit quality control, serve as a valuable assessment tool and assist students in understanding their level of aptitude with relation to interior design prior to graduation.

4. Continuous assessment and self-study must be completed in order to continue to improve and determine the validity of the unique degrees which we offer. Careful compliance with all ABET/CIDA standards, as well as industry expectations and program goals must continue to be maintained. Students need to benefit from persistent involvement in research and community service projects, and it is the hope of the faculty to eventually create a Bachelor's degree in Architectural Technology and a Master's degree in Interior Design in order to contribute to advance understanding of the profession and assist in the current crisis that can be witnessed regarding the lack of design educators.

The DST faculty are certain that our young program is bound for sustained success. It is through continued use of industry resources and successful assessment strategies, as well as consistent experimentation with new ideas that our program will grow to be respected and recognized within the state of Indiana, and nationally. We recognize our downfalls, and have implemented plans of action to address gaps in curriculum as well as program weaknesses in order to better prepare future graduates. It is our final conclusion that we have created a successful enterprise of elevated quality, capable of producing creative, talented individuals who will make lasting contributions to interior design and related professions.

DST Program/Department Improvements & Initiatives

The faculty and administration for the Design Technology programs have many ideas in mind with regards to future development of the curriculum and plan of study. As we have only witnessed three graduating classes from our INTR B.S. degree program, we are aware that continuous examination and improvements will be needed as we observe consistent trends emerging among graduates. We estimate that changes will occur at gradual paces, with critical changes taking priority over tedious initiatives. In addition, common trends and changes within the industry, including future changes among ABET/CIDA standards, will most certainly affect that way in which we deliver our curriculum and help us to identify new goals and educational objectives.

After thorough self-study, specific gaps in our curriculum have been identified and addressed. While many of these gaps simply require the addition of educational material in our course delivery and student deliverables, some changes to the overall plan of study have been determined to be appropriate.

1. It has been established that the courses which our students take in the construction technology department have been delivered in a somewhat sporadic way in recent semesters, leading us to the decision to bring those courses into our own department in order to more accurately control and deliver material in an effective way. For this reason, courses which previously held the prefix "CNT" will now be annotated as "ART" courses, with the intention to keep the numbering and placement of the courses similar to their current locations. This is not to say that the course objectives and the construction technology focus will be lost from these courses. We intend to retain the basic deliverables and material in the course while accentuating the relationship between the interior design and construction professions.

2. It was noted upon examination of student work that earlier exposure to computer graphics related skills would provide more advanced graphic communication skills to be utilized by our students earlier in their work. For this reason, we have added an additional graphics course to our plan of study in the second semester (CGT 117). Also, the prerequisites and numbering of all existing computer graphics courses has been analyzed and revised to ensure that students receive certain skill sets in the proper chronological order.

3. We discovered an exceptional amount of strength and overlap within many of our senior level courses. Upon close examination of our senior thesis and capstone courses, significant repetition of skills, research and ideas were revealed. For this reason, we are considering combining these two courses into one, 5 credit hour class. The course will remain highly intense, yet will allow for some flexibility in research topics and presentation technique without repeating ideas. As we also discovered a similar phenomenon occurring between our sustainable design course and our building systems course, we are exploring the possibility of combining these courses into a 4 credit hour class as well.

4. An accounting course was removed from our curriculum based on the finding that students were receiving sufficient and more relevant business accounting and marketing knowledge from our interior design business practices and project management courses.

5. The creation of a course at the senior level to assist students in further developing written communication skills was created entitles “Writing Construction Documents.” This course replaces the CNT 347 course which focused more specifically on construction administration and specifications.

6. As we consider implementing an evaluation tool such as portfolio review to our program in the future, we have added a portfolio development course in the fourth semester of our program. This course will be called INTR 253, and will serve as an early introduction to business practices as well as explore acceptable ways to organize student and professional work for presentation to potential employers and clients.

A timeline for the implementation of these changes was considered, and the majority of these alterations have been made to the plan of study for the spring 2007 semester. An exception to this is the portfolio development course which is still in discussion at this time, and the combining of the four senior level courses into two. While some changes have been made at the time of this report, it is estimated that it may take until fall of 2007 or spring of 2008 before measurable outcomes of these changes can be assessed and examined.

Looking toward the future, several possible changes can be foreseen. Faculty transitions are of great concern considering the current lack of qualified interior design educators that is being witnessed nation wide. It is our hope that we are able to hire additional faculty to further enhance the quality of our program without losing any of our current personnel. Also, reorganization efforts within the school may result in some changes of leadership or departmental association in the near future. In this case, certainly every possible attempt will be made to retain consistency and even improve our location within the organizational structure. Furthermore, an indication of possible budget cuts within the state and University may require solicitation of alternate funding and resources in order to sustain our program. As technology progresses, there is also a possibility that a higher demand in online course delivery or the creation of advanced tools for the industry may require us to re-design our curriculum. In any event, we remain fully prepared to address these issues as they arise with a positive attitude and with resolution to move forward in whichever direction is deemed necessary.

The composition of our faculty has had a direct impact on the way in which we handle challenges and address industry and educational trends. We remain a close group of colleagues who retain open communication and utilize teamwork to work through both day-to-day and ongoing issues that arise. However, we not only rely on internal opinions and discussion, but solicit the feedback of practitioners and advisory board members on a regular basis to ensure that our decisions are in the best interest of the students and industry. When challenges occur, careful analysis and open dialog transpire, allowing for a large amount of input prior to decisions being made. Likewise, when new trends are observed, research and surveillance take place ensuring that any changes or implementations to the program occur only after consideration of all factors.

DESIGN TECHNOLOGY PROGRAM 2007 ASSESSMENT REPORT
Written by Emily McLaughlin
June 2007

Department Mission and Vision

The underlying objective of the Design Technology programs is to create multidisciplinary individuals with the necessary skills to enter the technology driven industries of the new millennium. Classroom knowledge will link applications to the field through multiple service-learning activities with community partners, and student learning will be regularly measured and assessed using PUL and ABET/CIDA outcomes, as well as industry feedback.

Constituents

All full and part-time faculties are charged with assessing PUL and ABET/CIDA program outcomes noted for a given course, reporting findings and recommending actions for course improvement. At least one course is identified to assess each PUL and ABET/CIDA program outcome.

Early Career Objectives

The career objectives of our programs include producing graduates who will hold certain attributes, as measured through internship analysis, employer evaluation and alumni survey in the early years of their careers following graduation.

During the assessment process, where strengths and weaknesses are found as a result of our evaluation process, faculty members first discuss possible remedies. Faculties then implement changes as required; and, where appropriate seek additional input from industry. Changes then are evaluated using surveys, project reviews, tests, quizzes, homework assignments, papers, course and instructor evaluation and other tools to determine if further improvements and adjustments are required. In essence, a continual and closed loop system is employed to insure continuous improvement.

Program Learning Outcomes

Our programs were designed with ABET and CIDA outcomes in mind as fundamental guides. We have mapped these onto the IUPUI Principles of Undergraduate Learning to show that all PULs are thus assessed and have found patterns that indicate students are meeting or exceeding our expectations. We continue to refine the connection between work items and measurable outcomes to better substantiate this data.

During the assessment process, student work is examined as well as student self reports indicating how well they feel they have met indicators. Where strengths and weaknesses are found as a result of our evaluation process, faculty members first discuss possible remedies. Faculties then implement changes as required; and, where appropriate seek additional input from industry. Changes then are evaluated using surveys, project reviews, tests, quizzes, homework assignments, papers, course and instructor evaluation and other tools to determine if further improvements and adjustments are required. In essence, a continual and closed loop system is employed to insure continuous improvement.

DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING 2007 ANNUAL ASSESSMENT REPORT
Prepared by Elaine Cooney—July 2007

The ECET department is home to five degree programs: Biomedical Engineering Technology (BMET-AS), Computer Engineering Technology (CpET-AS and CpET-BS), and Electrical Engineering Technology (EET-AS and EET-BS). The assessment process is carried out amongst all courses in the department, thus this report reflects results from all programs.

From September 30 to October 2, 2006 a team from the Accreditation Board for Engineering and Technology (ABET) visited to evaluate our EET-BS degree program for re-accreditation and our CpET-BS program for initial accreditation. The final accreditation results are not available at this time, but the preliminary results look promising. The only concerns expressed in the preliminary reports are:

- The evaluators perceived a lack of feedback to students in both oral and written communications: Although the data collected using both direct and indirect measures demonstrate that our graduates have good communication skills, the evaluators were not satisfied with the quantity of corrections made on students' written work or the methods of feedback in grading students' oral presentations. New techniques are now in place for grading students' communications.
- Some assessment data that are being collected are not from the courses that were identified in the mapping process as being crucial to achieving the program outcomes. The evaluators were confused by our assessment plan that sometimes assesses outcomes in courses other than where the material is being "taught". We will review our course objectives and assessment plan to insure that the process is logical and the assessment feedback loop is complete.

Problems were discovered with the fall, 2006 student course objective surveys: instructions and rating scale were not consistent, and some classes treated "5" as "Strongly Agree" and other classes treated it as "Strongly Disagree." Because of this inconsistency, the results are not valid and are not presented. The problem has been corrected for the spring, 2007 semester.

With the reduced faculty and school reorganization, it will be crucial to stream-line the assessment process to make it sustainable. An emphasis will be placed on organizing, simplifying and documenting the assessment process to make it less of a burden on faculty.

ECET Assessment Summary of the B.S. Degree Programs – 2007

1. General outcomes:	2. What the student will know or be able to do? (measurable outcomes)	3. How will you help students learn it (in class or out of class)	4. Where will your students learn it?	5. How each of the measurable outcomes is measured	6. Calendar year 2005 assessment findings	7. Changes planned/put into place	8. 2006 assessment findings	9. Impact / further change needed
ABET Criterion 1, item a; Demonstrate an appropriate mastery of the knowledge, techniques, skills and modern tools of their discipline.	ECET program outcome #1 - “Demonstrate knowledge, techniques (including the use of modern tools), and skills in the use of components, circuits, programs and systems encountered in the degree program’s courses.” There are sets of generally accepted skills that are used in the discipline such as circuit analysis and design, analog and digital design, and programming.	Laboratories are a strong component of this learning objective. In addition, normal classroom activities such as lectures, homework, and group learning activities learn these skills.	Mastery of a skill set is a primary objective of the departments teaching mission and all courses in this curriculum have this as a primary focus.	Student self-assessment of their comprehension of course objectives was measured for courses taught during the spring semester. Selected exam questions were used in ECET 157, 164 and 209 to assess this outcome.	The department continued to be strong in this outcome. The percentage of students indicating that they strongly agree or agree they can perform tasks indicated by the course objectives associated with this outcome in Spring 2005 was 79.2%. In Fall 2005, 84.6%of students strongly agreed or agreed they could perform the objectives. On exam questions targeting this criterion during the fall semester, 72.6% of the students scored a 70% or better.	In ECET 107 a software package is being utilized to analyze some circuits.	The percentage of students indicating that they strongly agree or agree they can perform tasks indicated by the course objectives associated with this outcome in Spring 2006 was 82.3%. On exam questions targeting this criterion during the spring semester, 77.1% scored a 70% or better.	The department will continue to focus on teaching these necessary skills.

ECET Assessment Summary of the B.S. Degree Programs – 2007

1. General outcomes:	2. What the student will know or be able to do? (measurable outcomes)	3. How will you help students learn it (in class or out of class)	4. Where will your students learn it?	5. How each of the measurable outcomes is measured	6. Calendar year 2005 assessment findings	7. Changes planned/put into place	8. 2006 assessment findings	9. Impact / further change needed
ABET Criterion 1, item b; Apply current knowledge and adapt to emerging applications in mathematics, science, engineering and technology.	This criterion is mapped to ECET Program Outcome 2 – "Use current knowledge of mathematics, science and emerging technology tools of their discipline to solve problems and demonstrate solutions."	In addition to classroom activities such as lectures, homework, and group learning activities, laboratories are a strong component of learning.	Solving problems using math and other tools is foundational to all circuits courses.	Student self-assessment of comprehension of course objectives is measured. Specific questions demonstrating application of mathematics in ECET 207, 307 and 357 are included on final exams.	The percentage of students indicating that they strongly agree or agree they can perform tasks indicated by the course objectives associated with this outcome in Spring 2005 was 74.0%. In Fall 2005, 76.6%of students strongly agreed or agreed they could perform the objectives. On exam questions targeting this criterion during the fall semester, 85.8% of the students scored a 70% or better.	Course objectives were reviewed and updated.	The percentage of students indicating that they strongly agree or agree they can perform tasks indicated by the course objectives associated with this outcome in Spring 2006 was 83.5%. On exam questions targeting this criterion during the spring semester, 76.8% scored a 70% or better; during the fall semester, 84.4% scored a 70% or better.	The department will continue to monitor student progress in this area, as well as add technologies to course work as appropriate.

ECET Assessment Summary of the B.S. Degree Programs – 2007

1. General outcomes:	**2. What the student will know or be able to do? (measurable outcomes)**	**3. How will you help students learn it (in class or out of class)**	**4. Where will your students learn it?**	**5. How each of the measurable outcomes is measured**	**6. Calendar year 2005 assessment findings**	**7. Changes planned/put into place**	**8. 2006 assessment findings**	**9. Impact / further change needed**
ABET Criterion 1, item c; Conduct, analyze and interpret experiments and apply experimental results to improve processes.	This criterion maps to ECET Program Outcome 5 – “Conduct, analyze and interpret experiments, and assess results.”	Laboratories are a strong component of this learning objective. All ECET courses include a laboratory component. Students receive training on equipment from the lab instructor.	Students will practice this objective in all courses, since everyone includes a laboratory component.	Student self-assessment of comprehension of course objectives is measured. Laboratory practical exams are given in many courses that require a student to design a circuit or system, construct it, and analyze the results to determine if improvements are needed.	The percentage of students indicating that they strongly agree or agree they can perform tasks indicated by the course objectives associated with this outcome in Spring 2005 was 81.7%. In Fall 2005, 78.3%of students strongly agreed or agreed they could perform the objectives. 82.7% of students passed lab practical exams during the Fall, 2005 semester.	Course objectives were reviewed and updated. New software package was integrated into ECET 331 to model and analyze transmission systems.	The percentage of students indicating that they strongly agree or agree they can perform tasks indicated by the course objectives associated with this outcome in Spring 2006 was 83.8%. 81.3% of students passed lab practical exams during the Spring 2006 semester.	We plan to develop a rubric to be used in ECET 307 and 357 to measure student’s ability to analyze experimental results.

ECET Assessment Summary of the B.S. Degree Programs – 2007

1. General outcomes:	2. What the student will know or be able to do? (measurable outcomes)	3. How will you help students learn it (in class or out of class)	4. Where will your students learn it?	5. How each of the measurable outcomes is measured	6. Calendar year 2005 assessment findings	7. Changes planned/put into place	8. 2006 assessment findings	9. Impact / further change needed
ABET Criterion 1, item d; Apply creativity in the design of systems, components or processes appropriate to program objectives.	This criterion maps to ECET Program Outcome 4 – "Apply and design components, circuits, systems and software programs in their specialty area as demonstrated in a senior project." Students should be able to design a system by creatively applying fundamental skills learned in the curriculum.	Some laboratory assignments require a creative approach, and many classes have required projects. Faculty support students in the process with classroom instruction and informal help. Formal instruction in the design process occurs in ECET 490 – Senior Design I.	Most ECET courses have course objectives that have a creative component.	Student self-assessment of their comprehension of course objectives was measured. This outcome was also evaluated in the department's terminal senior design course: both the design itself and the design process are measured.	The percentage of students indicating that they strongly agree or agree they can perform tasks indicated by the course objectives associated with this outcome in Spring 2005 was 81.5%. In Fall 2005, 81.7%of students strongly agreed or agreed they could perform the objectives. Faculty evaluated the senior design projects, and found that in the Spring 2005 semester 91.6% of the students scored a 3 or above on the rubric elements. In fall, 2005, 82.4% scored a 3 or above.	ECET 490 was offered as an on-line course for the first time in the Fall 2006 semester. Course objectives were reviewed and updated. A project in which students installed a small PBX system was added to ECET 453.	The percentage of students indicating that they strongly agree or agree they can perform tasks indicated by the course objectives associated with this outcome in Spring 2006 was 76.9%. Faculty evaluated the senior design projects, and found that in the Fall 2006 semester 88.2% of the students scored a 3 or above on the rubric elements.	Student feedback on the on-line format of ECET 490 led to a restructuring of some assignments for the Spring, 2007 semester.

ECET Assessment Summary of the B.S. Degree Programs – 2007

1. General outcomes:	**2. What the student will know or be able to do? (measurable outcomes)**	**3. How will you help students learn it (in class or out of class)**	**4. Where will your students learn it?**	**5. How each of the measurable outcomes is measured**	**6. Calendar year 2005 assessment findings**	**7. Changes planned/put into place**	**8. 2006 assessment findings**	**9. Impact / further change needed**
ABET Criterion 1, item e; Function effectively on teams.	This criterion maps to ECET Program Outcome 6 – "Function as a member of a 2-4 person team to complete a task in a timely manner. Demonstrate ability to organize work done by team members." Students should successfully work within a team environment: this includes understanding different roles within a team and working with others in modular designs and projects.	Laboratories are a strong component of this learning objective. Other classroom activities include discussions and group learning activities. Many ECET students take OLS courses to learn more about team work, and formal team building is included in ECET 371.	Students work in small groups in most of our laboratories and learn practical group skills. Courses ECET309, 360, 371 and 417 have formal group projects.	A self-assessment was completed by students and the instructor teaching courses with group projects. Course objectives were evaluated by students. The ECET Teaming rubric was used by faculty and student peers to assess team skills in ECET 209, 234, 307, 371 and 417.	The percentage of students indicating that they strongly agree or agree they can perform tasks indicated by the course objectives associated with this outcome in Spring 2005 was 88.8%. In Fall 2005, 85.2%of students strongly agreed or agreed they could perform the objectives. In Spring, 2005, Faculty assessed 92.9% of teams scored a three or above on rubric items, but student peers reported only 69.4%. (This disparity is caused results coming from 2 different classes). In Fall, 2005 (when more classes participated) the faculty reported scores of 3 or above 84.9% of the time. Students reported 3 or above for 85.2% of the rubric items.	Course objectives were reviewed and updated. Two team building exercises developed and led by an OLS graduate student were added to ECET 371.	The percentage of students indicating that they strongly agree or agree they can perform tasks indicated by the course objectives associated with this outcome in Spring 2006 was 84.0%. In Spring, 2006, faculty assessed 88.9% of teams scored a three or above on rubric items. In Fall, 2006 student peers reported scores of 3 or above 99.1% of the time.	Currently, rubric data for each class is combined to generate a histogram of performance for each rubric item, and we are not tracking if groups are performing at an acceptable level for *all* rubric items. We should investigate the validity of these different scoring methods.

ECET Assessment Summary of the B.S. Degree Programs – 2007

1. General outcomes:	2. What the student will know or be able to do? (measurable outcomes)	3. How will you help students learn it (in class or out of class)	4. Where will your students learn it?	5. How each of the measurable outcomes is measured	6. Calendar year 2005 assessment findings	7. Changes planned/put into place	8. 2006 assessment findings	9. Impact / further change needed
ABET Criterion 1, item f; Identify, analyze and solve technical problems.	This maps to ECET Program Outcome 3 – "Identify, analyze and solve technical problems as required in the degree program's courses." There are sets of generally accepted problem types used in the discipline.	A large portion of normal classroom activities such as lecture and homework are devoted to teaching this objective. Laboratories also play a strong role in teaching related to this learning objective.	Mastery of discipline related problem solving is primary objective of the departments teaching mission and all courses in this curriculum have this as a primary focus.	Student self-assessment of their comprehension of course objectives was measured. In ECET 207, 231, 307, 309, 417, 483 and BMET 320 specific final exam questions are used to measure this outcome (goal: 70% score 70% or higher on each question).	The percentage of students indicating that they strongly agree or agree they can perform tasks indicated by the course objectives associated with this outcome in Spring 2005 was 75.7%. In Fall 2005, 79.6%of students strongly agreed or agreed they could perform the objectives. On exam questions targeting this criterion during the spring semester, 69.6% of the students scored a 70% or better, and in the fall, 2005 semester 67.6% of the students scored a 70% or better.	In Fall, 2006, a section of ECET 107 was offered with an additional recitation that will focus on problem solving. Course objectives were reviewed and updated.	The percentage of students indicating that they strongly agree or agree they can perform tasks indicated by the course objectives associated with this outcome in Spring 2006 was 80.2%. On exam questions targeting this criterion during the spring semester, only 39.8% scored a 70% or better; This low result was traced to very poor performance in ECET 284, and was addressed in the course during the next semester.	Problem solving steps will continue to be stressed, especially in foundational courses.

ECET Assessment Summary of the B.S. Degree Programs – 2007

1. General outcomes:	2. What the student will know or be able to do? (measurable outcomes)	3. How will you help students learn it (in class or out of class)	4. Where will your students learn it?	5. How each of the measurable outcomes is measured	6. Calendar year 2005 assessment findings	7. Changes planned/put into place	8. 2006 assessment findings	9. Impact / further change needed
ABET Criterion 1, item g; Communicate effectively.	This criterion maps to ECET Program Outcome 7 – "Write technical reports; present data and results coherently in oral and graphic formats." We are evaluated based on communica-tions skills that are expected by industry of recent graduates.	Students are required to write reports and papers that are returned for corrections and/or graded for clarity and grammar. Oral presentations are critiqued.	Students take the required English composition, speech, and technical communication courses. In addition, papers are required in many courses, including ECET304, 490 and 491. Oral reports are required in ECET 234, 371, 490 and 491.	Oral and written presentations were evaluated in ECET 491 and other courses.	The percentage of students indicating that they strongly agree or agree they can perform tasks indicated by the course objectives associated with this outcome in Spring 2005 was 91.6%. In Fall 2005, 85.6%of students strongly agreed or agreed they could perform the objectives. In the Spring, 2005 semester, faculty rated 91.9% of the items on the written report rubric and 95.6% of the items on the oral report rubric a 3 or above. In Fall, 2005, 93.1% of written report rubric items and 97.1% of oral report rubric items were rated a 3 or above.	ECET 490 required an oral report, but this requirement was modified in the on-line version. Instructions for source citation were formalized in ECET 304. Course objectives were reviewed and updated.	The percentage of students indicating that they strongly agree or agree they can perform tasks indicated by the course objectives associated with this outcome in Spring 2006 was 82.9%. In the Spring, 2006 semester, faculty rated 87.8% of the items on the written report rubric and 96.2% of the items on the oral report rubric a 3 or above. In Fall, 2006, 79.7% of written report rubric items and 92.8% of oral report rubric items were rated a 3 or above. The drop in acceptable writing in the fall semester can be tracked to students not citing sources.	According to our accreditation visit draft report, additional feedback should be given to students on the mechanics of their writing and speaking. Methods to incorporate oral presentations into on-line courses must be investigated and tested.

ECET Assessment Summary of the B.S. Degree Programs – 2007

1. General outcomes:	**2. What the student will know or be able to do? (measurable outcomes)**	**3. How will you help students learn it (in class or out of class)**	**4. Where will your students learn it?**	**5. How each of the measurable outcomes is measured**	**6. Calendar year 2005 assessment findings**	**7. Changes planned/put into place**	**8. 2006 assessment findings**	**9. Impact / further change needed**
ABET Criterion 1, item h; Recognize the need for and possess the ability to pursue lifelong learning.	This criterion maps to ECET Program Outcome 8 – “Demonstrate skills for life-long learning by locating, evaluating and applying relevant information using external resources such as the Internet, data books, trade publications and library resources.”	We require research projects using technical literature. ECET 490-91 requires demonstration of technical competence in state-of-the art project management and project design.	Research strategies are presented in ECET 103. Many courses require investigative reports or assignments, including ECET234, 304, 307, 360, 403, 472, 490 and 491.	Student self-assessment of their comprehension of course objectives are measured. An assignment to assess the validity of websites using a rating scale is evaluated in ECET 304. In ECET 307, students are required to use library resources to research a topic.	The percentage of students indicating that they strongly agree or agree they can perform tasks indicated by the course objectives associated with this outcome in Spring 2005 was 90.0%. In Fall 2005, 90.2%of students strongly agreed or agreed they could perform the objectives. In Spring 05, 90.6% of ECET 307 students successfully completed an assignment to find, cite, and summarize a journal article.	Course objectives were reviewed and updated.	The percentage of students indicating that they strongly agree or agree they can perform tasks indicated by the course objectives associated with this outcome in Spring 2006 was 38.5%. This low score may be explained by the low number courses (only one with only one course objective) taught that had an objective associated with this outcome.	Investigate other measurable outcomes associated with life long learning. Investigate other assessment methods, especially in PBL courses/projects (PBL projects require self-directed learning, essential in life long learning).

ECET Assessment Summary of the B.S. Degree Programs – 2007

1. General outcomes:	**2. What the student will know or be able to do? (measurable outcomes)**	**3. How will you help students learn it (in class or out of class)**	**4. Where will your students learn it?**	**5. How each of the measurable outcomes is measured**	**6. Calendar year 2005 assessment findings**	**7. Changes planned/put into place**	**8. 2006 assessment findings**	**9. Impact / further change needed**
ABET Criterion 1, item i; Understand professional, ethical and societal responsibilities.	This criterion maps to ECET Program Outcome 9 – "Demonstrate ethical conduct as described in the university student code of conduct. Demonstrate knowledge of professional code of ethics." Students can successfully communicate the many alternative choices.	Statements warning against plagiarism and reminding students of the student code of conduct will be added to some syllabi. Faculty will use the university policies to enforce the code of conduct.	In ECET 103 & ECET 107, students review the Student Code of Conduct and Statement on Civility. In ECET 499, the IEEE code of ethics and ethical case studies are presented in the classroom.	Student work is evaluated using turnitin.com to check for plagiarism. Students complete a "self-assessment" survey each semester to evaluate course objectives which are mapped to this outcome. The faculty is surveyed regarding student ethics and civility (Professionalism, Social ethics, Technical ethics, and Plagiarism criteria).	In Spring 2005, 100.0% of students showed 10% or less plagiarism as measured by turnitin.com. In Fall 2005, 57.1% of students showed 10% or less plagiarism. In Spring 2005, 90.1% items on the civility rubric were scored by faculty a 4 or 5; In Fall 2005, 100% of the items were scored 4 or 5. (The course with high plagiarism measured by turnitin.com is not included in the faculty survey data.) The percentage of students indicating that they strongly agree or agree they can perform tasks indicated by the course objectives associated with this outcome in Spring 2005 was 63.0%. In Fall 2005, 89.2%of students strongly agreed or agreed they could perform the objectives. (Most of this improvement came in ECET 499 objectives.)	ECET 493 is now the permanent course number for "Ethics and Professionalism in Technology"	The percentage of students indicating that they strongly agree or agree they can perform tasks indicated by the course objectives associated with this outcome in Spring 2006 was 71.9%. In Spring 2006, 87.5% items on the civility rubric were scored by faculty a 4 or 5.	Faculty will continue to educate students on "What is plagiarism?" and enforce the penalties for plagiarism. A case study regarding the elimination of PCB's as transformer cooling liquid will be for ECET 231.

ECET Assessment Summary of the B.S. Degree Programs – 2007

1. General outcomes:	2. What the student will know or be able to do? (measurable outcomes)	3. How will you help students learn it (in class or out of class)	4. Where will your students learn it?	5. How each of the measurable outcomes is measured	6. Calendar year 2005 assessment findings	7. Changes planned/put into place	8. 2006 assessment findings	9. Impact / further change needed
ABET Criterion 1, item j; Recognize contemporary professional, societal and global issues and be aware of and respect diversity.	This criterion is mapped to ECET Program Outcome 10 – “Demonstrate a respect for diversity as described in the university civility statement. Recognize contemporary professional, societal and global issues in case studies and course projects.”	Faculty model respect for students. Case studies are presented in the classroom.	In ECET 103 & ECET 107, students review the Student Code of Conduct and Statement on Civility. ECET 499 Ethics & Professionalism In Technology is now required for all students.	Faculty are surveyed regarding student ethics and civility (items Civility, tolerance & plagiarism on rubric) Students will complete a quiz over sexual harassment and diversity in ECET 499. Students will complete a case study including global perspective in ECET 499. Students complete a “self-assessment” survey each semester to evaluate course objectives which are mapped to this outcome.	The percentage of students indicating that they strongly agree or agree they can perform tasks indicated by the course objectives associated with this outcome in Spring 2005 was 63.6%. In Fall 2005, 84.6%of students strongly agreed or agreed they could perform the objectives. (Most of this improvement came in ECET 499 objectives.) The faculty survey regarding student ethics and civility (items Civility, tolerance & plagiarism on rubric) showed 88.1% items scoring a 4 or 5 during Spring 2005 (less than goal of 90%), and 100% in Fall 2005.	ECET 493 is now the permanent course number for “Ethics and Professionalism in Technology”	The percentage of students indicating that they strongly agree or agree they can perform tasks indicated by the course objectives associated with this outcome in Spring 2006 was 76.7%. The faculty survey regarding student ethics and civility (items Civility, tolerance & plagiarism on rubric) showed 73% items scoring a 4 or 5 during Spring 2006 (less than goal of 90%).	ECET 106 is no longer offered because beginning in Fall, 2006 the school required TECH 102, Discovering Technology as a learning community course. This will require us to change our course objectives and assessment plan to insure this criterion is adequately addressed early in the program.

ECET Assessment Summary of the B.S. Degree Programs – 2007

1. General outcomes:	2. What the student will know or be able to do? (measurable outcomes)	3. How will you help students learn it (in class or out of class)	4. Where will your students learn it?	5. How each of the measurable outcomes is measured	6. Calendar year 2005 assessment findings	7. Changes planned/put into place	8. 2006 assessment findings	9. Impact / further change needed
ABET Criterion 1, item k; Have a commitment to quality, timeliness and continuous improvement.	This criterion maps to ECET outcome 11 – “Demonstrate quality, timeliness and ability to complete increasingly complex homework and projects throughout the degree experience.”	Stress the importance of handing work in neat and on time. Teach project management making use of Gantt charts and other organizational tools.	Throughout the 100/200 level courses, and ECET490/491	Student self assessment of their comprehension of course objectives is measured. A rubric is used to measure ECET 157 power supply project construction. Record the number of students turning selected assignments in on time, late, and not at all in ECET 107, 109, 164, 207, 209, 231 and 284. Gantt charts for each student project in 491 are assessed. Quality of construction/ software of senior design projects is evaluated using a rubric.	The percentage of students indicating that they strongly agree or agree they can perform tasks indicated by the course objectives associated with this outcome in Spring 2005 was 78.8%. In Fall 2005, 80.0%of students strongly agreed or agreed they could perform the objectives. In Fall, 2005, the power supply construction rubric showed 82.1% of items evaluated 4 or 5; the senior project quality rubric showed 82.3% scoring 4 or 5. In Spring, 2005 69.8% of counted assignments were turned in on time, and 77.1% were turned in on time in the Fall, 2005. Both semesters were lower than the goal of 80%, but there was improvement.	Course objectives were reviewed and updated.	The percentage of students indicating that they strongly agree or agree they can perform tasks indicated by the course objectives associated with this outcome in Spring 2006 was 88.6%. In Spring, 2006 62.8% of counted assignments were turned in on time, and in the Fall 81.7% were turned in on time.	A rubric to assess milestone charts will be developed for senior design (ECET 490/491) and published for student use. Faculty must continue to stress timeliness in turning in assessments.

ECET Assessment Summary
July, 2007

The Electrical and Computer Engineering Technology Mission:
"to provide quality education, scholarship, and service in electrical and computer engineering technology to better serve the community of central Indiana and its citizens".

Department Goals:

- To assure that our students participate in educational experiences in the areas of electrical and computer engineering technology and their adjunct studies that fully prepares them for quality careers in industry and commercial enterprises. Two years of study shall prepare them for technical careers as A.S. graduates; two additional years of study shall prepare them for engineering technology careers as B.S. graduates.
- To enhance and advance the capability of the ECET faculty in their fields of expertise, such as electronics, microprocessors, electronics manufacturing, digital circuits, software development, power, communications, and controls.

Constituents:
The constituencies of the ECET program are ECET students, ECET faculty, potential employers of ECET students, alumni, Industrial Advisory Board (IAB), school and university, and the national engineering technology community.

Early Career Objectives:

1. Demonstrate the ability to analyze, design, apply electronics and software programming . . . {see http://www.engr.iupui.edu/tech/ecet/peos.shtml for specifics for each degree}
2. Demonstrate the ability to function in a group environment in the workplace and to communicate effectively in oral, written, and visual modes in interpersonal and group environments.
3. Demonstrate and upgrade skills with changing technology (life-long learning).
4. Demonstrate ethical and professional conduct in the workplace and appreciate diversity.
5. Demonstrate a commitment to quality work, timeliness, and continuous improvement.

These objectives are assessed using focus groups (alumni & IAB) and surveys. The department chair collects, reduces and interprets the data from the focus groups. The surveys are administered by the dean's office, which collects and reduces the data. The data is interpreted by the department chair and assessment committee. The results are shared with faculty, student advisory board and IAB for feedback and recommendations.

Program Learning Outcomes:
The EET and CpET program outcomes are based on ABET a-k. A list may be found in the ECET Program Outcome documents which map the specific degree outcomes to Bloom's taxonomy of learning and ABET a-k. In general, the outcomes are assessed with: targeted exam questions; targeted assignments; rubrics to evaluate design, teaming, writing, oral presentations, and ethics & civility; student self-assessment surveys; and faculty course semester reflections.
The assessment data is collected by the faculty and reported to the ECET assessment committee. The committed presents the results to the department chair each semester. The department chair identifies any areas of weakness and the chair, the department faculty and the effected course's coordinator will determine what action will be taken. The changes will be documented in the ECET annual assessment report.

Office of Freshman Engineering – Assessment Summary

The Office of Freshman Engineering is the academic unit that interacts with prospective students and their families and serves all students new to engineering at IUPUI whether they are just beginning their studies, transferring from another institution, or starting work on a second degree. Through orientation programs, academic advising, and our freshman courses we try to become involved in the education of all of our students. We want to excite them about all the possibilities available through engineering study and also to provide resources to engage them in their quest to become successful engineering students. The Freshman Engineering Vision and Mission can be found at http://www.engr.iupui.edu/depts/frengr/vision.shtml.

Consistent with the mission of the Office of Freshman Engineering we collect data about the retention of the various categories of students that we serve (new beginners, outside transfers, and internal transfers from University College). Chief among these measures is the retention statistics of students. This information is gathered and analyzed approximately four years after matriculation. Additionally, we collect student satisfaction data in the fall and spring semesters from students in our freshman classes. Students in Freshman Engineering unless they are transfer students are typically several years away from entering the workforce. Therefore, we do not collect data on Early Career Objectives. Instead we do inquire about the students' commitment to their engineering major and their knowledge of the engineering field. These data are collected only from new students through a survey given in ENGR 195, the freshman engineering learning community. Results are used by ENGR 195 instructors to better inform first-year students about the engineering field.

Effectiveness of any career planning assistance provided while a student is in freshman engineering is assessed by questions in the Student Satisfaction Survey. These data are collected by the Office of Freshman Engineering and are analyzed and interpreted by Freshman Engineering faculty and staff. The information gleaned from the data is used to develop appropriate programming.

The program outcomes for freshman engineering courses are mapped to the Accreditation for Engineering and Technology (ABET) outcomes (see http://www.engr.iupui.edu/engr/me/funderoutcomes.shtml). Numerous sections of three courses were taught by Freshman Engineering at IUPUI during 2006. Two courses were taught through the Engineering Dual Degree Program (EDDP) at Butler University. Outcomes for the freshman engineering courses, ENGR 195, ENGR 196, and ENGR 197 can be found at http://www.engr.iupui.edu/engr/me/fcrsoutcomes.shtml. Outcomes are assessed using specific course outcomes surveys that are complete by students in every class near the end of the semester. The surveys are collected by the instructors and given to the Mechanical Engineering Department. There the data are reduced and returned to freshman engineering faculty. Results discussed by faculty and are used to improve specific aspects of the various courses taught in freshman engineering.

FRESHMAN ENGINEERING PROGRAM 2006 ASSESSMENT ANNUAL REPORT Prepared by Janet Meyer and the Freshman Engineering Staff June, 2007							
1	2	3	4	5	6	7	8
Program Outcomes	**Measurable Outcomes: What Will the Student Know or Be Able To Do?**	**Courses Reflecting the Outcomes**	**Methods of Teaching and Learning**	**How Do You Measure Each of the Desired Behaviors Listed in Column 2?**	**What Are the Findings in Assessing the General Outcomes (column 1)?**	**Proposed Improvements (and Changes) Based on Available Assessment Findings?**	**Impact of Changes?**
(a) Ability to apply knowledge of mathematics, science, and engineering	Students will be able reverse-engineer a real world electro-mechanical device. Students will be able to write programs in C language to solve engineering problems.	ENGR 196 ENGR 197	Lectures, computer assignments, labs, group discussions, homework assignments, engineering projects. .	Tests, homework, computer programs, course outcome surveys, student satisfaction surveys, evaluation of project reports. Surveys and grading rubric are used with the projects	Project surveys indicate increased understanding of engineering	(a) A standardized final exam for ENGR 197 is planned for 2007-2008.) (b) Continue to develop better-structured projects using feedback gained	Projects will continue to be used to increase both students' understanding of and commitment to engineering.

Program Outcomes	Measurable Outcomes: What Will the Student Know or Be Able To Do?	Courses Reflecting the Outcomes	Methods of Teaching and Learning	How Do You Measure Each of the Desired Behaviors Listed in Column 2?	What Are the Findings in Assessing the General Outcomes (column 1)?	Proposed Improvements (and Changes) Based on Available Assessment Findings?	Impact of Changes?
(b) Ability to design and conduct experiments, as well as to analyze and interpret data	Students will be able to conduct experiments by following instructions for set up of simple experiments. Students will be able to obtain experimental, numerical or graphical data and to compare results with theoretical models. Students will be able to construct a simple circuit	ENGR 196	Tutorials in class, lectures, computer assignments, lab work, group discussions, homework assignments, mentoring assistance with upper-level students, and Web resources.	Lab reports, online quizzes, exams, and outcome surveys.	Approximately 80% of EDDP students rate themselves 4 or above on being able to assemble a robot (this outcome was not assessed in ENGR 196). Currently less than 55% of ENGR 196 rate themselves 4.00 or above on a scale of 1.00 to 5.00 when asked whether the course helped them to construct a simple circuit; however, more than 68% of EDDP students rate themselves 4 or above on the same question	(a) Use robots to illustrate electrical principles. (b) Institute the use of frequent classroom assessment techniques to encourage and monitor student learning (c) Spend less course time on ProEngineer and more time building circuits (d) Enhance use of mentoring in the EDDP course.	Data collection is continuing; however, use of mentors appears to improve student outcomes.

Program Outcomes	Measurable Outcomes: What Will the Student Know or Be Able To Do?	Courses Reflecting the Outcomes	Methods of Teaching and Learning	How Do You Measure Each of the Desired Behaviors Listed in Column 2?	What Are the Findings in Assessing the General Outcomes (column 1)?	Proposed Improvements (and Changes) Based on Available Assessment Findings?	Impact of Changes?
(d) Ability to function on multi-disciplinary teams	Students will be able to work together in small groups to carry out experiments and to complete projects. Students will be able to collaborate with others to report on project findings, orally and in writing. Students will be able to operate as a member of a team with an understanding of the roles and relationships of members.	ENGR 195, ENGR 196	Lectures and team building exercises; practice in teamwork doing laboratory experiments, engineering projects, library research projects, and team oral and written reports. Fruit drops combining design strategies and teamwork were initiated in ENGR 195.	Lab reports, project presentation grades, and peer evaluations	Well over 80% Students have improved understanding of the roles and requirements of teamwork Some students comment on the time-management difficulty regarding teamwork.	(a) Continue to Include more specific teamwork instruction in ENGR 195 and ENGR 196; and (a) continue to extend engineering team projects to all sections at IUPUI. (b) Continue teamwork instruction at Butler, continue second team project, and improve team mentoring. (c) Continue teamwork instruction in ENGR 195 and continue use of Fruit drops. (d) Continue to address time-management issues. Use course management system to facilitate teamwork.	Student satisfaction regarding teamwork instruction is extremely high. Comments in the qualitative portion of Outcome surveys indicate that students found the fruit drops (pumpkins in the fall, honeydews in the spring) an engaging instructional method for learning about teamwork.

Program Outcomes	Measurable Outcomes: What Will the Student Know or Be Able To Do?	Courses Reflecting the Outcomes	Methods of Teaching and Learning	How Do You Measure Each of the Desired Behaviors Listed in Column 2?	What Are the Findings in Assessing the General Outcomes (column 1)?	Proposed Improvements (and Changes) Based on Available Assessment Findings?	Impact of Changes?
(e) Ability to identify, formulate, and solve engineering problems	Starting with a given problem, students will be able to develop and solve algorithms with C programs.	ENGR 197 ENGR 297	Lectures, assigned computer programs, and class exercises.	Tests, quizzes, homework, computer programs, outcome surveys.	Students previously expressed difficulty developing algorithms using a step by step process. Current outcomes report that in all but one section of 197 this has markedly improved. In three sections over 80% of students rate themselves at 4.00 or above on a scale of 1.00 to 5.00 when asked about ability to develop algorithms using a step by step process Students' ability in writing programs in C to solve engineering problems has remained the same as the previous year. More attention will continue to be directed towards improving this outcome. The changes in the course between the spring 2006 and fall 2007 semesters make it difficult to discern trends at this time. ENGR 297 was first taught in as a regular offering in Spring 2007.	(a) With Matlab no longer being taught in ENGR 196 and 197 more focused attention to C-programming is possible in ENGR 197. (b) Maintain the use of flow charting and pseudo-coding to improve understanding of algorithms (b) Administer a standardized C programming final exam in 2007-2008 to assist with assessment.	Last year there was a concern about understanding of algorithms. Outcomes evidence that this is improving. Matlab was removed from the ENGR 196 and 197 curricula and is being taught as ENGR 297 beginning in 2007. Assessment on this change is continuing

Program Outcomes	Measurable Outcomes: What Will the Student Know or Be Able To Do?	Courses Reflecting the Outcomes	Methods of Teaching and Learning	How Do You Measure Each of the Desired Behaviors Listed in Column 2?	What Are the Findings in Assessing the General Outcomes (column 1)?	Proposed Improvements (and Changes) Based on Available Assessment Findings?	Impact of Changes?
(f) Understand professional and ethical responsibilities.	Students should be able to demonstrate a knowledge of the engineering professional societies Students should be able to articulate an understanding of the responsibility of engineers regarding safety.	ENGR 195	Presentations by student organizations, web searches, lectures and case studies.	Increased membership in student organizations Homework, reports, student satisfaction surveys, and outcome surveys.	Freshman student membership in the engineering professional societies is currently low; In seven sections of ENGR 195 almost 80% of students rate themselves at 4.00 or above on a scale of 1.00 to 5.00 when asked if they could articulate the responsibility of engineers regarding safety.	Engineering department faculty and staff have received a Gateway Grant to study student engagement. Data are currently being collected for this study. The goal is to develop opportunities for students to access information about professional societies. Extending enrichment activity points awarded for participation in engineering student society meetings and events to all sections of ENGR 196 is proposed to encourage professional society involvement. Continue to emphasize the safety aspect of engineering in ENGR 195.	Improvements need to be made in recruiting freshman engineering students to professional societies

Program Outcomes	Measurable Outcomes: What Will the Student Know or Be Able To Do?	Courses Reflecting the Outcomes	Methods of Teaching and Learning	How Do You Measure Each of the Desired Behaviors Listed in Column 2?	What Are the Findings in Assessing the General Outcomes (column 1)?	Proposed Improvements (and Changes) Based on Available Assessment Findings?	Impact of Changes?
(g) Ability to communicate effectively	Students will be able to write reports and make project presentations to peers.	ENGR 195 ENGR 196	Lectures, project reports, and oral presentations including PowerPoint presentations.	Written report and oral presentation evaluations using rubrics.	Students are developing an appreciation for communication skills in engineering. Over 80% of ENGR 195 students continue to rate themselves 4.00 or above on a scale of 1.00 to 5.00 when asked whether the course improved their ability to collaborate to produce a report Over 70% of EDDP students now rate themselves at 4 or above in ability to write a short report. Better guidelines continue to be needed for reports in reverse engineering project. Currently less than 50% of ENGR 196 rate themselves 4.00 or above on a scale of 1.00 to 5.00 when asked whether the course helped them to write lab and project reports	(a) Change topic for ENGR 195 research reports to environmental, energy and global issues. (b) Continue to improve guidelines for engineering project reports. Provide sample reports and add group exercises in critiquing reports	ENGR 195 students are able to collaborate to produce a paper that includes citations. EDDP students significantly improved in their ability to write short reports. Continue providing guidelines to students. No improvement over previous year's assessment in this area.

Program Outcomes	Measurable Outcomes: What Will the Student Know or Be Able To Do?	Courses Reflecting the Outcomes	Methods of Teaching and Learning	How Do You Measure Each of the Desired Behaviors Listed in Column 2?	What Are the Findings in Assessing the General Outcomes (column 1)?	Proposed Improvements (and Changes) Based on Available Assessment Findings?	Impact of Changes?
(h) The broad education necessary to understand the impact of engineering solutions in a global and societal context	Students will demonstrate awareness of global impact of engineering on society and environment.	ENGR 195 EDDP course ENGR 190	Lectures, literature surveys and case studies.	Homework, project reports, project presentations, and outcome surveys.	Students indicate a preliminary understanding in outcome surveys and in Over 86% of ENGR 195 and EDDP students rate themselves 4.00 or above on a scale of 1.00 to 5.00 when asked if they can articulate a definition of engineering and appreciate the contributions of engineering and engineers in today's world.	(a) Use more real world examples in ENGR 195 (including products investigated in ENGR 196) when studying impact of engineering on society. (b) Research topic in ENGR 195 is changing in Fall 2007 from an engineering disaster to one covering global, environmental or energy issues.	Students appear to have a basic understanding of the engineering profession and its contributions.

Program Outcomes	Measurable Outcomes: What Will the Student Know or Be Able To Do?	Courses Reflecting the Outcomes	Methods of Teaching and Learning	How Do You Measure Each of the Desired Behaviors Listed in Column 2?	What Are the Findings in Assessing the General Outcomes (column 1)?	Proposed Improvements (and Changes) Based on Available Assessment Findings?	Impact of Changes?
(k) Ability to use the techniques, skills, and modern engineering tools necessary for engineering practice	Students will be able to use engineering tools like ProE, Matlab, Excel, and PSpice to complete engineering assignments. Students will be able to use a standard C program development environment.	ENGR 195, ENGR 196, ENGR 197	Lectures, classroom assignments, tutorials, homework, laboratory work and presentations	Graded assignments, lab reports, tests, project presentations, and outcome surveys.	Outcome surveys report that student rate their ability to use ProEngineer high. 88% of students of ENGR 196 students rate themselves 4.00 or above on a scale of 1.00 to 5.00 when asked how well the course prepared them to use ProEngineer to prepare solid models. The number drops to 79% when asked about using ProEngineer to extract 2-D engineering drawings from a solid model Over 73% of ENGR 196 students rate themselves 4.00 or above on a scale of 1.00 to 5.00 when asked about their ability to use PSpice to model circuits. Over 74% of ENGR 197 students rate themselves 4.00 or above on a scale of 1.00 to 5.00 when asked how well the course has helped them use a standard C	(a) As mentioned above, Matlab has been moved to a separate course, ENGR 297. This number (88%) held constant from the previous year. The 79% number is also constant from the previous year. There was a wide range of values in the seven sections assessed – even in sections taught by the same instructor. Continue to focus on using ProEngineer to extract 2-D drawings from a solid model. The ratings on PSpice dropped 3% but again are widely variable from class to class. This is a 4% drop from the previous year.	Data collection is continuing. Changes in the structure of ENGR 197, including the removal of Matlab, took place during the past year. The course Evaluation is continuing

	Engineering students should be able to utilize a library's resources including online databases for research and information purposes.				program development environment. Over 73% of ENGR 195 students rate themselves 4.00 or above on a scale of 1.00 to 5.00 when asked about their ability to utilize the library's online catalogue and over 77% rate themselves 4.00 or above when asked about familiarity with search engines.		

Summary of Student Satisfaction Survey Results
Freshman Engineering Program
2003-2006

	Questions	Fall 2003	Spring 2004	Fall 2004	Spring 2005	Fall 2005	Spring 2006	Fall 2006
1.	Quality of Academic Advising	3.97 (139)	3.95 (129)	3.96 (143)	4.19 (101)	4.15 (121)	4.22 (109)	4.09 (175)
2.	Quality of student support in adjusting to college	3.77 (124)	3.72 (129)	3.78 (134)	3.77 (102)	3.91 (112)	3.92 (101)	3.78 (169)
3.	Scheduling of ENGR 195, 196, 197	3.80 (141)	3.78 (129)	3.99 (145)	4.08 (104)	4.01 (117)	4.19 (108)	3.97 (182)
4.	Classroom environment conducive to learning	3.86 (145)	3.91 (129)	4.07 (147)	4.14 (106)	4.18 (118)	4.27 (110)	4.16 (183)
5.	Quality of Engineering and Technology computer labs	3.60 (141)	3.99 (129)	4.00 (146)	4.07 (106)	4.40 (118)	4.49 (108)	4.30 (183)
6.	Quality of ENGR 196/197 help sessions in aiding classroom performance	3.61 (88)	3.54 (129)	3.53 (93)	3.77 (76)	3.79 (63)	3.87 (70)	3.79 (121)
7.	Opportunities for networking with fellow students and faculty through professional societies such as ASME, IEEE, AIAA, SWE, NSBE, SAE, etc.	3.60 (103)	3.73 (129)	3.81 (110)	3.58 (72)	3.70 (80)	3.66 (62)	3.80 (145)
8.	Career planning assistance, department selection (ME/ECE/others) and study skills development	3.38 (117)	3.57 (129)	3.51 (119)	3.63 (88)	3.78 (99)	3.72 (87)	3.70 (149)
9.	Overall freshman experience on the IUPUI campus	3.75 (138)	3.79 (129)	3.90 (139)	4.0 (103)	3.86 (117)	4.07 (108)	3.77 (172)

10.	Overall quality of Freshman Engineering education	3.65 (100)	3.80 (142)	3.78 (129)	4.01 (140)	4.12 (105)	4.01 (118)	4.04 (176)
11.	Quality of Instruction (new question Spring '04)	N/A	N/A	3.89 (129)	3.93 (145)	4.20 (106)	3.96 (121)	4.01 (177)

Analysis

Student satisfaction data for the Freshman Engineering Program summarized above show very similar results in nearly all categories in both semesters of 2006 when compared with those of corresponding semesters of the previous academic year. The chief difference is in the increase in the numbers of students responding in fall 2006. (It is also important to note that these numbers include students still in University College. In every category, the responses of students admitted directly to engineering are higher.)

- In both spring and fall semesters, satisfaction was relatively high in the areas of classroom and computer lab environment, quality of instruction, and overall freshman engineering education. Student satisfaction ratings in most categories remained essentially the same as the data from the previous year.

- Opportunities for networking with fellow students and faculty through professional societies such ASME, IEEE, etc. rose slightly since Spring 2003. Currently a study supported by a Gateway Grant is underway focusing on improving student engagement.

- Assistance with career planning and department selection is an area we hope to incorporate in academic advising; especially since many students at this stage are not sure what kind of engineering they are interested in. We continue to promote internship opportunities in the learning community, through collaboration with the School of Engineering and Technology Career Services Office, and through the freshman listserv.

- The survey indicates that students need ongoing help in adjusting to college. This is an area where further research could be done.

- Retention data for students entering during the 2003/2004 academic year is found below. It is clear that the data about these entering students is less than satisfactory. Assessment will be done in the future to better determine what practices and programs positively affect retention. Results appear to indicate that retention percentages are remaining fairly steady. However, the number of students admitted to Freshman Engineering has increased.

Retention Statistics for
Students Entering Freshman Engineering during 2003-2004 Academic Year
As of June, 2007

Academic Standing	**Beginners**	**Transfers Other Schools**	**IUPUI Transfers**	**EDDP**
Graduated or at Senior Status in Engineering	16	30	17	9
Still in Engineering at Freshman – Junior Level	3	4	9	4
Known to have Transferred to Another University	5	2	2	
Graduated from or Enrolled in Technology	2	6	4	
Graduated from or Enrolled in a Major other than Engineering or Technology	14	8	3	20
Dropped Out	21	26	21	11
Total	**61**	**76**	**56**	**44**
Percentage Retained in Engr	**31.15**	**44.74**	**46.43**	**29.5**

Retention Summary
Percentages of Students Retained in Engineering

Admission Category	Students Entering 1999-2000 % Retained	Students Entering 2000-2001 % Retained	Students Entering 2001-2002 % Retained	Students Entering 2002-2003 % Retained	Students Entering 2003-04 % Retained
Beginners	35.19	45.24	40.62	26.41	31.15
External Transfers	51.43	42.57	53.52	45.33	44.74
IUPUI Transfers	55.56	69.57	53.66	42.37	46.43
EDDP	37.14	40.0	30.58	37.93	29.5
Overall Retention (All Students)	**45.12 (n = 195)**	**40.82 (n = 196)**	**45.79 (n = 214)**	**38.88 (n = 216)**	**38.81 (n=237)**

DEPARTMENT OF MECHANICAL ENGINEERING 2007 ASSESSMENT REPORT

ME Assessment Web Site: http://www.engr.iupui.edu/me/fassessment.shtml

Prepared by: H.U. Akay, Jie Chen, and Courtney Wooton
July 6, 2007

Preamble

The Department of Mechanical Engineering has had an assessment process in place since the fall of 2000 to ensure continuous evaluation and improvement of its undergraduate program. The requirements of the Accreditation Board for Engineering and Technology (ABET) together with the assessment processes of IUPUI and the School of Engineering and Technology are the guiding factors of this process. As part of the assessment process, the faculty developed the Undergraduate Program Outcomes and Undergraduate Program Objectives. While the Program Outcomes describe the competencies students are expected to master prior to graduation, the Program Objectives depict skills that students are expected to possess after working a few years following graduation. Our Bachelor of Science in Mechanical Engineering is currently accredited from ABET until 2010, when it will undergo a re-accreditation review.

Undergraduate Program Outcomes of the Department of Mechanical Engineering

The Undergraduate Program Outcomes of the department are consistent with the criteria set by the Accreditation Board for Engineering and Technology (ABET). While using the ABET criteria, the faculty established the program outcomes with consideration given to early feedback provided by employers and alumni and guidance of eight Undergraduate Program Objectives, which are described in the section below. Students in the Mechanical Engineering program by the time of graduation are expected to be able to:

a. Demonstrate and apply knowledge of mathematics, science, and engineering with:
- **a1.** Knowledge in chemistry and calculus-based physics in depth [1, 5]
- **a2.** Mathematics through multivariate calculus, differential equations, and linear algebra [1, 5]
- **a3.** Probability and statistics [1, 5]
- **a4.** Mechanical engineering sciences: solid mechanics, fluid-thermal science, material science [1, 4, 5]

b. Design and conduct experiments methodically, analyze data, and interpret results [1, 5]
c. Design a system, component, or process to meet desired needs with applications to:
- **c1.** Mechanical systems [4]
- **c2**. Thermal systems [4]

d. Function in teams to carry out multidisciplinary projects [4, 8]
e. Identify, formulate, and solve engineering problems [5]
f. Understand professional and ethical responsibilities [2, 7]
g. Communicate effectively, in writing and orally [6]
h. Understand the impact of engineering solutions in a global and societal context through broad education [7]
i. Recognize the need to engage in lifelong learning [3]
j. Demonstrate knowledge of contemporary issues [2]
k. Use the techniques, skills, and modern tools of engineering effectively and correctly in engineering practice with:
- **k1.** Mechanical engineering analysis tools (e.g., ANSYS, ProMechanica, etc.) [4, 5, 8]
- **k2.** Engineering design and manufacturing tools (e.g., ProE) [4, 5, 8]
- **k3.** Internet and library resources [3, 8]
- **k4.** Mathematical computing and analysis tools (e.g., Matlab, Excel, LabView, Minitab, etc.) [4, 5, 8]

The numbers in the brackets above correspond to the Undergraduate Program Objectives. Thus, each Undergraduate Program Outcome is linked to one or more Undergraduate Program Objective.

Undergraduate Program Objectives of the Department of Mechanical Engineering

The Undergraduate Program Objectives, developed by the department's Assessment and Undergraduate Education Committees, are in accordance with ABET standards, as well as the mission of the department. Consultation with the faculty and feedback from alumni and industry were also taken into consideration when establishing these objectives, which were designed to educate undergraduate students who should be capable during the first few years after graduation of:

1. Demonstrate excellent technical capabilities in mechanical engineering and related fields
2. Be responsible citizens
3. Continue their professional advancement through life-long learning
4. Apply sound design methodology in multidisciplinary fields of mechanical engineering
5. Competently use mathematical methods, engineering analysis and computations, and measurement and instrumentation techniques
6. Practice effective oral and written communication skills
7. Understand the environmental, ethical, diversity, cultural, and contemporary aspects of their work
8. Work collaboratively and effectively in engineering and manufacturing industries

Assessment Tools

The department has developed several tools for continuous evaluation and improvement of its undergraduate program. The tools employed are categorized into direct and indirect evidence categories, as described below.

The measures used in the indirect evidence category include:

1. Course learning outcomes surveys in all courses conducted at the end of each semester to determine self-assessment of students on how well the course outcomes are met
2. Exit surveys on program outcomes conducted at the time of graduation to obtain self-assessment of the graduates on how well the program outcomes are met
3. Annual student satisfaction survey conducted annually to determine student satisfaction with the program
4. Undergraduate Student Advisory Board that provides input on student satisfaction and needs
5. Alumni survey for measuring the impact of program outcomes in the performance of graduates

The tools in the direct evidence category consist of:

1. Industrial Advisory Board that provides input on performance and expected qualifications of graduates
2. Employer survey for measuring effectiveness of the program outcomes in the work force
3. Fundamentals of Engineering (FE) exam results on students who take it in their senior year. This is a standardized national exam, which gives comparisons of our students' scores against the national averages
4. Feedback forms for course outcomes survey results completed and submitted at the end of each semester by the faculty teaching the courses
5. Jury evaluations in key courses that involve final project reports or presentations in front of an audience of faculty, industry guests, and fellow students
6. Instructor's assessment of student performance in course outcomes via evaluation of key exams, projects and homework against the course outcomes

7. Industry feedback of performance of our coops and interns. A new process has been initiated at the School level, which is expected to give good data on our student's performance in the workplace

Collection and assessment of these data are continuing and the appropriate enhancements are being made regularly.

Recent Results and Changes

With the assessment measures that are in place, we are continuously monitoring the effectiveness of the curriculum established in fall 2003. The following are the findings in 2006/07:

1. Course Learning Outcomes Surveys ask students to rate their self-assessment of mastering learning outcomes, specific to each course, using a 5 point scale. The departmental goal for the semester averages on these surveys is to be above a 3.75 out 5. We use the 3.75 threshold, because it corresponds to the mid point between good and very good. The department has been successful in reaching our goal in 12 out of 14 semesters (Figure 1). In addition, we strive to keep at least 70% of approximately 300 course learning outcomes above the 3.75 threshold. While this goal is obtainable, it has proved to be rather challenging, as we have not been able to consistently meet it. This goal has only been reached in 6 out of 14 semesters (Figure 1). However, three additional semesters' averages were close, being within one percentage point. This is an area where we will continue to work hard in order to improve. After receiving the surveys, instructors are required to respond the results and propose changes to address the weaker areas. The changes are normally implemented in the following semester. The dynamic process will help us to reach our goal.
2. As with the Course Learning Outcome Surveys, we strive to keep the semester averages of the Exit Surveys above a 3.75. This criterion has been reached consistently since spring 2001. Although we met this goal last year, we fell from the highest average (4.41) in spring 2006 to the lowest (3.77) in fall 2006, which is shown in Figure 2. Likewise, the only semester we have not reached the 70% goal was in the fall of 2006, which also dropped from the highest percentage (100%) above to the lowest (61.12%). This data will be analyzed by the Undergraduate Education and Assessment Committee, as well as the Faculty, to review possible reasons this change may be attributed to. However, the overall cumulative average for these surveys remains well above a 3.75 at 4.06.
3. The Annual Student Satisfaction Survey is given to all sophomores, juniors, and seniors during the spring semester. Each student only fills out one survey, which assesses their satisfaction with the undergraduate program and the department. While the 3.75 goal has not been met since the survey originated in spring 2001, we came the closest we've been to achieving that goal in spring 2007. The average of this survey went from the lowest (3.05) in spring 2006 to the highest (3.52) in spring 2007 (Figure 3). Average scores of each question for the surveys conducted annually since 2001 are tabulated in Table 1, showing a noticeable improvement in 2007. Since only three questions out of 14 are above the 3.75 threshold, there is room for improvement in all categories. We will continue working towards attaining the 3.75 threshold.
4. The student satisfaction survey results seen in Table 1 led to:
   a) More tutoring sessions, including volunteer peer-tutoring, have been instituted for lower level courses in the curriculum. The effects have been assessed by interviewing the tutors.
   b) More emphasis has been placed upon co-op, internship, and job placement services. Regular oral presentations have been scheduled each semester to assess quality.
   c) Recitations have been scheduled in key sophomore level courses. The effects have been assessed in the Student Satisfaction Survey, indicating need for improvement to make them more effective.
   d) Team writing approach in lab reports.

5. Jury evaluation of capstone design projects led to:
    a) More emphasis on project evaluation
    b) More emphasis on impact statement of design
    c) Increased faculty supervision during the first six weeks
    d) Implementation of inter-group evaluations and more projects management rules in the capstone design projects
6. Course outcomes surveys led to:
    a) Addition of term papers/technical writing exercises in certain courses to improve research and writing skills
    b) Emphasis on solving more examples in various classes

Summary

Assessment is a constant process in the Department of Mechanical Engineering, as feedback is collected every semester using the tools and methods described earlier. This assessment process can be seen in Figure 4. The feedback collected via this process assists in the continual improvement of our program and is regarded as invaluable. When obtaining feedback, we use four main sources of input: Student, Faculty, Industry, and Alumni. While each of these groups is used for a different reason, they are all constituencies we strive to serve. The assessment tools used in each of these four categories is illustrated in Figure 5. This figure also depicts the process for analyzing the feedback and the governing bodies who do so. After the data and feedback is evaluated, any necessary changes are recorded and implemented in the following semester. While our enrollment is continuing to grow, there are several changes that are currently under consideration for the future including:

a) Revision in the statistics course for more practical examples
b) A new seminar course
c) A mechatronics track together with the ECE department
d) FE exam requirement for standardized test for all undergraduate students

Table 1. Student Satisfaction Survey Results

Survey Question	Spring 2001 (N=60)	Spring 2002 (N=69)	Spring 2003 (N=83)	Spring 2004 (N=69)	Spring 2005 (N=62)	Spring 2006 (N=97)	Spring 2007 (N=123)
1. Quality of Instruction	3.61	3.58	3.71	3.54	3.36	3.33	3.85
2. Quality of ME experimental labs (ME 272, 310, 314, 340, 372)	3.13	3.35	3.15	3.08	2.93	3.13	3.30
3. Quality of ME design courses (ME 262, 372, 414, 462)	3.45	3.55	3.44	3.17	2.90	3.21	3.58
4. Effectiveness of recitations hours (ME 200, ME 262, ME 270, Me 274, ME 372)							3.07
5. Quality of computing facilities for design and computational labs	3.16	3.38	3.62	3.55	3.34	3.23	3.60
6. Quality of advising and help with the POS	3.27	3.27	3.20	3.30	3.22	3.07	3.45
7. Scheduling of courses/classes	3.28	3.56	3.19	3.47	3.36	3.38	3.33
8. Classroom environments conducive to learning	3.68	3.75	3.96	3.77	3.65	3.56	3.80
9. Career planning assistance, job placement, and professional skills development	2.96	2.89	2.80	3.00	2.79	3.20	3.44
10. Opportunities for networking with fellow students and faculty through professional societies	3.81	3.95	3.33	3.54	3.06	3.17	3.54
11. Quality of help from the department staff (non faculty)						3.74	3.64
12. Quality of tutoring services offered by the department and student groups							3.33
13. Overall professional learning experience	3.65	3.58	3.65	3.58	3.39	3.27	3.65
14. Overall quality of ME education	**3.75**	**3.82**	**3.82**	**3.64**	**3.62**	**3.36**	**3.78**

Note: All items were assessed using a 5 point scale, with 1= Least Satisfactory, 5= Most Satisfactory. Sophomore, Junior, and Senior results were combined.

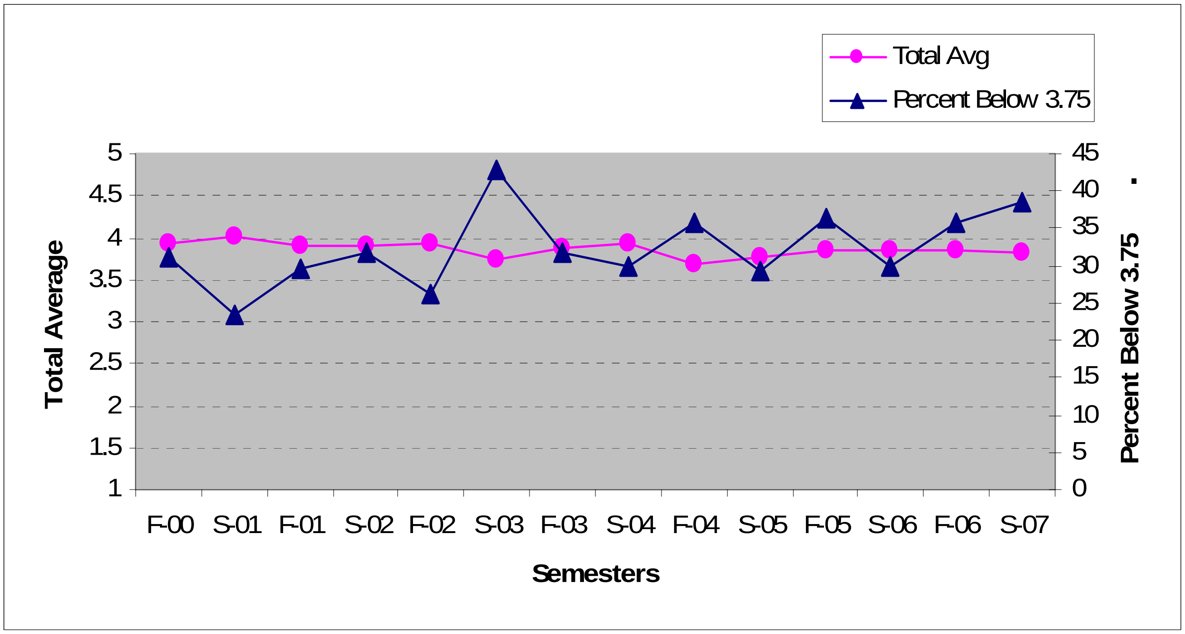

Figure 1. Analysis of Course Learning Outcome Survey Results

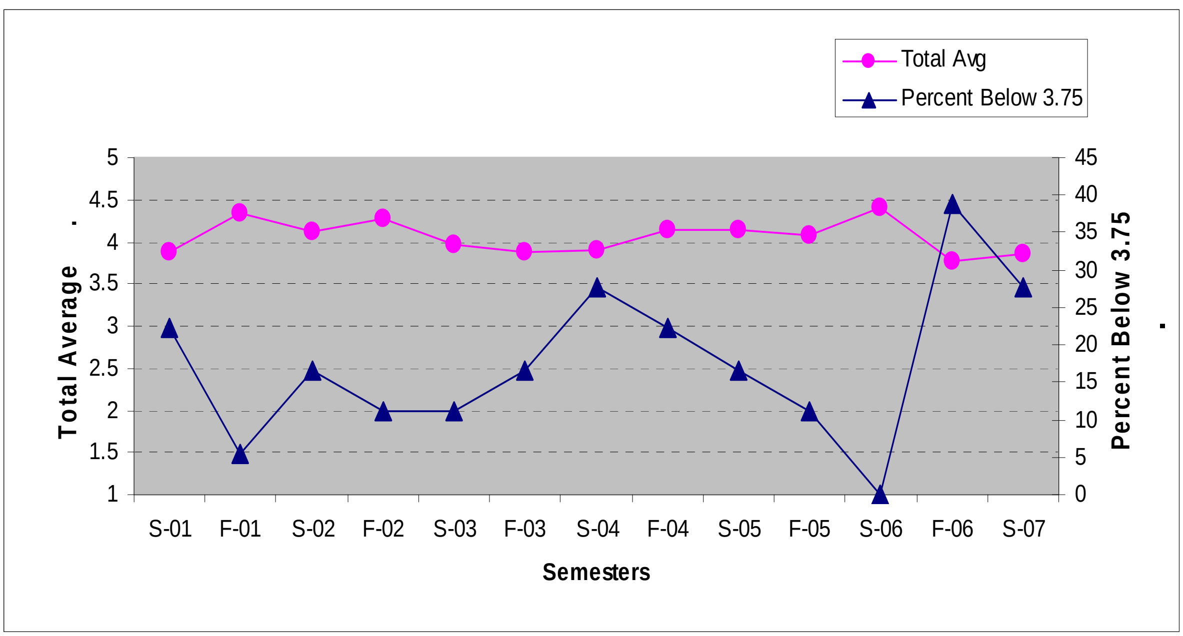

Figure 2. Analysis of Program Outcome (Exit) Survey Results

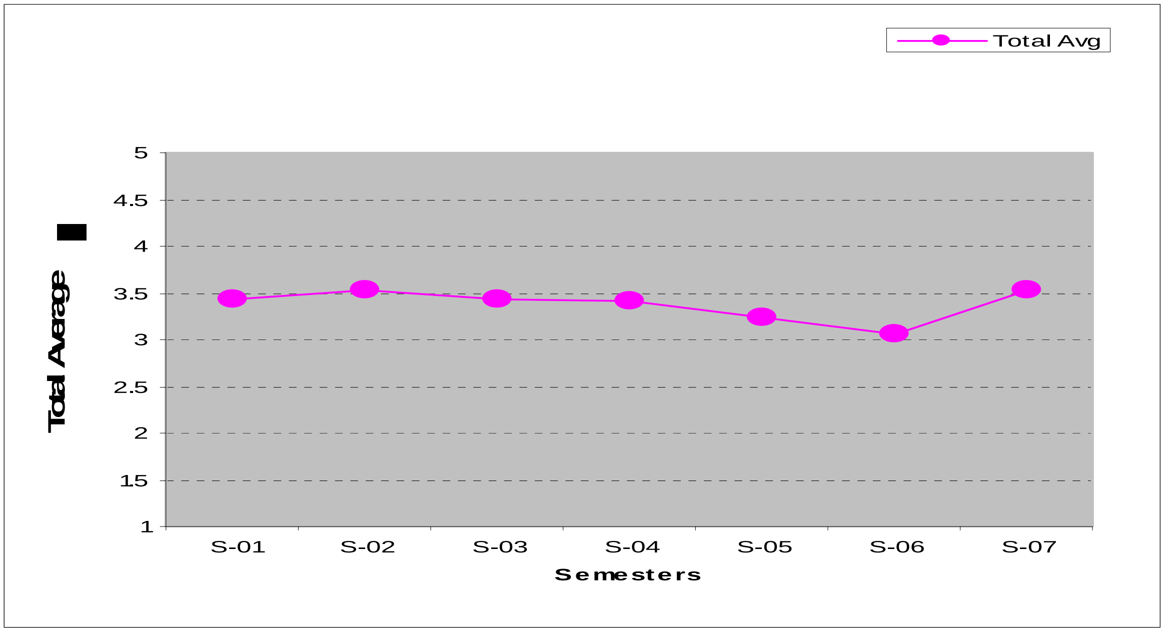

Figure 3. Semester Averages of Annual Student Satisfaction Surveys

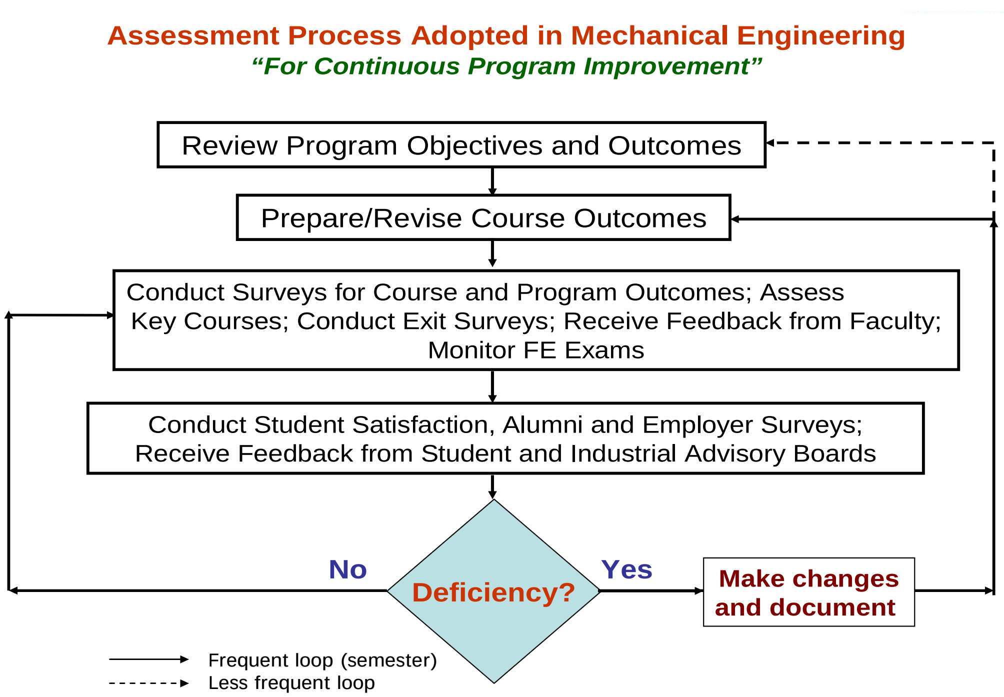

Figure 4. Department of Mechanical Engineering Assessment Process

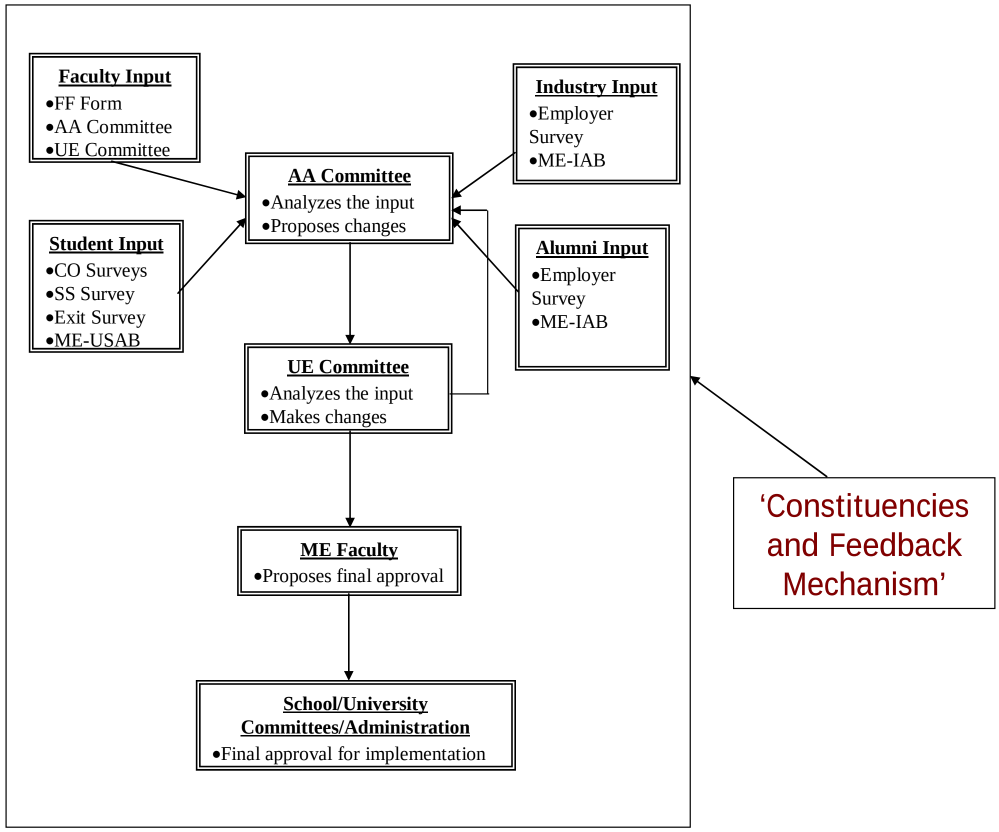

Figure 5. Categorization of Input and Process for Analysis of Feedback

Summary of Program Assessment Process in the Department of Mechanical Engineering

Since its inception in the fall of 2000, the Department of Mechanical Engineering's program assessment process has been utilized to ensure continuous evaluation and improvement of the department's undergraduate program (see http://www.engr.iupui.edu/me/fassessment.shtml). The vision of the department is to be an innovative leader in providing undergraduate and graduate mechanical engineering education, conducting high quality research, and serving industry and government agencies in Indianapolis, the state, and beyond. To remain consistent with this vision, the department must conduct constant assessment of its program. In addition, the department strives to uphold its mission (see http://www.engr.iupui.edu/me/fmission.shtml) while serving its constituencies including, all ME students, all ME faculty, potential employers, alumni, ME Industrial Advisory Board, Undergraduate Student Advisory Board, local chapters of professional societies, and the School and University.

One way the department assesses its program is through monitoring the Undergraduate Program Outcomes (see http://www.engr.iupui.edu/me/funderoutcomes.shtml), which outline the knowledge and skills that ME students are expected to be proficient in by graduation. These outcomes were developed in accordance with the Accreditation Board of Engineering and Technology (ABET) requirements and are consistent with the IUPUI Principles of Undergraduate Learning (PULs). Each IUPUI PUL is monitored, because each program outcome is mapped to a PUL. In addition, to monitor how well the program outcomes are met, each course has a set of outcomes that the students should be able to master at the end of the course. Likewise, each course outcome is mapped to a program outcome to ensure all outcomes are being met within the curriculum.

Several different methods are employed in assessing program outcomes, using both direct and indirect evidence. The measures used for indirect evidence include course learning outcome surveys, exit surveys, annual student satisfaction survey, feedback from the Undergraduate Student Advisory Board, and an alumni survey. Tools used for collecting data in the direct evidence category include ME Industrial Advisory Board, employer survey, Fundamentals of Engineering exam results, faculty feedback forms for course outcome surveys, jury evaluations in key courses, and instructor's assessment of student performance in course outcomes.

Another way the undergraduate program is assessed is through measuring the Undergraduate Program Objectives (see http://www.engr.iupui.edu/me/funderobjectives.shtml). These objectives were developed to educate students on a set of skills that they should be competent in after spending a few years in the work place following graduation. Like the Undergraduate Program Outcomes, the Undergraduate Program Objectives are also consistent with the criteria set by ABET. Students' competency in these areas is assessed using an alumni survey, an employer survey, and all other tools used for measuring program outcomes.

Each semester data is collected using the various assessment tools listed above. The data derived from the assessment tools can be classified into four categories: Student Input, Faculty Input, Industry Input, and Alumni Input. When a deficiency is found in the program, changes are documented and implemented in the following semester. In order to implement a change in the curriculum, the ME Assessment and Accreditation Committee analyze the input from all four groups listed above and propose changes to the ME Undergraduate and Assessment Committee, who also analyze the input and make the necessary changes. Their recommendations are forwarded to the ME Faculty for approval and proposal of final approval to the School and University, who grant the final approval for implementation.

Department of Mechanical Engineering Technology
2006 Assessment Report

Summary

Vision of the Department of Mechanical Engineering Technology

The MET Department will ensure that its graduates are proficient in the principles of science and engineering as they relate to practical applications required to meet the demands of industry in Indiana, the nation, and the world. The MET Department will be recognized as an innovative leader through its diverse faculty, staff, and students, and its excellence in learning, discovery, and engagement.

Mission of the Department of Mechanical Engineering Technology

The mission of the Department of Mechanical Engineering Technology (MET) at IUPUI is to educate and graduate students who will become the finest practitioners, managers, and leaders in Mechanical Engineering Technology.

Constituents

- MET Faculty
- MET Students
- MET Alumni
- Industrial Advisory Board (IAB) and Potential Employers of MET Students
- National and International Professional Societies
- The School and University

Early Career Objectives

Consistent with the criteria set by the Accreditation Board for Engineering and Technology (ABET), the Program Educational Objectives of the Department of Mechanical Engineering Technology are, "*To produce graduates who, during the first few years of professional practice, will*:

1. Show their ability to solve problems related to the workplace through their application of excellent technical capabilities in mechanical engineering technology and related supporting fields.
2. Be responsible citizens in the workplace through their demonstrated ethical and professional conduct and appreciation for diversity in its various forms.
3. Continue their professional advancement through life-long learning opportunities, in-service training and engagement with professional organizations.
4. Practice effective oral and written communication skills.
5. Show their ability to address diverse environmental, ethical, diversity, cultural, and contemporary aspects of their work
6. Work collaboratively and effectively in engineering and manufacturing industries as a liaison between professional engineers and manufacturing personnel
7. Have the ability to function both as an individual, and within the dynamics of a group environment, in the workplace

Program Learning Outcomes

The MET program at IUPUI has established 11 outcomes to ensure its graduates are equipped to accomplish the expected objectives. These outcomes require each student to show competency as detailed below, and reflect those established by ABET. Graduates of the Mechanical Engineering Technology Baccalaureate program will:

1. Demonstrate an appropriate mastery of the knowledge, techniques, skills, and modern tools of their discipline within designated courses which provide laboratory components,
2. Apply current knowledge in mathematics, science, engineering and technology, and recognize emerging applications in these areas,
3. Conduct experiments, analyze and interpret experimental data, and apply experimental parameters in order to improve and/or modify processes,
4. Apply creativity in the design of systems, components, or processes within Mechanical Engineering Technology projects,
5. Function effectively as a member of a project teams, or with group projects,
6. Identify, analyze, and solve technical problems,
7. Communicate effectively in written, oral, and graphical modes,
8. Recognize the need for lifelong learning, and participate in educational and professional opportunities to expand your knowledge base
9. Understand and communicate professional, ethical, and social responsibilities as a practitioner of MET
10. Demonstrate a respect for diversity and a knowledge of contemporary professional, societal, and global issues, and
11. Demonstrate via actions a commitment to quality, timeliness, and continuous improvement

CY 2006 Report

Early Career Objectives

Consistent with the criteria set by the Accreditation Board for Engineering and Technology (ABET), the Program Educational Objectives of the Department of Mechanical Engineering Technology are, "*To produce graduates who, during the first few years of professional practice, will*:

1. Show their ability to solve problems related to the workplace through their application of excellent technical capabilities in mechanical engineering technology and related supporting fields.
2. Be responsible citizens in the workplace through their demonstrated ethical and professional conduct and appreciation for diversity in its various forms.
3. Continue their professional advancement through life-long learning opportunities, in-service training and engagement with professional organizations.
4. Practice effective oral and written communication skills.
5. Show their ability to address diverse environmental, ethical, diversity, cultural, and contemporary aspects of their work
6. Work collaboratively and effectively in engineering and manufacturing industries as a liaison between professional engineers and manufacturing personnel
7. Have the ability to function both as an individual, and within the dynamics of a group environment, in the workplace

Assessment

Program Educational Objectives are assessed concurrently with Program Education Outcomes utilizing various instruments including:

1. Student Instructor Evaluations which also include questions on course outcomes submitted at the end of each semester
2. Interviews conducted with students during their senior design projects (MET 414)
3. Discussions with faculty advisors during student chapter meetings of professional organizations
4. Alumni survey for measuring the impact of program outcomes in the performance of graduates (conducted by the Office of the Dean)
5. Employer survey for measuring effectiveness of the program outcomes in the work force (conducted by the Office of the Dean)
6. Feedback from IAB members at annual meetings
7. Instructor's assessment of student performance in regards to course outcomes via evaluation of specific problems on exams, projects, lab assignments (if applicable), and homework against the course outcomes

Responsibilities and Frequency for Assessment

Assessment Tool	Responsible Party	Frequency
Student Instructor Evaluation	Delivered by the School	Every semester (may not be given in some cases during summer sessions due to reduced staff)
Interviews in MET 414	Course Coordinator or Instructor	Every semester course is offered
Discussions from Professional Organization meetings	Faculty advisor assigned to oversee student chapters of professional organizations	Every meeting with chapter officers and student members
Alumni Survey	Office of the Dean	Once per year
Employer Survey	Office of the Dean	Once every two years
Industrial Advisory Board (IAB)	Department	At least annually
Instructor's Assessment	Course instructor	In every course

Involvement of Constituencies in Assessment

Primary Constituencies	Means of Feedback
MET Faculty	Chair' yearly interview Dean's yearly interview (if appropriate) Results of "Student Instructor Evaluations" Semester Faculty Retreat Monthly Faculty Meeting
MET Students	Meetings with faculty and Chair at weekly Office Hours Participation in "Student Instructor Evaluations" Professional Organization Student Chapters
MET Alumni	Alumni surveys conducted through Dean's Office
Industrial Advisory Board (IAB) and Employers	Yearly meeting with faculty and students Participation as speakers in courses, jury members on Senior design projects Employer survey conducted through Dean's Office
National and International Professional Societies	Participation as officers in professional organizations Review team member for assessment organizations
School and University Senate Committees	Review of all curriculum and assessment issues at the School level Review of all curriculum issues at university level PRAC support for grants and assessment report

	reviews at the university level

Program Learning Outcomes

The MET program at IUPUI has established 11 outcomes to ensure its graduates are equipped to accomplish the expected objectives. These outcomes require each student to show competency as detailed below, and reflect those established by ABET. Graduates of the Mechanical Engineering Technology Baccalaureate program will:

1. Demonstrate an appropriate mastery of the knowledge, techniques, skills, and modern tools of their discipline within designated courses which provide laboratory components,
2. Apply current knowledge in mathematics, science, engineering and technology, and recognize emerging applications in these areas,
3. Conduct experiments, analyze and interpret experimental data, and apply experimental parameters in order to improve and/or modify processes,
4. Apply creativity in the design of systems, components, or processes within Mechanical Engineering Technology projects,
5. Function effectively as a member of a project teams, or with group projects,
6. Identify, analyze, and solve technical problems,
7. Communicate effectively in written, oral, and graphical modes,
8. Recognize the need for lifelong learning, and participate in educational and professional opportunities to expand your knowledge base
9. Understand and communicate professional, ethical, and social responsibilities as a practitioner of MET
10. Demonstrate a respect for diversity and a knowledge of contemporary professional, societal, and global issues, and
11. Demonstrate via actions a commitment to quality, timeliness, and continuous improvement

Process to Assess Program Learning Outcomes

Program Educational Objectives are assessed concurrently with Program Education Outcomes utilizing various instruments listed in the previous section. Additionally, Program Learning Outcomes are mapped to show the relationship between each course and program outcomes.

This mapping process also helps ensure that the following aspects of the curriculum are supported:

a. Identifies any course where outcomes may be lacking, or further support could be added
b. Identifies any overlap of outcomes in multiple courses that can be eliminated or revised
c. Gives a preliminary grasp if outcomes and objectives are being matched appropriately through MET or supporting courses offered
d. Provides a visual representation of the curriculum which easily shows the relationship of outcomes to general topic areas

	MET Program Outcome										
Course	**a**	**b**	**c**	**d**	**e**	**f**	**g**	**h**	**i**	**j**	**k**
MET 101								x	x	x	x
MET 102	x	x					x				
MET 105	x		x		x	x	x		x		x
MET 111	x	x	x	x	x	x	x				
MET 141	x	x	x		x	x	x	x	x	x	
MET 142	x	x	x		x		x	x	x	x	
MET 211	x	x	x		x	x	x				
MET 213	x		x	x	x	x	x				
MET 214		x				x	x		x		
MET 220	x	x	x			x	x				
MET 230	x	x				x					
MET 240	x	x	x	x	x		x		x	x	
MET 242	x	x	x		x	x	x	x	x		
MET 310	x	x	x			x	x	x			x
MET 320	x	x				x					
MET 328	x	x		x			x				
MET 344	x	x				x			x	x	
MET 350	x	x				x					
MET 384	x	x	x	x	x	x	x				
MET 414		x		x	x	x	x		x		x
MET 426	x	x		x			x				
CGT 110	x	x					x				
IET 104	x	x				x				x	
IET 150	x	x	x			x					x
IET 350	x	x			x	x					x
ECET 116	x	x	x			x					
MATH 153, 154, 221, 222	x										
CHEM-C 101,121	x		x								
PHYS 218, 219	x		x								
ENG-W 131							x				
COMM-R 110							x				
TCM 220							x				
TCM 340							x		x		
TCM 370							x			x	
Technical Electives*	x	x	x			x					
Social Science / Humanities Electives*							x			x	
* (Student may choose from a list of approved courses.)											

Additionally, Program Educational Outcomes are assessed through the use of end of the semester reflection documents prepared by faculty. Documents for spring and fall 2006 follow.

Mechanical Engineering Technology Program
End of Semester Reflection

Course# **MET 111** Reflection by: **Pete Hylton** Semester: **Spring 2006**

1. Are there course objectives that need to be deleted, added, updated or revised? Are there any course objectives or other course materials that a significant number of students did not adequately comprehend?

    No.

    In addition, relating to this topic . . .
    a. What changes were made?
    b. Why? (be specific)
    c. Which course objectives were affected?
    d. Comments on course objectives for which students did not meet your expectations.

2. Comment on course assessment assignments where students did not meet your expectations.
    None

3. Was the textbook (or course notes) adequate to meet the goals of the course? Is there a need to actively pursue another text?
    Yes.
    a. What changes were made?
    b. Why? (be specific)
    c. Which course objectives were affected?

4. Does the course sufficiently challenge or overly challenge students?
    Fine.
    a. What changes were made?
    b. Why? (be specific)
    c. Which course objectives were affected?

5. Comment on anything new tried in the course that worked or did not work. Indicate if it should be continued. This can include new course materials or teaching techniques.
    Introduced a research and analysis project which went well.
    a. What changes were made?
    b. Why? (be specific)
    c. Which course objectives were affected?

6. Did the laboratory exercises support course objectives and were the students sufficiently engaged by the laboratory assignments? **Yes**
    a. What changes were made?
    b. Why? (be specific)
    c. Which course objectives were affected?

7. Are there laboratory assignments that did not work properly, need rewriting to remove ambiguities, or need updating for new technology? **No**
   a. What changes were made?
   b. Why? (be specific)
   c. Which course objectives were affected?

8. Is there laboratory equipment or laboratory software used for the course that needs to be replaced, updated or better maintained? **Better equipment needed.**
   a. What changes were made?
   b. Why? (be specific)
   c. Which course objectives were affected?

Mechanical Engineering Technology Program
End of Semester Reflection

Course# **MET 214** Reflection by: **Jack Zecher** Semester: **Spring 2006**

1. Are there course objectives that need to be deleted, added, updated or revised? Are there any course objectives or other course materials that a significant number of students did not adequately comprehend?

No, course objectives do not need to be changed.

In addition, relating to this topic . . .
   a. What changes were made?
   b. Why? (be specific)
   c. Which course objectives were affected?
   d. Comments on course objectives for which students did not meet your expectations.
      Many students did not grasp the mapping relationship between Mohr's stress coordinate system and the physical part's coordinate system (x,y)

2. Comment on course assessment assignments where students did not meet your expectations.
   The exam question that evaluated the mapping relationship between Mohr's stress coordinate system and the physical part's coordinate system (x,y), showed that many students did not understand how the calculation of stress at two specific angles can then be used defined a Mohr's circle of stress.

3. Was the textbook (or course notes) adequate to meet the goals of the course? Is there a need to actively pursue another text?
   The text is adequate.
   a. What changes were made?
      Handout are provided in the areas of 3-D moment diagrams
   b. Why? (be specific)
      The text does not show shear and moment diagrams, resulting from gear and v-belt forces on shafts using 3-D isometric images.
   c. Which course objectives were affected?
      6. Students can calculate various design parameters of V-belts, spur gears, gear trains, and clutches and brakes.

4. Does the course sufficiently challenge or overly challenge students?
   No, students are not overly challenged.
   a. What changes were made?
   b. Why? (be specific)
   c. Which course objectives were affected?

5. Comment on anything new tried in the course that worked or did not work. Indicate if it should be continued. This can include new course materials or teaching techniques.
   a. What changes were made?
   b. Why? (be specific)
   c. Which course objectives were affected?

6. Did the laboratory exercises support course objectives and were the students sufficiently engaged by the laboratory assignments?
   There is not a lab in this course.
   a. What changes were made?
   b. Why? (be specific)
   c. Which course objectives were affected?

7. Are there laboratory assignments that did not work properly, need rewriting to remove ambiguities, or need updating for new technology?
   There is not a lab in this course.
   a. What changes were made?
   b. Why? (be specific)
   c. Which course objectives were affected?

8. Is there laboratory equipment or laboratory software used for the course that needs to be replaced, updated or better maintained?
   There is not a lab in this course.
   a. What changes were made?
   b. Why? (be specific)
   c. Which course objectives were affected?

Mechanical Engineering Technology Program
End of Semester Reflection

Course# **MET 310** Reflection by: **Jack Zecher** Semester: **Spring 2006**

1. Are there course objectives that need to be deleted, added, updated or revised? Are there any course objectives or other course materials that a significant number of students did not adequately comprehend?

No, course objectives do not need to be changed.

In addition, relating to this topic . . .

a. What changes were made?
b. Why? (be specific)
c. Which course objectives were affected?
d. Comments on course objectives for which students did not meet your expectations.

2. Comment on course assessment assignments where students did not meet your expectations.

None

3. Was the textbook (or course notes) adequate to meet the goals of the course? Is there a need to actively pursue another text?

The text is adequate.

a. What changes were made?
b. Why? (be specific)
c. Which course objectives were affected?

4. Does the course sufficiently challenge or overly challenge students?

Students are sufficiently challenged.

a. What changes were made?
b. Why? (be specific)
c. Which course objectives were affected?

5. Comment on anything new tried in the course that worked or did not work. Indicate if it should be continued. This can include new course materials or teaching techniques.

a. What changes were made?
b. Why? (be specific)
c. Which course objectives were affected?

6. Did the laboratory exercises support course objectives and were the students sufficiently engaged by the laboratory assignments?

Yes, the lab assignments are fully integrated with the lectured topics and are weighted heavy in determining the student's final grade

a. What changes were made?
b. Why? (be specific)
c. Which course objectives were affected?

7. Are there laboratory assignments that did not work properly, need rewriting to remove ambiguities, or need updating for new technology?

All lab assignments worked well

a. What changes were made?
b. Why? (be specific)
c. Which course objectives were affected?

8. Is there laboratory equipment or laboratory software used for the course that needs to be replaced, updated or better maintained?

The software used in the lab (Algor) will be replaced with Ansys next year.

a. What changes were made?
b. Why? (be specific)

Ansys is used more wildly than Algor

c. Which course objectives were affected?

Mechanical Engineering Technology Program
End of Semester Reflection

Course# **MET 344** Reflection by: **Jamie Workman-Germann** Semester: **Spring 2006**

1. Are there course outcomes that need to be deleted, added, updated or revised? Are there any course outcomes or other course materials that a significant number of students did not adequately comprehend?

   Students continue to have difficulty with course outcomes related to phase diagrams and TTT diagrams.

   In addition, relating to this topic . . .
   a. What changes were made? Additional focus in the prerequisite course (MET 141) is being implemented for Fall 2007. Students are being "suggested" to take follow-up course (MET 344) during semester immediately following MET 141 while topics are "fresh" in their memories (even though course is not scheduled to be take until ~5 semesters later)
   b. Why? (be specific) Information retention is greater the sooner the follow-up course is taken. So, with additional emphasis on outcomes in the prerequisite course and follow-up course taken sooner, it is expected that performance in this area will improve.
   c. Which course objectives were affected?
   d. Comments on course objectives for which students did not meet your expectations.

2. Comment on course assessment assignments where students did not meet your expectations.

   Three assessments were given for phase diagrams as well as TTT diagrams; homework assignments, quiz, and exam questions. Quiz, at comprehension Bloom level, was adequately performed by all students. Homework and exam questions at analysis Bloom level did not meet desired performance level. (70% of students answering questions correctly)

3. Was the textbook (or course notes) adequate to meet the goals of the course? Is there a need to actively pursue another text?
   a. What changes were made? All course lecture materials were transitioned to PowerPoint and audio files to accompany slides were developed.
   b. Why? (be specific) Without the benefit of a live instructor, PowerPoint "reading points" were not sufficient to convey full extent of information to students. Therefore, as a supplement, audio files for the lecture notes were created and uploaded to the Oncourse site so that students could have the effect of an instructor without seeing the instructor.
   c. Which course objectives were affected?

4. Does the course sufficiently challenge or overly challenge students?
   a. What changes were made? Difficult material for phase diagrams and TTT diagrams overly challenged the students in the distance format. Therefore, additional instructional materials were developed and an "in-person" study session was developed

b. Why? (be specific) Enough students responded that they needed additional information to adequately understand the materials related to this section of the course and that the lecture notes did not provide enough detail to answer all their questions.
c. Which course objectives were affected?

5. Comment on anything new tried in the course that worked or did not work. Indicate if it should be continued. This can include new course materials or teaching techniques.
   a. What changes were made? This was the first semester that the course was taught in an online format via Oncourse.
   b. Why? (be specific) Changing the format of the course was a result of feedback from students and focus from the school to develop distance courses.
   c. Which course objectives were affected? No objectives were affected in the transition from classroom to distance format.

Students like the availability of MET 344 via distance format, but as with transitioning any course from lecture to distance, there were some issues that arose. Most of this surrounded the logistics of grading and providing "direct" assistance to students when they had questions. Several items were noted that will be implemented in Spring 2007 improvements:

1. tighter feedback loop is needed for returning homework assignments
2. additional information (lecture notes) are needed with step by step detail for difficult topics such as phase diagrams
3. chat sessions and in-person review sessions are beneficial for difficult topics

6. Did the laboratory exercises support course objectives and were the students sufficiently engaged by the laboratory assignments? **Laboratory not included in course**
   a. What changes were made?
   b. Why? (be specific)
   c. Which course objectives were affected?

7. Are there laboratory assignments that did not work properly, need rewriting to remove ambiguities, or need updating for new technology?
   a. What changes were made?
   b. Why? (be specific)
   c. Which course objectives were affected?

8. Is there laboratory equipment or laboratory software used for the course that needs to be replaced, updated or better maintained?
   a. What changes were made?
   b. Why? (be specific)
   c. Which course objectives were affected?

Mechanical Engineering Technology Program
End of Semester Reflection

Course# **MET 350** Reflection by: **Pete Hylton** Semester: **Spring 2006**

2. Are there course objectives that need to be deleted, added, updated or revised? Are there any course objectives or other course materials that a significant number of students did not adequately comprehend?

   No.

   In addition, relating to this topic . . .
   e. What changes were made?
   f. Why? (be specific)
   g. Which course objectives were affected?
   h. Comments on course objectives for which students did not meet your expectations.

2. Comment on course assessment assignments where students did not meet your expectations.
   None

3. Was the textbook (or course notes) adequate to meet the goals of the course? Is there a need to actively pursue another text?
   Yes.
   d. What changes were made?
   e. Why? (be specific)
   f. Which course objectives were affected?

4. Does the course sufficiently challenge or overly challenge students?
   Fine.
   d. What changes were made?
   e. Why? (be specific)
   f. Which course objectives were affected?

5. Comment on anything new tried in the course that worked or did not work. Indicate if it should be continued. This can include new course materials or teaching techniques. **n/a**
   d. What changes were made?
   e. Why? (be specific)
   f. Which course objectives were affected?

6. Did the laboratory exercises support course objectives and were the students sufficiently engaged by the laboratory assignments? **n/a**
   d. What changes were made?
   e. Why? (be specific)
   f. Which course objectives were affected?

7. Are there laboratory assignments that did not work properly, need rewriting to remove ambiguities, or need updating for new technology? **n/a**

d. What changes were made?
e. Why? (be specific)
f. Which course objectives were affected?

8. Is there laboratory equipment or laboratory software used for the course that needs to be replaced, updated or better maintained? **n/a**
d. What changes were made?
e. Why? (be specific)
f. Which course objectives were affected?

Mechanical Engineering Technology Program
End of Semester Reflection

Course# **MET 414** Reflection by: **Pete Hylton** Semester: **Spring 2006**

1. Are there course objectives that need to be deleted, added, updated or revised? Are there any course objectives or other course materials that a significant number of students did not adequately comprehend?

   No.

   In addition, relating to this topic . . .
   a. What changes were made?
   b. Why? (be specific)
   c. Which course objectives were affected?
   d. Comments on course objectives for which students did not meet your expectations.

2. Comment on course assessment assignments where students did not meet your expectations.
   None

3. Was the textbook (or course notes) adequate to meet the goals of the course? Is there a need to actively pursue another text?
   Yes.
   a. What changes were made?
   b. Why? (be specific)
   c. Which course objectives were affected?

4. Does the course sufficiently challenge or overly challenge students?
   Fine.
   a. What changes were made?
   b. Why? (be specific)
   c. Which course objectives were affected?

5. Comment on anything new tried in the course that worked or did not work. Indicate if it should be continued. This can include new course materials or teaching techniques. **no**
   a. What changes were made?
   b. Why? (be specific)
   c. Which course objectives were affected?

6. Did the laboratory exercises support course objectives and were the students sufficiently engaged by the laboratory assignments? **n/a**
   a. What changes were made?
   b. Why? (be specific)
   c. Which course objectives were affected?

7. Are there laboratory assignments that did not work properly, need rewriting to remove ambiguities, or need updating for new technology? **n/a**

a. What changes were made?
b. Why? (be specific)
c. Which course objectives were affected?

8. Is there laboratory equipment or laboratory software used for the course that needs to be replaced, updated or better maintained? **n/a**

a. What changes were made?
b. Why? (be specific)
c. Which course objectives were affected?

Mechanical Engineering Technology Program
End of Semester Reflection

Course# **MET 111** Reflection by: **Jack Zecher** Semester: **Fall 2006**

2. Are there course objectives that need to be deleted, added, updated or revised? Are there any course objectives or other course materials that a significant number of students did not adequately comprehend?

No, course objectives do not need to be changed.

In addition, relating to this topic . . .

e. What changes were made?

The use of online websites for trig. review and vector addition was added

f. Why? (be specific)

It provided an additional learning resource

g. Which course objectives were affected?

h. Comments on course objectives for which students did not meet your expectations.

2. Comment on course assessment assignments where students did not meet your expectations.

Workmanship of students is very bad – used of graph paper was required for hw problems and example format of solving problems was stressed

3. Was the textbook (or course notes) adequate to meet the goals of the course? Is there a need to actively pursue another text?

The text is adequate – however, it contained many errors in the end of chapter problems

d. What changes were made?

e. Why? (be specific)

f. Which course objectives were affected?

g.

4. Does the course sufficiently challenge or overly challenge students?

Students are sufficiently challenged.

d. What changes were made?

e. Why? (be specific)

f. Which course objectives were affected?

5. Comment on anything new tried in the course that worked or did not work. Indicate if it should be continued. This can include new course materials or teaching techniques.

d. What changes were made?

The use of online websites for trig. review and vector addition was added

e. Why? (be specific)

It provided an additional learning resource

f. Which course objectives were affected?

6. Did the laboratory exercises support course objectives and were the students sufficiently engaged by the laboratory assignments?

There is not a lab in this course.

d. What changes were made?

e. Why? (be specific)

f. Which course objectives were affected?

7. Are there laboratory assignments that did not work properly, need rewriting to remove ambiguities, or need updating for new technology?

   There is not a lab in this course.

   d. What changes were made?
   e. Why? (be specific)
   f. Which course objectives were affected?

8. Is there laboratory equipment or laboratory software used for the course that needs to be replaced, updated or better maintained?

   There is not a lab in this course.

   d. What changes were made?
   e. Why? (be specific)
   f. Which course objectives were affected?

Mechanical Engineering Technology Program
End of Semester Reflection

Course# **MET 141** Reflection by: **Jamie Workman-Germann** Semester: **Fall 2006**

1. Are there course objectives that need to be deleted, added, updated or revised? Are there any course objectives or other course materials that a significant number of students did not adequately comprehend?

Students did not meet outcomes related to stress-strain diagrams, phase diagrams. Overall, some course objectives either need to be revised or removed as there continues to be too much material to cover in the allotted time. Additional narrative is provided throughout.

In addition, relating to this topic . . .

a. What changes were made?
b. Why? (be specific)
c. Which course objectives were affected?
d. Comments on course objectives for which students did not meet your expectations.

2. Comment on course assessment assignments where students did not meet your expectations.

Two assessments are utilized to gage performance on stress-strain diagrams. The first is a laboratory experiment and report, the other an exam. These assessments follow lecture and homework assignments related to the topic.

3. Was the textbook (or course notes) adequate to meet the goals of the course? Is there a need to actively pursue another text?

Textbooks available for this course are primarily too detailed and geared toward materials engineering programs/focus rather than technology and applications focus. The other extreme are textbooks that over simplify the materials for use in more of a trade or possibly community college setting.

a. What changes were made? The textbook for the course has been changed 3 times in 7 years and a new edition has been printed of the most recently adopted text. Textbooks are examined each semester, however, as mentioned above – typically are geared toward a different audience/level.
b. Why? (be specific) Student evaluations related to the textbook continue to be low. Students feel that the textbook is too difficult and includes too much information that is really not covered in the course.
c. Which course objectives were affected?

4. Does the course sufficiently challenge or overly challenge students?

The MET 141 course continues to overly challenge the students because the materials are truly intended for students with a chemistry background. However, the structure of the overall MET program does not have room to utilize chemistry as a prerequisite for this course. As such, introductory chemistry concepts are included in the course and impact the amount of other materials that can be covered in the semester. Recognizing this, the content of the course is being revised to scale back some of the course outcomes.

a. What changes were made? Beginning with Fall 2007, the course outcomes will be modified – specific outcomes to eliminate have not yet been finalized.
b. Why? (be specific) Students continue to struggle with sets of course outcomes
c. Which course objectives were affected?

5. Comment on anything new tried in the course that worked or did not work. Indicate if it should be continued. This can include new course materials or teaching techniques.
   a. What changes were made? Several changes were made to the course, and in retrospect, too many to truly examine and isolate the impact each one had on its associated course outcomes. The format of the course was modified to include a "materials awareness and responsibility" outcome, the laboratory was modified in number of experiments, equipment and format utilized, and more focus was included on teamwork and group projects/assignments.
   b. Why? (be specific)
   c. Which course objectives were affected? As mentioned, several course outcomes were affected and the eagerness of the instructor to make "dramatic" changes likely masked any true evaluation of the individual changes being made. Additional changes for the future will be implemented in a more closely controlled environment so that impact on the outcomes can be mapped back to the changes made.

6. Did the laboratory exercises support course objectives and were the students sufficiently engaged by the laboratory assignments?
   a. What changes were made? Several new or modified laboratory assignments have been implemented.
   b. Why? (be specific) Some of the equipment was old, some of the format of the experiments were not engaging/interesting to the students, and some of the experiments had little impact on the related course outcomes they were intended to support.
   c. Which course objectives were affected?

7. Are there laboratory assignments that did not work properly, need rewriting to remove ambiguities, or need updating for new technology?
   a. What changes were made? 3 new experiments have been developed around new equipments that was purchased. The equipment represents more recent technology in hardware and software than was previously being utilized.
   b. Why? (be specific) Previous experiments were primarily completely mechanical and had no computer interface or data collection capabilities. Program level outcomes place emphasis on the ability of students to perform experiments and collect associated data, so formative assessments of this outcomes was desired.
   c. Which course objectives were affected?

8. Is there laboratory equipment or laboratory software used for the course that needs to be replaced, updated or better maintained?
   a. What changes were made? New laboratory software and hardware were included for 3 different experiments. Additional improvements need to be made, but equipment costs are currently prohibitive.
   b. Why? (be specific) Old laboratory equipment was being used and did not reflect current technology in the area.
   c. Which course objectives were affected?

Mechanical Engineering Technology Program
End of Semester Reflection

Course# **MET 211** Reflection by: **Jack Zecher** Semester: **Fall 2006**

1. Are there course objectives that need to be deleted, added, updated or revised? Are there any course objectives or other course materials that a significant number of students did not adequately comprehend?

No, course objectives do not need to be changed.

In addition, relating to this topic . . .

a. What changes were made?

The use of multimedia animations were presented for almost all different type of stress and deflection topics

b. Why? (be specific)

It provided an additional learning resource

c. Which course objectives were affected? **all**

d. Comments on course objectives for which students did not meet your expectations.

2. Comment on course assessment assignments where students did not meet your expectations.

Students met the expectations

3. Was the textbook (or course notes) adequate to meet the goals of the course? Is there a need to actively pursue another text?

The text is adequate.

a. What changes were made?
b. Why? (be specific)
c. Which course objectives were affected?

4. Does the course sufficiently challenge or overly challenge students?

Students are sufficiently challenged.

a. What changes were made?
b. Why? (be specific)
c. Which course objectives were affected?

5. Comment on anything new tried in the course that worked or did not work. Indicate if it should be continued. This can include new course materials or teaching techniques.

a. What changes were made?

The use of multimedia animations were presented for almost all different type of stress and deflection topics

b. Why? (be specific)

It provided an additional learning resource

c. Which course objectives were affected?

6. Did the laboratory exercises support course objectives and were the students sufficiently engaged by the laboratory assignments?

Yes, however a combined stress lab would be helpful and a more sophisticated tensile test would improve the lab

a. What changes were made?

A wire extension experiment was added

b. Why? (be specific)

There was not an existing lab in which axial deflection was measured

c. Which course objectives were affected?

To determine the relationship between axial stress, deflection and Poisson's ratio

7. Are there laboratory assignments that did not work properly, need rewriting to remove ambiguities, or need updating for new technology?

   No

   a. What changes were made?
   b. Why? (be specific)
   c. Which course objectives were affected?

8. Is there laboratory equipment or laboratory software used for the course that needs to be replaced, updated or better maintained?

   A combined stress lab would be helpful and a more sophisticated tensile test would improve the lab

   a. What changes were made? **see above**
   b. Why? (be specific)
   c. Which course objectives were affected?

Mechanical Engineering Technology Program
End of Semester Reflection

Course# **MET 213** Reflection by: **Pete Hylton** Semester: **Fall 2006**

1. Are there course objectives that need to be deleted, added, updated or revised? Are there any course objectives or other course materials that a significant number of students did not adequately comprehend?

   No.

   In addition, relating to this topic . . .
   a. What changes were made?
   b. Why? (be specific)
   c. Which course objectives were affected?
   d. Comments on course objectives for which students did not meet your expectations.

2. Comment on course assessment assignments where students did not meet your expectations.
   None

3. Was the textbook (or course notes) adequate to meet the goals of the course? Is there a need to actively pursue another text?
   Yes.
   a. What changes were made?
   b. Why? (be specific)
   c. Which course objectives were affected?

4. Does the course sufficiently challenge or overly challenge students?
   Fine.
   a. What changes were made?
   b. Why? (be specific)
   c. Which course objectives were affected?

5. Comment on anything new tried in the course that worked or did not work. Indicate if it should be continued. This can include new course materials or teaching techniques.
   Introduced a new research project and report which went well.
   a. What changes were made?
   b. Why? (be specific)
   c. Which course objectives were affected?

6. Did the laboratory exercises support course objectives and were the students sufficiently engaged by the laboratory assignments? **Yes**
   a. What changes were made?
   b. Why? (be specific)
   c. Which course objectives were affected?

7. Are there laboratory assignments that did not work properly, need rewriting to remove ambiguities, or need updating for new technology? **No**
   a. What changes were made?

b. Why? (be specific)
c. Which course objectives were affected?

8. Is there laboratory equipment or laboratory software used for the course that needs to be replaced, updated or better maintained? **Okay**
   a. What changes were made?
   b. Why? (be specific)
   c. Which course objectives were affected?

Mechanical Engineering Technology Program
End of Semester Reflection

Course# **MET 220** Reflection by: **Maurice Bluestein** Semester: **Fall 2006**

1. This course includes a project report requirement to help students learn the value of research, how to do research, and to learn about energy conversion systems that cannot be covered in this course because of time constraints. Students have also been encouraged to give brief oral reports of their findings as a way of developing self-confidence and providing additional technical information to their classmates. There seems to be a lack of sufficient clarity on this assignment and so a better outline of the project should be developed. In addition, it has been difficult to motivate the students to give the optional oral report for extra credit. The oral report should be made mandatory with appropriate credit given.

2. Students tend to not work the homework problems assigned unless they are collected and graded. Additional problems for collection should be in the syllabus.

3. This is for many students their first exposure to a "story problem" course. It is the most difficult one for most MET majors. Thus it may help to show practical applications by taking students on a field trip. One to the local power station on the south side of Indianapolis would be a good choice.

Mechanical Engineering Technology Program
End of Semester Reflection

Course# **MET 230** Reflection by: **Maurice Bluestein** Semester: **Fall 2006**

1. The lab equipment is old and unreliable. Consider obtaining funds for a new trainer such as one made by Parker-Hannifin. As an alternative, working with Ivy Tech's fluid power lab equipment is possible.

2. Most students are unfamiliar with the components of a typical fluid power system. It may help to have a demonstration lab early on in the course to illustrate the mechanisms.

Mechanical Engineering Technology Program
End of Semester Reflection

Course # **MET 242** Reflection by: **Ken Rennels** Semester: **Fall 2006**

1. Are there course objectives that need to be deleted, added, updated or revised? Are there any course objectives or other course materials that a significant number of students did not adequately comprehend?

   Course objective 8. Calculate tool paths and develop G & M code for simple NC milling operations.

   Students did not adequately comprehend material.

   Course objective 11. Provide basic cost estimation for material removal operations.

   Material not adequately covered in lecture or laboratory material. Consider deletion or revision.

   Course objective 12. Work as a team to investigate topics, write reports, and make presentations on a specified material removal topic.

   Presentations not utilized in course due to time constraints and amount of material covered. Consider deleting presentations from objective.

   In addition, relating to this topic . . .
   a. What changes were made? **Laboratory report for G&M code tool path calculation rewritten.**
   b. Why? (be specific) **Improve student comprehension of G&M code NC programming.**
   c. Which course objectives were affected? **Course objective 8.**
   d. Comments on course objectives for which students did not meet your expectations.

2. Comment on course assessment assignments where students did not meet your expectations. **None identified**

3. Was the textbook (or course notes) adequate to meet the goals of the course? Is there a need to actively pursue another text? **Textbook adequate – no need to change.**
   a. What changes were made?
   b. Why? (be specific)
   c. Which course objectives were affected?

4. Does the course sufficiently challenge or overly challenge students? **Course is sufficiently challenging to students with no experience with chip removal processes. Course does include challenges for students with machine tool operation experience through the machining parameter, force and horsepower calculations.**
   a. What changes were made?
   b. Why? (be specific)
   c. Which course objectives were affected?

5. Comment on anything new tried in the course that worked or did not work. Indicate if it should be continued. This can include new course materials or teaching techniques.

    a. What changes were made? **Two lectures were delivered 100% online.**
    b. Why? (be specific) **Instructor's travel schedule.**
    c. Which course objectives were affected? **No measureable effect on results of test questions related to the material.**

6. Did the laboratory exercises support course objectives and were the students sufficiently engaged by the laboratory assignments? **Yes**
    a. What changes were made?
    b. Why? (be specific)
    c. Which course objectives were affected?

7. Are there laboratory assignments that did not work properly, need rewriting to remove ambiguities, or need updating for new technology?
    a. What changes were made? **NC programming laboratory report and project moved from Emco F1 milling machine to Fadal CNC Machining Center.**
    b. Why? (be specific) **Use of modern word address programming rather than tab sequential programming. Equipment more reliable and current**
    c. Which course objectives were affected? **Positive effect meeting objective 8.**

8. Is there laboratory equipment or laboratory software used for the course that needs to be replaced, updated or better maintained? **The majority of the equipment in the machine tool laboratory needs replacement with machines built within the last 50 years.**
    a. What changes were made? **None due to lack of capital equipment funds.**
    b. Why? (be specific)
    c. Which course objectives were affected?

Mechanical Engineering Technology Program
End of Semester Reflection

Course# **MET 320** Reflection by: **Maurice Bluestein** Semester: **Fall 2006**

1. For the past 10 years, a test of prerequisites has been given on the first day of class. The results have not changed, being under 50% for the 10 questions on calculus and the first thermodynamics course, and under 40% for the 4 thermodynamics questions. Consideration should be given to giving the test in the second class period, with an opportunity for the students to review the material, to see if the scores can be improved. This would be a way of evaluating retention.

2. This course emphasizes analysis of engine cycles. To improve understanding, a field trip to a local engine plant should be undertaken.

Mechanical Engineering Technology Program
End of Semester Reflection

Course# **MET 328** Reflection by: **Jack Zecher** Semester: **Fall 2006**

1. Are there course objectives that need to be deleted, added, updated or revised? Are there any course objectives or other course materials that a significant number of students did not adequately comprehend?

No, course objectives do not need to be changed.

In addition, relating to this topic . . .
   a. What changes were made? **none**
   b. Why? (be specific)
   c. Which course objectives were affected?
   d. Comments on course objectives for which students did not meet your expectations.

2. Comment on course assessment assignments where students did not meet your expectations.
   students met the expectations

3. Was the textbook (or course notes) adequate to meet the goals of the course? Is there a need to actively pursue another text?
   The text is adequate.
   a. What changes were made?
   b. Why? (be specific)
   c. Which course objectives were affected?

4. Does the course sufficiently challenge or overly challenge students?
   Students are sufficiently challenged.
   a. What changes were made?
   b. Why? (be specific)
   c. Which course objectives were affected?

5. Comment on anything new tried in the course that worked or did not work. Indicate if it should be continued. This can include new course materials or teaching techniques.
   a. What changes were made?
   b. Why? (be specific)
   c. Which course objectives were affected?

6. Did the laboratory exercises support course objectives and were the students sufficiently engaged by the laboratory assignments?
   Yes
   a. What changes were made?
      A new rapid prototyping machine was used this semester
   b. Why? (be specific)
   c. Which course objectives were affected?

7. Are there laboratory assignments that did not work properly, need rewriting to remove ambiguities, or need updating for new technology?
   No

a. What changes were made?
b. Why? (be specific)
c. Which course objectives were affected?

8. Is there laboratory equipment or laboratory software used for the course that needs to be replaced, updated or better maintained?
    a. What changes were made? **see above**
    b. Why? (be specific)
    c. Which course objectives were affected?

Mechanical Engineering Technology Program
End of Semester Reflection

Course# **MET 350** Reflection by: **Maurice Bluestein** Semester: **Fall 2006**

1. This course includes an analysis of centrifugal pumps with a design portion. To reinforce the concepts, a demonstration would be helpful. The MET department has a centrifugal pump test bed which has not been used for lack of time in the semester. A chapter on fluid flow measurement, which is covered in other courses, could be eliminated to permit a session with the centrifugal pump demonstration.

2. In addition to adding a demonstration, it would be helpful to include a chapter on air flow in ducts. An effort should be made to find additional lecture time or alternatively, a student project to research this material.

Mechanical Engineering Technology Program
End of Semester Reflection

Course# **MET 384** Reflection by: **Maurice Bluestein** Semester: **Fall 2006**

1. The laboratory equipment for this course is old and unreliable. There are three sets of lab equipment; time permits only two to be used. Consideration should be given to replacing the PK water controller experiments with those using the water controllers developed by IUPUI. The Frakes air controllers will continue to be used as they are the most reliable systems and allow for the demonstration of the effects of differential control. This will require switching the lab's PC units between the water and air systems.

2. The PC's in this laboratory are old and slow. When computer lab equipment is upgraded, the remaining units should be given to the instrumentation laboratory.

3. The software utilized with the lab's PC units should be switched from Labtech Notebook to Labview. This will permit more continuity in the Frakes air controller experiments.

4. The textbook for this course has been the best choice among books geared to a more electronics oriented discipline. A second text is left in the library for additional usage but the students rarely access it. There is no ideal text that emphasizes the mechanical nature of instrumentation. Thus the best solution may be the publication of the instructor's notes in a bound volume.

Mechanical Engineering Technology Program
End of Semester Reflection

Course# **MET 414** Reflection by: **Pete Hylton** Semester: **Fall 2006**

1. Are there course objectives that need to be deleted, added, updated or revised? Are there any course objectives or other course materials that a significant number of students did not adequately comprehend?

   No.

   In addition, relating to this topic . . .
   a. What changes were made?
   b. Why? (be specific)
   c. Which course objectives were affected?
   d. Comments on course objectives for which students did not meet your expectations.

2. Comment on course assessment assignments where students did not meet your expectations.
   None

3. Was the textbook (or course notes) adequate to meet the goals of the course? Is there a need to actively pursue another text?
   None
   a. What changes were made?
   b. Why? (be specific)
   c. Which course objectives were affected?

4. Does the course sufficiently challenge or overly challenge students?
   Fine.
   a. What changes were made?
   b. Why? (be specific)
   c. Which course objectives were affected?

5. Comment on anything new tried in the course that worked or did not work. Indicate if it should be continued. This can include new course materials or teaching techniques.
   We tried a one week intensive schedule and it was VERY well received.
   a. What changes were made?
   b. Why? (be specific)
   c. Which course objectives were affected?

6. Did the laboratory exercises support course objectives and were the students sufficiently engaged by the laboratory assignments? **n/a**
   a. What changes were made?
   b. Why? (be specific)
   c. Which course objectives were affected?

7. Are there laboratory assignments that did not work properly, need rewriting to remove ambiguities, or need updating for new technology? **n/a**
   a. What changes were made?
   b. Why? (be specific)
   c. Which course objectives were affected?

8. Is there laboratory equipment or laboratory software used for the course that needs to be replaced, updated or better maintained? **n/a**
   a. What changes were made?
   b. Why? (be specific)
   c. Which course objectives were affected?

OLS Assessment Process

http://www.iupui.edu/~team8ols/assess/

Assessment within the Department of Organizational Leadership and Supervision [OLS] is a methodology and a process that provides documentation of instructional goals and learning outcomes. The process also helps to identify needed improvements in teaching and learning and to demonstrate the effect of those improvements.

OLS Program Educational Objectives:

- Prepare leaders who have demonstrated competence within specific technical fields.
- Give students an understanding of the principles, practices, and forces (economic, social, political, technological, and cultural) shaping the closely related disciplines of leadership, supervision, and management.
- Close the gap between theory and practice in the disciplines of leadership, supervision, and management,
- Equip OLS students with knowledge, skills, resources, and perspectives necessary to be fully contributing members of their respective professions.
- Enable students to work well with others in a team setting, and be able to be self-managed and self-directed in planning, implementing, presenting, and evaluating their work.
- Provide students with authentic experiences, activities, and situations that mirror the dynamics of what the OLS student will encounter in the workplace.
- Place emphasis on involving the students in their learning experience by employing experiential learning, case studies, classroom discussions, and simulations as the primary methods of instruction.
- Utilize learning methodologies to develop our students within collaborative and interdisciplinary educational experiences.

Data sources:

Data are drawn from the following sources: Classroom data, Surveys of student satisfaction, Graduating senior survey, Passing rate on certificate program, Retention rates, graduation rates, and number of degrees conferred, Alumni satisfaction surveys, Employer satisfaction surveys.

Collection and reporting of classroom data:

The instructor of record for each section of OLS courses is responsible for the following:

- Specify course objectives that meet one or more of the IUPUI Principles of Undergraduate Learning (PUL).
- Devise methodology that brings students to a specified level of competence for each PUL objective.
- Measure student performance in meeting the PUL objectives.
- Report the results. Keep records to compare performance between sections and from one semester to the next.
- Analyze the results. Make recommendations for improvements, if a substantial number of students did not meet the specified level of competence for a given PUL objective.

Semester reports:

At the end of each semester, OLS instructors provide a report of assessment activities by completing the "OLS Assessment Checklist and Report." Instructions and examples are provided within the OLS assessment Web pages:
http://www.iupui.edu/~team8ols/assess/

Long term use of assessment data:

Data gathered during the assessment process provide essential documentation required for successful reviews by campus administration and by external accreditation agencies. Continuous improvement of OLS programs is driven by assessment data.

June 11, 2007

PUL and a selection of OLS classes where PUL was assessed.		Examples of methods used to measure PUL performance.	Scoring rubric on file?	Performance goal.	Findings.	Recommendations.
1.Core Communication and Quantitative Skills: The ability of students to write, read, speak and listen, perform quantitative analysis, and use information resources and technology--the foundation skills necessary for all IUPUI students to succeed.						
OLS 100, OLS 252, 263, 274, 327	(a) to express ideas and facts to others effectively in a variety of written formats, (b) to comprehend, interpret, and analyze texts, (c) to evaluate the logic, validity, and relevance of data (d) to solve problems that are quantitative in nature, (e) to make efficient use of information resources and technology for personal and professional needs.	Students were given a 50 question multiple-choice/True-False test based on selected portions of the text book. The selected portions were identified as essential elements of learning and retention for the OLS 252 class in Human Behaviors in Organizations. PUL 1, outcome b, was selected because of its focus on the ability to comprehend, interpret, and analyze texts.	y	The instructional objective of the assignment was to have 70% of the students score 70% or higher on the exam.	110 students took the test. 60% of students successfully completed the assignment - scored 70% or higher. 35 points or a 70% is the minimum score that signifies competence with PUL 1 and outcome b.	This is the fourth time that a common final exam has been used for multiple sections of OLS 252. Student performance in this section did NOT meet instructional objectives. It will be necessary to track outcomes over several semesters to determine the long term effectiveness of the final exam in determining competence with PUL 1 outcome b.
		Case studies, simulations.	y	The instructional objective was to have 85% of students earn 13 points out of a possible 15 points.	72.6% of students earned 13 points or more. The instructional objective was therefore not met.	Spend additional time during class on key content areas. Provide students with handout and explanation of a similar scenario that meets all criteria.

PUL and a selection of OLS classes where PUL was assessed.		Examples of methods used to measure PUL performance.	Scoring rubric on file?	Performance goal.	Findings.	Recommendations.
2. Critical Thinking: The ability of students to analyze carefully and logically information and ideas from multiple perspectives.						
OLS 263, 327, 368	(a) to analyze complex issues and make informed decisions (b) to synthesize information in order to arrive at reasoned conclusions (c) to evaluate the logic, validity, and relevance of data (d) to solve challenging problems (e) to use knowledge and understanding in order to generate and explore new questions	Report: Discuss your team's development (or lack of it) during the semester. Describe the roles you saw develop, group dynamics, problems you had, and how your team solved them - if your team did. Use names of your team members. Use the terms that were used in class and in the text book. What did you learn about teams?	y	All students earn a performance rating of at least 75% in meeting 4 learning objectives.	Two of the four the objectives were met.	Spend additional time during class on key content areas.

PUL and a selection of OLS classes where PUL was assessed.	Examples of methods used to measure PUL performance.	Scoring rubric on file?	Performance goal.	Findings.	Recommendations.
2. Critical Thinking [Continued]	Quiz.	y	The objective of the assessment was PUL 2.b - Synthesize information in order to arrive at reasoned conclusions. The student needed to demonstrate critical thinking to understand the behavioral concept and describe 2 of 5 ways to use the concept. The goal was to have 75% of the students accurately describe the parts of the a conceptual model, describe the process, and to describe the connection of the model to past behavior. Each student was also to describe two of the five ways to use the model as discussed in class.	Eighty seven percent of the students accurately described the parts of the model, seventy three percent of the students described why the model is useful, sixty percent of the students accurately described the process, but only fifty three percent of the students accurately described the connection of the model to past behavior. One hundred percent of the students accurately described two of the five ways to use the model as discussed in class.	Additional class time must be devoted to the model and its functions.

PUL and a selection of OLS classes where PUL was assessed.		Examples of methods used to measure PUL performance.	Scoring rubric on file?	Performance goal.	Findings.	Recommendations.
3. Integration and Application of Knowledge: The ability of students to use information and concepts from studies in multiple disciplines in their intellectual, professional, and community lives.						
	(a) to enhance their personal lives (b) to meet professional standards and competencies (c) to further the goals of society	Presentations (lecture, demonstration, and performance based outcomes) requiring communication with classmates and understanding of the principles of training and the development of training.	y	100% of students would successfully complete this assignment. A score of 29/30 was considered excellent. A score of 19/25 was given for a fair presentation.	All students met the instructional objectives.	While the student performance did meet the instructional objectives, the following recommended improvements will be incorporated for next semester: Students will be required to use Powerpoint and trainers notes to complete the final assignment encouraging more planning and specifics on their outlines. Students will be assigned professional topics as many of the students spent their time trying to be original in their topic rather than concentrating on the process. Students will be given more assignments requiring critical thinking and research as they were, as a group, overwhelmed with the mid-term even though they had over 2 weeks to complete this. The mid-term and other critical thinking process assignments will be integrated into the classes with more specific direction on completion and expectations.

PUL and a selection of OLS classes where PUL was assessed.		Examples of methods used to measure PUL performance.	Scoring rubric on file?	Performance goal.	Findings.	Recommendations.
4. Intellectual Depth, Breadth, and Adaptiveness: The ability of students to examine and organize disciplinary ways of knowing and to apply them to specific issues and problems.						
OLS 263, 327	(a) Intellectual depth describes the demonstration of substantial knowledge and understanding of at least one field of study (b) intellectual breadth is demonstrated by the ability to compare and contrast approaches to knowledge in different disciplines (c) adaptiveness is demonstrated by the ability to modify one's approach to an issue or problem based on the contexts and requirements of particular situations	Students are expected to prepare a 3 page paper which selects an HR topic and describes it from the perspective of one of the Principles of Undergraduate Learning. The outcomes anticipated are that the student will enhance theirs and the classes' knowledge of the topic by providing a presentation that logically establishes a position on the value and impact of their chosen topic; supporting it with research and data.	y	The objective is for the student to research the selected topic and prepare well supported written presentation from the perspective of their chosen PUL. It should be presented in a way that demonstrates the student's understanding of the subject and explores the topic from the perspective of the HR department.	23 of 28 students (82%) completed the assignment with a C or better, which is the minimum competence level.	

PUL and a selection of OLS classes where PUL was assessed.		Examples of methods used to measure PUL performance.	Scoring rubric on file?	Performance goal.	Findings.	Recommendations.
5. Understanding Society and Culture: The ability of students to recognize their own cultural traditions and to understand and appreciate the diversity of the human experience, both within the USA and internationally.						
OLS 263, 327	(a) to compare and contrast the range of diversity and universality in human history, societies, and ways of life (b) to analyze and understand the interconnectedness of global and local concerns (c) to operate with civility in a complex social world	Report: Arrange an interview with a "cultural informant," someone who was born into a culture substantially different from your own culture. Use survey questions provided by the instructor. Analyze the data and report on the results. Identify and express connections to textbook content. Use textbook principles of effective cross cultural communication to evaluate the experience. https://oncourse.iu.edu/access/content/user/tdiemer/xculwks/xcul-interview1.html	y	Seventy percent of the class will score a grade of B or above.	88 students are included in this analysis. Performance fell short of expectations, with 52% earning grades of B or above.	Move the assignment to a later week within the semester. Augment content and add more experiential activities to the instructional modules.

PUL and a selection of OLS classes where PUL was assessed.		Examples of methods used to measure PUL performance.	Scoring rubric on file?	Performance goal.	Findings.	Recommendations.
6. Values and Ethics: The ability of students to make judgments with respect to individual conduct, citizenship, and aesthetics						
OLS 263	(a) to make informed and principled choices regarding conflicting situations in their personal and public lives and to foresee the consequences of these choices (b) to recognize the importance of aesthetics in their personal lives and to society	Case study. Students are asked to provide solutions to this case study by first using no “ethical decision making model” and then by using the PISCO model developed by diBono (1985).	y	The instructional objectives for the assignment are: *Analyze, contemplate, discuss and make decisions about a variety of ethical scenarios using a variety of decision making models. *Integrate, synthesize and accept the diverse views and case interpretations of others. *Evaluate the logic, validity and relevance of diverse views and case interpretations involving ethical and legal leadership issues.	22 students = (students were given only the case study and assessment rubric prior to completing this assignment but NOT the PISCO Decision Making Model) = overall mean score using 5 point Likert scale as depicted on the assessment rubric for this assignment = 2.77 26 students = (all 36 students in both sections were given the case study and assessment rubric prior to completing this assignment AND provided with the PISCO Decision Making Model) = overall mean score using the student Grade Point Average on a 4.0 scale with 1.0 being a D, 2.0 being a C, 3.0 being a B and 4.0 being an A, = 2.98. The mean of 2.98 is a significant jump from the 2.77 mean of the OLS 263 Fall 2005 section. In addition, the mean score of 2.98 for the 36 students who were given both the assessment rubric and the PISCO Decision Making Model increased from the Fall 2005 section of OLS 263 given both the assessment rubric and the PISCO Decision Making Model. The Fall 2005 (section 26092) mean score using the student Grade Point Average on a 4.0 scale was 2.94.	Clearly the opportunity to utilize a decision making model, in this case the PISCO Decision Making Model (diBono, 1985), along with the assessment rubric created for this assignment helped student grade point averages on the identical assignment to increase. For future study, I will take each individual section of the assessment rubric and compare means in an effort to determine teaching strategies to help meet the instructional objectives.

TECHNICAL COMMUNICATION (TCM) 2006 ASSESSMENT REPORT
Prepared by Becky Fitterling
Spring 2007

Overview

Mission and Vision

The Technical Communication Program has its roots in fostering the kind of workplace communication skills that both the students in the School of Engineering and Technology will need to develop when they begin their careers. The Program focuses on both the oral and written communication skills that entry-level management positions require. The Program seeks not only to teach the necessary communication skills that the students will need, but also to encourage the students' appreciation of the value of those skills.

Constituents

Students in all engineering and technology programs are required to take technical communication courses. Engineering students must take TCM 360, Communication in Engineering Practice, and the technology students choose from among several offerings, depending on what their major departments mandate. All technology students are introduced to technical communication through TCM 220, Technical Report Writing; in addition, many enroll for TCM 340, Correspondence in Business and Industry, and TCM 370, Oral Practicum for Technical Managers. In addition, many students enroll for TCM 320, Written Communication in Science and Industry.

Program Learning Outcomes

The general learning outcome on which TCM focuses is "to communicate effectively." This wording is specified in EAC criterion 3(g) and in TAC criterion 2(g). In addition, TAC documentation also has a subsection in criterion 4 called "Program Characteristics" which more specifically articulates the expectations of effective communication. Those parameters are the basis of TCM coursework. TCM has also identified in each individual course which program outcomes as well as which PULs apply to course content. Data is shared with the Program Director to make curricular and faculty training improvements.

Following is a summary of TCM's assessment techniques:

Technical Communication (TCM)	**ABET/PUL**	**Assess selected courses, including the one required by all technology departments (TCM 220) as well as upper-level TCM technology courses (TCM 370, TCM 340).** **For engineering students, assess TCM 360.**	TCM 220: panel of three TCM full-time faculty judging students' papers through a criteria-based assessment. TCM 370: review of students' final oral presentations on tape and measured against criteria. TCM 340: TBD TCM 360: Jury of presentations in front of faculty and fellow students.

2006 Review

Data

The Technical Communication Program continues to refine its assessment policies and operations. In the interest of time and balance, starting in the fall of 2007, we have decided to do assessment activities in the fall semester each year, which means that for calendar year 2006, the data gathered for last spring semester is the data for this report. That report is attached.

ABET Criteria and PULs

In 2006, Becky Fitterling, TCM Lecturer and member of the School's assessment committee, analyzed the connection between the ABET Outcomes Criteria (both EAC and TAC), IUPUI's PULs, and the TCM courses. This study was intended to lay out the goals of the TCM program both for the students and for the adjunct faculty on whom we depend heavily to deliver our classes. The results of that analysis follow:

Principle of Undergraduate Learning	TCM
<u>Core Communication and Quantitative Skills</u> The ability of students to write, read, speak, and listen, perform quantitative analysis, and use information resources and technology – the foundation skills necessary for all IUPUI students to succeed. This set of skills is demonstrated, respectively, by the ability to: a) express ideas and facts to others in a variety of written formats: b) comprehend, interpret, and analyze texts; c) communicate orally in one-on-one and group settings; d) solve problems that are quantitative in nature, and e) make efficient use of information resources and technology for personal and professional needs.	TCM 220 TCM 320 TCM 340 TCM 350 TCM 360 TCM 370
<u>Critical Thinking</u> The ability of students to analyze carefully and logically information and ideas from multiple perspectives. This skill is demonstrated by the ability of student to: a) analyze complex issues and make informed decisions; b) synthesize information in order to arrive at reasoned conclusions; c) evaluate the logic, validity, and relevance of data; d) solve challenging problems, and; e) use knowledge and understanding in order to generate and explore new questions.	TCM 220 TCM 320 TCM 340 TCM 360
<u>Integration and Application of Knowledge</u> The ability of students to use information and concepts from studies in multiple disciplines in their intellectual, professional, and community lives. This skill is demonstrated by the ability of students to: a) enhance their personal lives; b) meet professional standards and competencies, and; c) further the goals of society.	TCM 360 TCM 370
<u>Intellectual Depth, Breadth, and Adaptiveness</u> The ability of students to examine and organize disciplinary ways of knowing and to apply them to specific issues and problems.	TCM 220 TCM 340 TCM 360

a) Intellectual depth describes the demonstration of substantial knowledge and understanding of at least one field of study. b) Intellectual breadth is demonstrated by the ability to compare and contrast approaches to knowledge in different disciplines. c) Adaptiveness is demonstrated by the ability to modify one's own approach to an issue or problem based on the contexts and requirements of particular situations.	TCM 370
<u>Understanding Society and Culture</u> The ability of students to recognize their own cultural traditions and to understand and appreciate the diversity of the human experience, both within the United States and internationally. This skill is demonstrated by the ability to: a) compare and contrast the range of diversity and universality in human history, societies, and ways of life; b) analyze and understand the interconnectedness of global and local concerns, and; c) operate with civility in a complex social world.	TCM 360

<u>Values and Ethics</u> The ability of students to make judgments with respect to individual conduct, citizenship, and aesthetics. A sense of values and ethics is demonstrated by the ability of students to: a) make informed and principled choices regarding conflicting situations in their personal and public lives and to foresee the consequences of these choices, and; b) recognize the importance of aesthetics in their personal lives and to society.	TCM 340 TCM 360

ABET (Technology) **Criterion 2. Program Outcomes**. An engineering technology program must demonstrate that graduates have:	**TCM**
a. an appropriate mastery of the knowledge, techniques, skills, and modern tools of their disciplines,	
b. an ability to apply current knowledge and adapt to emerging applications of mathematics, science, engineering and technology,	
c. an ability to conduct, analyze and interpret experiments and apply experimental results to improve processes,	TCM 220
d. an ability to apply creativity in the design of systems, components, or processes appropriate to program objectives,	TCM 220 TCM 320
e. an ability to function effectively on teams,	all
f. an ability to identify, analyze, and solve technical problems,	
g. an ability to communicate effectively,	all
h. a recognition for the need for, and ability to engage in lifelong learning,	
i. an ability to understand professional, ethical and social responsibilities,	TCM 340
j. a respect for diversity and a knowledge of contemporary professional, societal, and global issues,	
k. a commitment to quality, timeliness, and continuous improvement.	

ABET (Technology) **Criterion 4. Program Characteristics.** **Subsection called Communications.** The communications content must develop the ability of graduates to:	**TCM**
a. plan, organize, prepare, and deliver effective technical reports in written,	TCM 220

oral, and other formats appropriate to the discipline and goals of the program,	TCM 320 TCM 340 TCM 370
b. incorporate communications skills throughout the technical content of the program,	all
c. utilize the appropriate technical literature and use it as a principal means of staying current in their chosen technology, and	TCM 320 TCM 340 TCM 370
d. utilize the interpersonal skills required to work effectively in teams.	all

ABET (Engineering) **Criterion 3. Program Outcomes and Assessment** Engineering programs must demonstrate that their students attain:	**TCM**
(a) an ability to apply knowledge of mathematics, science, and engineering	
(b) an ability to design and conduct experiments, as well as to analyze and interpret data	
(c) an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability	TCM 360
(d) an ability to function on multi-disciplinary teams	TCM 360
(e) an ability to identify, formulated, and solve engineering problems	
(f) an understanding of professional and ethical responsibility	TCM 360
(g) an ability to communicate effectively	TCM 360
(h) the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context	TCM 360
(i) a recognition of the need for, and the ability to engage in lifelong learning	
(j) a knowledge of contemporary issues	
(k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.	

Ongoing Challenges

Engineering

As we look to organizing the assessment activities for our courses, we face a number of challenges. The first is that for TCM 360 we have depended on the goodwill and cooperation of the members of the engineering faculty to attend and evaluate the students' final oral presentations. For the past three semesters, the participation levels have dwindled dramatically, making any kind of meaningful data close to impossible. As busy as people are at the close of the semester, it is no wonder that volunteer assessment activities are a hard sell; nonetheless, we find ourselves with very little input from the faculty. It is clear that we are going to have to make some changes in our approach.

Technology

The assessment mechanism for TCM 220 is fairly well established, in terms of a committee of instructors doing evaluations of a sampling of final student reports. The measurement tool has been refined and revised to our satisfaction. One goal would be to perfect the feedback mechanism to the faculty so that they are aware both of the procedures and results of analysis.

For TCM 370, viewing the students' taped presentations is in some respects the most efficient assessment approach, and in some respects the least efficacious. The quality of the tape, for example, obviously influences the viewers' evaluation. With videotape becoming an outdated technology, we even encounter resistance from students who don't own VCRs! Digital technology – when it is readily available – may alleviate part of that problem. The alternative of having live juries may well present the same problem as the one we have in TCM 360. Another possible approach is to have cross-class visitation by the TCM 370 instructors, so they can work with one another in terms of both evaluation and teaching improvement.

TCM 340 does not as yet have an evaluation process in place. Because some technology programs are not requiring it, we need to establish a mechanism to develop dependable data. Probably we will initiate some kind of portfolio assessment. Just exactly what is one of the challenges facing us this year!

Feedback

Generally, we have relied on faculty meetings to share the results and challenges facing our assessment activities. Looking to the future, we are interested in pursuing the kind of "reflective session" that our colleagues in ECET have initiated, to encourage more active participation by our faculty, both fulltime and adjunct, in making the assessment activities more meaningful. As the workplace changes, we need to be sensitive to what curricular changes will be meaningful in our courses.

Appendix
Spring 2006 Results

EXECUTIVE SUMMARY

The Technical Communication Program evaluated the communication skills of 72 students in the spring of 2006. Twenty-four engineering students in TCM 360 were evaluated on their oral presentation skills on their final presentation of the semester by an outside jury. In addition, 18 of those students' final written reports were evaluated by their instructor using a holistic rubric. A panel of three TCM instructors evaluated the final written products of 29 technology students in TCM 220. In TCM 370, TCM faculty observed presentations of 19 students. In all cases, the goal was bifurcated: to have 70% or more of the students average at least 3.5 (on a 5-point scale) and to have the average of the separate criteria each average at least 3.5. The engineering results were good, with 81% of the students scoring 3.5 or above and 100% of the criteria averaging at least 3.5. Technology results are improving: the writing skills of the TCM 220 students showed 70% of the students performing at 3.5 or better, and 83% of the criteria averaging at least 3.5. In the oral presentations of TCM 370, 74% of the students averaged 3.5 or better, and 85% of the criteria averaged at least 3.5. Efforts will continue to be made for course improvement, especially in the areas of visual communication, use of sources, and in the nature of workplace writing.

ENGINEERING ASSESSMENT

TCM 360, Oral Presentations

Process:

The assessment process for the School of Engineering concentrated on the final oral presentations that the students delivered in TCM 360, Communication in Engineering Practice. Jurors from the students' disciplines were invited to attend the students' final oral presentations. Using a rubric judging 13 specific criteria of the presentation plus one criterion of "Overall Impression," the jurors scored each of the criteria on a scale of 1-5. In the spring semester, a total of 24 students were evaluated, 18 ME students and six ECE students. No BME students were assessed.

We varied the jury process a bit for spring semester, based on the fact that a total of seven (7) class periods had been set aside for presentations. Worried that organizing the students randomly and inviting any E&T faculty to attend would cause problems, we instead organized the students by their majors. The assumption was that at least the faculty of the major would find it possible to attend. Unfortunately, we had no outside jurors on either day when the BME students gave their presentations, and as a result, we have no data for BME. The ECE data are likewise light, with only six students' results. Furthermore, although the ME students were judged solely by ME faculty, the ECE students were evaluated by one ME professor and one ECE professor. (These details will be addressed later.)

The criteria (categories) assessed were Introduction, Content, Data and Analysis, Conclusion, Organization, Visuals, Language, Length, Grammar, Delivery, Pace & Volume, Body Language, Q&A, and Overall Impression.

The goal of the assessment was two-fold: (a) 70% or more of the students would achieve an overall average score of 3.5 or higher; and (b) 70% or more of the criteria would be judged at 3.5 or higher.

Results:

For the spring semester, the goal of 70% or more of the students averaging 3.5 was, in fact met; overall, 81% of the students met that goal. In terms of the criteria, all were judged at 3.5 or higher, meaning a 100% accomplishment. “Visuals” is the category that continues to show the most weakness.

The combined results are shown in Table 1.

Table 1: TCM 360 Juried Presentation Scores, ME and ECE

	Average	#>3.5	%>3.5	Av>3.5	70%>3.5	Either?
Introduction	3.8	20	83%	Y	Y	Y
Content	3.8	21	88%	Y	Y	Y
Data	3.8	18	75%	Y	Y	Y
Conclusion	3.7	20	83%	Y	Y	Y
Organization	3.8	19	79%	Y	Y	Y
Visuals	3.6	13	54%	Y	N	Y
Language	3.9	20	83%	Y	Y	Y
Length	3.9	21	88%	Y	Y	Y
Grammar	4.0	22	92%	Y	Y	Y
Preparation	4.0	20	83%	Y	Y	Y
Pace & Volume	3.9	19	79%	Y	Y	Y
Body Language	3.8	18	75%	Y	Y	Y
Q&A	4.0	21	88%	Y	Y	Y
Overall Impression	3.9	17(/20)	85%	Y	Y	Y
Average	3.8	19.4	81%			

Details of the data broken out by major are contained in Appendix 1.

Analysis:

The scores on the presentations were very high this semester, indicating a continuing positive trend. A couple of new factors may have contributed to the positive outcomes. First, as mentioned before, the students giving the presentations on the same day all had the same majors. For the most part, that change meant that their jurors represented the students’ department. One could assume that the jurors were thus predisposed to react more positively to their students than when they evaluate students that they may not know or associate with their departments.

The ME students were judged exclusively by ME professors. In the case of the six ECE students, two jurors participated, one from ECE and one from ME. The ME juror scored consistently tougher than the ECE juror, and it would only seem reasonable that a more diverse audience would give a broader range of scores.

Second, the participation of faculty was limited this semester. Our jurors numbered only seven this semester, and several students were evaluated by only one juror. Of the seven jurors, all but one were from ME, and no one from the BME faculty attended. The emphasis that the ME chair puts on assessment clearly shows in these numbers. Understanding that the invitations to attend the presentations come at a fairly frantic time for everyone in the semester, we may have to re-evaluate how to make the assessment process work for both students and faculty alike.

The new assessment form seems to be working well.

Actions Taken:

As previously mentioned, we changed the organization of the presentations this semester, with rather mixed results. We may need to look at how we go forward with this procedure in the future to try to balance fairness to the students with demands on the faculty's time.

ENGINEERING ASSESSMENT

TCM 360, Written Final Reports

Process:

This semester, in addition to the juried oral presentations, one instructor did an analysis of the students' final written reports in terms of the holistic rubric used in the final evaluations of their reports. Although the rubric has ten categories, only nine of them applied because the students did not take the option of using an appendix. The categories were scenario memo, introduction, analysis, reasoning, implementation, design and visuals, sentences, mechanics, and reflective memo. (A copy of the rubric is in Appendix 2.)

Using a scale of 5-4-3-2, the instructor assigned a value for each of the criteria used when evaluating the paper. Because a maximum of 45 points was possible, the goal of 70% of the students scoring a 36 or better (calculated as 80 % of 45, the lowest possible B) was set for the class. In addition, the average score of 3.5 on each of the criteria was also set.

Results

The final recommendation reports of 18 TCM 360 students were evaluated. Seventy-two percent (13 students) scored more than 36 points, including two students whose scores were rounded up from 35.5. The class average score was 37.1. All criteria attained an average of at least 3.5 as well. Generally, then, the students have succeeded in meeting the expectations of their written reports. Table 2 details the data.

Table 2: Results of Instructor’s Holistic Evaluation

TCM 360 Written Report - Instructor's Evaluation																			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	AV
Scenario	5	4	5	5	4	4.5	3.5	5	4	4	5	5	4	4.5	5	5	0	5	4.3
Introduction	5	3.5	3.5	5	4.5	5	4	5	4.5	3.5	4.5	3	3	4	4	3	3	5	4.1
Analysis	4	4	4	5	4	4	4	4.5	4	3.5	5	4	3	4.5	4	3	4	4	4.0
Reasoning	4	3	4	5	4	4	3.5	4.5	4	4	5	3.5	3	5	3.5	3	3	5	3.9
Implementation	4.5	3	5	5	3	4	3.5	4.5	4.5	4	4	3	2.5	4.5	3	3	3	4	3.8
Design/Visuals	4.5	3	4	4	4	4.5	4	3	4	4	5	4	2	4	4	3	5	4	3.9
Sentences	5	4	4	5	3.5	4	4	5	5	3	4	4	4	4	4	2.5	3	4	4.0
Mechanics	5	4	3.5	5	4	4	4	4	4.5	3	5	4	4	4	4	3	4	5	4.1
Reflective	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	5	4.9
Total /45	42	33.5	38	44	36	39	35.5	40.5	39.5	34	42.5	35.5	30.5	39.5	36.5	30.5	29	41	37.1

Analysis

Although delineating the scores on the rubric does not necessarily constitute a rigorous scientific approach to evaluation, the results do give the instructor an idea of where improvements can be made in teaching the written recommendation report. For example, the aspect of “implementation” presents itself as one needing some attention, as does the design of the document itself.

Actions Taken:

Evaluating the written products has historically taken a back seat to the oral presentations. A more rigorous system for evaluating the written reports may need to be devised.

TECHNOLOGY ASSESSMENT

TCM 220 and TCM 370

Overall Process:

Technology assessment for fall semester concentrated on two of the core TCM classes for the technology students, TCM 220, Technical Report Writing, and TCM 370, Oral Practicum for Technical Managers.

TCM 220

Process:

A panel of three TCM instructors did holistic evaluations of 29 final TCM 220 papers of spring '06 students. The students were picked randomly from all of the TCM 220 classes, including the online classes, a total of 10 sections of TCM 220.

Using a rubric of 12 criteria, we set as a goal to have 70% of the students achieve an average score of 3.5 or above, and 70% of the criteria to be evaluated at least 3.5. This rubric is the one we revised last semester.

The criteria were Introduction, Content, Data & Analysis, Conclusion, Organization, Visuals, Layout, Language, Length, Mechanics, Sentence Structure and Credit for Sources.

Results:

The results of the assessment for spring semester were very encouraging. In terms of the criteria, all but two of the criteria averaged 3.5 or higher, meaning an 83% accomplishment. The two categories that did not average 3.5 were Visuals and Credit for Sources. Furthermore, 20 of the 29 students averaged over 3.5 on their results. Rounding 68.96% to 70%, we can declare success meeting that goal as well. Table 3 details the results of all of categories.

Table 3: TCM 220 Final Products Juried Evaluation

	Average	# ≥ 3.5	% ≥ 3.5	Avg ≥ 3.5?	70% ≥ 3.5?	Either satisfied?
Introduction	3.6	20	70%	y	y	y
Content	3.8	20	70%	y	y	y
Data	3.6	22	76%	y	y	y
Conclusion	3.7	21	72%	y	y	y
Organization	3.7	18	62%	y	n	y
Visuals	3.3	8/17	47%	n	n	n
Layout	3.6	18	62%	y	n	y
Language	3.9	23	79%	y	y	y
Length	3.6	18	62%	y	n	y
Mechanics	3.6	18	62%	y	n	n
Sentences	3.8	22	76%	y	y	y
Credit	2.4	6/17	35%	n	n	n
Average	3.6	20	70%	y	y	y

Analysis:

The data for TCM 220 show progress. Although we still need to improve our students' mastery of effective visuals and the correct acknowledgment of outside material, we are trending upward. The TCM program's renewed efforts at assessment activities and education of our adjunct faculty seem to be having a positive effect on our results.

Action Plan:

We will continue to share the results of our assessment activities with the faculty, and we will look at new approaches to improve the teaching and learning of visual aspects of reports and of using and acknowledging sources.

TCM 370

Process:

A panel of three TCM instructors reviewed the in-class presentations of 19 TCM 370 students, using the revised rubric for assessing students' workplace oral abilities. Thirteen criteria were measured: Introduction, Content, Data, Conclusion, Organization, Visuals, Language, Length, Grammar, Preparation, Pace & Volume, Body Language, and Q&A.

The goal of the assessment was two-fold: (a) 70% or more of the students would achieve an overall average score of 3.5 or higher; and (b) 70% or more of the criteria would be judged at 3.5 or higher.

Results:

Seventy-four percent (74%) of the students averaged 3.5 or better on their presentations. As indicated in Table 4, all of the criteria except for Visuals and Length met the goal of averaging at least 3.5.

Table 4: TCM 370 Juried Presentations

	Average	# ≥ 3.5	% ≥ 3.5	Avg ≥ 3.5?	70% ≥ 3.5?	Is either satisfied?
Introduction	3.5	11	58%	Y	N	Y
Content	3.7	14	74%	Y	Y	Y
Data	3.5	11	58%	Y	N	Y
Conclusion	3.5	13	68%	Y	N	Y
Organization	3.5	10	53%	Y	N	Y
Visuals	3.4	11	58%	N	N	N
Language	4.0	16	84%	Y	Y	Y
Length	3.4	12	63%	N	N	N
Grammar	3.9	15	79%	Y	Y	Y
Preparation	4.0	14	74%	Y	Y	Y
Pace & Volume	3.9	12	63%	Y	N	Y
Body Language	4.0	16	84%	Y	Y	Y
Q&A*	4.3					
Average	3.7					

Only 10 students were evaluated on this criterion; 9 were over 3.5

Analysis:

Although the numbers in TCM 370 look good, the panel has some concerns, primarily on the subject of the content of the presentations. It is important for us to identify and emphasize the nature of workplace communication activities.

Action Plan:

TCM is currently evaluating the current text book and assignments to determine their suitability for the TCM 370 class.

CONCLUSION:

TCM continues to study the trends and techniques of our assessment activities. We are looking to make some curricular changes in order to better meet the communication needs of our students; these changes will include a broader scope of reports in TCM 220 and perhaps more emphasis on changing communication media.

APPENDIX 1
TCM 360 Results Broken out by Major

Mechanical Engineering

	#1	#2	#3	#4	#5	#6	#7	#8	#9	#10	#11	#12	#13	#14	#15	#16	#17	#18	Average	#>3.5	%>3.5	Av>3.5	70%>3.5	Either?
Introduction	3.5	4.0	3.0	3.5	3.5	4.0	4.0	4.0	4.0	4.5	4.0	4.0	4.0	4.0	4.0	4.5	4.0	5.0	4.0	17	94%	Y	Y	Y
Content	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.5	3.5	4.0	4.0	4.0	4.5	3.5	4.0	4.5	4.0	18	100%	Y	Y	Y
Data	3.0	4.0	4.5	3.5	4.0	4.0	4.0	4.0	4.0	4.0	3.5	3.0	4.0	4.0	4.5	4.0	4.0	4.5	4.0	16	89%	Y	Y	Y
Conclusion	3.5	3.0	4.0	4.0	4.0	4.0	5.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.5	3.5	3.5	4.5	3.9	17	94%	Y	Y	Y
Organization	4.0	4.0	4.5	4.5	4.0	4.0	5.0	4.0	4.0	3.0	3.0	4.0	4.0	4.0	4.0	3.5	3.5	5.0	4.0	16	89%	Y	Y	Y
Visuals	4.0	3.0	4.0	3.0	4.0	2.0	4.0	3.0	4.0	4.0	3.0	3.0	3.0	3.0	5.0	3.5	3.5	5.0	3.7	10	56%	Y	N	Y
Language	4.0	4.0	4.0	4.0	4.5	4.0	4.0	4.0	4.0	4.5	4.0	4.0	3.0	4.0	5.0	4.0	4.0	4.5	4.2	17	94%	Y	Y	Y
Length	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	5.0	4.5	4.0	4.0	4.0	4.0	4.5	4.5	4.5	4.2	18	100%	Y	Y	Y
Grammar	4.0	4.0	4.0	4.0	4.5	4.0	4.0	4.0	4.0	5.0	5.0	4.0	4.0	4.0	4.5	4.5	4.5	4.5	4.3	18	100%	Y	Y	Y
Preparation	4.0	4.5	3.5	3.5	5.0	4.0	4.0	4.0	4.0	5.0	4.0	3.0	4.0	4.0	5.0	4.0	4.5	4.5	4.2	17	94%	Y	Y	Y
Pace&volume	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	5.0	4.5	3.0	4.0	3.0	4.5	3.5	3.5	5.0	4.1	16	89%	Y	Y	Y
Body Language	4.0	4.0	4.0	4.0	3.5	3.0	4.0	4.0	4.0	4.0	4.5	4.0	3.0	3.0	4.5	4.0	4.0	5.0	4.0	15	83%	Y	Y	Y
Q&A	3.5	4.5	4.0	4.5	4.5	4.0	4.0	4.0	4.0	4.5	4.5	4.0	4.0	4.0	4.5	4.0	4.5	4.5	4.3	18	100%	Y	Y	Y
Overall Impression	4.0	4.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0				5.0	4.0	4.0	4.5	4.2	15/15	100%	Y	Y	Y
Average	3.8	4.0	4.0	3.9	4.1	3.8	4.1	3.9	4.0	4.4	3.9	3.7	3.8	3.8	4.6	3.9	4.0	4.7	4.1					

means one juror

18 students
7 had only one evaluator
all evaluators from ME

Electrical and Computer Engineering

	#1	#2	#3	#4	#5	#6	Average	#>3.5	%>3.5	Av>3.5	70%>3.5	Either?
Introduction	3.5	3.3	3.5	3.0	2.3	4.5	3.3	3	50%	N	N	N
Content	3.5	2.5	4.5	2.5	3.0	4.0	3.4	3	50%	N	N	N
Data	4.0	3.0	2.8	3.0	3.0	4.0	3.3	2	33%	N	N	N
Conclusion	3.5	2.5	3.5	2.8	2.8	3.5	3.1	3	50%	N	N	N
Organization	3.5	3.0	3.8	2.5	3.0	4.5	3.4	3	50%	N	N	N
Visuals	3.5	2.5	4.0	2.5	3.0	5.0	3.5	3	50%	Y	N	N
Language	4.0	3.5	2.5	2.0	3.3	4.5	3.3	3	50%	N	N	N
Length	4.0	3.5	3.0	2.0	3.0	4.5	3.3	3	50%	N	N	N
Grammar	4.0	3.5	2.8	1.5	3.5	4.5	3.3	4	66%	N	N	N
Preparation	4.0	2.5	3.0	2.0	3.5	5.0	3.3	3	50%	N	N	N
Pace&volume	4.0	3.0	3.5	1.8	3.0	5.0	3.4	3	50%	N	N	N
Body Language	4.0	2.5	4.0	2.3	3.0	4.5	3.3	3	50%	N	N	N
Q&A	3.8	3.0	4.0	2.0	2.5	4.5	3.4	3	50%	N	N	N
Overall Impression	4.0	2.8	3.8	2.3	3.0	4.8	3.4	3	50%	N	N	N
										N	N	N
Average	3.8	2.9	3.5	2.3	3.0	4.5	3.3	3	50%			

6 students
2 evaluators (one ME; one ECE)

APPENDIX 2
ASSESSMENT RUBRICS

Criteria for Assessing Students' Workplace Writing Abilities

Rater's Initials____________ Major of Student ____________ Date _______________

		Excellent		Good	Weak		N/A
Content	Introduction gives overview and states purpose of document.						
	Content fits purpose and audience.						
	Data and analysis are logical, sound, and sufficient.						
	Conclusion flows from content and brings closure to document.						
	Organization of content is logical and flows smoothly.						
Visuals	Visuals help understanding and are clear, easy to read, and error-free.						
	Page layout is effective and professional looking.						
Presentation	Language used is appropriate.						
	Length is appropriate to audience, situation, and content.						
	Grammar, punctuation, and spelling are consistently correct.						
	Sentence structure is clear and concise.						
	Credit is given for work from other sources.						

Criteria for Assessing Students' Workplace Speaking Abilities

Rater's Initials____________ Major of Student ____________ Speaker Number ______

		Excellent		Good	Weak		N/A
Content	Introduction gives overview and states purpose of presentation.	5	4	3	2	1	n/a
	Content fits purpose and audience.						
	Data and analysis seem logical and sound.						
	Conclusion flows from content and brings closure to presentation.						
	Organization of content is easy to follow.						
Visuals	Visuals help understanding and are clear, easy to read, and error-free.						
Presentation Style	Language used is appropriate.						
	Length fits purpose.						
	Grammar is consistently standard.						
	Presentation is well prepared and well rehearsed.						
	Pace and volume are at appropriate levels.						
	Body Language is relaxed with adequate eye contact.						
	Question and answer time is handled well.						
**	Overall Impression	5	4	3	2	1	n/a