MECHANICAL

		2002	2003	2004	2005	2006	2007	2008	Avg-5 year
Section I: Part A: Academic Instruction Expenditures (fiscal year)	1. Salaries/Benefits	$877,259.00	$978,057.00	$1,141,450.00	$1,244,129.00	$1,223,048.00	$1,179,587.91	$1,187,571.38	
	5 Year Average								$1,195,157.26
	2. Other Operating Exp.	$48,578.00	$69,677.00	$89,044.00	$51,109.00	$26,283.00	$30,639.34	$62,105.94	
	5 Year Average								$51,836.26
	3. Total	$925,837.00	$1,047,734.00	$1,230,494.00	$1,295,238.00	$1,249,331.00	$1,210,227.25	$1,249,677.32	
	5 Year Average								$1,246,993.51
Section I: Part B: Student Credit Hour Production (fiscal year)	1. Lower Division	391	385	416	481	436	446	815	
	5 Year Average								518.8
	2. Upper Division	2846	2979	2680	2755	2707	3547	3784	
	5 Year Average								3094.6
	3. Masters	1210	1275	1038	942	775	821	765	
	5 Year Average								868.2
	4. Doctoral	90	92	76	102	55	28	114	
	5 Year Average								75
	5.Total	4537	4731	4210	4280	3973	4842	5478	
	5 Year Average								4556.6
Section I: Part D: Percentage of Departmental SCH taken by: (fall)	1. Their Undergraduate Majors	46.6	46.8	46.8	45.3	54.3	54.3	60.2	
	5 Year Average								52.18
	2. Their Graduate Majors	33.9	34.8	32	34.9	26.4	16.6	17.2	
	5 Year Average								25.42
	3. Non-Majors	19.5	18.4	21.2	19.8	19.3	29.1	22.6	
	5 Year Average								22.4
Section I: Part E: Departmental Faculty (fall)	1. Tenured/Tenure Track Faculty Head Count	8	7	10	8	10	11	10	
	5 Year Average								9.8
	2. Tenured/Tenure Track Faculty with Terminal Degrees	8	7	10	8	10	10	9	
	5 Year Average								9.4
	3. Total Tenured Faculty	5	5	8	5	6	6	6	
	5 Year Average								6.2
	Total Instructional Faculty FTE in Department	8	8	10	10	10	11	10	
	5 Year Average								10.2
Section I: Part F: Actual Instructional FTE (fall)	1. Tenured/Tenure Track Faculty	6.87	7.2	9.43	9	10	10.59	10	
	5 Year Average								9.804
	2a. Instructor of Record (IOR)	3.43	3.21	2.51	1.32	1.48	2	3	
	5 Year Average								2.062
	2b. Not Instructor of Record	2.43	0	0.25	1.4	1.58	0.82	0.4	
	5 Year Average								0.89
	3. Other Instructional FTE	1.25	1.75	1.08	1.25	1.25	0.75	0.8	
	5 Year Average								1.026
	4.Total FTE	13.98	12.16	13.27	12.97	14.31	14.16	14.2	
	5 Year Average								13.782
	5. SCH generated by Tenured/Tenure Track Faculty	1517	1560	1477	1249	1242	1898	2046.8	
	5 Year Average								1582.56
	6. SCH generated by GTA's (IOR)	385	286	322	356	170	11	22.3	
	5 Year Average								176.26

Program Review Program Report

ENGINEERING

MECHANICAL

MECHANICAL ENGINEERING

		2002	2003	2004	2005	2006	2007	2008	Avg-5 year
Section II: Part A: Majors in the Discipline (fall)	1. Freshmen/Sophomores (optional)	63	55	86	74	91	95	127	
	5 Year Average								94.6
	2. Jrs., Srs., 5th Year Majors	166	171	143	159	164	187	212	
	5 Year Average								173
	3. Masters	120	134	141	134	102	102	79	
	5 Year Average								111.6
	4. 1st Prof / Specialist / Certif.	0	0	0	0	0	0	0	
	5 Year Average								0
	5. Doctoral	15	13	12	17	13	11	13	
	5 Year Average								13.2
	6. Total	364	373	382	384	370	395	431	
	5 Year Average								392.4
Section II: Part B: ACT Scores of Undergraduate Jrs.,Srs (fall)	1. Average ACT Composite	21.8	22.2	22	22.3	23.2	23.6	23.7	
	5 Year Average								22.96
	2. Low ACT	9	9	9	9	9	9	9	
	5 Year Average								9
	3. High ACT	33	33	30	32	34	34	34	
	5 Year Average								32.8
	4. Number Reporting an ACT Score	91	85	72	68	77	95	103	
	5 Year Average								83
	5. Percent Reporting ACT Score	54.82%	49.71%	50.35%	42.77%	46.95%	50.80%	48.58%	
	5 Year Average								47.89%
Section II: Part C: Degrees Conferred (fiscal year)	1. Associate	0	0	0	0	0	0	0	
	5 Year Average								0
	2. Baccalaureate	44	35	42	43	32	43	47	
	5 Year Average								41.4
	3. Masters	21	22	46	52	36	44	28	
	5 Year Average								41.2
	4. First Prof / Specialist / Certificate	0	0	0	0	0	0	0	
	5 Year Average								0
	5. Doctorate	4	3	1	3	4	1	0	
	5 Year Average								1.8
	6. Total	69	60	89	98	72	88	75	
	5 Year Average								84.4

7. SCH generated by Other Instructional Faculty	351	477	330	350	363	156	315	
5 Year Average								302.8
8. Total SCH	2253	2323	2129	1955	1775	2065	2384.1	
5 Year Average								2061.62
9. Average SCH per Tenured/Tenure Track Faculty	1599.68	1526.36	1165.41	1221.09	1098.98	1037.75	1098.98	
5 Year Average								1124.44
10. Average SCH per GTA (IOR only)	452.57	483.58	618.45	1175.98	1048.85	776.15	517.43	
5 Year Average								827.37
11. Average SCH per Other Instructional Faculty	1873.60	1338.29	2168.52	1873.60	1873.60	3122.67	2927.50	
5 Year Average								2393.18
12. Average Overall SCH per FTE	1064.67	1224.02	1121.64	1147.58	1040.12	1051.14	1048.18	
5 Year Average								1081.73

Program Review Program Report

ENGINEERING

MECHANICAL

Note: Year is fiscal year (summer, fall, spring). If data are from the fall only, it is from the fall of the fiscal year. For example, FY 2008 is Fall 2007 data.

MECHANICAL ENGINEERING

		2002	2003	2004	2005	2006	2007	2008	Avg-5 year
Section II: Part A: Majors in the Discipline (fall)	1. Freshmen/Sophomores (optional)	63	55	86	74	91	95	127	
	5 Year Average								94.6
	2. Jrs., Srs., 5th Year Majors	166	171	143	159	164	187	212	
	5 Year Average								173
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	4. 1st Prof / Specialist / Certif.	0	0	0	0	0	0	0	
	5 Year Average								0
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	5 Year Average								22.96
	2. Low ACT	9	9	9	9	9	9	9	
	5 Year Average								9
	3. High ACT	33	33	30	32	34	34	34	
	5 Year Average								32.8
	4. Number Reporting an ACT Score	91	85	72	68	77	95	103	
	5 Year Average								83
	5. Percent Reporting ACT Score	54.82%	49.71%	50.35%	42.77%	46.95%	50.80%	48.58%	
	5 Year Average								47.89%
Section II: Part C: Degrees Conferred (fiscal year)	1. Associate	0	0	0	0	0	0	0	
	5 Year Average								0
	2. Baccalaureate	44	35	42	43	32	43	47	
	5 Year Average								41.4
	3. Masters	21	22	46	52	36	44	28	
	5 Year Average								41.2
	4. First Prof / Specialist / Certificate	0	0	0	0	0	0	0	
	5 Year Average								0
	5. Doctorate	4	3	1	3	4	1	0	
	5 Year Average								1.8
	6. Total	69	60	89	98	72	88	75	
	5 Year Average								84.4

Wichita State University
College of Engineering
FY 2008-2009 KBOR Program Review
Dean's Response
BS, MS and PhD in Mechanical Engineering

College of Engineering Academic Program Review Process Overview

During academic year 2005-2006 the College of Engineering (CoE) underwent an extensive and inclusive strategic planning process with input from the College Industry Advisory Board (IAB), leadership, faculty, staff and students. The final outcome of this process was a ten-year strategic plan for the College. From this plan and based on the Wichita State University (WSU) mission, the mission and vision of the College of Engineering, as stated below, were developed and approved by the Wichita State University Provost and Vice President for Academic Affairs and Research.

Vision

The College of Engineering at Wichita State University will be recognized nationally and internationally for its: experience-based undergraduate and graduate degree programs; collaborative efforts with industry; and research programs to support the economic development and global competitiveness of the Wichita metropolitan area, the state of Kansas, and the nation.

Mission

The College of Engineering at Wichita State University is committed to:

- *Prepare graduates who will engage effectively and responsibly in the practice of the engineering profession in a global economy and in pursuing advanced engineering education.*
- *Conduct applied and basic research to support and contribute to the social and economic well-being of citizens and organizations in the Wichita metropolitan area, the state of Kansas and beyond.*
- *Cultivate the spirit of entrepreneurship and the connection between engineering and business that encourages technology commercialization.*
- *Improve continuously the engineering pedagogical methods employed in delivering its academic programs.*
- *Foster and value diversity of ideas and people through early student recruitment, outreach programs, and the recruitment and development of faculty role-models.*
- *Encourage scholarship in all its dimensions.*
- *Evolve thoughtfully in response to the needs of industry and the changing world.*

The Department of Mechanical Engineering (ME) vision and mission are in complete alignment with the CoE vision and mission above.

College Assessment Process

The purpose of the assessment process at the college level is to ensure that the college follows a strategic direction that serves well all its constituents and that there is a system in place that allows for

continuous improvement in the achievement of the college mission and vision. The input in this process is gathered from the College IAB and Student and Faculty Advisory Boards to the Dean. The College IAB provides input to the Dean and Chairs at least twice per academic year on college and departments strategic direction matters and overall engineering education issues. In addition, this board assists in the establishment or revision of the college's mission and vision and the evaluation of the achievement of these. The other two boards interact with the dean at least twice a semester to discuss topics such as laboratory infrastructure needs and overall quality of the educational or job experience. An additional tool used by the Dean to gather input from the faculty is the College of Engineering Faculty Survey of Department Chairperson.

Every undergraduate program in the CoE has its educational objectives and outcomes. The program objectives are statements that describe the expected accomplishments of graduates during the first few years after graduation while outcomes are statements that describe what students are expected to know and able to do by the time of graduation.

The primary assessment tools for the program objectives are the Alumni Surveys, Employer Survey and Industrial Advisory Board meetings. There is a process to establish or determine the objectives, how the program ensures that the objectives are achieved, and a system of ongoing evaluation that leads to continuous improvement of the program.

The process for determining and evaluating program objectives involves the program faculty, alums, employers, program or department IAB and the Program Curriculum and Assessment Committee and students. This process is repeated every year in most of the programs.

As part of the process to ensure the achievement of objectives, the Dean's Office administers the Alumni Survey every fall and sends the data gathered to the departments. Every fall the departments analyze the Alumni Survey data from the previous year, along with the Employer Survey data and the input received in the IAB Spring meeting. The Curriculum and Assessment Committee of the program consider this information and revise or update the program objectives and objective target levels and recommends curriculum changes and laboratory upgrades or enhancements. The recommendations are further reviewed by the IAB and approved or modified by the departmental faculty.

The desired outcomes of the academic programs are for the most part observed as attributes of the program graduates. These were developed by the faculty with input from the IAB and the students. The outcomes of every program essentially replicates the (a) through (k) outcomes of criterion 3 of the Engineering Accreditation Commission (EAC) of the Accreditation Board for Engineering and Technology (ABET).

Assessment tools for the program outcomes vary by program but may include: Fundamentals of Engineering Examination, core knowledge exams developed by program faculty, prerequisite exams, course folders or portfolios, alumni surveys, graduating senior exit surveys and interviews, senior project evaluation by faculty and professional engineers, specific class exam questions and projects and co-op experience evaluation by employers and students. Every outcome is assessed by at least one tool but on the average three tools are used per outcome.

The process to ensure the achievement of the program outcomes is repeated every year and involves data collection and analysis by the program Curriculum and Assessment Committee, recommendations of changes from the committee, consideration of those changes by the IAB of the program and approval of the changes by the departmental faculty. The final step in closing the loop in the process is the implementation of faculty approved changes and modification to the catalog.

Bachelor of Science in Mechanical Engineering

The Department of ME offers an undergraduate program; a Bachelor of Science (BS) in Mechanical Engineering (ME). There are three Program Educational Objectives (PEOs) associated with the BS in ME which resulted from a review process conducted after the College's mission and vision were approved. This process which includes program objectives development, evaluation, assessment and revision is part of the ABET continuous improvement process and it is performed by the ME Department on a regular basis. All program constituents; students, alumni, faculty and employers are involved in the process. However, since the revised PEOs apply to students who entered the program after spring 2007 and the data available is for students pursuing the program under the old PEOs, this program review is based on the three old PEOs. It is also important to mention that there are eleven outcomes which describe the attributes of a graduate from the BS in ME program.

The assessment of the undergraduate programs in the College of Engineering is the responsibility of the department offering the program. However, there is a coordinating body at the College level called the ABET Task Force in which each department has at least two representatives; the department chair plus a faculty member. This task force is chaired by the College ABET Coordinator and its charge includes the maintenance and updating of the assessment tools common to all programs (e.g., the Alumni Survey and the Cooperative Education Employer Survey), sharing of information and best practices and review of data collection methods and schedules. The ABET Task Force has been in place at least since the year 2001 but it has been meeting consistently since fall 2005. The Dean of the College of Engineering meets with this task force at least twice a year on regular years and at least four times during the year before an ABET visit.

The success in meeting the ME PEOs is a function of how well graduating students master the program outcomes. The mastery of the program outcomes is assessed through multiple tools including but not limited to: Comprehensive Exit Exam (CEE), Senior Project Presentations and Reports, Senior Exit Survey, Alumni Survey and Employer Survey. Most of these assessment tools are applied every year. Therefore, the ME Department is assessing the undergraduate students' mastery of the BS in ME program outcomes continuously.

In spring 2007, the BS in ME program was subjected to a mock ABET accreditation visit conducted by an experienced evaluator who reviewed the self-study report, curriculum content, laboratory facilities, college and institution support for each program, program objectives and outcomes' review and assessment processes, and faculty size and credentials. Recommendations were provided by the ME program mock visitor on how to present some of the assessment results in the self-study report, development of laboratory facilities and application of some of the assessment tools. The mock

evaluator was pleased with the program and the support of the institution for this. The actual ABET accreditation visit took place in fall 2007 and the College was informed of the full accreditation of the program (six years) in August 2008. By the time the KBOR BSME program review is over, this program would have been under some sort of comprehensive review for 24 months. As it is required by ABET, all these program reviews have involved not only the department chair but all the faculty members in the department.

Master of Science and Doctor of Philosophy in Mechanical Engineering

The ME Department offers two graduate programs namely, Master of Science (MS) and Doctor of Philosophy (PhD) in Mechanical Engineering. The MS in ME program provides the students with the opportunity to advance their undergraduate to a more mature level of understanding. It also provides them with an introduction to research. An individual's curriculum can be designed to serve his/her specific needs and career goals. The PhD in ME degree recognizes a candidate's high achievement in research and the student's original contribution to the advancement of knowledge in one of these areas: thermal or fluid engineering, mechanical systems analysis and design, robotics and control, and materials science and engineering. No further specific program outcomes to be used in measuring the student mastery of program content or skills developed has been established by the ME Department for its graduate program.

The assessment of the graduate programs in the College of Engineering is the responsibility of the department offering the program. However, there is a coordinating body at the College level called the Graduate Committee (GC) in which each department is represented. This committee is chaired by the College Associate Dean and is in charge of overseeing the development and implementation of the assessment plans for the individual graduate programs, sharing information and best practices on assessment, recruitment and operation of the programs. The GC meets on a regular basis and also handles common challenges and opportunities to multiple graduate programs.

One of the main sources of data for the assessment of the success in meeting the ME graduate program objectives is the Graduate School Exit Survey which provides feedback on the degree of satisfaction of the graduates with the educational experience they received at WSU.

Use of Data

In reviewing the three academic programs offered by the ME Department, multiple sources of information and data were used including the report provided by the WSU Office of Institutional Research for Program Review, benchmarking analysis of WSU IME Department and industrial engineering departments of the mid-west region of the United States, faculty activity reports and productivity analysis covering years 2003 to 2007, the assessment data for the BS in ME program as well as the most recent Graduate School Exit Survey results. The assessment data for the BS in ME is based on the application of direct and indirect assessment tools. The data comes from surveys, interviews, assessment exams, senior project reports, and faculty as well as employers evaluation of senior design presentations. Different constituents including faculty, students, employers and alumni are sources of input in this assessment process.

The recommendations included below as well as the fiscal implications of these are based on all the data analyzed as part of the program review process and the College of Engineering productivity measures included in Table 1.

Table 1. College of Engineering Productivity (Five-Year Average).

Measure\Department	AE	ECE	IME	ME
# of undergraduate students/Faculty	20.13	31.74	6.8	26.24
# of MS students/faculty	5.83	21.05	11.61	10.94
# of PhD students/faculty	1.35	2.12	1.78	1.29
# of journal articles/faculty	0.5	?	1.27	1.18
# of conference proceedings	1.58	?	2.53	2.12
external funds awarded/faculty ($/year)	$208,529	$111,592	$85,225	$51,591
Credit hours/faculty	372.16	688.28	420.94	446.73
Degrees awarded/faculty	4.27	15.09	5.84	8.27

Significant Program Changes

The changes implemented by the IME Department within the last five years to close the loop in the continuous improvement process of its academic programs are included as follows.

- The engineering graphics was redesigned to focus more on design drafting and tolerance.
- Both writing and oral communication skills development are now expected outcomes for all the design courses offered by the ME Department.
- Design and manufacturing issues, safety and ethics topics have been integrated in every course offered by the ME Department.
- A new course, ME 450 Special Topics, was developed and an agreement was established with the Wichita Area Technical College (WATC) to use their laboratory facilities to support the course.
- MATHLAB was added as a computer tool used in the ME courses.
- The undergraduate ME program has been made more flexible by adding three elective courses which could be from outside engineering.
- Approval was obtained to award up to 3 credits of technical electives for Cooperative Education experience.
- Three new faculty members were hired in the areas of: component design/composite and nano-composite, measurement/instrumentation and controls, and materials engineering and nano-technology.
- The ME Department developed an Honors Track to provide outstanding students additional development opportunities.
- A Mechanical Engineering Minor was developed which is available to students from all other engineering majors.
- Laboratory facilities have been enhanced including:
    - the establishment of an agreement with WATC for the ME students to have access their

Welding, Machine Shop and Composite Laboratories,
  - investment of more than $200,000 in upgrades for the Materials Laboratory and
  - completion of initial design of a new undergraduate nanotechnology laboratory.
- The Engineer 2020 program was implemented.

The Engineer 2020 program requires that to fulfill the requirements for a BS in ME degree at WSU, each student completes at least three of the following: a. Undergraduate Research, b. Cooperative Education or Internship, c. Global Learning or Study Abroad, d. Service Learning, e. Leadership, and f. Multidisciplinary Education. With the Engineer 2020 program the students will:

a) develop
   a. ability to design and conduct experiments, as well as to analyze and interpret data;
   b. 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;
   c. ability to function on multi-disciplinary teams;
   d. ability to identify, formulate, and solve engineering problems;
   e. understanding of professional and ethical responsibility;
   f. ability to communicate effectively; and
   g. ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.
b) obtain
   a. the broad education necessary to understand the impact of engineering solutions in a global, economic, environment, and societal context; and
   b. knowledge of contemporary issues.
c) recognize the need for, and an ability to engage in, life-long learning.

Summary and Recommendations

From the data presented in both program reviews, undergraduate and graduate, it is clear that the ME Department faculty size and qualifications are adequate to offer the three academic programs: BS, MS and PhD in ME. The productivity of the ME faculty as it is measured by the last five year average for the number of conference proceedings (2.1/faculty member), the number of undergraduate students/instructional faculty (26.2/faculty member), the number of degrees awarded/instructional faculty (8.3), among others, should be commended. The College of Engineering heavily depends on the release money generated by the faculty in the College to conduct its operations. Therefore, it is strongly encouraged that the level of research funded research and specifically faculty release generated by the ME be increased.

It is clear that the programs offered by the ME Department supports the WSU mission as an urban research serving institution and contribute to the economy of the city of Wichita, the state of Kansas and the nation. Further, the undergraduate PEOs and the graduate program objectives are being met. There is also evidence that the undergraduate program outcomes are being mastered by the graduates from the ME program.

As part of BS in ME continuous improvement process it is recommended that:

- The work in progress to strengthen the advising system continue.
- More industry based projects be available for the Senior Design course.
- The implementation of the teaching laboratory enhancement and development plan continue.
- The efforts to further enhance the undergraduate educational process including the classroom experience be expanded.

The graduate programs in the ME Department could benefit from the following:

- A separate set of program objectives and outcomes for each one of the two graduate programs; MS and PhD in ME.
- An assessment process for student mastery of the program outcomes for each one of the two graduate programs.
- Increase in the number of PhD students.
- Expansion of the system in place to follow up the placement of graduates.

The expansion of the Engineer 2020 program should continue. It is also recommended that as many ME faculty members as possible continue to be involved in the College of Engineering Faculty Enhancement program with the objective of improving, even further, the quality of the educational experience offered by the department. The work of the First Year Engineering Program Task Force should also continue with active participation of the ME faculty.

Fiscal Implications of Recommendations

The ME Department is encouraged to maintain its commitment to academic excellence and program objectives as well as the continuous improvement process of its academic programs. The size and qualifications of the current ME faculty are adequate to support these goals and the BS, MS and PhD programs.

If the recommendations above are to be implemented successfully, the current ME Department faculty size should be maintained. Another potential fiscal implication of implementing the above recommendations is the need for additional information technology and non-information technology laboratory support. The College of Engineering did have four persons providing support in these areas, however, since summer of 2008 that number went down to two when some of the information technology responsibilities were moved to UCATS. If providing additional technical support becomes an imperative, a combination of resources from research projects and faculty release will be a potential source of funding to cover the cost of such support.

Wichita State University
GRADUATE SCHOOL
KANSAS BOARD OF REGENTS 2009 PROGRAM REVIEW
Doctor of Philosophy in Mechanical Engineering
Master of Science in Mechanical Engineering

Review process: The Graduate Council prepared, discussed and reviewed these materials.

Program: The Mechanical Engineering Program serves three very distinct constituencies: students needing education for careers, the local community which tends to focus heavily on aerospace applications, and the larger profession interested in new research. This department seems to have a good sense of the constituencies that it serves, adapting to the needs of the local community, and pursuing the resources to make these goals happen. There is an emphasis on globalization and exposure of Master's students to research, which is a good foundation for their professional pursuits. There is an emphasis on helping students identify and develop their personal interest areas within the discipline, including four specialization areas for students' consideration. The program appears to average an enrollment of about 110-140 master's students and 10-20 Ph.D. students, resulting in one of the highest graduate to undergraduate enrollment ratios of peer institutions.

Mission: The Mechanical Engineering the department sees its role as supporting its three main constituencies of students, the profession, and the community. In addition, the program has recently shifted its focus away from just job training to include life-long learning and problem solving.

Program faculty: There are currently eleven full time faculty members with Ph.D.s in their fields. The faculty members have distinguished themselves in their fields, as reflected in the number of awards and honors held by numerous faculty members. The largest area consists of faculty studying Energy and Thermal/Fluid Sciences. The report's very helpful breakdown of their backgrounds suggests the majority of faculty members are in their prime teaching and research years with a good spread of assistant, associate, and full professors. Other than CY 2004, where there were significant drops in publications and money from grant awards, the overall number of publications and grant awards seems appropriate for the department. Given the size of the program, however, WSU has a considerably higher ratio of students per faculty member than regional peer institutions.

Student outcomes and student needs: There was a considerable jump between CY 2003 and CY 2004 in the number of master's degrees conferred. Numbers of degrees from 2004 on are double those of 2003 and earlier. This, plus the changes in Program Educational Objectives at the same time, suggests a significant change in program that seems to be working. No change in the number of Ph.D.'s conferred seems to have taken place. Given the strong connection between the ME profession in terms of exams, requirements, and business requirement, it seems that the program is adequately monitored and is meeting the requirements of the stakeholders. The rate and cost effectiveness of the program are appropriate and serve the Wichita community well, in addition to some graduates assuming positions in global markets.

Summary/Recommendations: It was difficult to separate some of the statistics of the undergraduate program from those of the graduate component so specific needs are hard to assess. In spite of the high numbers of students per faculty member, the program seems to be accomplishing its mission. Statistics do not raise any major concerns. It is recommended that additional faculty be added to the program to support the continuing demand for quality teaching and research. Today's economy may further erode grant support, putting increased pressure on all faculty to devote time to securing external funding that will keep the program facilities and faculty on the leading edge.

Submitted by Abu Masud, Associate Dean of the Graduate School
Approved by the Graduate Council on November 20, 2008

KBOR Program Review

Department of Mechanical Engineering

Wichita State University

2008

Table of Contents

1. A statistical overview of relevant departmental data

Data from FY 2002 to 2008 as prepared by the Kansas Board of Regents (KBOR) Program Review Information System is presented in Appendix A. Please note that one faculty member was on leave without pay for 2008, thus the work load for the individual faculty members increased.

2. A statement that describes how the program relates to the mission and role of the college and university

Vision and Mission

The vision and mission of the Mechanical Engineering Program are in line with those of the College of Engineering and the mission of Wichita State University. These are presented in Appendix B for comparison. The program is designed and geared to produce engineering graduates who can practice their profession within the metropolitan area and beyond. The engineers of this program will have gained broad education that will contribute toward the development of the larger metropolitan area and the larger community of Kansas, which are also the basic mission of the university. The program aims to impart educational and cultural tools necessary for the engineering profession in today's globalized industry.

WSU Mechanical Engineering Department Vision

The Mechanical Engineering (ME) Program will be nationally and internationally recognized for outstanding education and research.

WSU Mechanical Engineering Department Mission

The Mechanical Engineering Program at Wichita State University is committed to the following:

- Providing students with a broad mechanical engineering education.
- Helping advance the mechanical engineering profession.
- Contributing toward the economic development of the state of Kansas.

Objectives

The new Program Educational Objectives (PEOs) of the Mechanical Engineering Program, as adopted by its constituents in fall 2006 and currently followed by the program, are as follows:

- PEO-1: Educate students to be successful mechanical engineers in their professions in a global environment.
- PEO-2: Prepare students to pursue life-long learning.
- PEO-3: Prepare students for real-world problems by working on industry-based projects.

The PEOs of the Mechanical Engineering Program are consistent with the vision and mission of the College of Engineering (CoE). Aiming to produce successful mechanical engineers in a global environment, they are in tune with the CoE's mission of producing engineers capable of working in metropolitan area industries. Wichita and Kansas industries are increasingly involved in global collaboration and design activities. The program's graduates, with their industry-based project experience and their life-long learning qualities, play an important role in fulfilling the mission of the university and the CoE, which places emphasis on regional development and growth through education,

research, and service. The new PEOs are available on the Department of Mechanical Engineering's web page (www.wichita.edu/mechanical), are included in the information sent to potential students, and will be published in the next WSU undergraduate catalog (www.wichita.edu/catalog).

The pre-2006 Program Educational Objectives are as follows:

- PEO-1: Prepare students for employment as mechanical engineers.
- PEO-2: Enable interested students to pursue graduate education.
- PEO-3: Utilize the unique opportunities of a metropolitan location to provide graduates with industry based project experiences.

Students that joined the program prior to fall 2006 will have studied under the old PEOs. Any students who have joined or will join the program in or after spring 2007 will study under the new PEOs exclusively. Therefore, the full impact of these changes will not be realized until these latter students graduate beginning in 2011. Since the graduates prior to 2007 were primarily educated under the 2006 PEOs, much of the data in this program review is based on these older PEOs.

At the graduate level, the Master's program provides the students with an opportunity to advance their undergraduate education to a more mature level of understanding. It also provides them with an introduction to engineering research. An individual's curriculum can be designed to serve his/her specific needs and career objectives. The degree of Doctor of Philosophy recognizes a candidate's high achievement in research and his/her original contribution to the advancement of knowledge in the area chosen, the results of which are compiled in a dissertation and presented in an oral defense to the members of the academic community and published in reputed technical journals. Currently, several areas of specialization exist both at the Masters and Doctoral level in Mechanical Engineering. These include:

- Thermal/Fluid Engineering
- Mechanical Systems Analysis and Design
- Robotics and Control
- Materials Science and Engineering

3. A statement that analyzes the quality of the program as assessed by the strengths, productivity, and qualifications of the faculty

Currently the Department has eleven full-time tenure/tenure track faculty members. All faculty members have Ph.D. degrees in appropriate disciplines for their area of specialization. Nine of the eleven faculty members have Graduate Membership with Dissertation Chairing or Co-Chairing status. Graduate status for the remaining faculty is being pursued. The undergraduate and graduate Mechanical Engineering Programs consist of four stems: (1) Energy and Thermal/Fluid Sciences, (2) Robotics and Control, (3) Mechanical Systems Analysis and Design, and (4) Materials Science and Engineering. The number of faculty positions shows a well-balanced distribution among these four areas. There are four faculty members with specialties in the Energy and Thermal/Fluid Sciences area, including Alternative Fuels and Fuel Safety; non-Newtonian and Viscoelastic materials; Bio-Fluids and Bio-Heat Transfer; Computational Fluid Dynamics and Heat Transfer. Two faculty members have specializations in Robotics

and Control, including biosensors and biomedical devices; and non-linear control. Three faculty members have specializations in Mechanical Systems Analysis and Design, including Vehicle Crashworthiness and Impact Dynamics; and Acoustics. Two faculty members have specializations in Materials Science and Engineering, including Composites Processing; Nano- and Bio-Composites; and Nanotechnology. As per Table 3.1, the ranking and age group distributions of faculty show a reasonable spread as well. Each semester there are a small number of courses that are taught by highly qualified adjunct professors from the local industry. These individuals all hold a Doctorate at minimum and are carefully chosen, usually from Industry. The qualifications and affiliations of our adjunct professors are shown in Table 3.2.

Table 3.1 Faculty Analysis

					Years of Exp			Total # of Pub	
Name	**Age**	**PhD Degree**	**Rank**	**Area of Expertise**	**Govt/ Ind**	**Acad**	**WSU**	**Refd Jour**	**Conf Proc**
I. Ahmed	45	Texas, Austin '97	Assoc Prof	Computation, Fluid Dynamics, and Heat Transfer	1	11	8	6	11
R. Asmatulu	40	Virginia Tech, '01	Assist Prof	Nanotechnology, Materials Science	3	3	2	20	30
B. Bahr	53	Wisconsin-Madison '88	Prof	Robotics, Manufacturing, and Mechatronics	2	18	20	17	50
B. Driessen	39	Georgia Inst of Tech '96	Assist Prof	Controls and Dynamics, Robotics	6	6	4	23	33
D. Koert	51	Drexel '90	Assoc Prof	Thermodynamics, Combustion and Fluid Mechanics	1	17	15	2	2
H. Lankarani	48	Arizona '88	Prof	Mechanical Design, Crashworthiness, Biomechanics	1	20	19	46	121
B. Minaie	46	Minnesota '90	Assoc Prof	Polymer Composites and Nano-composites	0	7	4	5	8
TS. Ravi	52	Iowa State '91	Prof	Energy Conservation, Biothermal Applications	5	19	17	15	24
D. Siginer	62	Minnesota '82	Prof	Fluid Mechanics, Non-Newtonian Fluids, Rheology of Bio-Fluids	0	35	8	62	120
K. Soschinkse	50	WSU '97	Assist Prof	Capstone Design, Mechanical Measurements and Acoustics	20	4	4	1	6
G. Talia	64	Case Western Reserve '80	Prof	Materials	12	30	23	65	80

Table 3.2: Education and Affiliations of Adjunct Professors

Name	Degree	University	Year	Affiliation
Dwight Buford	Post Doc	Colorado School of Mines	1987	NIAR
Saeed Cheema	PhD	WSU	2001	Cessna
Sang Lee	ScD	George Washington University	2006	Spirit AeroSystems
Michael McCoy	PhD	WSU	2003	Spirit AeroSystems
Hussain Al-Ghanem	PhD	WSU	2006	Pulse Systems, Electronic Health

				Record
Ali Youssef	PhD	WSU	1995	
Julie Turner	PhD	Louisiana State University	1989	LearJet
Indranil Dandaroy	PhD	University of MO, Rolla	1999	Hawker Beach
Nathaniel Reynolds	PhD	Florida State	1986	Spirit AeroSystems

Direct involvement in fundamental research allows faculty to bring firsthand knowledge of state-of-the-art industry techniques and equipment into the classroom. Faculty members are encouraged and committed to conducting research and publishing their research findings in leading journals, conference proceedings, and other scholarly publications. Over half of faculty members also act as reviewers or editors for scholarly journals. The Department believes these scholarly pursuits are an integral part of faculty productivity and allows the strength and qualifications of our faculty members to continuously grow. The productivity of the faculty is evident from the quality and quantity of the publications the faculty have produced in the recent years. Publication data for individual faculty is shown in Table 3.1 and department wide data for the past five years in Table 3.3. Faculty are also very active in pursuing research funding by submitting research proposals to regional, state, and federal agencies. Table 3.4 shows the total and average number of proposals submitted, number of proposals awarded, and amount of research funding awarded for the past five years.

Table 3.3 Publication/ Presentation Productivity

		CY03	CY04	CY05	CY06	CY07	Avg
Faculty Head Count		8	10	10	11	11	
Refereed Journal Publications	**Total**	14	6	14	16	10.3	12.1
	Per Faculty	1.8	0.6	1.4	1.5	0.9	1.2
Conference Proceedings Publications	**Total**	13	20	27.3	29.5	18.6	21.7
	Per Faculty	1.6	2	2.7	2.6	1.7	2.1
Other Presentations	**Total**	43	60	65.6	72.5	58.6	59.9
	Per Faculty	5.4	6	6.6	6.6	5.3	6

Table 3.4 Summary of Grant Activity

	FY 2003		FY 2004		FY 2005		FY 2006		FY 2007	
	Total	**Per Fac**	**Total**	**Per Fac**	**Total**	**Per Fac**	**Total**	**Per Fac**	**Total**	**Per Fac**
# Submitted	55	6.9	44	4.4	32	3.2	48	4.4	52	4.7
# Accepted	38	4.8	28	2.8	20	2	24	2.2	17	1.5
$ Awarded in Thousands	1945	243	1136	116	2249	225	1243	113	1788	163

The strength of faculty can also be seen from the awards and recognition they have received during the past years, both internally and externally. A small selection of the awards and honors Mechanical Engineering faculty members have received in the past five years include:

- Recipient, Polished Professor Award, College of Engineering: 2004, 2005, 2006, 2007
- Recipient, Excellence in Research Award, Wichita State University: 2007
- Recipient, Dwane and Velma Wallace Outstanding Educator Award for Excellence in Teaching, College of Engineering: 2005
- Recipient, Dwane and Velma Wallace Outstanding Educator Award for Excellence in Research, College of Engineering: 2008
- Fellow, AAM: elected 2006
- Fellow, American Society of Mechanical Engineering: 2005
- Fellow, Boeing Company: 2004, 2005, 2006

In conclusion, the quality of the Mechanical Engineering program is excellent as assessed by the strengths, productivity, and qualifications of the faculty. In 2007 the Mechanical Engineering Department was fully reaccredited by the Engineering Accreditation Commission (EAC) of the Accreditation Board for Engineering and Technology, Inc. (ABET). This further affirms the quality of the program and the strengths, productivity, and qualifications of the faculty.

4. A statement that analyzes the quality of the program as assessed by the regularly offered curriculum and the effect of the curriculum on the students

The quality of the undergraduate program is certified, in part, by ABET. The Mechanical Engineering Department recently underwent an accreditation review during the 2007-2008 academic year and received full accreditation from ABET. The curriculum is designed to provide students with a necessary background in math and sciences, fundamental concepts in energy, mechanics, material behavior, and design. The curriculum also provides the students with the necessary techniques and principles of applying their basic knowledge to engineering practice. The curriculum is constantly evolving and the present program is a further enhancement of an already excellent curriculum.

The Department of Mechanical Engineering fully utilizes all available tools to prepare its students for engineering practice. The curriculum requires a student to begin with necessary basic math and science courses to enable them to meet today's global economy and interdisciplinary engineering needs. Next, students take fundamental engineering courses, such as Statics, Circuits I, Thermodynamics I, and Computer Applications. Basic courses in the energy and design stems of mechanical engineering lay the necessary foundation in mechanical engineering. During their junior and senior years, students take intermediate and advanced design courses. The Capstone Design course is meant to be the final experience, in which all skills acquired by the student throughout the curriculum are utilized and tested through actual industry-sponsored design projects. The curriculum requires seven electives, including thermal system design and mechanical engineering design, which provide the opportunity for students to specialize in various fields such as Business, Biology, Manufacturing, or Aerospace. The faculty continuously improves the program based on feedback from graduating seniors, alumni, the Industrial Advisory Board, as well as by following regional and national trends.

The mechanical engineering graduates are uniquely prepared for the engineering profession through their general education requirements. To enable them to succeed in today's culturally diverse global

society, the students are required by the University to take a certain number of courses in Social and Behavioral Sciences, Fine Arts, and the Humanities. All engineering students are required to take an Engineering Ethics course (Philosophy 385) to learn about the importance of ethics in design and manufacture of engineering products and their relevance to the engineering decision making process. The mechanical engineering curriculum is designed to ensure the stated outcomes through due emphasis on issues and principles of statistics and ethics throughout the program.

ME Department's programs and efforts are influenced by the concentration of technology-oriented industries in the Wichita area. Particular attention is given to scheduling classes so that engineers employed by local industry may pursue a graduate degree in mechanical engineering. The Mechanical Engineering Graduate Program offers courses of study leading to the Master of Science (MS) and Doctor of Philosophy (PhD) degrees. The Master's program provides the students with an opportunity to advance their undergraduate education to a more mature level of understanding. It also provides them with an introduction to engineering research. The curriculum can be designed to serve the student's specific needs and career objectives. The degree of Doctor of Philosophy recognizes a candidate's high achievement in research and original contribution to the advancement of knowledge in the area chosen, the results of which are compiled in a dissertation and presented in an oral defense to the members of the academic community.

The department adopts a number of assessment tools to determine if the curriculum is producing its desired outcomes. Copies of the assessments and graphs of the most recent results can be found in Appendix C. The feedback provided by these tools is used in refining the curriculum constantly to ensure the success of the program educational objectives presented in Section 2.

The philosophy behind the Mechanical Engineering Department's assessment program is simple: the belief that data is an indispensable aid to decision making in order to continuously improve the program. The assessment tools used are listed as follows.

- The ME Senior Exit Survey on Classes and Senior Exit Survey: quantitative
- The ME Senior Exit Interview (Industrial Advisory Board): qualitative
- The Comprehensive Exit Exam (CEE): quantitative
- The Alumni Survey: primarily quantitative data, some qualitative
- Senior Project Evaluations: quantitative
- Graduate Program Survey: qualitative

These assessments are collected and analyzed to identify potential weaknesses and concerns with the program. Corrective actions are discussed and implemented. The summary of concerns identified through these assessment tools and actions taken to correct these concerns are outlined below.

Table 4.1. Concerns and Corrective Actions Identified

Identified Weakness	Actions To Correct Weakness 2001–07	Persons Involved 2001–07
Awareness of Safety Issues (ABET Assessment Committee)	Safety will be emphasized in all labs starting in ME 251 and in all junior/senior labs and projects. Also, seminars will emphasize safety issues.	Chaudhuri (previous chair), Talia, all faculty (junior/senior labs/projects)
Drawing Skills	Engineering graphics will place more emphasis on design drafting and tolerancing. This was already proposed during earlier program faculty meetings. Two other upper-level ME courses will further reinforce these concepts and provide practice for the students.	Bahr, Soschinske, Lankarani (quality and reliability in machine design)
Attention to Details of Project including Communication and Reports	Neatness, completeness, and clarity of solutions in all courses will be emphasized. This will provide practice and reinforce their importance to students.	All faculty, (all design courses)
Realistic Expectation of Technology and/or Tools in Workplace	Various design issues and associated issues on manufacturing, safety, and ethics will be discussed with students. Students should consider the aspects of preventing loss of life and property at the workplace.	All faculty (all courses)
Professionalism (Ethics, Societal Issues, Sustainability, and Teamwork)	Soschinske will emphasize and work on these issues in the senior capstone design course. Bahr will include these issues in ME 450 Special Topics and expose students to manufacturing methods and societal issues.	Soschinske, Bahr, design/lab instructors
Computer Tools	Evaluate program requirements, replace Java with MATLAB, introduce Office Tools and Linear Algebra	Ravi, Bahr
Component Design/Composite and Nanocomposite	Search committee hired a new design faculty (Dr. Minaie)	Design Committee
Measurement/ Instrumentation and Controls	Search committee hired a new faculty (Dr. Driessen)	Design and Thermal Committee
Materials Engineering And Nanotechnology	The Search Committee hired a new faculty (Dr. Asmatulu)	Material search committee
Lack of outside Department Elective	The Department has included three electives from Engineering, Liberal Art and Sciences, Business school, and a maximum of three hours coop education as electives. By doing so the curriculum now requires 134 for graduation.	Mechanical Engineering faculty, IAB, and Student Advisory Board

Table 4.1. Concerns and Corrective Actions Identified (cont)

Lack of Honor Program in the ME	The Department has developed an honor track for the outstanding student in the department.	All faculty, IAB, and Student Advisory Board
Lack of Mechanical Engineering Minor	The department has developed a Mechanical Engineering Minor program for other Engineering Programs	All Faculty, IAB
Inadequate Laboratory Experiences	The Mechanical Engineering has collaborated with Wichita Area Technical College to use their laboratories such as the Welding, Machine shop, and Composite. The Department has spent more than $200,000 towards the Materials laboratory enhancement. The Department has initiated the development of an undergraduate nanotechnology laboratory in 2008.	Bahr and Laboratory Committee
In adequate technician support for the laboratories adversely is affecting the course delivery and that will of great concern for the ME ABET	The Lack of Technician support has adversely affected the delivery of the laboratory teaching. This issue has been raised in the department meetings and the problem has been communicated to the Dean.	All faculty, Chari and the Dean

The ME Senior Exit Survey on Classes and Senior Exit Survey (Appendix C.1)

The Mechanical Engineering Program Senior Exit Survey of the overall program is a confidential survey given to the ME 662 Capstone Design class. Students are instructed to omit their names on the form for purposes of anonymity. A portion of the survey (Figure C.1.1), seeks input on four areas related to the program: Amount of Learning, Quality of Instruction, Workload, and Course Value. Students are asked to rate their classes using these four categories. The category "Amount of Learning" is described to students as "learned material that was useful for understanding more advanced classes or was useful to you as an educated citizen and a competent engineering professional." The rating scale is from 1 to 5, with 1 identified as "didn't learn anything new," 3 identified as "learned an average amount of new material," and 5 identified as "learned a lot." The category "Quality of Instruction" is described to students as "the instructor was well prepared, organized, skillful, innovative, fair, and knowledgeable about the subject." The rating scale is from 1 to 5, with 1 identified as "definitely not," 3 identified as "average," and 5 identified as "excellent." The category "Workload" is described to the students as "hours required for this class in preparation, reading, homework, projects, etc., compared to your other college classes." The rating scale is from 1 to 5, with 1 identified as "way below average," 3 identified as "average," and 5 identified as "way above average." The category "Course Value" is described to students as "the course materials are of high quality, appropriate for the stated course objectives and are up to date." The rating scale is from 1 to 5, with 1 identified as "poor," 3 identified as "average," and 5 identified as "excellent." Scores for Amount of Learning from 2002-2008 are presented in Figure C.1.4. Overall the score indicate student satisfaction with the program. However, some problem areas

can be identified through trends over the years. For example, ME 325 Computer Applications shows increased scores in 2003 and 2004 but then drop again for 2006 and 2007. Faculty members are currently identifying what changes occurred in the course and evaluating the best course of action to improve its effectiveness.

The survey also allows students to give feedback on a variety of issues concerning their educational experience at WSU (Figure C.1.2). Student concerns are discussed in faculty meetings, and corrective actions are taken. An additional questionnaire (Figure C.1.3) deals with the evaluation and recommendations for improvement of various topics based on concerns during the period in which the student has been in the program. This feedback is then conveyed to the appropriate faculty for corrective action if needed. Feedback from these evaluations identified dissatisfaction with the quality of laboratories and equipment. Additional funds have been allocated for the purchase of new equipment as well as the care and upkeep of current equipment. The department has also developed collaboration with Wichita Area Technical College which allows ME students access to laboratories equipped with machining, fabrication, and welding equipment without the need to duplicate this equipment within the department.

Senior Exit Interview (Appendix C.2)

The Senior Exit Interview was designed to be open-ended, whereby students are encouraged to discuss the program freely with Industry Advisory Board (IAB) members. Each student is interviewed alone and independently with full confidentiality. IAB members submit a report (figure C.2.3) and discuss the students' views in the joint IAB-ME faculty meeting that is usually held soon after the interview and following the senior design presentation at the end of the semester.

Albeit subjective, the program faculty considers this a very valuable tool as it provides an indication of what is important for one of the primary constituents. The faculty considers the views and results expressed and passed on by the IAB when formulating any changes to the future curriculum and program.

Comprehensive Exit Exam (Appendix C.3)

Students in the program are strongly encouraged to take the Fundamentals of Engineering (FE) Examination administered by the National Society of Professional Engineers (NSPE). However, program faculty observed that many senior students did not take the FE Exam. In order to assess the outcomes more reliably, the faculty decided in spring 2004 to offer a mandatory Comprehensive Exit Exam (CEE) for senior students as part of the capstone design course. This exam consists of 60 questions covering the entire mechanical engineering core and design courses. It provides an independent assessment of Program Outcomes. Analysis of results (figure C.3.1) leads to important changes in the curriculum. For example, low scores in HVAC identified a need to increase the frequency of offerings.

Alumni Survey (Appendix C.4)

College of Engineering alumni have been identified as an important constituent for assessment of the engineering programs. Accordingly, the College decided to develop an Alumni Survey, the results of which can be used to aid the faculty's decision-making process for assessing the effectiveness of educational programs. Recent results (figure C.4.2) indicated that ratings on global awareness, ethics

and professionalism, social and economic considerations in design problems, and laboratory experience needed closer attention. This was a contributing factor to the development of the new PEOs outlined in Section 2 with an emphasis on global awareness.

Senior Project Evaluation (Appendix C.5)

Each semester, all capstone design projects are evaluated by project sponsors and the instructor. The instructor summarizes the evaluation results and forwards this information to the ME faculty. The capstone course evaluation is a composite exercise consisting of assessment by the instructor, CEE, industry sponsors, and peer evaluation. The average scores of various outcomes in the capstone design course are determined using the rubrics shown in Figure C.5.1. These rubrics are used by both the instructor and the industry liaison in evaluating the various team projects.

Graduate Program Survey (Appendix C.6)

The Graduate Program Survey is a three page survey administered by the Graduate School. Students are required to complete the survey within four weeks of the beginning of their graduating semester when submitting their degree card. The survey asks the student to evaluate the departmental graduate program as well as the Graduate School, libraries, and financial support (Figure C.6.1). The program analysis includes information on faculty and staff, courses, academic and research advising, and technology. This survey provides important data that allows the department to evaluate the effectiveness of courses and indicates potential problem areas that need to be addressed to give students the best possible education. There is an internal Graduate Survey currently under development to provide more detailed information on potential problem areas (Figure C.6.2). This survey is completely anonymous. There is also an open comment section provided to gain insight into student opinions and concerns that are not directly evaluated. Results (table C.6.1) indicate a need for betting advising, more graduate level classes, and better technology. The department is discussing options for addressing these issues in the future.

5. A statement that addresses student needs, employer demands, and how well the program prepares the students for their goals.

The ME Program has been designed and revamped such that mechanical engineering students receive design experience throughout the curriculum. The importance of design and the application of basic concepts to design are emphasized in various fundamental thermal-fluid, material, and design courses. The ME Program requires students to take one mechanical design elective and one thermal design elective, which enable them to appreciate the intricacies of design. In these courses, students are split into teams. Each team is required to do a group project and write a professional report. They further enhance their design experience through courses such as ME 639 Applications of Finite Element Methods in Mechanical Engineering, ME 637 Computer-Aided Engineering, and ME 541 Mechanical Engineering Design II, among others. Thermal design electives include ME 544 Design of HVAC Systems and ME 631 Heat Exchanger Design. The design experience that students receive deals with practical problems and illustrates the importance of cost estimation, use of software, analytical skills, and performance analysis.

During the junior and senior years, mechanical engineering students are required to do a group project, write a professional report, and write an ethics and safety paper in various design courses. The objective is for the students to understand and disarm the "realistic constraints" in design problems. Students address various constraints including economic, global, safety, environmental, and sustainability. Students are expected to initiate and develop their own project design topic in that subject area in consultation with the instructor. They are expected to meet every week, submit weekly minutes, and plan, design, analyze, and finalize the design along with a cost analysis and an analysis of ethical, safety, and global issues. The goal is for students to become familiarized with design concepts and analysis, to develop team project skills, and prepare for ME 662 Capstone Design during the final semester.

Students receive major design experience through two required thermal and mechanical design courses, two laboratory courses, and the Capstone Design course. Most students also receive further design experience in the other two design electives. Since 2005, the department encourages students to take an outside elective course to enhance their interdisciplinary background and cross-application of mechanical design.

The Capstone Design course continues to be the ultimate test for students. This course is continuously revamped with input from Professional Organizations and Industry. Starting with AY 07, this course will be coordinated by a mechanical system and a thermal system faculty member. The course has further been strengthened by industry projects, continued consultation with industry liaisons, and assessment by industry liaisons and other non-faculty industry observers. Students use Wichita Area Technical College (WATC) facilities, which have made this course a vibrant capstone course, one in which the students are provided an opportunity to apply almost everything they have learned throughout their curriculum.

Senior Capstone Design, ME662, is required of all mechanical engineering undergraduate seniors in their last semester of study. In this course, students work in groups of three to four on projects suggested by area industries. In addition to suggesting a project, the sponsoring firm assigns an engineer to work with each group and to evaluate the results. This evaluation plays a major part in the final grade assigned to students. Acceptable projects for the course range from conceptual studies to final detailed designs and prototype construction. Students are also expected to consider the "realistic constraints" posed by construction, global, safety, environmental, and sustainability issues. Students are assigned to projects at the beginning of the semester. They are responsible for contacting the project sponsor and setting up a meeting to determine the requirements and objectives of the sponsor. They must work with the sponsor to define carefully the scope of the project, the project deliverables, and a timeline for completing important steps. Progress is reported to the course instructor in the form of scheduled written and oral reports, which must be submitted throughout the semester. Group members are required to make a final presentation of their work in a multimedia environment to industry sponsors and faculty. Students are expected to use proper planning, design concepts, interaction with industry engineers, and presentation skills—characteristics that are expected in any professional engineer.

In addition to the rigorous curriculum, students are prepared through integration of their various skills, through extracurricular design projects, industry and internship experiences, and competition/participation in the WSU-Undergraduate Research Forum (WSU-UGRF) and other regional

professional conferences. Students are well prepared with a strong foundation of math and physical sciences and core engineering principles, followed by design concepts and their application to practical open-ended design problems in several courses. With a view toward improving retention, prerequisite exams and tutorial programs have been introduced. Students also participate in the student branch of various professional organizations such as the American Society of Mechanical Engineers (ASME), the Society of Automotive Engineers (SAE), and the Society of Women Engineers (SWE).

Addressing Student Needs Specific to WSU Community

For geographical as well as traditional reasons, an overwhelming majority of WSU ME graduates find employment in the aviation industry based in Wichita. It is important to note that a significant portion of our students are local employees returning to school for a baccalaureate degree after a few years of experience on their jobs. Therefore, most of our students have a very clear idea about their educational needs and objectives, and have their plans of study laid out well ahead of graduation. For these same reasons, more than half of our students are not only non-traditional, but are also part-time students who have to balance unyielding demands on their times from their employers, from their personal family responsibilities, and a typical engineering course load. Figures 5.1-5.3 illustrate the relatively high proportion of part time students in the WSU Mechanical Engineering programs, especially when compared with similar programs at other Universities. On the other hand, many of the traditional students take up part-time employment with the local companies as Co-op students, which helps them pay for their college expenses while receiving on-the-job-training. This program not only enhances the students' learning experience but also contributes to their course credit hours.

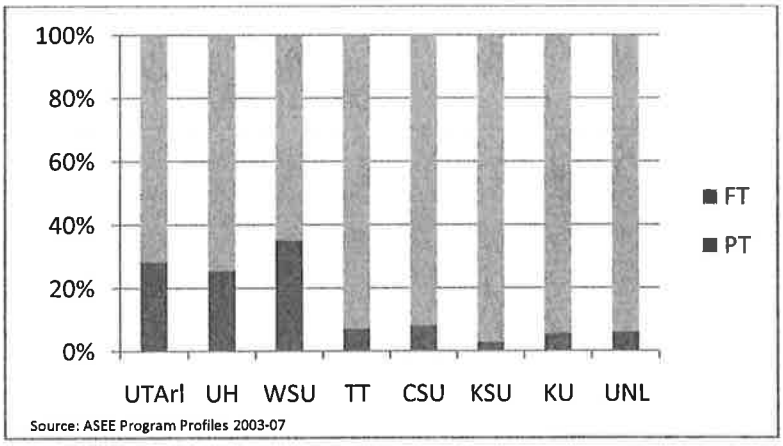

Figure 5.1: Percentage of Undergraduate Enrollment by Student Status, 2003-07 Average

(UTArl: University of Texas at Arlington, UH: University of Houston, WSU: Wichita State University, TT: Texas Tech University, CSU: Colorado State University, KSU: Kansas State University, KU: University of Kansas, UNL: University of Nebraska at Lincoln)

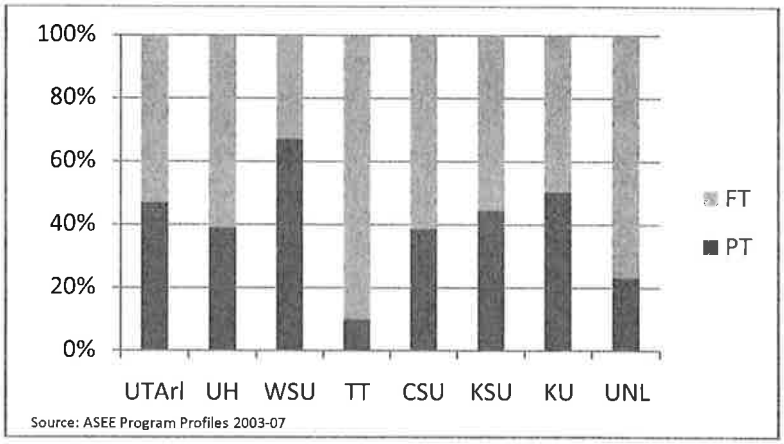

Figure 5.2: Percentage of MS Enrollment by Student Status, 2003-07 Average

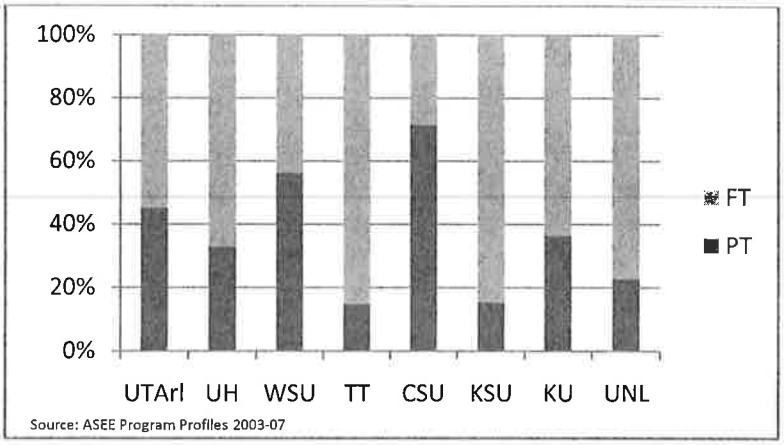

Figure 5.3: Percentage of PhD Enrollment by Student Status, 2003-07 Average

The ME department at WSU, in accordance with its mission statement, strives to provide its students with their unique circumstances with a schedule that is flexible enough and yet designed for ensuring course completion within a reasonable length of time. For most of the required common courses, two sections, one in the morning and another in the evening, are offered. In case there is not sufficient enrollment to justify two sections (such as those offered every semester, and those taken by only ME students), evening classes are offered every alternate semester. In all, laboratory and lecture sessions are offered in a staggered manner so that a part-time student taking two courses (six credit hours) per long semester can take almost all his/her courses in the prescribed sequence in the evenings. For the few courses that cannot be offered in the evenings for various logistical reasons, fortunately, the local employers recognize the situation and allow their employees time for attending one class during the normal working hours.

In addition to its highly qualified full-time faculty WSU ME department also draws its adjunct faculty from a local pool of professional engineers of exceptional caliber. Each semester, a number of these adjunct faculty members teach a variety of undergraduate as well as graduate courses, including the Capstone Design course mentioned above. Therefore, WSU ME students get a unique opportunity of learning about standards and practices prevalent in the profession from its very practitioners.

Formal mechanisms for addressing specific students needs also exist in the ME department at WSU. In addition to continuous feedback from the students to the respective course instructor as well as to the Department Chair, an Exit Survey is administered to every student in his/her final semester. The data generated through these surveys are regularly reviewed and used for continual improvement of faculty performance as well as for upgrading equipment and facilities in the laboratories and information technology services.

Employer Demands: As indicated above, a majority of WSU ME graduates get absorbed locally. Naturally, the ME department's mission and strategies reflect the demands and needs of the professional engineering community of such major companies as Boeing, Spirit AeroSystems, Cessna, Hawker-Beechcraft, Bombardier-Learjet, and Koch. In addition to the aircraft companies, there are a number of locally owned large and small engineering consultancy and service firms such as MKEC and PEC. Other major equipment manufacturing companies include CASE-New Holland and Coleman. A number of smaller manufacturing companies supply very specialized components for the aircraft companies in town as well as automobile companies nationwide. Hiring managers from these companies, some of whom are WSU ME alumni, maintain close ties with the department and keep the faculty aware of their specific needs as well as of trends in the industry in general.

A formal mechanism of seeking and receiving employer feedback also exists in the WSU ME department in the form of its Industry Advisory Board. This Board is made up of about ten professional engineers representing various local industries. The ME faculty and Chair meet with this Board once a semester (twice a year). Recommendations made by the Board members are discussed and adopted for implementation; follow-up is provided for recommendations adopted in the past. The Board members are also invited to, and typically attend, the Final Project Presentations for the Senior Capstone Design Course.

6. A statement that describes the service the program provides to the discipline, the university, the metropolitan area or Kansas, and others as appropriate

The WSU ME department is made up of an active group of faculty each of whom is engaged in high quality research in his individual field of expertise. In addition to carrying a standard load of instruction and supervision of Master's as well as Doctoral students, the faculty members regularly take part in all of the policy-making bodies at the College (of Engineering) level as well as at the University wide level. ME faculty members also serve on thesis and dissertation committees outside the department. Furthermore, WSU ME faculty members regularly participate in various forums at the national and international levels for presenting their research findings. Peer review work is performed by faculty members for the foremost journals and conferences in their respective fields. Sponsors of externally funded research include NSF, NASA, DoD, DoE, and FAA.

Other indicators of service by WSU ME faculty to their discipline include (all information presented here is based on records of last five years): (i) Editorships of multiple international journals; (ii) Organization and Chairing of Conference sessions for professional organizations at the national and international levels; (iii) Membership in ASME, SAE, FAA, and IEEE Technical Committees; (iv) Organization and

conducting of Technical Workshops and Short Courses for the professional engineers; and (v) Consultancies for the industry and national laboratories.

Service by WSU ME faculty to the College and University community include (i) Membership in a number of University Senate Committees; (ii) Chairing of the Information Technology communication network (LAN) committee; (iii) Chairing of the University Radiation Safety Committee; (iv) Membership in the University Curriculum Committee; (v) Tenure and Promotion Review Committees, and (vi) Membership in the University Honors Committee.

The WSU ME department offers three "service" courses to the students in the College of Engineering. These are (i) ME 250: Introduction to Materials Science and Engineering, with its laboratory, ME 251; (ii) ME 398: Thermodynamics I; and (iii) ME 521: Fluid Mechanics. The first is required for all engineering majors except Electrical and Computer Engineering. The second is required for all WSU engineering majors, while the third is mandatory for ME and Aerospace Engineering majors only.

Service to the metropolitan area by the ME program is provided in a number of ways and at different levels. Faculty members regularly hold various positions in the offices of ASME, SAE, and Tau Beta Pi at the local and regional levels. ME faculty have acted as Judges in the LEGO-MIND competition, a program held under the joint leadership of WSU College of Education and the College of Engineering for attracting local middle school students toward the study of science, mathematics, and engineering. ME faculty have also been active in the Wallace Scholarship Invitational, where the best of Kansas' High School graduates are recruited to the College of Engineering. The ME faculty regularly act as judges in the Engineering Open House, where all students in the College of Engineering get an opportunity to showcase their talents once a year.

The ME department also sponsors the national ME honor society, Tau Beta Pi, as well as the Student Sections of Society of Automotive Engineers (SAE), Society of Manufacturing Engineering (SME), and American Society of Mechanical Engineers (ASME). Faculty members act as Advisors to these Student Chapters, maintain liaison with the state, regional, and national level offices. The ME department also provides full support to the Baja SAE and Formula SAE projects. This is a competition wherein teams from engineering schools in the US as well as a few leading universities around the world compete with vehicles completely designed, fabricated, and test-driven by students.

7. An assessment of the program's cost effectiveness as measured by such matters as cost per credit hour, peer comparisons, and other indicators

Wichita State University's geographic location and proximity to Engineering related industry creates a unique opportunity for a low cost education combined with a close relationship with potential employers. The 2008 costs per credit hour for students are $138.15, $394.05 for Undergraduate Resident and Non-Resident respectively, and $192.05, $559.45 for Graduates. A comparison of the average tuition and fees from 2003-07 for similar Undergraduate and Graduate programs is presented in Figure 7.1. WSU is less expensive across the board, which points to the cost effectiveness of the program.

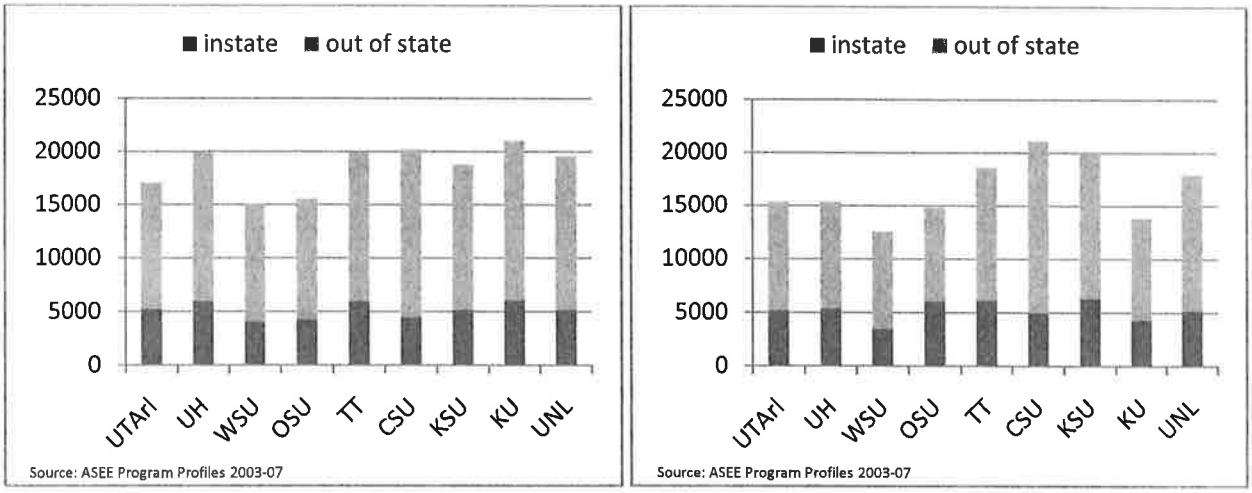

Figure 7.1 Undergraduate (left) and Graduate (right) Tuition and Fees, 2003-07 Average

The average cost of production per credit hour, using the statistics presented in Appendix A, is $274 averaged over the past 5 years. Furthermore the average cost per credit hour has decreased by $64 between 2004 and 2008 due to increased production of credit hours.

Another indication of the effectiveness of the ME program is evident through the strength of enrollment. It is seen in Figure 7.3, the average Graduate program enrollment is second only to the University of Texas at Arlington. When the enrollment numbers of Graduate (y axis) and Undergraduate (x axis) are plotted against each other (Figure 7.3) it is easily seen that while the average Undergraduate enrollment in the Mechanical Engineering program at WSU is lower than neighboring Universities, the program has a disproportionate number of graduate students. This is partially due to the number of returning students from local industry. Figure 7.4 shows the workload of the faculty due to graduate students and speaks to the efficiency of the ME faculty.

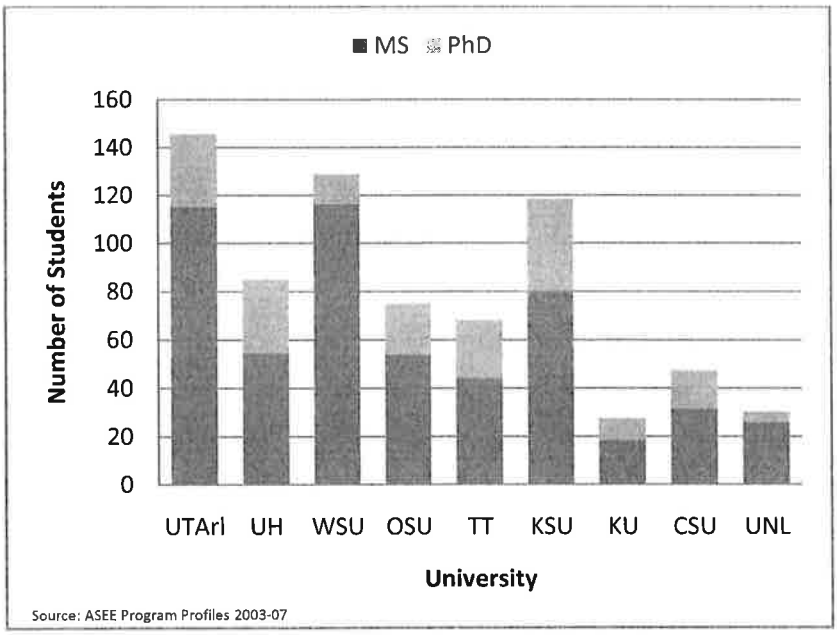

Figure 7.2: Graduate Enrollment, 2003-07 Average

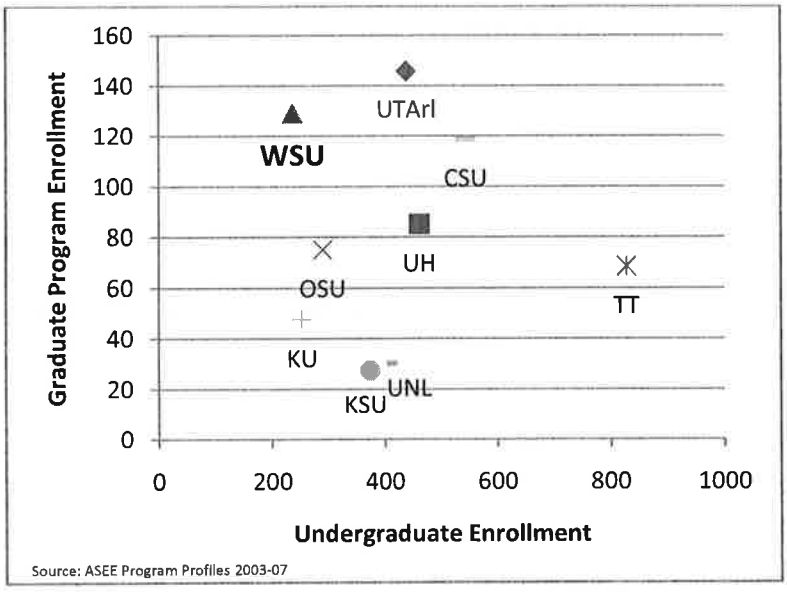

Figure 7.3: Graduate Program Enrollment Proportional to Undergraduate, 2003-07 Average

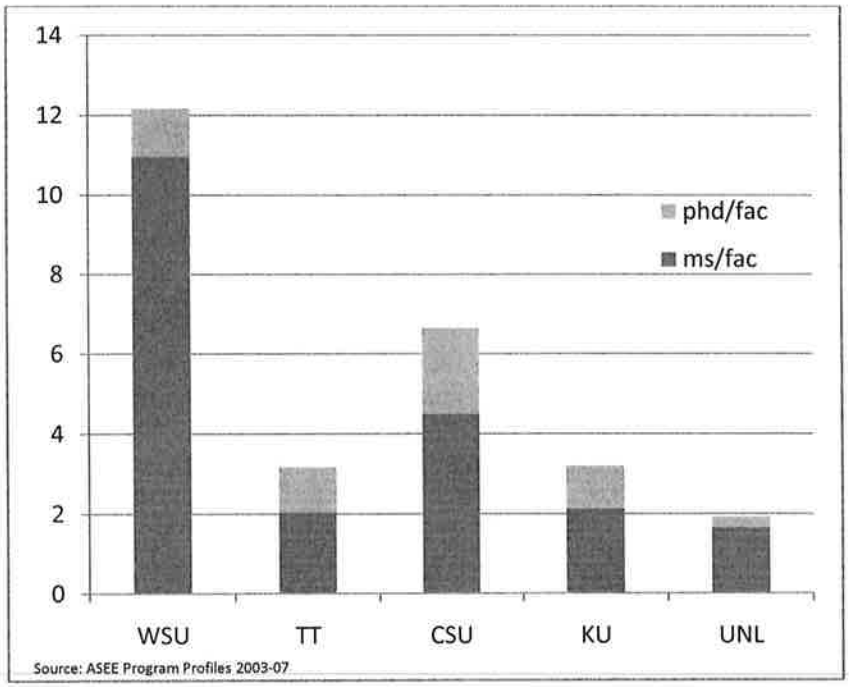

Figure 7.4: Graduate Students Per Faculty Member, 2003-07 Average

Appendix A. Mechanical Engineering Board of Regents Program Review

DESCRIPTION	2002	2003	2004	2005	2006	2007	2008
Section I: Part A: Academic Instruction Expenditures							
1. Salaries/Benefits	$877,259	$978,057	$1,141,450	$1,244,129	$1,223,048	$1,179,588	$1,187,571
2. Other Operating Exp.	$48,578	$69,677	$89,044	$51,109	$26,283	$30,639	$62,106
3. Total	$925,837	$1,047,734	$1,230,494	$1,295,238	$1,249,331	$1,210,227	$1,249,677
Section I: Part B: Student Credit Hour Production							
1. Lower Division	391	385	416	481	436	446	815
2. Upper Division	2,846	2,979	2,680	2,755	2,707	3,547	3,784
3. Masters	1,210	1,275	1,038	942	775	821	765
4. Doctoral	90	92	76	102	55	28	114
5.Total	4,537	4,731	4,210	4,280	3,973	4,842	5,478
Section I: Part D: Percentage of Departmental SCH taken by:							
1. Their Undergraduate Majors	46.6	46.8	46.8	45.3	54.3	54.3	60.2
2. Their Graduate Majors	33.9	34.8	32	34.9	26.4	16.6	17.2
3. Non-Majors	19.5	18.4	21.2	19.8	19.3	29.1	22.6
Section I: Part E: Departmental Faculty							
1. Tenured/Tenure Track Faculty Head Count	8	7	10	8	10	11	10
2. Tenured/Tenure Track Faculty with Terminal Degrees	8	7	10	8	10	10	9
3. Total Tenured Faculty	5	5	8	5	6	6	6
Total Instructional Faculty FTE in Department	8	8	10	10	10	11	10
Section I: Part F: Actual Instructional FTE							
1. Tenured/Tenure Track Faculty	6.87	7.2	9.43	9	10	10.59	10
2a. Instructor of Record (IOR)	3.43	3.21	2.51	1.32	1.48	2	3
2b. Not Instructor of Record	2.43	0	0.25	1.4	1.58	0.82	0.4
3. Other Instructional FTE	1.25	1.75	1.08	1.25	1.25	0.75	0.8
4.Total FTE	13.98	12.16	13.27	12.97	14.31	14.16	14.2
5. SCH generated by Tenured/Tenure Track Faculty	1,517.0	1,560.0	1,477.0	1,249.0	1,242.0	1,898.0	2,046.8
6. SCH generated by GTA's (IOR)	385.0	286.0	322.0	356.0	170.0	11.0	22.3
7. SCH generated by Other Instructional Faculty	351.0	477.0	330.0	350.0	363.0	156.0	315.0

8. Total SCH	2,253.0	2,323.0	2,129.0	1,955.0	1,775.0	2,065.0	2,384.1
9. Average SCH per Tenured/Tenure Track Faculty	220.82	216.67	156.63	138.78	124.20	179.23	204.68
10. Average SCH per GTA (IOR only)	112.24	89.10	128.29	269.70	114.86	5.50	7.43
11. Average SCH per Other Instructional Faculty	280.8	272.5714286	305.5555556	280	290.4	208	393.75
12. Average Overall SCH per FTE	161.16	191.04	160.44	150.73	124.04	145.83	167.89
Section II: Part A: Majors in the Discipline							
1. Freshmen/Sophomores (optional)	63	55	86	74	91	95	127
2. Jrs., Srs., 5th Year Majors	166	171	143	159	164	187	212
3. Masters	120	134	141	134	102	102	79
4. 1st Prof / Specialist / Certif.	0	0	0	0	0	0	0
5. Doctoral	15	13	12	17	13	11	13
Section II: Part B: ACT Scores of Undergraduate Jrs.,Srs							
1. Average ACT Composite	21.8	22.2	22	22.3	23.2	23.6	23.7
2. Low ACT	9	9	9	9	9	9	9
3. High ACT	33	33	30	32	34	34	34
4. Number Reporting an ACT Score	91	85	72	68	77	95	103
5. Percent Reporting ACT Score	54.82%	49.71%	50.35%	42.77%	46.95%	50.80%	48.58%
Section II: Part C: Degrees Conferred							
1. Associate	0	0	0	0	0	0	0
2. Baccalaureate	44	35	42	43	32	43	47
3. Masters	21	22	46	52	36	44	28
4. First Prof / Specialist / Certificate	0	0	0	0	0	0	0
5. Doctorate	4	3	1	3	4	1	0

Appendix B. Vision and Mission Statements

B.1 Wichita State University Mission Statement

During 1991-1992, the six universities under the Kansas Board of Regents were involved in the process of mission review and development, and the following mission statement for Wichita State University was developed:

Wichita State University is committed to providing comprehensive educational opportunities in an urban setting. Through teaching, scholarship and public service the university seeks to equip both students and the larger community with the educational and cultural tools they need to thrive in a complex world, and to achieve both individual responsibility in their own lives and effective citizenship in the local, national and global community.

High quality teaching and learning are fundamental goals in all undergraduate, graduate and continuing education programs. Building on a strong tradition in the arts and sciences, the university offers programs in business, education, engineering, fine arts, and health professions, as well as in the liberal arts and sciences. Degree programs range from the associate to the doctoral level and encompass seventy-five fields of study; non-degree programs are designed to meet the specialized educational and training needs of individuals and organizations in south central Kansas.

Scholarship, including research, creative activity, and artistic performance, is designed to advance the university's goals of providing high quality instruction, making original contributions to knowledge and human understanding, and serving as an agent of community service. This activity is a basic expectation of all faculty members at Wichita State University.

Public and community service activities seek to foster the cultural, economic and social development of a diverse metropolitan community and of the state of Kansas. The university's service constituency includes artistic and cultural agencies, business and industry, and community, educational, governmental, health, and labor organizations.

Wichita State University pursues its mission utilizing the human diversity of Wichita, the state's largest metropolitan community, and its many cultural, economic and social resources. The university faculty and professional staff are committed to the highest ideals of teaching, scholarship and public service, as the university strives to be a comprehensive, metropolitan university of national stature.

B.2 WSU College of Engineering Vision and Mission Statements

Vision

The College of Engineering at Wichita State University will be recognized nationally and internationally for the following: its experience-based undergraduate and graduate degree programs; its collaborative efforts with industry; and its research programs that support the economic development and global competitiveness of the Wichita metropolitan area, the state of Kansas, and the nation.

Mission

The College of Engineering at Wichita State University is committed to the following:

- Preparing graduates who will engage effectively and responsibly in the practice of the engineering profession in a global economy and in pursuing advanced engineering education.
- Conducting applied and basic research to support and contribute to the social and economic well-being of citizens and organizations in the Wichita metropolitan area, the state of Kansas and beyond.
- Cultivating the spirit of entrepreneurship and the connection between engineering and business that encourages technology commercialization.
- Improving continuously the engineering pedagogical methods employed in delivering its academic programs.
- Fostering and valuing diversity of ideas and people through early student recruitment, outreach programs, and the recruitment and development of faculty role models.
- Encouraging scholarship in all its dimensions.
- Evolving thoughtfully in response to the needs of industry and the changing world.

Appendix C. Assessments and Results

Section C.1 The ME Senior Exit Survey on Classes and Senior Exit Survey

Spring 2007 Senior Exit Survey on Classes (5 = excellent—1 = poor)				
Required Courses	Amount of Learning	Quality of Instruction	Workload	Course Value
AE 223 Statics	①②③④⑤	①②③④⑤	①②③④⑤	①②③④⑤
AE 333 Mechanics of Materials	①②③④⑤	①②③④⑤	①②③④⑤	①②③④⑤
AE 373 Dynamics	①②③④⑤	①②③④⑤	①②③④⑤	①②③④⑤
CHEM 211 General Chemistry I	①②③④⑤	①②③④⑤	①②③④⑤	①②③④⑤
COMM 111 Public Speaking	①②③④⑤	①②③④⑤	①②③④⑤	①②③④⑤
ECE 282 Circuits I	①②③④⑤	①②③④⑤	①②③④⑤	①②③④⑤
ENGL 100/101 College English I	①②③④⑤	①②③④⑤	①②③④⑤	①②③④⑤
ENGL 102 College English II	①②③④⑤	①②③④⑤	①②③④⑤	①②③④⑤
IME 222 Engineering Graphics	①②③④⑤	①②③④⑤	①②③④⑤	①②③④⑤
IME 255 Engineering Economy	①②③④⑤	①②③④⑤	①②③④⑤	①②③④⑤
MATH 242 Calculus I	①②③④⑤	①②③④⑤	①②③④⑤	①②③④⑤
MATH 243 Calculus II	①②③④⑤	①②③④⑤	①②③④⑤	①②③④⑤
MATH 344 Calculus III	①②③④⑤	①②③④⑤	①②③④⑤	①②③④⑤
MATH 555 Differential Equations I	①②③④⑤	①②③④⑤	①②③④⑤	①②③④⑤
ME 250 Materials Engineering	①②③④⑤	①②③④⑤	①②③④⑤	①②③④⑤
ME 251 Materials Engineering Laboratory	①②③④⑤	①②③④⑤	①②③④⑤	①②③④⑤
ME 325 Computer Applications	①②③④⑤	①②③④⑤	①②③④⑤	①②③④⑤
ME 339 Design of Machinery	①②③④⑤	①②③④⑤	①②③④⑤	①②③④⑤
ME 398 Thermodynamics I	①②③④⑤	①②③④⑤	①②③④⑤	①②③④⑤
ME 439 Mechanical Engineering Design I	①②③④⑤	①②③④⑤	①②③④⑤	①②③④⑤
ME 502 Thermodynamics II	①②③④⑤	①②③④⑤	①②③④⑤	①②③④⑤
ME 521 Fluid Mechanics	①②③④⑤	①②③④⑤	①②③④⑤	①②③④⑤
ME 522 Heat Transfer	①②③④⑤	①②③④⑤	①②③④⑤	①②③④⑤
ME 533 Mechanical Engineering Laboratory	①②③④⑤	①②③④⑤	①②③④⑤	①②③④⑤
ME 633 Mechanical Engineering Systems Lab	①②③④⑤	①②③④⑤	①②③④⑤	①②③④⑤
ME 659 Mechanical Control Systems	①②③④⑤	①②③④⑤	①②③④⑤	①②③④⑤
ME 662 Mechanical Engineering Practice	①②③④⑤	①②③④⑤	①②③④⑤	①②③④⑤
PHIL 385 Engineering Ethics	①②③④⑤	①②③④⑤	①②③④⑤	①②③④⑤
PHYS 313 University Physics I	①②③④⑤	①②③④⑤	①②③④⑤	①②③④⑤
PHYS 314 University Physics II	①②③④⑤	①②③④⑤	①②③④⑤	①②③④⑤
PHYS 315 University Physics Laboratory I	①②③④⑤	①②③④⑤	①②③④⑤	①②③④⑤
General Education Core Introductory Course	①②③④⑤	①②③④⑤	①②③④⑤	①②③④⑤
Elective Courses				
ME 541 Mechanical Engineering Design II	①②③④⑤	①②③④⑤	①②③④⑤	①②③④⑤
ME 544 Design of HVAC Systems	①②③④⑤	①②③④⑤	①②③④⑤	①②③④⑤
ME 631 Heat Exchanger Design	①②③④⑤	①②③④⑤	①②③④⑤	①②③④⑤
ME 637 Computer-Aided Engineering	①②③④⑤	①②③④⑤	①②③④⑤	①②③④⑤
ME 639 Applications FEM in Mechanical Eng	①②③④⑤	①②③④⑤	①②③④⑤	①②③④⑤
ME 641 Thermal Systems Design	①②③④⑤	①②③④⑤	①②③④⑤	①②③④⑤

Figure C.1.1 Senior Exit Survey Section 1

Senior Exit Survey

The Mechanical Engineering Program is undergoing continuous change to better meet the needs of students and the employers who hire graduates. This questionnaire is one of the methods we use to gather information about our program. Please answer the following questions as honestly as you can. Please DO NOT include your name or any identifying information.

1. Please answer the following and provide your comments.

Professional communications skills were emphasized.

[ ] Strongly Agree [ ] Agree [ ] Neutral [ ] Disagree [ ] Strongly Disagree [ ] N/A

Team work skills were emphasized.

[ ] Strongly Agree [ ] Agree [ ] Neutral [ ] Disagree [ ] Strongly Disagree [ ] N/A

N/A computer technologies were extensively used in the classroom.

[ ] Strongly Agree [ ] Agree [ ] Neutral [ ] Disagree [ ] Strongly Disagree [ ] N/A

Ethics was emphasized in several courses in the program.

[ ] Strongly Agree [ ] Agree [ ] Neutral [ ] Disagree [ ] Strongly Disagree [ ] N/A

Comments:

2. Laboratories are designed to help students understand the principles of engineering science courses, learn how to collect engineering data, and give hands-on experience with engineering equipment. Please state your laboratory experience in terms of these objectives.

Laboratory class lectures explained theory adequately.

[ ] Strongly Agree [ ] Agree [ ] Neutral [ ] Disagree [ ] Strongly Disagree [ ] N/A

Laboratory class lectures covered safety issues.

[ ] Strongly Agree [ ] Agree [ ] Neutral [ ] Disagree [ ] Strongly Disagree [ ] N/A

The laboratory assistants were helpful.

[ ] Strongly Agree [ ] Agree [ ] Neutral [ ] Disagree [ ] Strongly Disagree [ ] N/A

Computer technologies, including software, were extensively used in the classroom.

[ ] Strongly Agree [ ] Agree [ ] Neutral [ ] Disagree [ ] Strongly Disagree [ ] N/A

Comments:

3. Please give your views on student advising on academic and professional issues provided by mechanical engineering faculty.

Overall, ME faculty advising and guidance on academics/career was helpful

[ ] Strongly Agree [ ] Agree [ ] Neutral [ ] Disagree [ ] Strongly Disagree [ ] N/A

Overall, the faculty had expertise in various fields within M.E.

[ ] Strongly Agree [ ] Agree [ ] Neutral [ ] Disagree [ ] Strongly Disagree [ ] N/A

Comments:

4. Do you believe that the ME curriculum has prepared you for engineering practice in the real world?

The program allowed you to practice engineering science fundamentals in the solution of real problems.

[ ] Strongly Agree [ ] Agree [ ] Neutral [ ] Disagree [ ] Strongly Disagree [ ] N/A

How actively did you participate in professional activities ASME, SAE, Mini-Baja, SAE Formula Car, or other activities?

[ ] Very Active [ ] Active [ ] Participated [ ] Occasionally Participated [ ] Did Not Participate

Comments:

Do you feel that your co-operative work experience has been a useful supplement to your classroom engineering education? Please feel free to comment.

I have had co-op experience during my program

[ ] Strongly Agree [ ] Agree [ ] Neutral [ ] Disagree [ ] Strongly Disagree [ ] N/A

I have current or previous engineering work experience

[ ] Strongly Agree [ ] Agree [ ] Neutral [ ] Disagree [ ] Strongly Disagree [ ] N/A

IF you are a transfer student, how would you consider your background with that of your classmates at the BEGINNING of your ME program?

[ ] superior [ ] much better [ ] somewhat less [ ] was harder [ ] don't know

Comments:

If you are a transfer student, do you agree that your competency level is similar to other students in your senior classes?

[ ] Strongly Agree [ ] Agree [ ] Neutral [ ] Disagree [ ] Strongly Disagree [ ] N/A

7. Other comments.

Figure C.1.2 Senior Exit Survey Section 2

Senior Exit Survey Suggestions for Improvement

Please offer constructive criticism of the Mechanical Engineering Program and departmental services and faculty—your most favorite instructor/subject. Offer suggestions for improvement of areas in which the program is weak, and be sure to tell us about areas where the program is strong. Please feel free to attach additional sheets for comments.

1. Which mechanical engineering required course(s) helped you raise your skills and knowledge? Please elaborate.

2. Which mechanical engineering elective course(s) helped you learn practical and real-life skills? Please elaborate.

3. Which of the mechanical engineering course(s) need changes? Please elaborate.

4. Upon graduation, do you plan to work or go to graduate school?

5. Please give scores for the following ABET evaluation outcomes: ***Poor (1)* to *Excellent (5)***

(a) Ability to apply knowledge of mathematics, science, and engineering. ( )

(b) Ability to design and conduct experiments, as well as to analyze and interpret data. ( )

(c) Ability to design a system, component or process to meet desired needs. ( )

(d) Ability to function on a multi-disciplinary team. ( )

(e) Ability to identify, formulate, and solve engineering problem. ( )

(f) Understanding of professional and ethical responsibility. ( )

(g) Ability to communicate effectively. ( )

(h) Broad education necessary to understand the impact of engineering solutions in a global and social context. ( )

(i) Recognition of the need for, and an ability to engage in life-long learning. ( )

(j) Knowledge of contemporary issues. ( )

(k) Ability to use the techniques, skills and modern engineering tools necessary for engineering practice. ( )

Figure C.1.3 Senior Exit Survey Section 3: Suggestions for Improvement

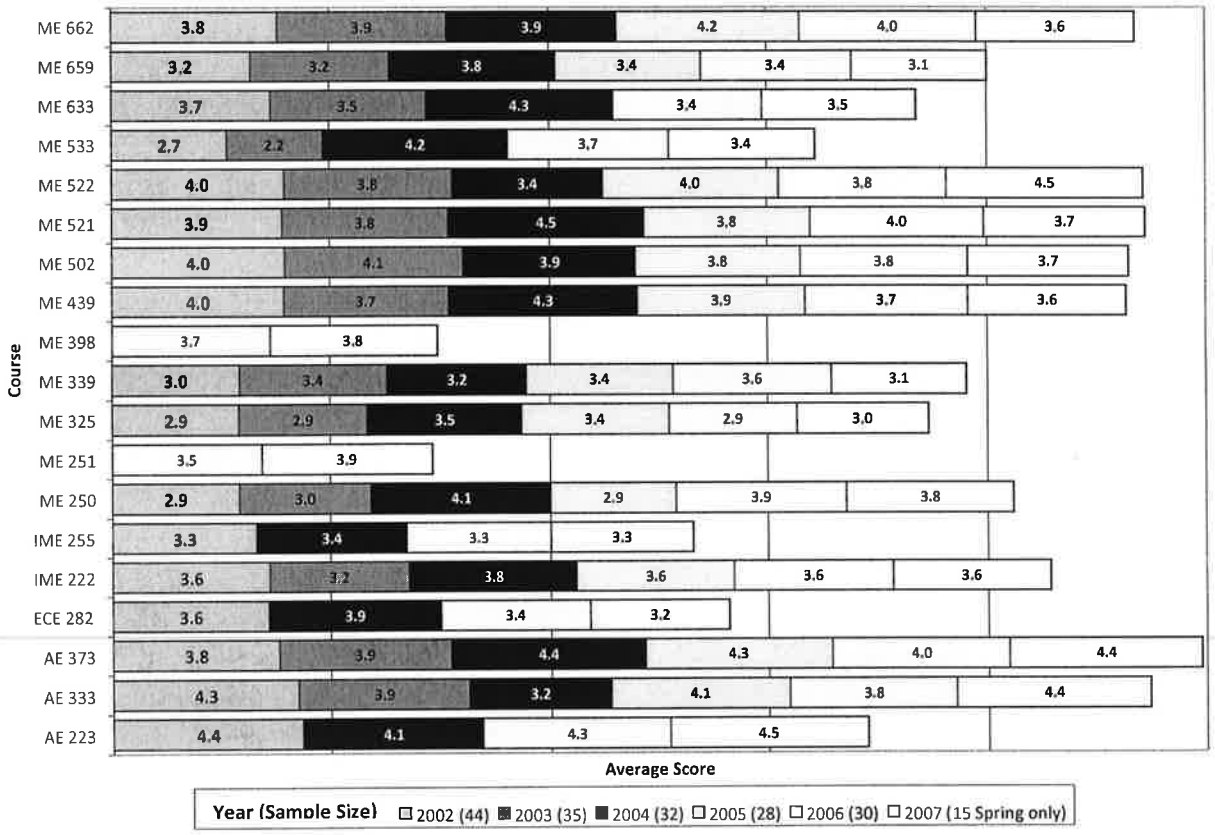

Figure C.1.4 Average Senior Exit Survey Scores (Amount of Learning) 02-07

Section C.2 The ME Senior Exit Interview (Industrial Advisory Board)

Senior Exit Interview with Industry Advisory Board

Have you had any cooperative education or any industry experience?

What are your short-term goals? Long-term goals?

Are you planning to go to graduate school? If yes, what area?
Engineering (area: _____) b. Management c. Other _____

In what kind of job or industry field would you like to work?

On a scale of 1 (low) to 5 (excellent), what is your overall rating of the WSU ME Program in preparing you for engineering practice or further study? _____
What are your suggestions for further strengthening the program?

Did you take classes outside WSU as part of your coursework for your ME degree? If yes, were the courses deficient in any way?

What is your opinion about facilities, including library, labs, and computational facilities?

On a scale of 1 (low) to 5 (excellent), what is your overall rating of the WSU ME faculty in terms of quality, knowledge, and expertise? _____

Other suggestions (use back of form as needed):

Figure C.2.1 Senior Exit Interview IAB Form

Average Score with 5 Being Perfect—Sample Size = 5									
Practicing Engineering Science	Communication Skills	Team Work Skills	Ethics	Resources and Ideas Shared	Use of Real-Life Problems	Use of Design Principles in Projects	New Technologies for Communication	Projects Synergized Various Skills	Successful Practicing Engineers
4.5	3	4.3	3	4.3	4.5	4.3	3.3	3.8	4

Figure C.2.2 Spring 2006 Senior Exit Interview IAB

Summary Comments from an IAB Member

Fall 2006

This summary represents the main topics that were shared during the interview of seven graduating seniors during fall 2006.

All students interviewed were satisfied that they received an education commensurate with their expectations. They all felt they had a good experience at WSU and their time was well spent. They had very positive comments about the faculty and staff and that they were all competent and friendly. The majority of students are continuing their education to seek a master's degree in engineering, business, or some other discipline. Most students had acquired positions with local industry and were excited about moving forward in their lives. One student was planning a PE certification. Several students had long-range plans of starting their own business, with plans to take some classes in entrepreneurship. The overall rating of the WSU ME experience was 3 or better (on scale of 1 low to 5 high). Most students had taken some amount of class work outside of WSU, mostly in the pre-engineering basic core curriculum. Schools mentioned were Cowley County Community College and Butler County Community College. Cost was the major factor. None indicated that this work was deficient in any way or did not prepare them adequately. Regarding the opinions about facilities, all students had some comments about the inadequacy of the mechanical laboratories. The computational facilities were given high marks. The overall rating regarding quality, knowledge, and expertise of the WSU ME faculty was rated between 3 and 4.

Some specific comments the students made are mentioned below:

Design classes were a weak area. Instructors were assigned at the last minute. ME 533 Mechanical Engineering Laboratory was not well equipped. Lab classes were cut short. Labs needed updated equipment or repaired.

I would like to see a greater understanding of CATIA as it relates to the overall design process.

Some instructors de-emphasized important theories, and students felt that they lacked the required prerequisites for higher coursework, causing some difficulty and having to play catch-up.

Some part-time instructors from industry were good and brought some positive ideas, but some also lacked focus and priority towards students' interests. To that extent, full-time professors were more dedicated.

A few faculty members were too easy on some of the students, allowing them to get by with minimal work. The standards were not set high enough in some cases.

Some classes were very theoretical with little emphasis on practical use and the application of the theory. More emphasis on real-world application should be stressed.

All class handouts and notes should be given at the beginning of the semester, instead of handing them out at each class session. This would allow students to look at the overall class content and allow them to study ahead.

Figure C.2.3 Fall 2006 Assessment Document by IAB Interviewer

Section C.3 The Comprehensive Exit Exam (CEE)

YEAR	SAMPLE SIZE	Thermodynamics	Fluid Machinery	HVAC	Heat Transfer	Controls	Computer	Material Science	Mechanical Design	Stress Analysis	Dynamic Systems	Energy Conversion and Power Plants	Measurement and Instrumentation	Fluid Mechanics
04	11	35	36	39	59	45	52	58	49	53	38	18	27	42
06	18	41	37	22	48	44	41	59	34	38	41	13	46	35
07	19	31	22	24	56	29	35	51	39	42	52	22	31	27

Figure C.3.1 CEE Results 2004-07

Section C.4 The Alumni Survey

WSU ME Alumni Survey Results 2003 and 2005		
Year	2003	2005
Sample Size=	13	10
Questions	**Average Score**	
Scale: 1- Extremely Poorly, 2- Poorly, 3- Satisfactorily, 4- Well, 5- Extremely Well		
1. Use knowledge in basic Math and Sciences (physics, chemistry, mathematics, etc.)	4.2	4.3
2. Use knowledge in engineering sciences (theory) relevant to my major.	4.2	4.3
3. Model and design systems and components.	3.6	3.7
4. Communicate ideas and results verbally and in writing.	4.2	4.0
5. Communicate engineering ideas and results in drawings and graphic expressions.	3.8	4.2
6. Integrate knowledge and information for engineering problem solving.	3.9	4.2
7. Work effectively in an international/global environment.	3.8	3.5
8. Apply engineering professionalism and ethical standards appropriately.	4.2	4.2
9. Obtain needed knowledge and self-learn.	4.2	4.2
10. Build teams and facilitate team processes/outcomes.	4.2	3.8
11. Be aware of the socio-economic context in which engineering is practiced.	3.9	3.0
12. Use appropriate computer hardware and software.	3.9	3.9
13. Collect laboratory data and analyze the data appropriately.	3.5	3.7
14. At the end of my undergraduate studies, I was prepared for graduate study and/or professional career in my major area or related disciplines.	4.2	3.8
Scale: 1- Not at All, 2- A Little, 3- A Fair Amount, 4- Much, 5- Very Much		
15. I was well qualified for undergraduate studies at the time of my admission to the program.	4.4	4.5
16. A sufficient number of technical elective courses in my area of interest were available.	3.0	3.4
17. The laboratory facilities supporting my studies were satisfactory.	3.1	2.6
18. The quality of teaching within my major department was satisfactory.	3.5	3.3
19. I was satisfied with the advising received from the faculty members of the department.	3.0	3.7
20. I was treated with dignity and respect by the faculty members of the department.	4.2	4.7

Figure C.4.1 Alumni Survey Results 2003-05

WSU ME Alumni Survey Results 2007	
Sample Size=52	
Questions	**Average Score**
Scale: 1- Extremely Poorly, 2- Poorly, 3- Satisfactorily, 4- Well, 5- Extremely Well	
1. Apply basic *Math, Science* (physics, chemistry, mathematics, etc), and Engineering knowledge.	4.2
2. Design experiments, collect laboratory data, and analyze the data appropriately.	3.7
3. *Model and design* systems and components.	3.6
4. Build multi-disciplinary teams and facilitate team processes/outcomes.	3.8
5. Integrate knowledge and information for engineering problem solving.	4.2
6. Apply engineering professionalism and ethical standards appropriately.	3.9
7. *Communicate* ideas and results verbally and in writing.	4.0
8. Work effectively in an international/global environment.	3.5
9. Obtain needed additional knowledge and continue self-learning.	3.9
10. Be aware of the contemporary issues regarding engineering.	3.6
11. Use techniques, skills, and modern engineering tools.	3.9
12. The laboratory facilities supported class lectures.	3.3
13. The career and professional advising received from the faculty was helpful.	3.5
Scale: 1- Strongly Disagree, 2- Disagree, 3- Mostly Agree, 4- Agree, 5- Strongly Agree	
14. I believe that the program helped me to become a successful mechanical engineer in today's global environment.	4.0
15. I have taken courses or company training/workshops after graduation.	4.0
16. I believe the program's industry based projects helped me prepare for work after graduation.	4.0
17. The present students are being exposed to Global environment issues and design integration. I agree that this will be beneficial to the engineers.	4.2

Figure C.4.2 Alumni Survey Results 2007

Section C.5 Senior Project Evaluations

OUTCOME	Overall mastery (> 90)	Very Good Understanding(>80)	Satisfactory and Acceptable>70	Less Than Satisfactory<70
Application of Fundamentals	Identifies and applies all relevant math and physical laws	Identifies most math and physical laws and applies them well	Identifies major governing laws and applies them	Has inadequate identification and application skills
Design Formulation	Formulates excellent open-ended concepts	Comes up with alternative designs	Comes up with a design and applies it	Has inadequate conceptualization skills
Application of Tools	Uses excellent application of software and other tools	Has very good skills but takes a little more time	Has adequate skills to create most simple designs	Lacks thorough application skills
Social/Global Awareness	Understands very well social/global issues and resolves them	Identifies most social/global issues and identifies possible solutions	Recognizes various, but not all, social/global issues and is able to interrelate them	Recognizes a few issues but is unable to relate them to engineering problems
Communication Skills	Exhibits excellent presentation and report writing skills	Exhibits effective presentation and good report writing skills	Has understandable presentations delivers reports that address most aspects.	Has inadequate presentation skills and omits parts of reports
Ethical Consideration	Recognizes, analyzes, and resolves problems with multiple options	Recognizes, analyzes, and suggests resolution to problems	Recognizes, analyzes, and suggests solutions to problems adequately	Unable to recognize or analyze problems
Life-Long Learning	Uses references, handbooks, and journal articles, and cites real applications	Uses handbooks and library sources outside of class material	Uses library sources and the Internet	Uses class material only

Figure C.5.1 ME 662 Senior Capstone Design Course Rubrics

	Sample Size	Sponsor Evaluation	Instructor Evaluation	Assessment Grade	Poster	E-mail	Lecture Summary	Oral	Written	Final Written	Final Grade
Spring 2006	**19**	90%	91%	54%	100%	100%	100%	88%	63%	95%	87%
Spring 2005	**26**	92%	94%	76%	100%	100%	92%	88%	86%	93%	93%
Fall 2004	**16**	88%	92%	75%	100%	100%	100%	94%	92%	89%	91%
Spring 2004	**20**	93%	98%	73%	100%	100%	79%	95%	94%	95%	90%

Figure C.5.2 ME 662 Senior Capstone Design Grade Breakdown, Spring 2004–06

Section C.6 Graduate Exit Survey

Graduate Student Exit Survey

Please evaluate your graduate education by taking a few minutes to complete this questionnaire. Be assured that the information you provide will remain confidential and your answers to the questions will in no way affect your relations with the faculty, staff, or the Graduate School of Wichita State University. The feedback you provide is important and will provide information that will enable WSU to improve the quality of its graduate education. Thank you for your cooperation. (v7.3)

SECTION I: DEPARTMENT/PROGRAM (Questions about your program of study)

A. PROGRAM LEVEL

Please indicate whether you agree or disagree with the following statements.	**Agree (1)**	**Disagree (2)**
1. My program provided a graduate student handbook	O	O
2. Faculty/staff were well-informed about program degree requirements	O	O
3. Faculty/staff were accessible	O	O

4. On a scale of one (very dissatisfied) to five (very satisfied), rate your overall satisfaction with your program of graduate studies at WSU.

Very Dissatisfied O (1) O (2) O (3) O (4) O (5) Very Satisfied

B. COURSE/INSTRUCTION

Please answer the following questions below about the courses you took during your graduate studies.

5. What TIME of day do you **most** PREFER to attend courses (**check only one**)?

O Morning (1) O Afternoon (2) O Evening (3) O No preference (4)

6. What DAY(S) do you **most** PREFER to attend courses (**check only one**)?

O Monday (1)
O Tuesday (2)
O Wednesday (3)
O Thursday (4)
O Weekend (5)
O Monday B Wednesday B Friday (6)
O Monday B Wednesday (7)
O Tuesday B Thursday (8)
O Other (9)
O No preference (0)

Please indicate whether you agree or disagree with the following statements.	**Agree (1)**	**Disagree (2)**
7. My classes were offered at times convenient to my schedule	O	O
8. Course offerings enabled me to complete my degree in a timely manner	O	O

Please rate the following aspects of your overall graduate education at WSU.

9. Your satisfaction with the feedback provided by faculty about your course work?

Not Satisfied O (1) O (2) O (3) O (4) O (5) Satisfied

10. Your satisfaction with the quality of instruction in courses *required* by your program?

Not Satisfied O (1) O (2) O (3) O (4) O (5) Satisfied

11. Your satisfaction with the overall course instruction you received in your graduate studies at WSU.

Not Satisfied O (1) O (2) O (3) O (4) O (5) Satisfied

C.1. ACADEMIC ADVISING (for enrollment and degree requirement related activities, not research advising)
(if you did not receive academic advising, skip to Question 21).

12. Did you generally receive academic advising **BEFORE** registering for classes? O Yes (1) O No (2)

13. Approximately how many times per semester did you meet or communicate with an advisor for academic advising?

O 0 O 1 O 2 O 3 or more

Please indicate whether you agree or disagree with the following statements.	**Agree (1)**	**Disagree (2)**
14. My academic advisor was usually accessible for advising	O	O
15. My academic advisor was knowledgeable about requirements in my major	O	O
16. My academic advisor made clear the requirements I needed to complete my degree	O	O
17. My academic advisor provided information to help me select courses	O	O
18. My academic advisor notified me of graduate school deadlines	O	O
19. My academic advisor assisted me in preparing graduate school and department forms	O	O

(Continued on next page)

20. On a scale of one (very dissatisfied) to five (very satisfied), rate your overall level of satisfaction with the academic advising you have received.

Very Dissatisfied O (1) O (2) O (3) O (4) O (5) Very Satisfied

C.2. RESEARCH ADVISING (Dissertation, Thesis, or Master=s Project advising)
(if your program only involves course work with no final project, skip to Question 26).

21. During a typical semester, about how often did you meet or communicate with an advisor about your dissertation, thesis or master=s project? O 0 O 1 O 2 O 3 or more

Please indicate whether you agree or disagree with the following statements.	**Agree (1)**	**Disagree (2)**
22. My advisor was accessible when I wanted to talk about my research	O	O
23. My advisor provided feedback about rough drafts of my research	O	O
24. My advisor provided useful advice about preparing for my research defense	O	O

25. On a scale of one (very dissatisfied) to five (very satisfied), rate your overall level of satisfaction with the advising you received about your dissertation, thesis, or masters project.

Very Dissatisfied O (1) O (2) O (3) O (4) O (5) Very Satisfied

D. TECHNOLOGY

26. Was it necessary to have access to WSU technology in order to complete your graduate course work?

O Yes (1) O No (2)

On a scale of one (not at all accessible) to five (very accessible), rate the level of accessibility to each of the following:

(WSU technology)	**Not at all Accessible (1)**	**(2)**	**(3)**	**(4)**	**Very Accessible (5)**	**N/A (6)**
27. Computers (wordprocessing, spreadsheets, etc.)	O	O	O	O	O	O
28. Internet access	O	O	O	O	O	O
29. Laboratory or field equipment	O	O	O	O	O	O
30. Specialized software (statistical, programming, CAD, etc)	O	O	O	O	O	O

31. On a scale of one (very dissatisfied) to five (very satisfied), rate your overall satisfaction with the WSU technology?

Very Dissatisfied O (1) O (2) O (3) O (4) O (5) Very Satisfied

SECTION II. GRADUATE SCHOOL (Questions about your contact with the Graduate School)

32. Which of the following did you use **most frequently** to contact the Graduate School Office (**check only one**)?

O In-person (1) O Mail (2) O Phone (3) O Email (4) O Webpage (5) O n/a (6)

33. For what reasons did you contact the Graduate School office in person, mail, phone or email (**check all that apply**)?

O Did not contact Graduate School (331)
O Admission (332)
O Exceptions (333)
O Plan of Study (334)
O Degree completion (335)
O Enrollment (336)
O Obtain/submit forms (337)
O Assistanships, awards, grants (338)
O Financial aid eligibility (339)
O Other/please specify (330)_____

34. **If** you accessed the Graduate School webpage, for what reasons did you access the webpage (**check all that apply**)?

O On-line application (341)
O Downloadable forms (342)
O Who to contact (343)
O Regulations (344)
O Deadlines (345)
O Program information (346)
O Health insurance links (347)
O Financial aid opportunities (348)
O Graduate School Bulletin (349)
O Other/please specify (340) _____

35. Did you consult/use the Graduate School Bulletin (hardcopy) O Yes (1) O No (0)

Please indicate whether you agree or disagree with the following statements.	**Agree (1)**	**Disagree (2)**	**N/A(3)**
36. The staff in the Graduate School were courteous	O	O	O
37. The staff in the Graduate School appeared knowledgeable	O	O	O
38. The staff in the Graduate School processed my request in a timely manner	O	O	O

(Continued on next page)

39. On a scale of one (least amount of expertise) to five (most amount of expertise), rate the level of expertise, at which you found the Graduate school staff to possess, when helping you through your graduate school career.

Least Expertise O 1 O 2 O 3 O 4 O 5 Most Expertise O 6 N/A

Please indicate whether you agree or disagree with the following statements.	**Agree(1)**	**Disagree (2)**
40. I knew the purpose of my plan of study	O	O
41. I knew the purpose of the application for degree card	O	O
42. Graduate School forms for my degree completion were easily accessible	O	O
43. I knew the deadlines for degree completion requirements	O	O

Recall when you first made the decision to pursue graduate studies. How important was each of the following reasons in making this decision?	**Important (1)**	**Not Important (2)**
44. A higher degree will open up job opportunities	O	O
45. I wanted to pursue a position in my current job that requires a higher degree	O	O
46. My employer provided a tuition waiver	O	O
47. Scholarships/fellowships/assistanships	O	O
48. Location of WSU	O	O
49. Reputation of WSU or your department and/or faculty	O	O
50. An undergraduate advisor	O	O
51. Recommendations from family or friends	O	O
52. Advertisements from WSU	O	O

SECTION III. WSU LIBRARIES

On a scale of one (very dissatisfied) to five (very satisfied), rate your overall satisfaction with the main WSU library:

	Very Dissatisfied				Very Satisfied
53. Convenient times for access	O(1)	O(2)	O(3)	O(4)	O(5)
54. Access to the library via the internet	O(1)	O(2)	O(3)	O(4)	O(5)
55. Resources for research	O(1)	O(2)	O(3)	O(4)	O(5)
56. Helpfulness of Library faculty/staff	O(1)	O(2)	O(3)	O(4)	O(5)
57. Overall satisfaction	O(1)	O(2)	O(3)	O(4)	O(5)

SECTION IV. FINANCIAL SUPPORT

Please indicate the approximate number of **SEMESTERS** *you have received each type of financial support.*

	None *(0)*	**1 -2** *(1)*	**3-4** *(3)*	**5-6** *(5)*	**7 or more** *(7)*
58. Teaching assistantship	O	O	O	O	O
59. Research assistantship	O	O	O	O	O
60. Staff office assistanship	O	O	O	O	O
61. Fellowship/Scholarship	O	O	O	O	O
62. Research Grant	O	O	O	O	O
63. Financial aid.(need-based)	O	O	O	O	O
64. Personal/family funding	O	O	O	O	O
65. Off campus employment	O	O	O	O	O
66. Bank Loans	O	O	O	O	O
67. Employer tuition waiver	O	O	O	O	O
68. Other funding	O	O	O	O	O

69. Of the funding sources listed above in questions 58-68, which were your most important sources of support during your graduate studies?:

Most important_____Second most important_____

70. Throughout your graduate education, about how much money did you borrow for education purposes?

O(0)	Did not obtain loans	O(5)	$15,000 - $19,999	O(10)	$40,000 - $44,999
O(1)	below $1,000	O(6)	$20,000 - $24,999	O(11)	$45,000 - $49,999
O(2)	$1,000 - $4,999	O(7)	$25,000 - $29,999	O(12)	$50,000 or more
O(3)	$5,000 - $9,999	O(8)	$30,000 - $34,999		
O(4)	$10,000 - $14,999	O(9)	$35,000 - $39,999		

71. During your graduate education at WSU, did you work for an employer off-campus? O Yes (1) O No (2)

If you would like to make additional comments please place them on the back of this page.

Figure C.6.1 Graduate Exit Survey

Table C.6.1 Graduate Exit Survey Results Academic Year 03-04 to 07-08

SECTION I: DEPARTMENT/PROGRAM (Questions about your program of study)								
A. PROGRAM LEVEL								
							Agree	Disagree
1. My Program provided a graduate student handbook							87%	13%
2. Faculty/staff were well-informed about program degree requirements							96%	5%
3. Faculty/staff were accessible							98%	2%
	Very dis-satisfied	2	3	4	Very satisfied	Satisfied or higher	Mean	Median
4. Rate your overall satisfaction with your program of graduate studies at WSU	1.3%	2.7%	18.3%	36.6%	41.1%	77.7%	4.13	4.00
B. COURSE/INSTRUCTION								
							Agree	Disagree
7. My classes were offered at times convenient to my schedule.							96%	4%
8. Course offerings enabled me to complete my degree in a timely manner							86%	14%
	Very dis-satisfied	2	3	4	Very satisfied	Satisfied or higher	Mean	Median
9. Your satisfaction with the feedback provided by faculty about your course work	1.3%	3.6%	18.2%	30.7%	46.2%	76.9%	4.17	4.00
10. Your satisfaction with the quality of instruction in courses required by your program	1.8%	3.6%	16.4%	36.0%	42.2%	78.2%	4.13	4.00
11. Your satisfaction with the overall course instruction you received in your graduate studies at WSU	1.3%	3.1%	18.3%	34.8%	42.4%	77.2%	4.14	4.00
C. ADVISING								
C.1 ACADEMIC ADVISING (for enrollment and degree requirement related activities)								
							Agree	Disagree
12. Did you generally receive academic advising BEFORE registering for classes?							77%	23%
		0	1	2	3 or more		Mean	Median
13. Approximately how many times per semester did you meet with an advisor for academic advising?		5.3%	19.2%	18.8%	56.7%		2.40	3.00
							Agree	Disagree
14. My academic advisor was usually accessible for advising							97%	3%
15. My academic advisor was knowledgeable about requirements in the major							97%	3%
16. My academic advisor made clear the requirements I needed to complete my degree							91%	9%
17. My academic advisor provided information to help me select courses							88%	12%
18. My academic advisor notified me of graduate school deadlines							75%	26%
19. My academic advisor assisted me in preparing graduate school and departmental forms							81%	19%
	Very dis-satisfied	2	3	4	Very satisfied	Satisfied or higher	Mean	Median
20. Rate your overall level of satisfaction with the academic advising you have received.	0.5%	6.2%	10.6%	32.2%	50.5%	82.7%	4.26	5.00
C.2. RESEARCH ADVISING (Dissertation, Thesis, or Master's Project advising)								

	0	1	2	3 or more	Mean	Median
21. During a typical semester, about how often did you meet or communicate with an advisor about your dissertation, thesis or master's project?	0.0%	0.0%	18.5%	81.5%	2.79	3.00

	Agree	Disagree
22. My advisor was accessible when I wanted to talk about my research	96.7%	3.3%
23. My advisor provided feedback about rough drafts of my research	92.9%	7.1%
24. My advisor provided useful advice about preparing for my research defense	93.8%	6.2%

	Very dis-satisfied	2	3	4	Very satisfied	Satisfied or higher	Mean	Median
25. Rate your overall level of satisfaction with the advising you received about your dissertation, thesis, or master's project	1.4%	2.8%	6.6%	25.8%	63.4%	89.2%	4.47	5.00

D. TECHNOLOGY

	Agree	Disagree
26. Was in necessary to have access to WSU technology in order to complete your graduate course work?	91.9%	8.1%

	Not at all accessible	2	3	4	very accessible	Mean	Median
27. Computers (word-processing, spreadsheets, etc.)	1.9%	0.9%	5.1%	14.8%	77.3%	4.65	5.00
28. Internet access	0.9%	0.5%	2.8%	9.3%	86.6%	4.80	5.00
29. Laboratory or field equipment	2.6%	4.1%	11.9%	20.1%	61.3%	4.34	5.00
30. Specialized software (statistical, programming, CAD, etc)	1.4%	4.7%	11.2%	17.3%	65.4%	4.41	5.00

	Very dis-satisfied	2	3	4	Very satisfied	Satisfied or higher	Mean	Median
31. Rate your overall satisfaction with the WSU technology?	0.5%	2.7%	14.2%	35.6%	47.0%	82.6%	4.26	4.00

ME Graduate Exit Survey

The ME Graduate Program Assessment must be taken by all new graduates in order to receive clearance by the ME Dept. All query in this regard should be directly addressed to the Graduate Coordinator: ikram.ahmed@wicita.edu

Please read all the questions (**A** through **G**) before answering; circle around the No. that best fits your response – there is room for additional comments at the bottom:

A. Did you find the laboratory/computational equipment necessary for your research to be sufficient?

(1) very much (2) just enough (3) not all

B. Were the above mentioned equipment maintained and upgraded in a timely manner?

(1) very much (2) it was alright (3) no

C. Were there sufficient help provided for using the above equipment, either elec./mech. instrumentation or computer software/hardware (in the form of an expert technician, senior graduate students, or the advising professor)?

(1) most of the times (2) just enough (3) barely

D. Did you get to take all the courses you wanted? (please list courses expected but not offered in Comments):

(1) yes (2) most of them (3) very few

E. Did you find the courses offered to be challenging enough?

(1) most of them (2) some of them (3) very few

F. For how long did you receive some form of a financial assistantship, through the ME Dept (TA; GA; grader) or a professor's research funds (RA; GA)?

(1) > 2 Semesters (2) <= 2 Semesters (3) never

G. Overall, did you find the academic atmosphere at WSU intellectually stimulating and helpful for learning?

(1) very much (2) somewhat (3) not at all

YOUR COMMENTS:

Please leave your comments below – these may refer to the above questions, or you can suggest any other issue not addressed above, but you feel was critical in your graduate education experience at WSU ME. Thank you for your honest input – this will help us improve our program, and therefore future graduate students will benefit from this.

Figure C.6.2 ME Graduate Exit Survey