MEG Advisory Board Meeting

January 29, 2010

TBE B174

9:00 AM

Agenda

- Curriculum reviews
- Board membership
- Charter – requirement for $100 donation, options
- Fundraising ideas
- ABET Self-Study Report
- Update on Dean Sandgren's Planning Retreat scheduled Jan 22

Curriculum Reviews

- Evaluated course by board members
  - ME 440 Mechanical Engineering Design (Reviewer: V. Venkatesh)
  - ME 421 Automatic Control (Reviewer: M. Miller)
  - ME 380 Fluid Dynamics (Reviewer: C. Scott)
  - ME 452 Mechanical Vibrations (Reviewer: M Schwob)

Reviewer(s): _____
Date: _____

1.0 Description of Curriculum Area Being Reviewed
    1.Area:
    2.Course Title(s):
    3.Instructor(s):
    4.Description of course(s):
2.0 Summary of course goals, what are the major concepts the course is trying convey from the reviewer's point of view:
3.0 Strengths of course and/or curriculum (please provide a list):
4.0 Performance Summary and Trends:
5.0 Actions for Performance Enhancement(s):
6.0 Other comments (not requited):

*Reviewer should attend one class of course being reviewed. Get a syllabus and compare to course catalog. Make notations of course delivery by educator and student participation in class.

Board Membership

MEG Advisory Board Charter

I. Member Responsibilities:

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k) Make an annual gift of $100 personal or $1000 company gift to the operational fund for the Department. Board members gifts should be received by June 30 of each year.

⋮

Fund Raising

2010 ABET

- Status of ABET Self-Study Report
- 2009-2010 ABET Criterion
- Assessment of Educational Objective & Outcomes
- Volunteers for reviewing assessment method and results
- Review of two surveys (Industry & Alumni Surveys)

CRITERIA FOR ACCREDITING ENGINEERING PROGRAMS

Effective for Evaluations During the
2009-2010 Accreditation Cycle

Engineering Accreditation Commission

Status of ABET Self-Study Report

Background Info		(Done)
Criterion 1	Students	(Done)
Criterion 2	Program Educational Objectives	(Done)
Criterion 3	Program Outcomes	(Done)
Criterion 4	Continuous Improvement	(Done)
Criterion 5	Curriculum	(Almost done)
Criterion 6	Faculty	(Done)
Criterion 7	Facilities	Not yet
Criterion 8	Support	Not yet
Criterion 9	Program Criteria	Curriculum, Faculty (Done)
Appendix A	Course Syllabi	(Done)
Appendix B	Faculty Resume	(Done)
Appendix C	Laboratory Equipment	(Done)
Appendix D	Institutional Summary	Not yet
Appendix E	Other Supporting Documents	E.1 through E.1 to E.13 (almost one)

ABET 2009-2010 Criteria for Accrediting Engineering Programs:

a) *an ability to apply knowledge of mathematics, science, and engineering*
b) *an ability to design and conduct experiments, as well as to analyze and interpret data*
c) *an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability*
d) *an ability to function on multidisciplinary teams*
e) *an ability to identify, formulate, and solve engineering problems*
f) *an understanding of professional and ethical responsibility*
g) *an ability to communicate effectively*
h) *the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context*
i) *a recognition of the need for, and an ability to engage in life-long learning*
j) *a knowledge of contemporary issues*
k) *an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.*

MEG Educational Objectives and Outcomes

Provide mechanical engineering graduates with technical capabilities.

1.a. Fundamental knowledge of state-of-the-art and evolving areas associated with the mechanical engineering field.
1.b. Ability to design and conduct experiments, analyze data, and utilize statistical methods.
1.c. Ability to solve open-ended design problems.
1.d. Ability to use modern computational techniques to solve engineering problems.
1.e. Ability to mathematically model and analyze engineering systems.

Prepare the mechanical engineering graduates to have effective workplace skills.

2.a. Oral and written presentation of technical information.
2.b. Introductory knowledge of economics.
2.c. Working on a multi-disciplinary team with peers.
2.d. Motivation to pursue lifelong learning.

Instilling a sense of responsibility as a professional member of society.

3.a. Commitment to professional and ethical behavior in the workplace.
3.b. Awareness of world affairs and cultures.
3.c. Recognition of the impact of engineering on local and global societies.
3.d. Seeking professional licensure.

Assessment Methods & Edu. Outcomes

G.2. Internal Assessments	G.3. External Assessments
G.2.1 Course and Instructor Evaluations (Every Semester): **G.2.1.1** Lab Survey **G.2.1.2** Teacher Evaluation **G.2.1.3** Evaluation of (a)-(k) ABET Educational Outcomes **G.2.1.4** Evaluation of Course Objectives **G.2.1.5** Exit Interviews **G.2.1.6** Faculty Assessment **G.2.2 Program Internal Review by University (Every Year)**	G.3.1 FE Exam Results (Every Semester) G.3.2 Judging Senior Design Competition (Every Semester) G.3.3 MEG Advisory Board / Local Industry Surveys (Annual) G.3.4 MEG Advisory Board / Local Engineers Reports (Tri-Annual) G.3.5 Alumni Surveys (Tri-Annual) G.3.6 ABET Accreditation (Every Six Years)

Assessment Method / Program Outcomes	**G.2.1.1** Lab Survey	**G.2.1.3** Evaluation of (a)-(k) ABET Educational Outcomes by Students	**G.2.1.4** Evaluation of Course Objectives by	**G.2.1.5** Exit Interviews	**G.2.1.6** Assessment by _ -	**G.3.1** FE Exam Results	**G.3.2** Judging Senior Design Competition	**G.3.4** MEG Advisory Board / Local Industry Surveys	**G.3.5** Alumni Surveys
1.a. Fundamental knowledge of state-of-the-art and evolving areas ……..		×	×	×	×	×		×	×
1.b. Ability to design and conduct experiments, analyze data …..	×	×	×	×	×	×		×	×
1.c. Ability to solve open-ended design problems.		×	×	×	×	×	×	×	×
1.d. Ability to use modern computational techniques …..	×	×	×	×	×	×		×	×
1.e. Ability to mathematically model and analyze engineering …		×	×	×	×			×	×
2.a. Oral and written presentation of technical information.		×	×	×	×		×	×	×
2.b. Introductory knowledge of economics.		×	×	×	×	×	×	×	×
2.c. Working on a multi-disciplinary team with peers.	×	×	×	×	×		×	×	×
2.d. Motivation to pursue lifelong learning.		×	×	×	×			×	×
3.a. Commitment to professional and ethical behavior ….		×	×	×	×			×	×
3.b. Awareness of world affairs and cultures.		×	×	×	×			×	×
3.c. Recognition of the impact of engineering on local and …..		×	×	×	×			×	×
3.d. Seeking professional licensure.			×	×	×			×	×

G.2.1.1Lab Survey

Table 3.7 Cumulative LAB Assessment for each Laboratory Class from Spring 2005-Spring 2009

	Spring 2005	Fall 2005	Spring 2006	Fall 2006	Spring 2007	Fall 2007	Spring 2008	Fall 2008	Spring 2009	Cumulative Average
ME 100L (Intro to MEG & Aero)	3.9	9.9	4	3.3	4.4	3.8	4.3	3.7	4.1	4.6
ME 120 (AutoCAD)	4.3	3.8	4	3.7	3.8	3.9	3.7	4.1	4.4	3.9
ME 130 (Machine Shop Practice)						4.7	4.6	4.6	4.4	4.6
ME 220 (Pro Engineering)			4.6	3.7		4		4.4		4.2
ME 230 (CNC Prog)					4.9				4.9	4.9
ME 240 (Solid Works)	4.3		4.3		4.5		4.1		4.3	4.3
ME 302L (Strength of Matl Lab)	4.4	4.2	4.3	3.5	4.2	3.5	3.9	4.2	4.2	4
ME 315 (Thermal Lab)	3.3		3.5		3.9	3.7	3.9	4.2	4.3	3.8
ME 319/319L (Programming)	4.4		4.5		3.9		4.1		4.2	4.2
ME 337L (Eng Measurement)	4.2	3.3		3.8		4.1		4.5		4
ME 380L (Fluid Lab)	3.6	3.6	3.8	3.9	3.4	3.3	4.4	3.1	3.5	3.6
ME 421L (Auto Control Lab)		3.5		4.1		3.3		3.8		3.7

G.2.1.3 Evaluation of (a)-(k) ABET Educational Outcomes

Table 3.9 End-of-semester Student assessment of CRITERION 3

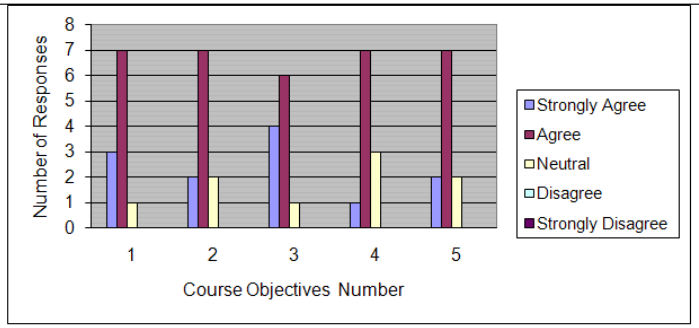
Criterion 3 (a)-(k) \ Semester	Spring 2005	Fall 2005	Spring 2006	Fall 2006	Spring 2007	Fall 2007	Spring 2008	Fall 2008	Spring 2009	Cumulative Average
a) an ability to apply knowledge of mathematics, science, and engineering	3.74	4.04	4.03		4.2	3.93	3.5	3.9	4	3.92
b) an ability to design and conduct experiments, as well as to analyze and interpret data	3.61	3.95	3.89		4.06	3.75	3.3	3.8	3.9	3.79
c) an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability	3.61	3.95	3.87		4.05	3.75	3	3.8	3.9	3.74
d) an ability to function on multidisciplinary teams	3.62	3.75	3.78		3.83	3.55	5	3.7	3.7	3.87
e) an ability to identify, formulate, and solve engineering problems	3.7	3.97	4.05		4.14	3.8	3.5	3.9	3.9	3.87
f) an understanding of professional and ethical responsibility	3.56	3.68	3.6		3.65	3.45	4	3.4	3.6	3.62
g) an ability to communicate effectively	3.48	3.71	3.62		3.74	3.51	3.3	3.6	3.7	3.59
h) the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context	3.58	3.73	3.68		3.8	3.51	3.6	3.6	3.7	3.66
i) a recognition of the need for, and an ability to engage in life-long learning	3.67	3.77	3.76		3.93	3.62	4	3.8	3.9	3.81
j) a knowledge of contemporary issues	3.52	3.64	3.68		3.65	3.38	3.3	3.4	3.6	3.52
k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.	3.78	4	4.03		4.19	3.89	3.3	3.8	4	3.87

(Excellent=5, Good=4, Neutral=3, Fair=2, Poor=1)

G.2.1.4 Evaluation of Class Course Objective (COA)

Table 3.10 Sample Course Objectives Assessment (COA)

ME 337 Engineering Measurement	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Faculty Response
1. Acquire the common mechanical measurement signals in the laboratory using either conventional measurement instruments or computer based data acquisition system.	3	5	1	0	0	
2. Design measurement system including the selection of appropriate transducers, signal conditioning units.	2	4	2	1	0	
3. Understand dynamic characteristics of measurement signal and instruments.	4	5	0	0	0	
4. Treat measurement data using statistics; probability theory; finite statistics, curve fitting of measurement data and goodness of fit.	4	4	1	0	0	
5. Analyze the measurement data using uncertainty analysis; propagation of individual uncertainties to final measurement results using Taylor series.	3	4	2	0	0	
						Total average COA*=4.2



Cumulative Results for Course Objective Assessment by Students (F05-F09)
5 (Strongly Agree)-1 (Strongly Disagree)

	Fall 05	Spring 06	Fall 06	Spring 07	Fall 07	Spring 08	Fall 08	Spring 09	Fall 09	5 Yr Avg.
ME 100*	3.9	3.7	4.0		4.1	4.0		3.8	2.5	**3.7**
ME 100L*	4.3	3.9	3.8	4.5	4.3	4.4	4.0	4.3	4.1	**4.2**
ME 120*	4.3	4.2	4.3	4.3	3.8	4.4		4.3	4.7	**4.3**
ME 130	4.8	5.0	3.8	4.7	5.0	4.3	5.0	4.9	5.0	**4.7**
ME 220*	4.5		4.3		4.3		4.4		4.7	**4.4**
ME 230								5.0		**5.0**
ME 240*				4.7		4.1		4.4		**4.4**
ME 242*			3.9	3.8	4.1	3.9	4.6		4.4	**4.1**
ME 301*	4.4		4.3		4.4		4.2	4.7		**4.4**
ME 302*	4.6	4.2	4.5		4.5	4.7	4.4	4.4	3.6	**4.4**
ME 302L*	4.5	4.7	4.5	4.6	4.5	4.6	4.2	4.7	4.4	**4.5**
ME 311*	4.2		4.0	4.2	3.9		4.0	3.8	4.2	**4.0**
ME 314*		4.3		4.4	4.5	4.2		4.5	4.5	**4.4**
ME 315*		4.0		4.1	4.3	4.4	4.6	4.5	4.5	**4.3**
ME 319*								4.5	4.5	**4.5**
ME 319L*								4.5	4.5	**4.5**
ME 320*		4.4		4.4		4.4		3.4		**4.2**
ME 330*		3.9		4.3		4.0		4.4		**4.2**
ME 337*	4.0		3.4		3.9		4.0	4.1		**3.9**

Relationship between Courses and Educational Outcomes

- C.O.A. (Course Obj Assessment)
- Faculty evaluation of courses (Course Grade)

ABET course descriptions for all ME courses have the following relationship:

Goal1: Provide mechanical engineering graduates with technical capabilities.					Goal 2: Prepare the mechanical engineering graduates to have effective workplace skills.				Goal 3: Instilling a sense of responsibility as a professional member of society.			
1.a	**1.b**	**1.c**	**1.d**	**1.e**	**2.a**	**2.b**	**2.c**	**2.d**	**3.a**	**3.b**	**3.c**	**3.d**
M	**H**		**H**	**L**	**L**		**L**					

Relationship of Course to Mechanical Engineering Program Educational Outcomes:
(L)ow (M)edium (H)igh

Cumulative C.O.A Data (F05-F09)

Table 3-11 Educational Outcomes evaluation based on the cumulative (Fall 2005-Fall 2009) Course Objective Assessment (COA) in **Appendix E.7**

Educational Objectives	Courses, (H)igh Relation		Courses, (M)edium Relation		Courses, (L)ow Relation		Weighted Avg.**
1.a. Fundamental knowledge of state-of-the-art and evolving...	ME 100, ME 100L, ME 242, ME 301, ME 302, ME 302L, ME 314, ME 315, ME 319, ME 319L, ME 320, ME 330, ME 380, ME 380L, ME 400, ME 402, ME 415, ME 416, ME 419, ME 421, ME 421L, ME 425, ME 426, ME 427, ME 434, ME 440, ME 446, ME 453, ME 455, ME 456, ME 460, ME 462, ME 470, ME 495, ME 497, ME 498		ME230, ME 311, ME 337, ME 337L, ME 418, ME 429		ME 220, ME 240		4.2
	Avg COA* (F05-F09)	4.16	Avg COA (F05-F09)	4.16	Avg COA (F05-F09)	4.37	
1.b. Ability to design and conduct experiments, ...	ME 100L, ME 130, ME 302L, ME 315, ME 337, ME 337L, ME 380L, ME 421, ME 421L, ME 434, ME 460, ME 462, ME 470, ME 497, ME 498		ME 100, ME 120, ME 220, ME 240, ME 242, ME 426, ME 427, ME 440, ME 455		ME 302, ME 314, ME 446		4.2
	Avg COA (F05-F09)	4.21	Avg COA (F05-F09)	4.18	Avg COA (F05-F09)	4.2	
1.c. Ability to solve open-ended design	ME 100, ME 100L, ME 320, ME 415, ME 418, ME 419, ME 421, ME 429, ME 440, ME 460, ME 462, ME 495, ME 497, ME 498		ME 302, ME 380, ME 400, ME 416, ME 434, ME 443, ME 446, ME 456		ME 120, ME 220, ME 240, ME 301, ME 302L, ME 311, ME 314, ME 315, ME 319, ME 319L, ME 330		4.1
	Avg COA (F05-F09)	4.13	Avg COA (F05-F09)	3.96	Avg COA (F05-F09)	4.29	
1.d. Ability to use modern computational..	ME 100, ME 100L, ME 120, ME 220, ME 240, ME 242, ME 315, ME 319, ME 319L, ME 320, ME 330, ME 337, ME 337L, ME 380, ME 400, ME 402, ME 421, ME 421L, ME 425, ME 429, ME 443, ME 453, ME 456, ME 495, ME 497, ME 498		ME 415, ME 416, ME 434, ME 440, ME 455, ME 460, ME 462		ME 230, ME 314, ME 426, ME 427, ME 446, ME 470		4.1
	Avg COA (F05-F09)	4.13	Avg COA (F05-F09)	3.98	Avg COA (F05-F09)	4.4	

Cumulative Course Grades (F07-F09)

Table 3.15 Educational Outcomes Assessed by Faculty Evaluation of Students (Fall 2007-Fall 2009) based on Table 3.3

Educational Outcomes	Avg. GPA (4.0 scale)	1(Strongly Disagree)-5(Strongly Agree) scale
1.a. Fundamental knowledge of state-of-the-art and evolving areas associated with the mechanical engineering field.	3.1	3.9
1.b. Ability to design and conduct experiments, analyze data, and utilize statistical methods.	3.2	4.0
1.c. Ability to solve open-ended design problems.	3.1	3.9
1.d. Ability to use modern computational techniques to solve engineering problems.	3.1	3.9
1.e. Ability to mathematically model and analyze engineering systems.	3.1	3.9
2.a. Oral and written presentation of technical information.	3.1	3.9
2.b. Introductory knowledge of economics.	3.5	4.4
2.c. Working on a multi-disciplinary team with peers.	3.1	3.9
2.d. Motivation to pursue lifelong learning.	3.1	3.9
3.a. Commitment to professional and ethical behavior in the workplace.	3.3	4.1
3.b. Awareness of world affairs and cultures.	.5	4.4
3.c. Recognition of the impact of engineering on local and global societies.		
3.d. Seeking professional licensure.	3.2	4.0

X1.25

G.2.1.5 Exit Interviews

Educational Outcomes

Table 3.12 Cumulative Summary of Graduate Exit Interview for Program Outcomes from Spring 2005 to Spring 2009

MEG Program Outcomes \ Semester	Spring 2005	Fall 2005	Spring 2006	Fall 2006	Spring 2007	Fall 2007	Spring 2008	Fall 2008	Spring 2009	Cumulative Average
1.a. Fundamental knowledge of state-of-the-art and evolving areas associated with the mechanical engineering field.	3.9	4.5	4.2	4.1	3.8	3.9	4.2	4.0	4.3	4.1
1.b. Ability to design and conduct experiments, analyze data, and utilize statistical methods.	3.7	4.25	4.3	4.5	4.2	3.5	4.4	4.3	4.3	4.2
1.c. Ability to solve open-ended design problems.	4.3	4.5	4.6	4.6	4.3	4.1	4.3	4.5	4.5	4.4
1.d. Ability to use modern computational techniques to solve engineering problems.	4.1	4.75	4.3	4.3	4.3	3.8	4.1	4.1	4.3	4.2
1.e. Ability to mathematically model and analyze engineering systems.	4.4	4.5	4.7	4.4	4.3	4.4	4.1	4.4	4.3	4.4
2.a. Oral and written presentation of technical information.	4.1	4.5	4.2	4.5	4.5	4.1	3.7	4.2	4.0	4.2
2.b. Introductory knowledge of economics.	4.4	4.5	4.5	4.1	4.2	4.1	4.1	4.4	4.3	4.3
2.c. Working on a multi-disciplinary team with peers.	4.4	4.75	4.7	4.7	4.8	4.5	4.4	4.6	4.7	4.6
2.d. Motivation to pursue lifelong learning.	4.0	4.75	3.9	4.5	4.3	4.3	3.8	4.5	4.5	4.3
3.a. Commitment to professional and ethical behavior in the workplace.	4.0	4.5	3.9	4.2	4.3	4.1	4.3	4.3	4.3	4.2
3.b. Awareness of world affairs and cultures.	3.7	3.75	3.4	3.2	3.7	3.1	3.2	3.4	3.5	3.4
3.c. Recognition of the impact of engineering on local and global societies.	3.7	3.5	3.8	3.5	3.8	3.8	3.7	4.1	4.1	3.8
3.d. Seeking professional licensure.	3.6	4	3.5	3.7	4.3	4.0	4.1	3.7	3.9	3.9

Lab Survey

Table 3.13 Cumulative Summary of Graduate Exit Interview for Laboratory from Spring 2005 to Spring 2009

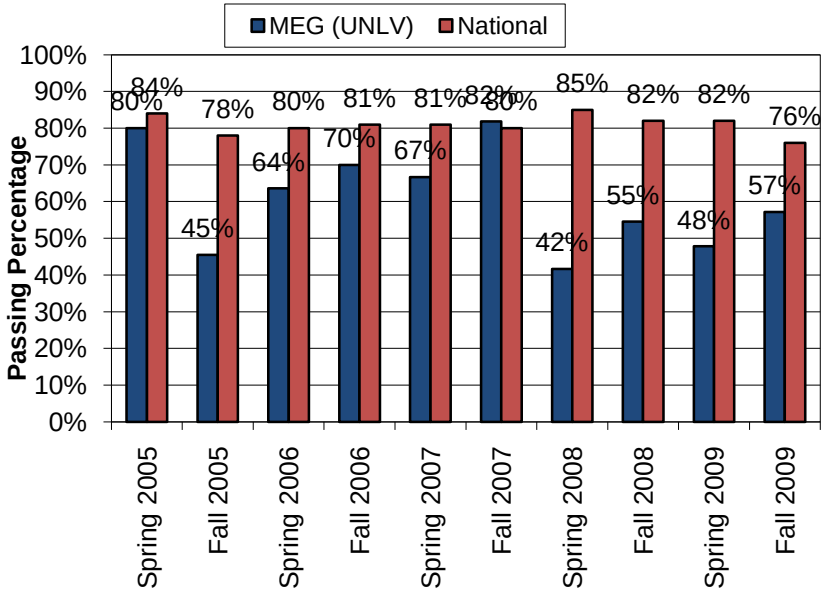
Laboratory Survey \ Semester	Spring 2005	Fall 2005	Spring 2006	Fall 2006	Spring 2007	Fall 2007	Spring 2008	Fall 2008	Spring 2009	Cumulative Average
1. The lab manual/notes adequately describe equipment and experiments. If not, please help us identify problems.	3.1	4.25	4.1	3.8	3.7	3.5	3.3	3.7	3.9	3.7
2. The lab experiments are reasonable in length and content. If not, how can we change it?	3.9	4	3.8	3.8	3.8	3.3	3.7	4.0	4.1	3.8
3. The lab experiments follow the lecture material. If not please explain.	3.4	3.5	3.7	3.8	3.7	3.4	3.4	3.7	3.4	3.6
4. The performance of the lab instructors is satisfactory. If not, how can they improve it.	2.9	4	3.5	3.9	4.5	3.5	3.0	3.7	3.8	3.6
5. The lab equipment is functional. If not, please explain.	2.3	3.25	2.9	3.2	3.3	2.5	2.6	3.4	3.6	3.0
6. The lab is well equipped. If not, what do you think is missing.	2.9	3.75	3.3	3.8	3.8	3.1	2.8	3.7	3.8	3.4

Postgraduate Survey

Table 3.14 Cumulative Summary of Exit Interview for Post-Graduate Survey from Spring 2005 to Spring 2009

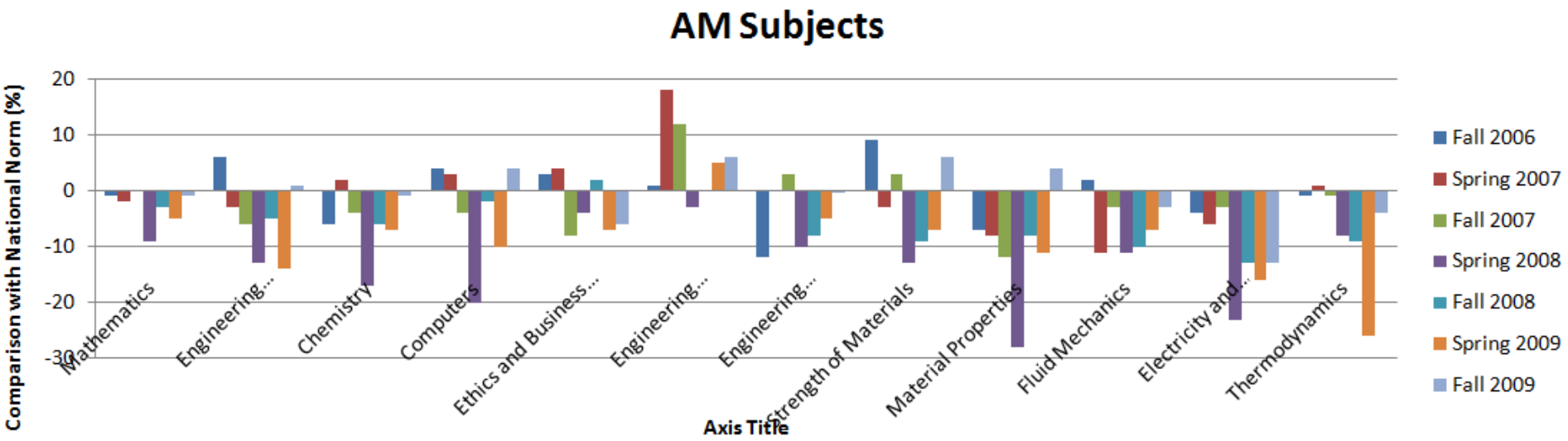
Post-Graduate Survey \ Semester	Spring 2005	Fall 2005	Spring 2006	Fall 2006	Spring 2007	Fall 2007	Spring 2008	Fall 2008	Spring 2009	Cumulative Average
1. Are you currently employed or do you have an employment offer?	71.4 %	75.0 %	100.0 %	76.9 %	16.7 %	62.5 %	61.1 %	78.6 %	68.4 %	67.8%
2. Is your employment related to Mechanical Engineering?	83.3 %	75.0 %	60.0 %	58.3 %	50.0 %	80.0 %	100.0 %	76.9 %	75.0 %	73.2%
3. Did you have an internship while your were student at UNLV? If you answer *yes*, please answer the following questions?	71.4 %	100.0 %	90.0 %	85.7 %	50.0 %	87.5 %	83.3 %	73.3 %	65.0 %	78.5%
3.a. Was your internship with a local firm/organization?	60.0 %	0.0%	66.7 %	63.6 %	100.0 %	85.7 %	92.9 %	91.7 %	91.7 %	72.5%
3.b Was it related to your field of study?			87.5 %	81.8 %	100.0 %			66.7 %	92.3 %	85.7%
3.c. Was your internship with a research project within the department?	60.0 %	100.0 %	44.4 %	54.5 %	0.0%	14.3 %	33.3 %	22.2 %	23.1 %	39.1%
3.d. Is your employment a result of an internship?	50.0 %	100.0 %	30.0 %	27.3 %	33.3 %	66.7 %	25.0 %	50.0 %	41.2 %	47.0%
4. Are you planning to pursue a graduate degree?	100.0%	75.0 %	77.8 %	78.6 %	57.1 %	87.5 %	70.6 %	92.9 %	82.4 %	80.2%
5. If so, have you applied?	60.0 %	75.0 %	25.0 %	50.0 %	25.0 %	0.0%	33.3 %	35.7 %	41.2 %	38.4%

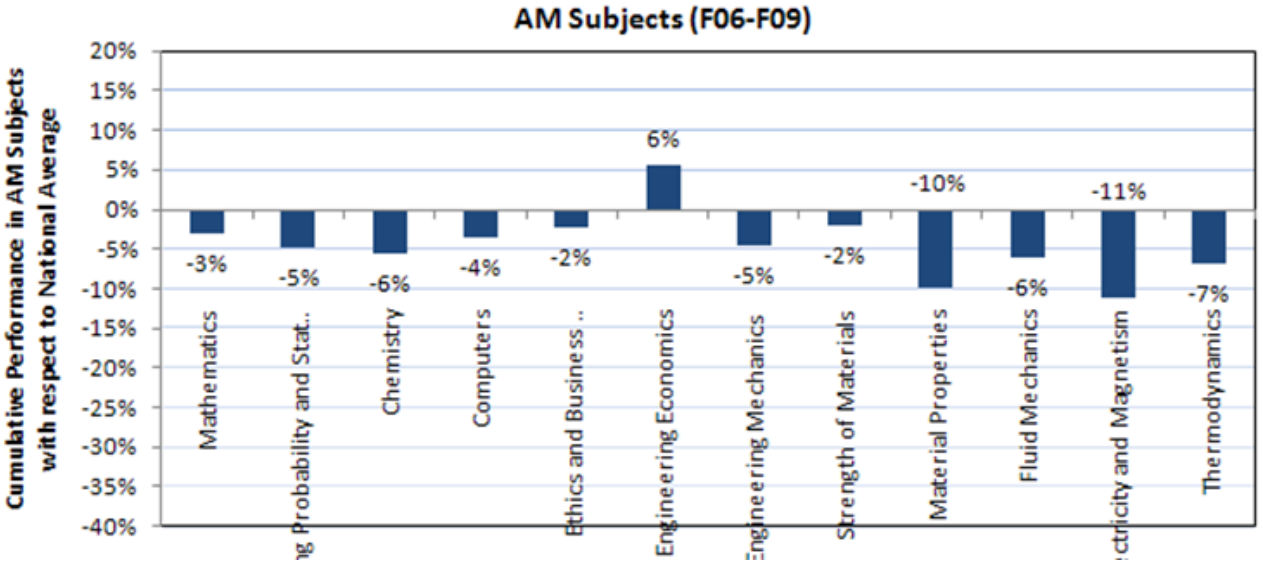
G.3.1 FE Exam Results

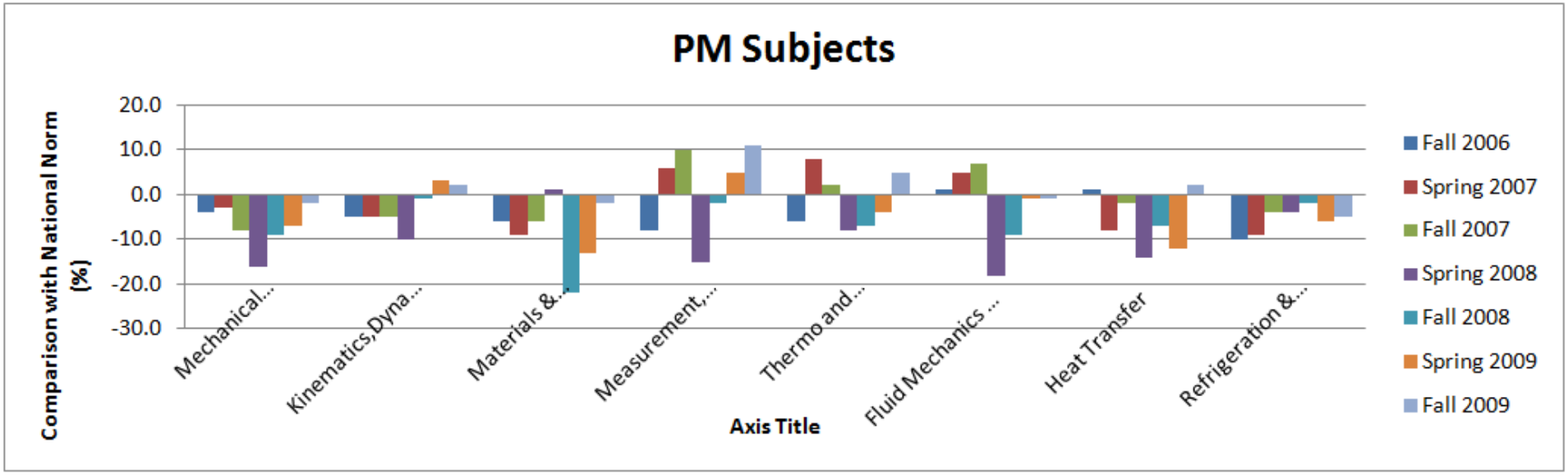


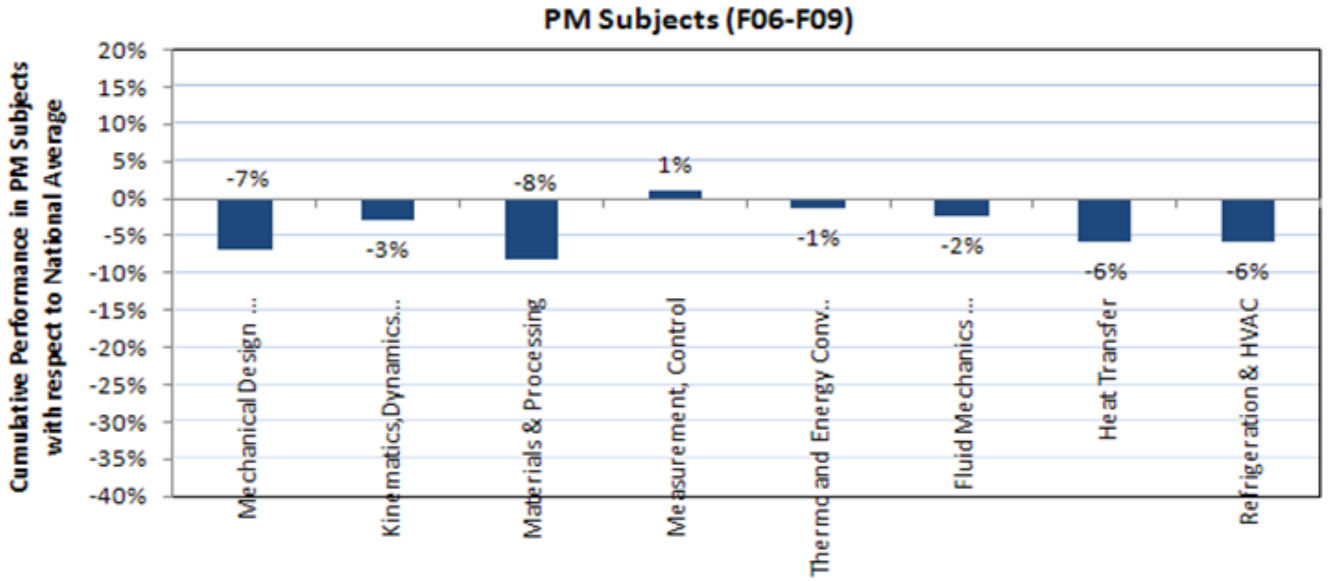
	MEG Program Outcomes												
AM Subjects	1.a.	1.b.	1.c.	1.d.	1.e.	2.a.	2.b.	2.c.	2.d.	3.a.	3.b.	3.c.	3.d.
Mathematics	×												
Engineering Probability and Statistics		×											
Chemistry	×												
Computers				×									
Ethics and Business Practices										×			
Engineering Economics							×						
Engineering Mechanics (Statics and Dynamics)	×												
Strength of Materials	×				×								
Material Properties	×				×								
Fluid Mechanics	×				×								
Electricity and Magnetism	×												
Thermodynamics	×				×								

	MEG Program Outcomes												
PM Subjects	1.a.	1.b.	1.c.	1.d.	1.e.	2.a.	2.b.	2.c.	2.d.	3.a.	3.b.	3.c.	3.d.
Mechanical Design and Analysis					×								
Kinematics, Dynamics, and Vibration					×								
Materials & Processing					×								
Measurement, Instrumentation, and Controls		×			×								
Thermodynamics and Energy Conversion Processes					×								
Fluid Mechanics and Fluid Machinery					×								
Heat Transfer					×								
Refrigeration & HVAC					×								


AM Subjects
Comparison with National Norm (%)
20
10
0
-10
-20
-30
Mathematics
Engineering...
Chemistry
Computers
Ethics and Business...
Engineering...
Engineering...
Strength of Materials
Material Properties
Fluid Mechanics
Electricity and...
Thermodynamics
Axis Title
Fall 2006
Spring 2007
Fall 2007
Spring 2008
Fall 2008
Spring 2009
Fall 2009


AM Subjects (F06-F09)
Cumulative Performance in AM Subjects with respect to National Average
20%
15%
10%
5%
0%
-5%
-10%
-15%
-20%
-25%
-30%
-35%
-40%
-3%
-5%
-6%
-4%
-2%
6%
-5%
-2%
-10%
-6%
-11%
-7%
Mathematics
Probability and Stat..
Chemistry
Computers
Ethics and Business ..
Engineering Economics
Engineering Mechanics
Strength of Materials
Material Properties
Fluid Mechanics
Thermodynamics


PM Subjects
Comparison with National Norm (%)
20.0
10.0
0.0
-10.0
-20.0
-30.0
Mechanical...
Kinematics,Dyna...
Materials &...
Measurement,...
Thermo and...
Fluid Mechanics ...
Heat Transfer
Refrigeration &...
Axis Title
Fall 2006
Spring 2007
Fall 2007
Spring 2008
Fall 2008
Spring 2009
Fall 2009


PM Subjects (F06-F09)
Cumulative Performance in PM Subjects with respect to National Average
20%
15%
10%
5%
0%
-5%
-10%
-15%
-20%
-25%
-30%
-35%
-40%
-7%
-3%
-8%
1%
-1%
-2%
-6%
-6%
Mechanical Design ...
Kinematics,Dynamics...
Materials & Processing
Measurement, Control
Thermo and Energy Conv...
Fluid Mechanics ...
Heat Transfer
Refrigeration & HVAC

G.3.2 Senior Design Competition

Howard R Hughes College of Engineering
Fall 2008 Senior Design Competition
Evaluation Form

Project Name: Shhhop Vac
Team Members: Brandon Bechtol, Juan Plata
Time: 9:15 – 9:45 a.m.
Department/s: Mechanical Engineering

- **Innovation** (Project and the technical approach is novel or unique)
  Please circle one only (1 is the lowest, 10 is the highest).

  2 4 6 8 10

- **Potential for Commercialization/Implementation** (It should be possible to either commercialize or implement the project. Potential for salability of the project or other applications / spin-offs, Economic analysis)
  Please circle one only (1 is the lowest, 10 is the highest).

  2 4 6 8 10

- **Technical Merit** (Merits in terms of the technical details of the project, Constraint analysis, Alternative design analysis, Testing and Quality of Test data)
  Please circle one only (1 is the lowest, 10 is the highest).

  2 4 6 8 10

- **Clarity and soundness of the project** (Are the ideas and implementation of the project clear?)
  Please circle one only (1 is the lowest, 10 is the highest).

  2 4 6 8 10

- **Presentation (oral)** (How well is the project presented orally?)
  Please circle one only (1 is the lowest, 5 is the highest).

  1 2 3 4 5

- **Presentation (poster)** (How well is the project presented in terms of the poster?)
  Please circle one only (1 is the lowest, 5 is the highest).

  1 2 3 4 5

Comments:

	Student Group 1 "Best Baja Buggie"			Student Group 2 "Elegant Bath Plumbing "			…	Student Group 10* "Home Power Meter"				
	Judge 1	Judge 2	Judge 3	Judge 1	Judge 2	Judge 3		Judge 3	Judge 1	Judge 2	Judge 3	Average Points per Area	Percentile per Area
Innovation (10 points)	8	7	6	6	4	5		8	10	8	9	**7.8**	**78%**
Potential for Commercialization/Implementation (10 points)	8	8	6	8	8	6		8	10	10	10	**8.6**	**86%**
Technical Merit (10 points)	10	8	8	8	8	6		10	10	8	9	**8.2**	**82%**
Clarity and soundness of the project (10 points)	10	7	7	8	6	7		10	10	10	8	**8.2**	**82%**
Presentation (oral) (5 points)	5	4	4	5	4	4		5	5	5	5	**4.5**	**90%**
Presentation (Poster) (5 points)	5	4	3	5	4	3		3	5	5	4	**4.2**	**84%**
Total in Percentile per Each Student Group	**79%**			**70%**					**94%**				

* Interdisciplinary

	Average Points per Evaluated Areas for all Project in each semester				Cumulative Average (F07-F09)		(1)-(5) scale using Table 3.20
	Fall 2007	Spring 2008	Fall 2008	Spring 2009			
Innovation (10 points)	7.6	7.0	7.4	7.8	**7.5/10.0**	**75%**	**3.5**
Potential for Commercialization/Implementation (10 points)	7.7	8.2	7.5	8.6	**8.0/10.0**	**80%**	**4.0**
Technical Merit (10 points)	7.7	7.7	8.0	8.2	**7.9/10.0**	**79%**	**3.9**
Clarity and soundness of the project (10 points)	7.8	7.8	7.8	8.2	**7.9/10.0**	**79%**	**3.9**
Presentation (oral) (5 points)	4.4	3.9	4.4	4.5	**4.3/5.0**	**86%**	**4.6**
Presentation (Poster) (5 points)	3.5	4.1	3.9	4.2	**3.9/5.0**	**78%**	**3.8**

G.3.4 Industry Survey Results

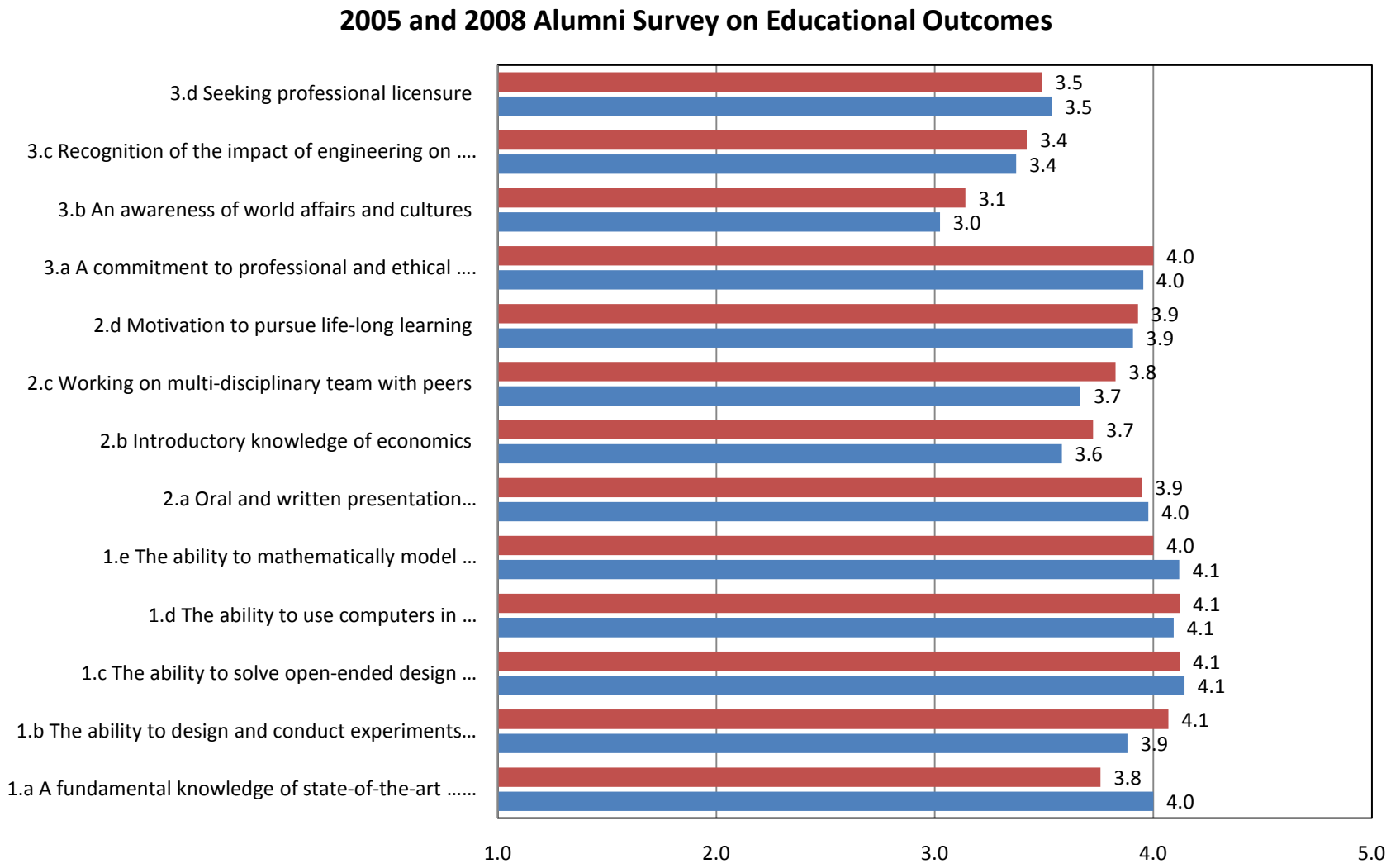
Table 3.22 Cumulative Industry Survey Results

	Spring 2005	Spring 2006	Spring 2007	Spring 2008	Spring 2009	5 yr Average
1.a A fundamental knowledge of state-of-the-art and evolving areas associated with the mechanical engineering field	4.2	4.2	3.3	3.6	3.1	**3.7**
1.b The ability to design and conduct experiments, analyze data, and utilize statistical methods	3.6	4.7	3.1	4.2	3.2	**3.7**
1.c The ability to solve open-ended design problems	4.2	4.0	3.4	4.2	3.1	**3.8**
1.d The ability to use computers in solving engineering problems	4.0	4.2	3.9	4.6	3.5	**4.0**
1.e The ability to mathematically model and analyze engineering systems	3.6	4.2	3.5	3.4	3.1	**3.5**
2.a Oral and written presentation of technical information	3.4	4.5	3.5	3.0	2.8	**3.5**
2.b Introductory knowledge of economics	3.4	3.5	3.0	3.6	3.0	**3.3**
2.c Working on multi-disciplinary team with peers	3.9	4.5	3.3	3.8	2.9	**3.7**
2.d Motivation to pursue life-long learning	3.9	4.7	3.4	4.0	3.5	**3.9**
3.a A commitment to professional and ethical behavior in the work place	4.6	5.0	3.9	4.4	3.0	**4.2**
3.b An awareness of world affairs and cultures	3.2	3.2	2.9	3.4	3.3	**3.2**
3.c Recognition of the impact of engineering on local and global societies	3.3	3.0	3.0	3.6	2.9	**3.2**
3.d Seeking professional licensure	3.7	3.3	3.4	3.2	3.0	**3.3**

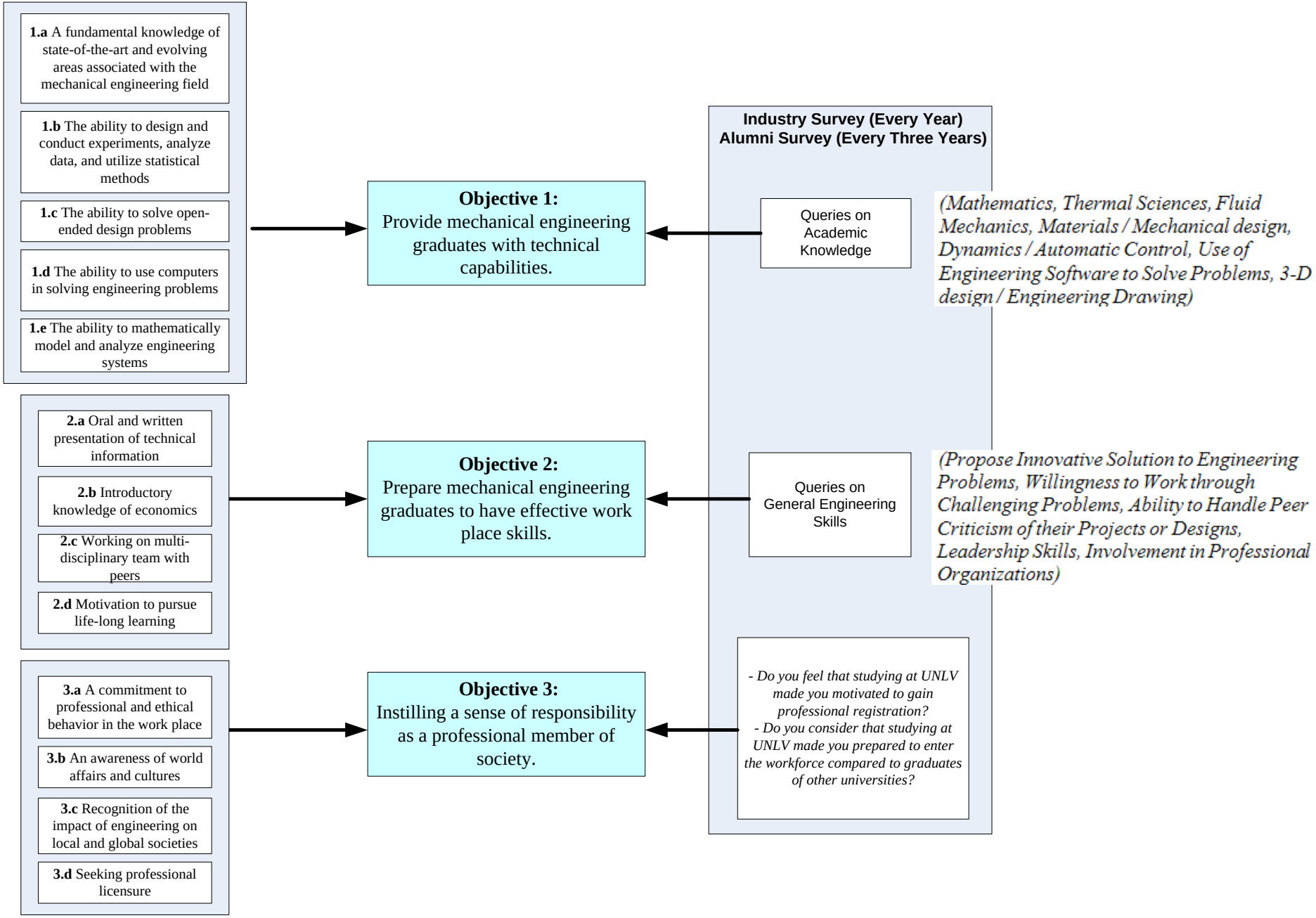
Chart Area

Ranking (5=Strongly Agree and 1=Strongly Disagree)

G.3.4 Alumni Survey



Achievement of Educational Objectives


1.a A fundamental knowledge of state-of-the-art and evolving areas associated with the mechanical engineering field
1.b The ability to design and conduct experiments, analyze data, and utilize statistical methods
1.c The ability to solve open-ended design problems
1.d The ability to use computers in solving engineering problems
1.e The ability to mathematically model and analyze engineering systems
Objective 1: Provide mechanical engineering graduates with technical capabilities.
Industry Survey (Every Year)
Alumni Survey (Every Three Years)
Queries on Academic Knowledge
(Mathematics, Thermal Sciences, Fluid Mechanics, Materials / Mechanical design, Dynamics / Automatic Control, Use of Engineering Software to Solve Problems, 3-D design / Engineering Drawing)
2.a Oral and written presentation of technical information
2.b Introductory knowledge of economics
2.c Working on multi-disciplinary team with peers
2.d Motivation to pursue life-long learning
Objective 2: Prepare mechanical engineering graduates to have effective work place skills.
Queries on General Engineering Skills
(Propose Innovative Solution to Engineering Problems, Willingness to Work through Challenging Problems, Ability to Handle Peer Criticism of their Projects or Designs, Leadership Skills, Involvement in Professional Organizations)
3.a A commitment to professional and ethical behavior in the work place
3.b An awareness of world affairs and cultures
3.c Recognition of the impact of engineering on local and global societies
3.d Seeking professional licensure
Objective 3: Instilling a sense of responsibility as a professional member of society.
- Do you feel that studying at UNLV made you motivated to gain professional registration?
- Do you consider that studying at UNLV made you prepared to enter the workforce compared to graduates of other universities?

Summary

Table 4.1 Assessment Results for CRITERION 2

Cumulative Industry & Alumni Survey Results for Educational Objectives

	Direct Assessment of Educational Outcomes		Indirect Assessment through Academic Knowledge		Indirect Assessment through General Engineering Skills		*Other Questions:* *- Do you feel that studying at UNLV made you motivated to gain professional registration?* *- Do you consider that studying at UNLV made you prepared to enter the workforce compared to graduates of other universities?*	
	Industry Survey	Alumni Survey	Industry Survey	Alumni Survey	Industry Survey	Alumni Survey	Industry Survey	Alumni Survey
Objective 1: Provide mechanical engineering graduates with technical capabilities.	**3.7**	**4**	**3.4**	**3.75**				
Objective 2: Prepare mechanical engineering graduates to have effective work place skills.	**3.6**	**3.85**			**3.6**	**3.7**		
Objective 3: Instilling a sense of responsibility as a professional member of society.	**3.3**	**3.5**					**3.55**	**3.22**

Scale: 5(Strongly Agree)-1(Strongly Disagree)

Rating>4.0

Rating<3.5

Achievement of ABET(a)-(k)

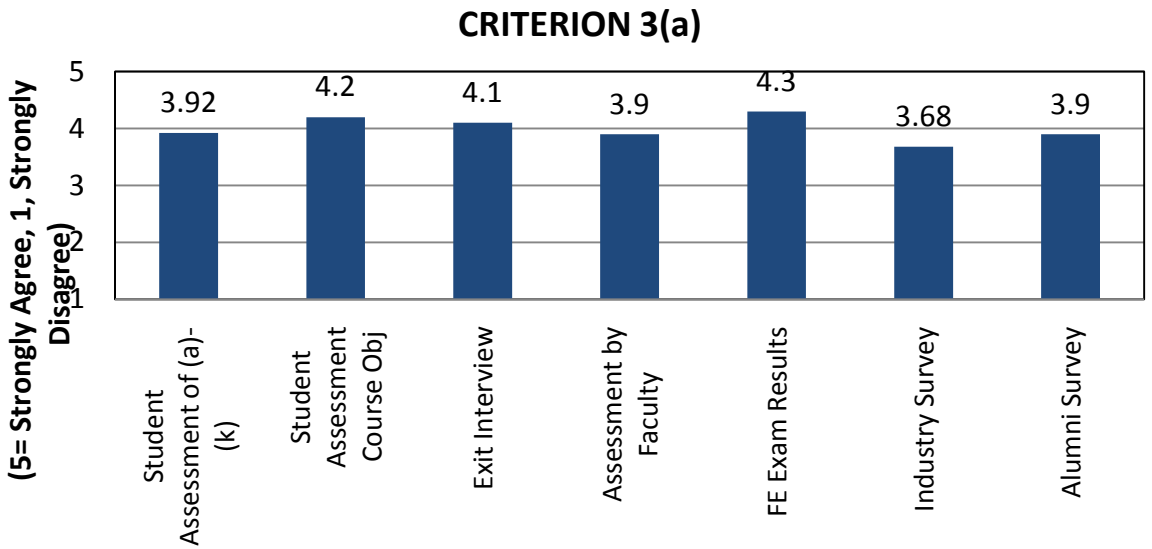
Criterion 3(a)

- Evaluation of Course Objectives
- Exit Interviews
- Faculty Assessment
- FE Exam
- MEG Advisory Board / Local Industry Surveys
- Alumni Surveys (Tri-Annual)

→ 1.a A fundamental knowledge of state-of-the-art and evolving areas associated with the mechanical engineering field

→ a) an ability to apply knowledge of mathematics, science, and engineering

Evaluation of (a)-(k) ABET Educational Outcomes by Students (every semester)



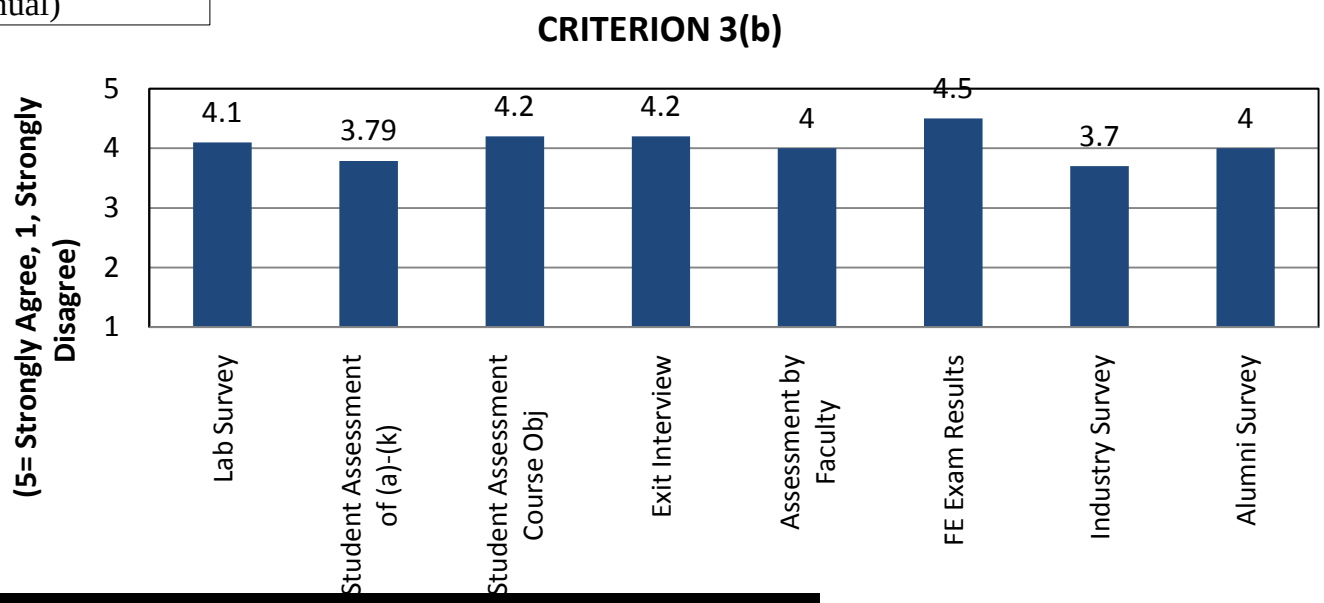
Criterion 3(b)

- Evaluation of Course Objectives
- Exit Interviews
- Faculty Assessment
- FE Exam
- MEG Advisory Board / Local Industry Surveys
- Alumni Surveys (Tri-Annual)

→ 1.b The ability to design and conduct experiments, analyze data, and utilize statistical methods

→ b) an ability to design and conduct experiments, as well as to analyze …

Evaluation of (a)-(k) ABET Educational Outcomes by Students (every semester)



Criterion 3(c)

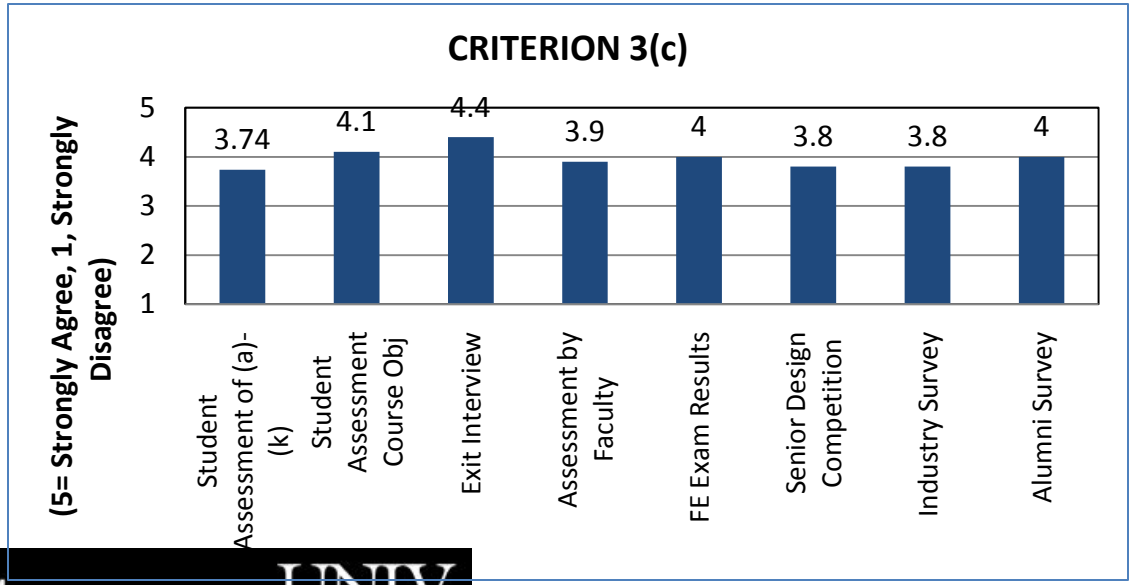
- Evaluation of Course Objectives
- Exit Interviews
- Faculty Assessment
- FE Exam
- Senior Design Competition
- MEG Advisory Board / Local Industry Surveys
- Alumni Surveys (Tri-Annual)

→ 1.c The ability to solve open-ended design problems

Evaluation of (a)-(k) ABET Educational Outcomes by Students (every semester)

↓

→ c) an ability to design a system, component, or process to meet desired needs …..



Criterion 3(d)

Evaluation of Course Objectives

Exit Interviews

Faculty Assessment

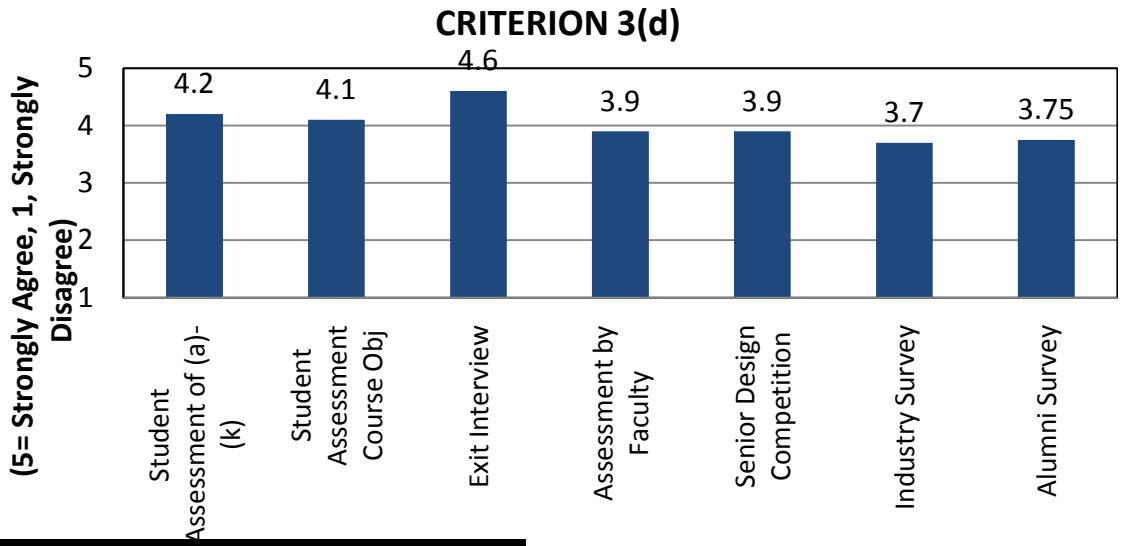
MEG Advisory Board / Local Industry Surveys

Alumni Surveys (Tri-Annual)

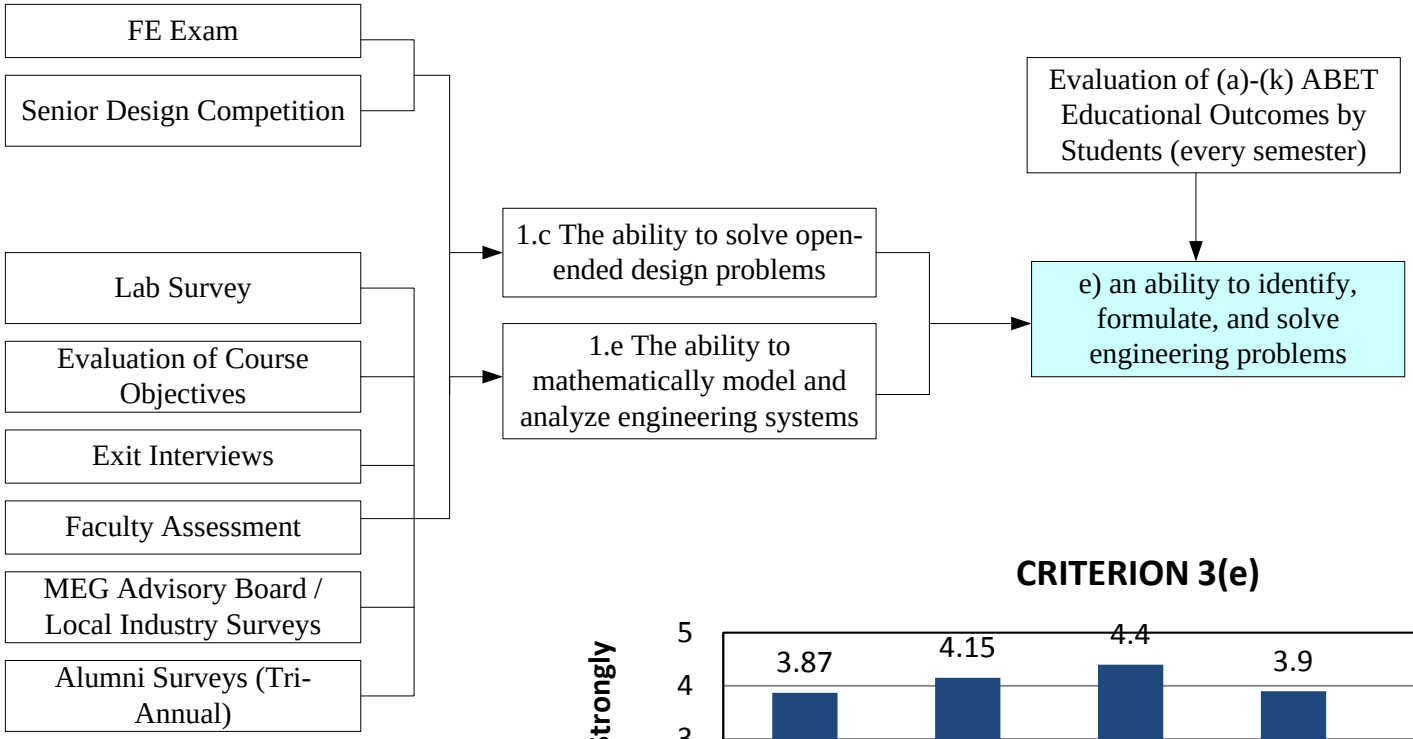
2.c Working on multi-disciplinary team with peers

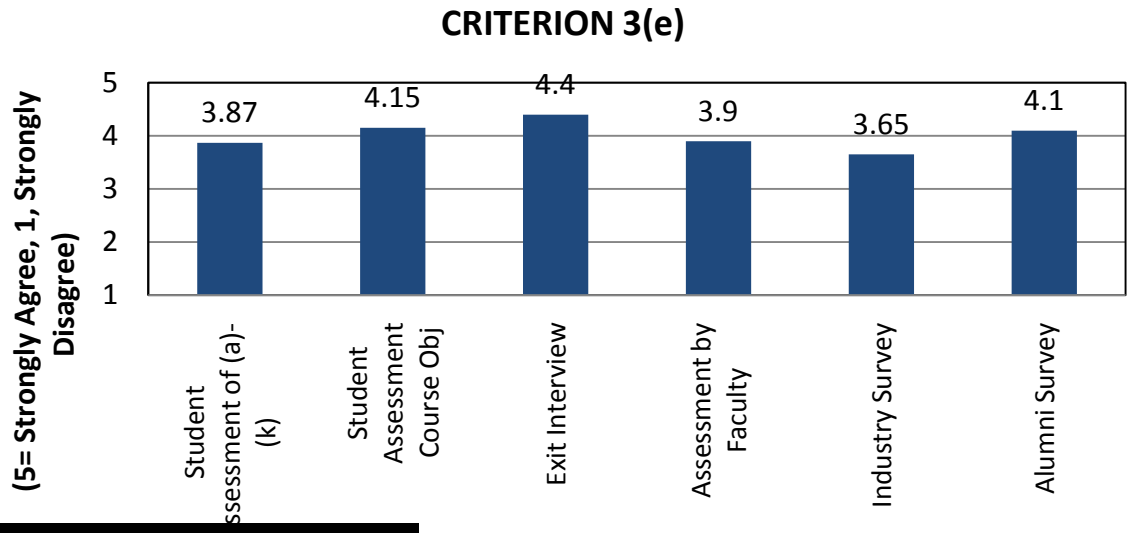
Evaluation of (a)-(k) ABET Educational Outcomes by Students (every semester)

d) an ability to function on multidisciplinary teams

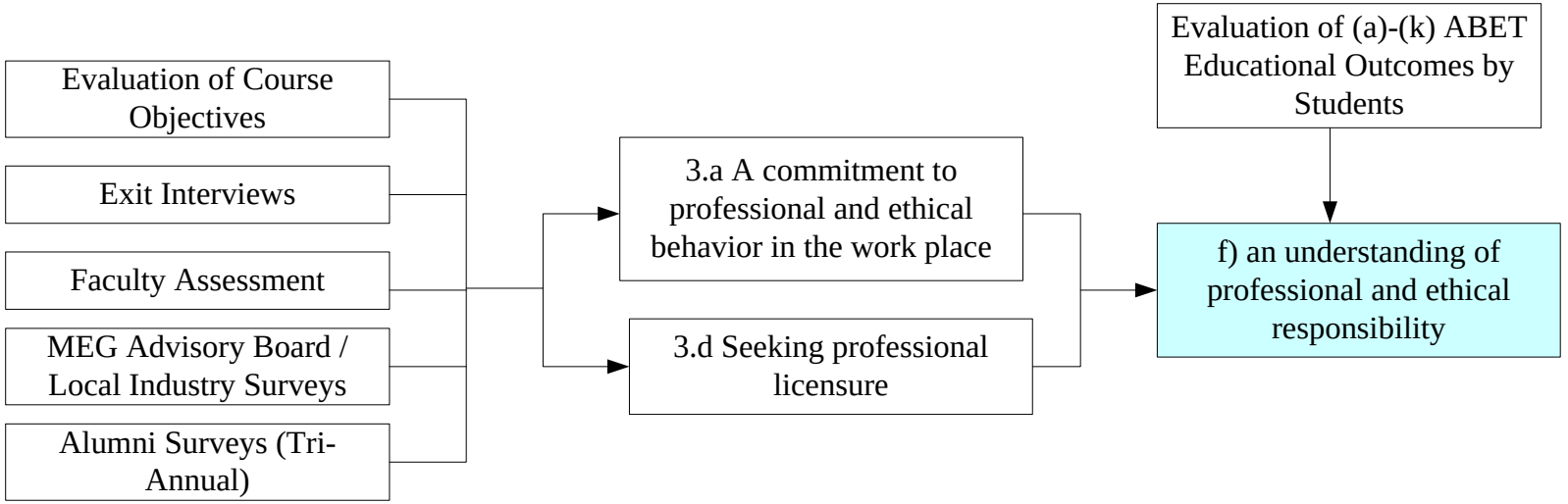


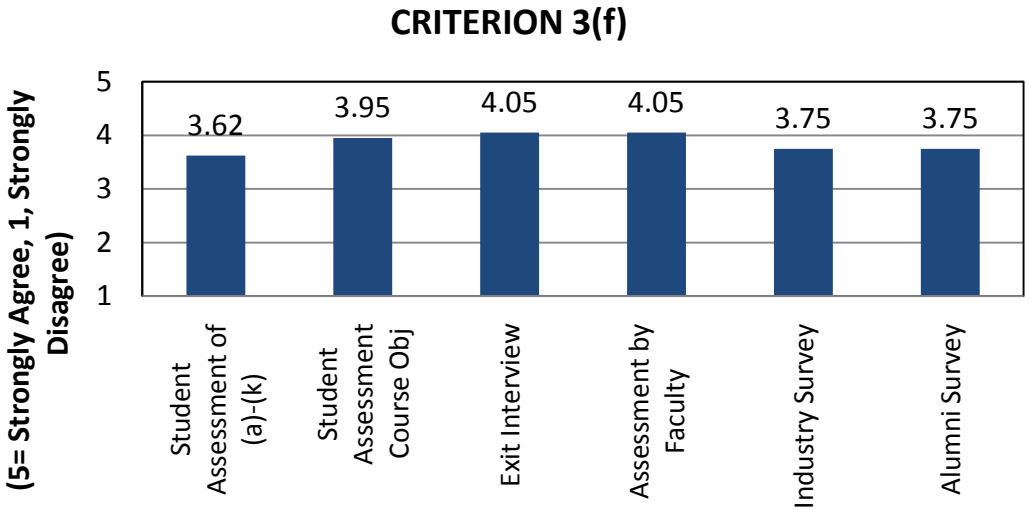
Criterion 3(e)



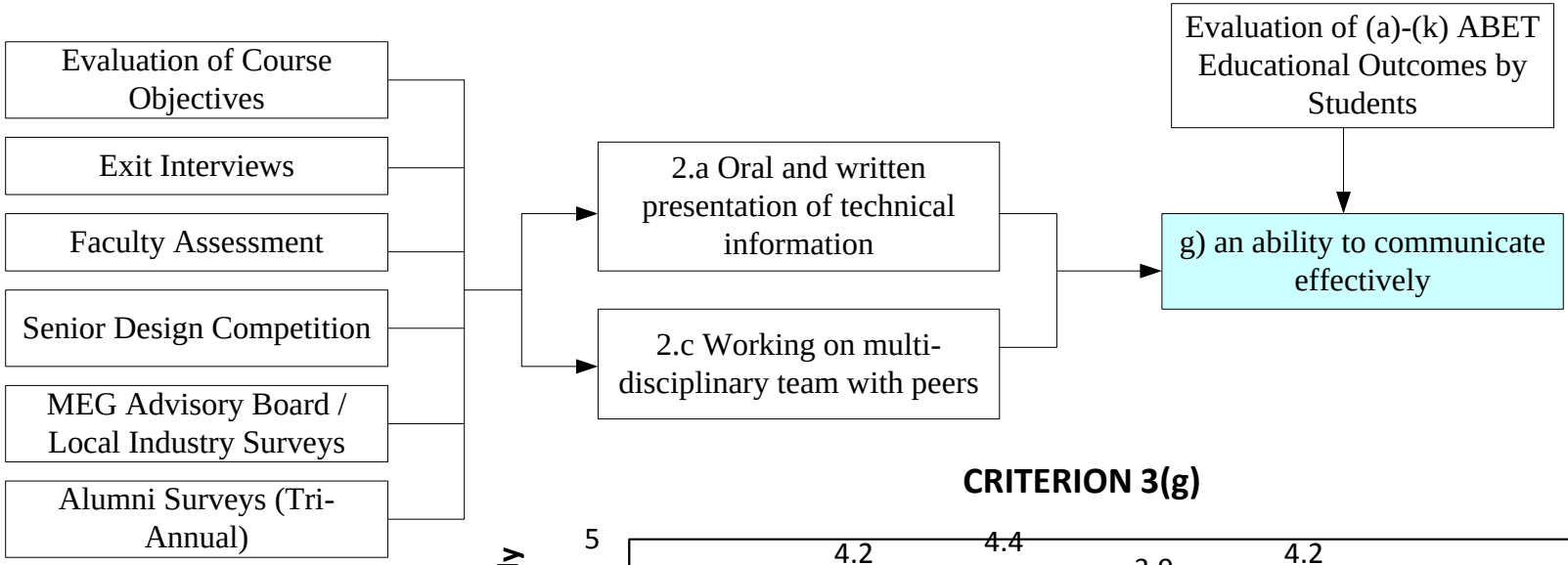


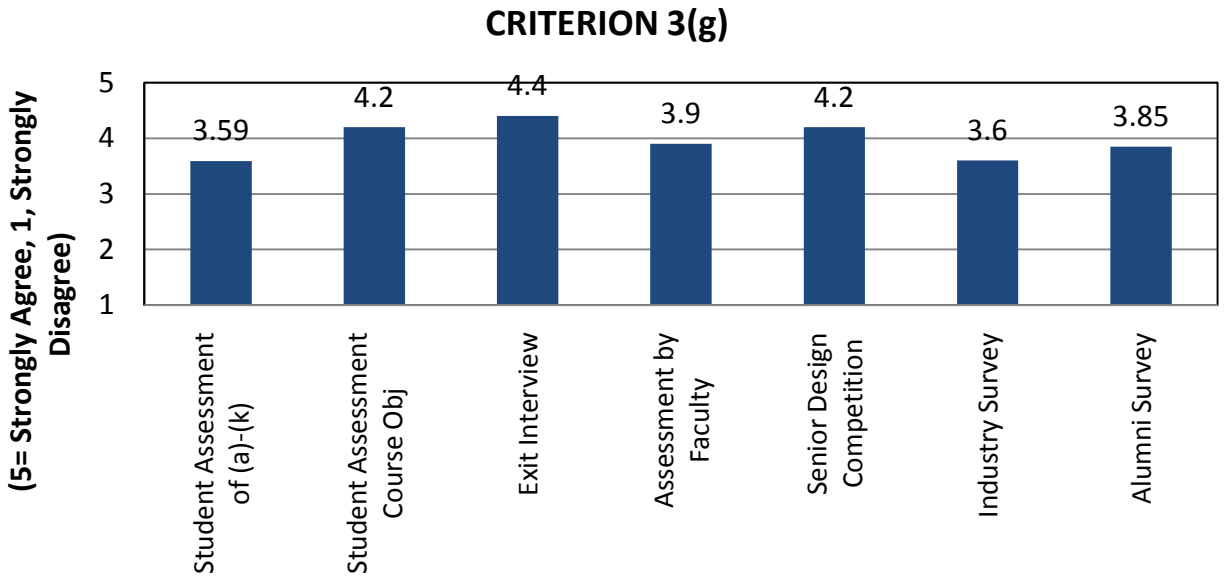
Criterion 3(f)



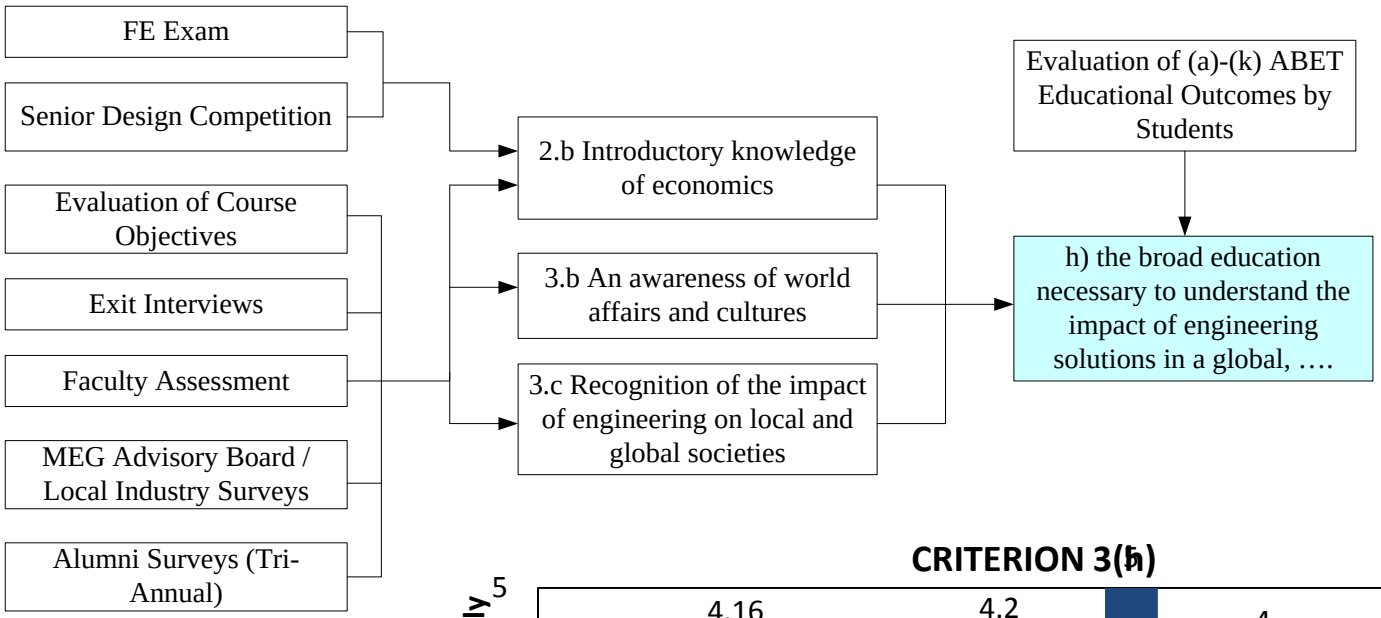


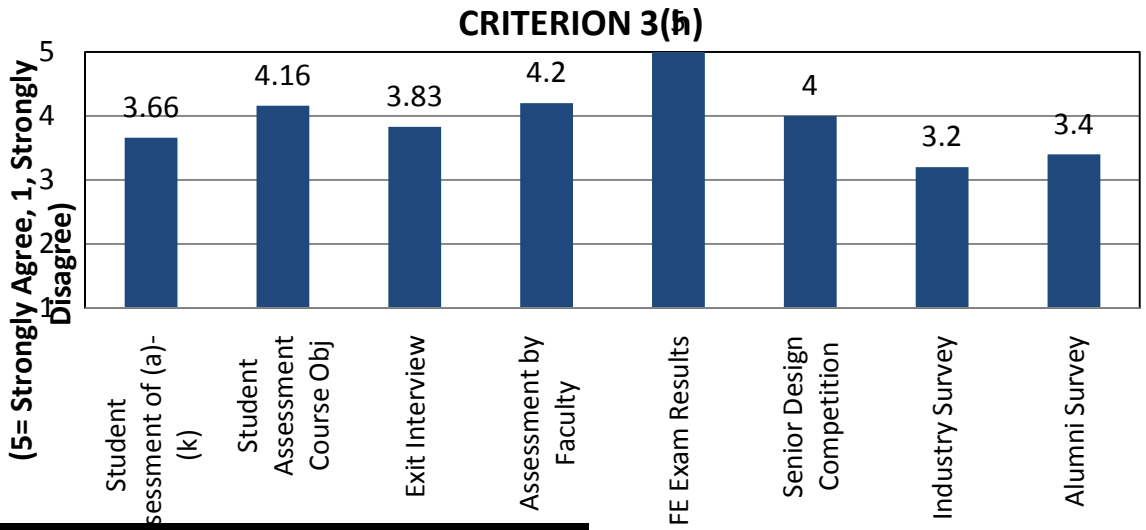
Criterion 3(g)



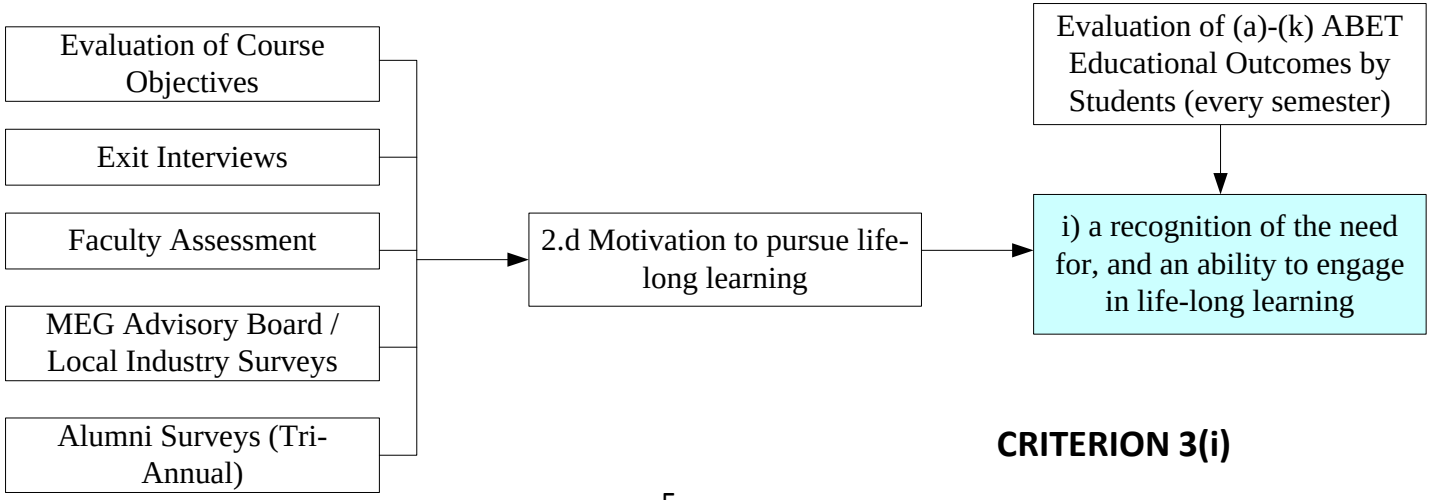


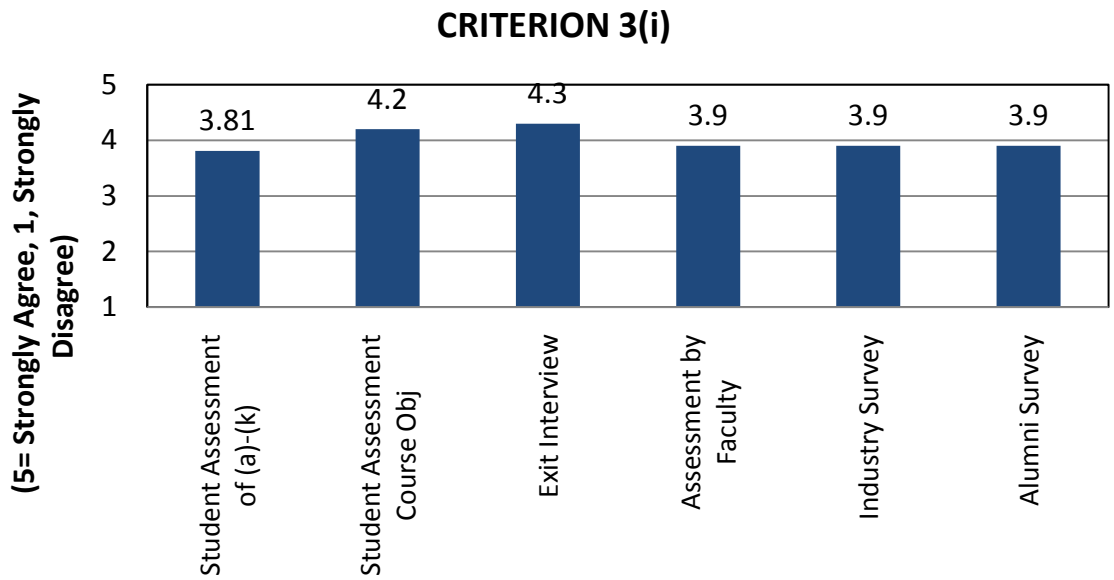
Criterion 3(h)



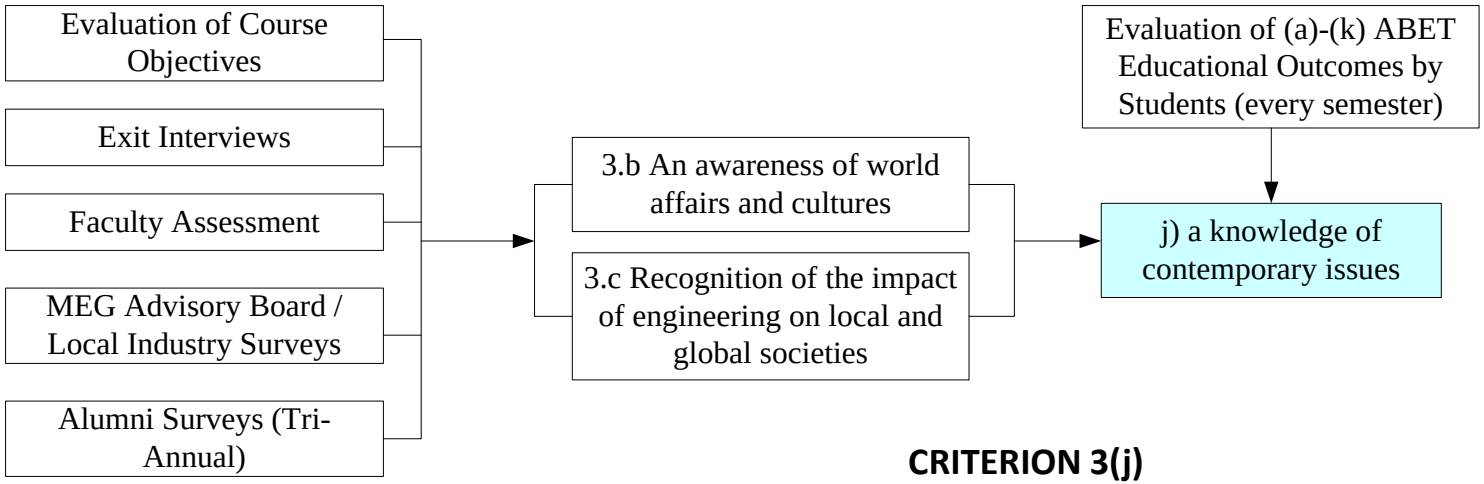


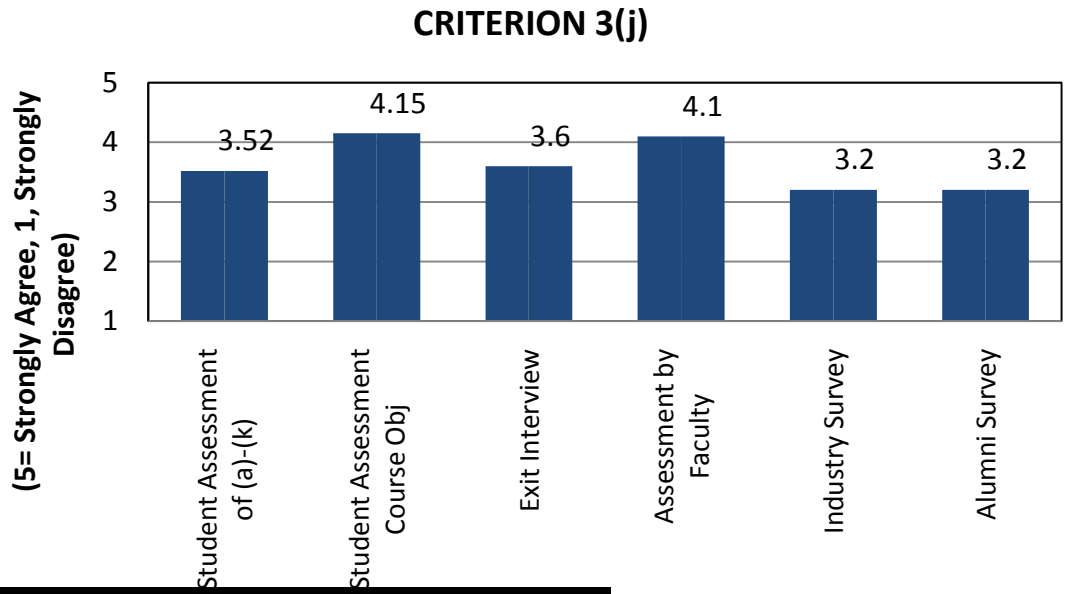
Criterion 3(i)



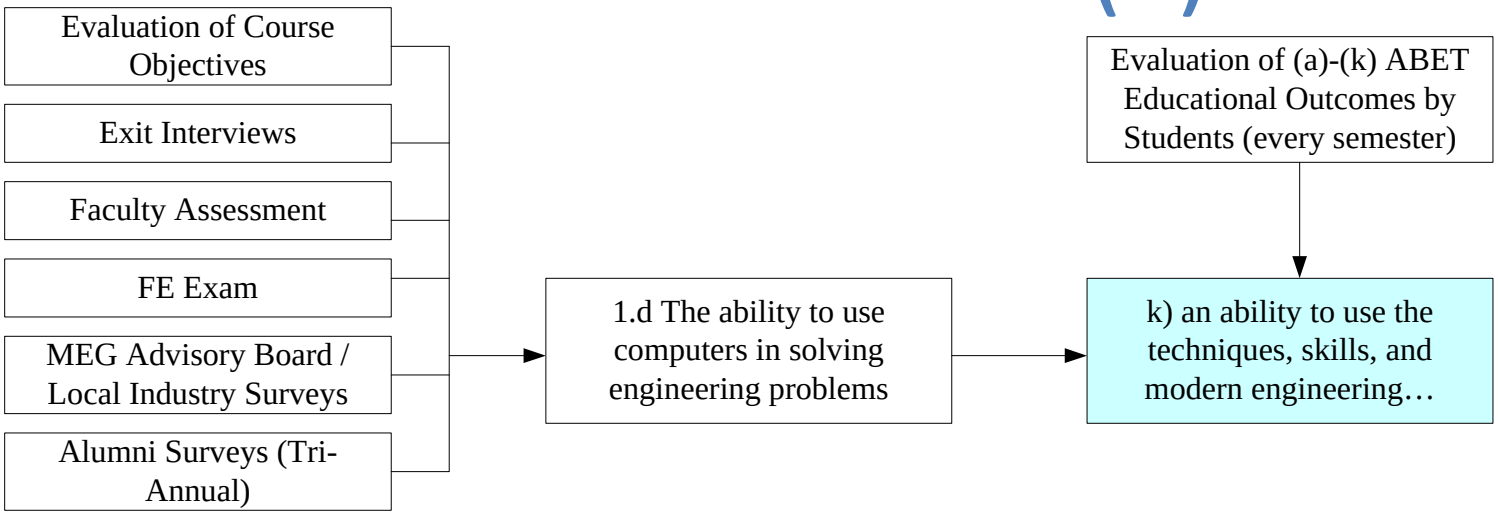


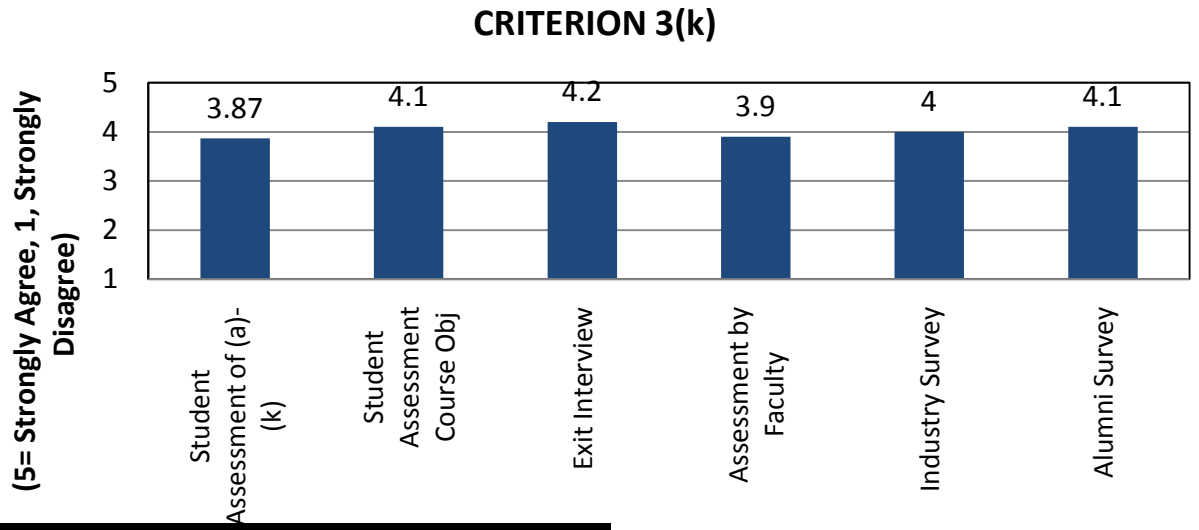
Criterion 3(j)





Criterion 3(k)





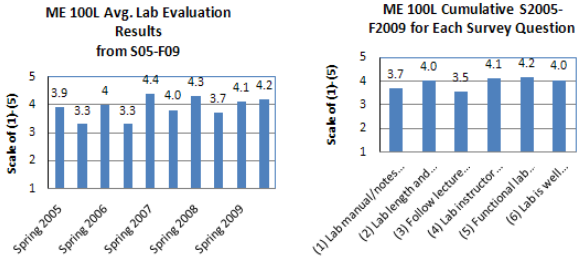
Summary

Table 4.2 Assessment Results for CRITERION 3

CRITERION3 \ Assessment Methods	Laboratory Survey	Student Assessment of (a)-(k)	Student Assessment Course Objectives	Exit Interview	Assessment by Faculty	FE Exam Results	Senior Design Competition	Industry Survey	Alumni Survey
a) an ability to apply knowledge of mathematics, science, and engineering		3.92	4.2	4.1	3.9	4.3		3.68	3.9
b) an ability to design and conduct experiments, as well as to analyze …	4.1	3.79	4.2	4.2	4	4.5		3.7	4
c) an ability to design a system, component, or process to meet desired needs …..		3.74	4.1	4.4	3.9	4	3.8	3.8	4
d) an ability to function on multidisciplinary teams		4.2	4.1	4.6	3.9		3.9	3.7	3.75
e) an ability to identify, formulate, and solve engineering problems		3.87	4.15	4.4	3.9			3.65	4.1
f) an understanding of professional and ethical responsibility		3.62	3.95	4.05	4.05			3.75	3.75
g) an ability to communicate effectively		3.59	4.2	4.4	3.9		4.2	3.6	3.85
h) the broad education necessary to understand the impact of engineering solutions in a global, ….		3.66	4.16	3.83	4.2	5	4	3.2	3.4
i) a recognition of the need for, and an ability to engage in life-long learning		3.81	4.2	4.3	3.9			3.9	3.9
j) a knowledge of contemporary issues		3.52	4.15	3.6	4.1			3.2	3.2
k) an ability to use the techniques, skills, and modern engineering…		3.87	4.1	4.2	3.9			4	4.1

Scale: 5(Strongly Agree)-1(Strongly Disagree) Rating>4.0 Rating<3.5

CRITERION 4 Continuous Improvement



(a)

(b)

Figure 4.2 Lab Survey Results from Spring 2005 to Fall 2009 (a) Average for all six questions (b) cumulative average for each question in Lab Survey

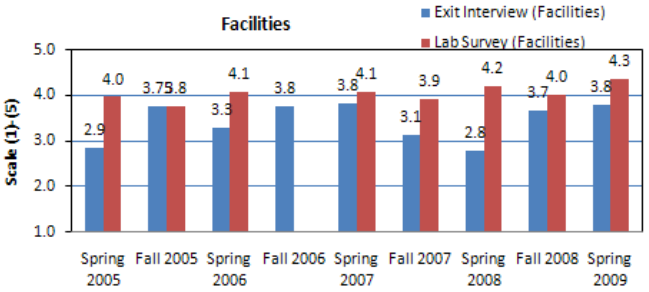
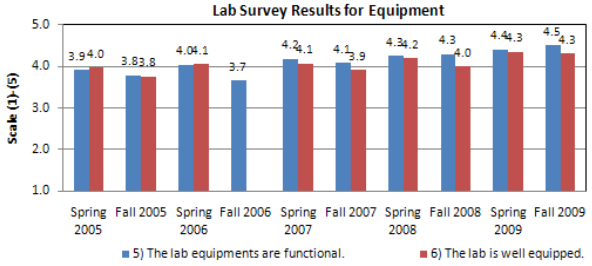


Table 4.3 Summary of 2004 ABET review and actions taken for program improvement

	Summary of 2004 ABET Review	Actions taken for improvement after 2004 ABET Review	Results of Implementation	Comments
Criterion 7 Facilities	Shop Safety	Shop equipment has been inspected and added safety instructions and signs as well as safety eyewear	Exit interview (see Fig.)	The College of Engineering recently completed Mendenhall Innovation & Design Laboratory in the existing machine shop area, and the facilities are extensively used by undergraduate student laboratory class and design projects.
	ME 100L Lab Space	Space problem for ME 100L was resolved. Currently, the lab is located in CBC C-234.	Lab Survey (see Fig.)	The new lab location is in the Classroom Complex where students can access the lab easily and has 1,000 sq ft which is ample space for their lab tasks.
Criterion 8 Institutional Support	Hiring Department Machinist	A full-time model designer/machinist, Mr. Kevin Nelson, was hired in 2005.	Lab Survey (see Fig.) Exit Interview (see Fig.)	Mr. Nelson work with both undergraduate and graduate students for designing experiments and prototypes. Two new elective 1 cr. courses, ME 130 Intro to Machinging and ME 230 CNC Machining, were introduced by Mr. Nelson. Both courses are very popular among students.
	Hiring Laboratory Director	A full-time Laboratory Director, Mr. Jeff Markle, was hired in 2005.	Lab Survey (see Fig.) Exit Interview (see Fig.)	Mr. Markle oversees all undergraduate and graduate laboratories with associated faculty mentors. Mr. Markle's regular interaction with faculty mentors and teaching assistants greatly improves the laboratory upgrade and maintenance as seen in our lab survey and graduate exit interviews.



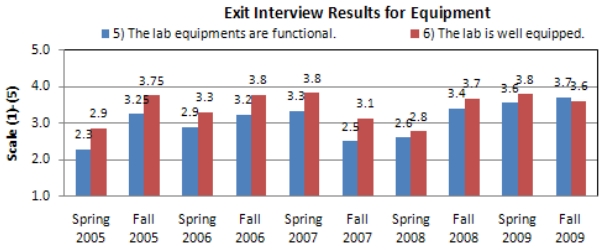
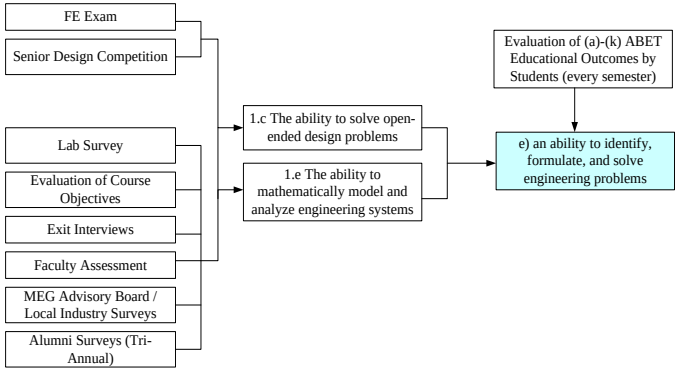


Figure 4.4 Exit Interview results for Question #5 and #6 related with Lab equipment and maintenance



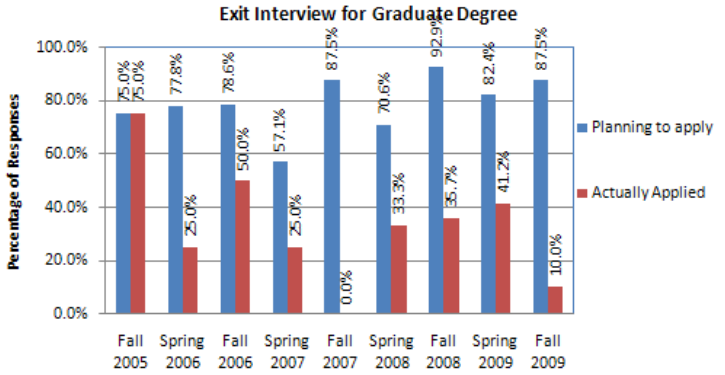


Figure 4.5 Exit Interview Results for Postgraduate Study

Criterion 2 Educational Objectives	Inclusion of "preparing graduate study" in the Program Objective	No Change	Exit Interview (see Fig.)	It was our view that it is one of long-term objectives which will be determined by individual student after graduation whether they will pursue the graduate study.
Criterion 3 Program Outcome Assessment	Improving queries in miscellaneous surveys and FE exam results for highlighting the potential areas for improvement	New mapping among CRITERION 3(a)-(k), MEG educational outcomes, and assessment measures are carefully developed for more quantitative assessment of the potential areas for improvement.	Table 4.2 (see Fig.)	
Criterion 5 Professional Components	The program needs one year of college level mathematics and science (32 cr.)	Mathematics elective (3 cr.) is added to make our program requires the total of 33 cr. hours of math/science.	FE Exam result in Math (see Fig.)	This change made our technical electives from 9 cr. to 6 cr.
Criterion 6 Faculty	Mentoring of all students by faculty is needed including freshmen and sophomore.	New mentoring form is developed to force all students to see their mentors in every semester		

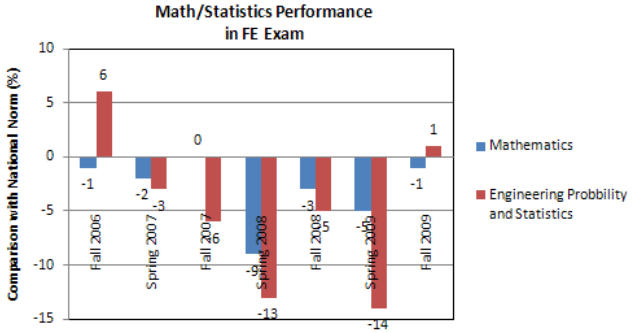


Figure 4.6 Comparison of FE Mathematics/Statistics AM subjects with national norm

College's Planning Retreat Results

- MEG Strategic Plan Update
- Current MEG Strategic Plan was created in 2006

2006 MEG Strategic Plan

Department of Mechanical Engineering
University of Nevada, Las Vegas

Strategic Plan - 2006

October 12, 2006

Summary

As the Department of Mechanical Engineering evolves, it faces new set of challenges. We have been experiencing simultaneous rise of the numbers of our undergraduate students, Ph.D. students, and research programs. Comparison with other mechanical engineering departments shows that our faculty members are successfully carrying significantly heavier research and teaching burdens that their counterparts in other schools. Additional resources (faculty, professional staff, and equipment) are needed to ensure that our research program continues while maintaining quality undergraduate education. These recourses will also help develop out newly approved master programs in Aerospace Engineering, Biomedical Engineering, and Material and Nuclear Engineering.

Department Mission Statement:

The Mechanical Engineering Department will provide a quality, state-of-the-art education in mechanical engineering to students for entry into positions in industry or graduate school while motivating faculty to attain excellence in research including the incorporation of education into their research programs.

Department Vision Statement:

- Maintain the high quality of the B.S. in Mechanical Engineering Program
- Develop nationally-recognized multidisciplinary research programs that are built on our current strengths

Comparison with Peers

Comparison with Peer Institutions

Comparisons were conducted with mechanical engineering departments in universities in the 2nd, 3rd, and 4th quartiles as per the 1995 National Research Council report, "Research-Doctorate Programs in the United States: Continuity and Change" (http://www.nap.edu/dataset/pub/research_doctorate_programs_in_the_united_states/appendix_k/t20mee.xls), which contains information obtained in 1993. While these data may be slightly out of date, we feel that they represent the overall ranking of various schools. The data included:

- the number of faculty within the department
- the level of productivity with regards to publications per faculty member
- total number of graduate students enrolled in the program
- number of enrolled Ph.D. students

The data serve as a set of measures and targets for the department. The following three tables show comparisons with the UNLV Department of Mechanical Engineering.

Table 1: Comparison with 2nd Quartile School

School	Fac.	Pub./Fac.	# of Grad. Std.	Ph.D.
Texas A&M	54	4.3	111	70
ASU	20	5.2	52	33
U Cincinnati	19	3.2	82	66
Mean Values	*23*	*5.6*	*57*	*34*
UNLV	**15**	**1.9**	**80**	**28**

Table 2: Comparison with 3rd Quartile School

School	Fac.	Pub./Fac.	# of Grad. Std.	Ph.D.
U Oklahoma	15	4.3	30	21
U Pittsburgh	14	5.2	42	21
U Utah	23	3.2	68	27
Mean Values	*19*	*3.3*	*46*	*22*
UNLV	**15**	**1.9**	**80**	**28**

Table 3: Comparison with 4th Quartile School

School	Fac.	Pub./Fac.	# of Grad. Std.	Ph.D.
UM, Columbia	22	2.1	40	21
UT, Arlington	19	2.3	38	21
U of S. Carolina	17	2.4	18	13
Mean Values	*13*	*2.2*	*26*	*10*
UNLV	**15**	**1.9**	**80**	**28**

Comparison with Peers

This comparison shows the following:

- The number of faculty is below the mean value for mechanical engineering departments in the 2nd and 3rd quartile schools.
- The ratio of graduate students to faculty is higher than the average of either the 2nd, 3rd, or 4th quartile schools.
- The number of publications produced yearly by the UNLV faculty compares with those in the 4th quartile schools. As the data of the previous section shows, this number has improved over the last five years.
- The total number of graduate students is higher than the mean values of either the 2nd, 3rd, or 4th quartile schools.
- The number of Ph.D. students is between the mean values of the 2nd quartile and 3rd quartile schools. These data should be assessed in the light of the fact that the PhD program at UNLV was not instigated until 1995.
- The ratio of Ph.D. students to the total number of graduate students is comparable with those in the 4th quartile schools.

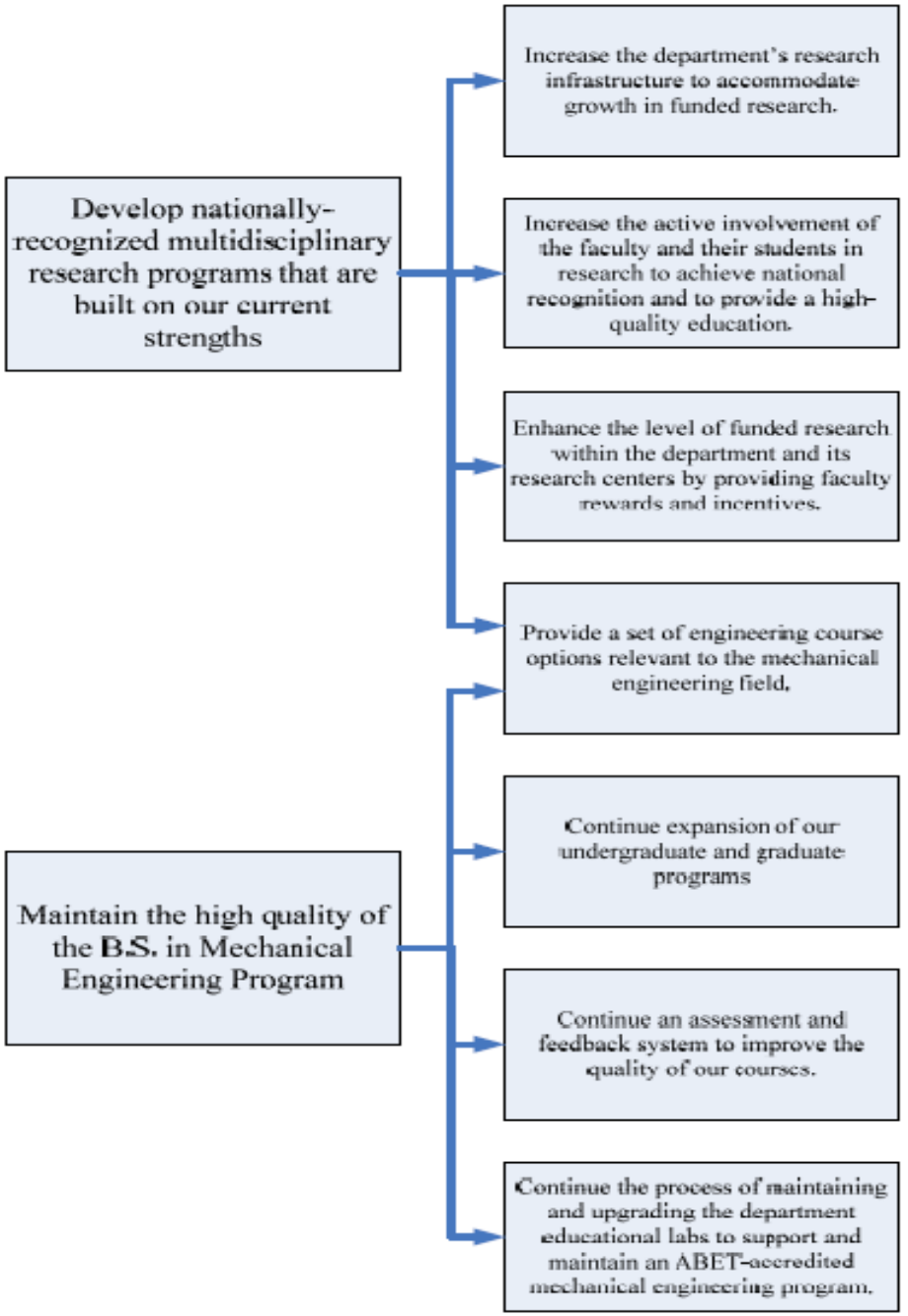
Goals

Goals

The department has the following goals:

- Increase the department's research infrastructure to accommodate growth in funded research.
- Increase the active involvement of the faculty and their students in research to achieve national recognition and to provide a high-quality education
- Enhance the level of funded research within the department and its research centers by providing faculty rewards and incentives.
- Provide a set of engineering course options relevant to the mechanical engineering field.
- Continue expansion of our undergraduate and graduate programs.
- Continue the process of maintaining and upgrading the department educational labs to support and maintain an ABET-accredited mechanical engineering program.
- Continue an assessment and feedback system to improve the quality of our courses.

Department Vision and Goals



Relation of the Goals to the Department Vision