Outcome I. Graduates will have a recognition of the need for, and an ability to engage in, life-long learning.

Course	Performance indicators
MAE 343, 454	Awareness and understanding of long life learning implications.
MAE 343, 454	Development of self-taught skills.
MAE 343, 454	Grade distribution.

Tools used: Course assessment by faculty, Alumni survey, Employer survey.

Data Collection: The data are collected every semester based on the course offerings.

Frequency of data collection:

The data are collected every time courses are taught.

Data Analysis: The data obtained are analyzed every year.

Closing the loop: This outcome is subject to review every year based on performance criteria and metrics and specific action

items are developed, if necessary, to revise the content of the courses. The analyzed data are presented

separately to the following groups in meetings.

a) Feedback to students on all assignments

b) Feedback to faculty, particular from majors.

Out	come and Performance Indictor	Performance In	ndicator Rubric			
Outcome I  "Graduates will have a recognition of the need for, and an ability to engage in, life-long learning".		Poor	Poor Fair		Good Very Good	
PI1	Awareness and understanding of long life learning implications	No notion of life-long- learning (LLL)	LLL barely Mentioned	LLL Addressed in context	LLL Addressed in context and illustrated	LLL Addressed, illustrated & discussed
PI2	Development of self-taught skills	No notion self- taught skills	self-taught skills mentioned	self-taught skills used	self-taught skills used and illustrated	self-taught skills used, illustrated & explained
PI3	Grade distribution	1 (F)	2 (D)	3 (C)	4 (B)	5 (A)

**Performance Indicator 1. (PI1).** "Awareness and understanding of long life learning implications." Engineering is a profession which requires continuous self-education and lifelong learning to stay current. The following rubrics are used to assess this indicator:

- **Poor.** This rubric is used when an assignment offers no evidence addressing the issue of self-learning or creative use of resources.
- Fair. This rubric is used when an assignment offers some evidence of self-learning and some creative use of resources.
- Good. This rubric is used when an assignment offers clear evidence of self-learning and creative use of resources.
- Very Good. This rubric is used when an assignment offers clear evidence of self-learning and creative use of resources that leads to solutions.
- **Excellent**. This rubric is used when in addition to the previous rubric, the self-learned material is illustrated and resources used are listed and documented.

**Performance Indicator 2.** (PI2). "Development of self-taught skills." Engineering is a profession which often requires self-taught skills to formulate and solve engineering problems. The following rubrics are used to assess this indicator:

- **Poor.** This rubric is used when an assignment offers no evidence of self-taught skills used in the formulation and/or solution of engineering problems.
- **Fair**. This rubric is used when an assignment offers some evidence self-taught skills which are referenced in the formulation of engineering problems or in their solution.
- **Good**. This rubric is used when an assignment offers evidence of self-taught skills which are then used in the formulation of engineering problems and applied in their solution.
- **Very Good**. This rubric is used when an assignment offers clear evidence of self-taught skills which are used in the formulation of engineering problems, applied in their solution and are illustrated.

- **Excellent**. This rubric is used when in addition to the previous rubric; the self-taught skills are illustrated, explained and documented.

Performance Indicator 3. (PI3). Grade distribution from class on applicable assignments or exercises. A, B, C, D, F

## **Assessment Tool:**

**Course Assessment Rubric by Faculty** 

## Mechanical Engineering Program Course-Outcome Matrix (October 2014)

Required Course   K = Key Course   F = related Course   Standard	ABET Outcome		a	<b>b</b>	c	$\frac{2014}{d}$	e	f	g	h	i	i	k	
K = Key Course				-				J	8		•	J		
MAE 211 Mechatronics         3         A         C         D         1         2           MAE 242 Natatics         3         A         I         1         1           MAE 242 Dynamics         3         A         I         1         1           MAE 243 Mech. of Materials         3         B         E         I         1           MAE 320 Intermodynamics         3         A         K         2           MAE 321 Applied Thermodynamics         3         B         E         H         J         3           MAE 321 Applied Thermodynamics         3         B         E         H         J         2           MAE 321 Applied Thermodynamics         3         B         B         G         2         2           MAE 321 Applied Thermodynamics         3         B         B         G         2         2           MAE 322 Thermal and Fluids Lab.         3         B         B         G         2         2           MAE 324 Dynamics of Machines         3         A         B         G         2         2           MAE 342 Dynamics of Machines         3         A         M         J         2         2 <t< td=""><td><b>K</b> = Key Course</td><td>Credit Hours</td><td>Apply Math, Science, and Engr</td><td>Design Experiments and Analyze and</td><td>Design System, Component, or Process</td><td>Multi-disciplinary Teams</td><td>Identify, Formulate and Solve Engr Problems</td><td>Professional and Ethical Responsibility</td><td>Communicate Effectively</td><td>Broad Education - Global and Societal</td><td>Life-long Learning</td><td>Contemporary Issues</td><td>Techniques, Skills, and Modern Engr Tools</td><td>Number of Outcomes per course</td></t<>	<b>K</b> = Key Course	Credit Hours	Apply Math, Science, and Engr	Design Experiments and Analyze and	Design System, Component, or Process	Multi-disciplinary Teams	Identify, Formulate and Solve Engr Problems	Professional and Ethical Responsibility	Communicate Effectively	Broad Education - Global and Societal	Life-long Learning	Contemporary Issues	Techniques, Skills, and Modern Engr Tools	Number of Outcomes per course
MAE 211 Mechatronics         3         A         C         D         1         2           MAE 242 Natatics         3         A         I         1         1           MAE 242 Dynamics         3         A         I         1         1           MAE 243 Mech. of Materials         3         B         E         I         1           MAE 320 Intermodynamics         3         A         K         2           MAE 321 Applied Thermodynamics         3         B         E         H         J         3           MAE 321 Applied Thermodynamics         3         B         E         H         J         2           MAE 321 Applied Thermodynamics         3         B         B         G         2         2           MAE 321 Applied Thermodynamics         3         B         B         G         2         2           MAE 322 Thermal and Fluids Lab.         3         B         B         G         2         2           MAE 324 Dynamics of Machines         3         A         B         G         2         2           MAE 342 Dynamics of Machines         3         A         M         J         2         2 <t< td=""><td>ENGR 101 Engr. Problem Solving 1</td><td>3</td><td></td><td></td><td></td><td></td><td></td><td>F</td><td>G</td><td></td><td></td><td></td><td></td><td>2</td></t<>	ENGR 101 Engr. Problem Solving 1	3						F	G					2
MAE 241 Statics         3         A         1           MAE 242 Dynamics         3         A         1           MAE 243 Mech. of Materials         3         B         E           MAE 316 Analy. of Engr. Sys.         3         A         K         2           MAE 316 Analy. of Engr. Sys.         3         A         K         2           MAE 321 Applied Thermodynamics         3         E         H         J         3           MAE 322 Thermal and Fluids Lab.         3         B         G         J         2           MAE 331 Fluid Mechanics         3         A         J         2           MAE 342 Intermed. Mech. Mails.         3         A         J         2           MAE 343 Intermed. Mech. Mails.         3         A         K         2           MAE 342 Machine Design and Mfs.         3         C         H         J         3           MAE 454 Machine Design and Mfs.         3         C         E         H         J         3           MAE 454 Machine Design and Mfs.         3         C         E         K         2           MAE 471 Prin. of Engr. Design         3         C         C         E         K         2 <td></td> <td></td> <td></td> <td></td> <td>С</td> <td>D</td> <td></td> <td><u> </u></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>					С	D		<u> </u>						
MAE 242 Dynamics         3         A         E         1           MAE 243 Mech. of Materials         3         E         1           MAE 244 Dynam. & Strength Lab         1         B         K         2           MAE 316 Analy. of Engr. Sys.         3         A         K         2           MAE 320 Thermodynamics         3         E         H         J         3           MAE 321 Applied Thermodynamics         3         E         H         J         2           MAE 321 Intermed and Fluids Lab.         3         B         G         2         2           MAE 331 Fluid Mechanics         3         A         J         2         2           MAE 331 Intermed. Mech. Matls.         3         A         F         F         2         2           MAE 414 Advanced Mechatronics         3         B         B         K         2         2           MAE 414 Advanced Mechatronics         3         B         B         K         2         2           MAE 443 Hachine Design and Mfg.         3         C         E         H         J         3           MAE 456 CAD & Finite Elem. Ana.         3         C         E         K         2	MAE 241 Statics		Α											
MAE 243 Mech. of Materials	MAE 242 Dynamics													
MAE 244 Dynam. & Strength Lab         1         B         K         2           MAE 316 Analy. of Engr. Sys.         3         A         K         2           MAE 320 Thermodynamics         3         E         H         J         3           MAE 321 Applied Thermodynamics         3         B         E         H         J         2           MAE 322 Thermal and Fluids Lab.         3         B         G         J         2           MAE 331 Fluid Mechanics         3         A         J         2           MAE 342 Dynamics of Machines         3         A         J         2           MAE 343 Intermed. Mech. Mails.         3         A         I         1         2           MAE 432 Heat Transfer         3         C         H         J         3           MAE 454 Machine Design and Mfg.         3         C         E         K         2           MAE 456 CAD & Finite Elem. Ana.         3         C         E         K         2           MAE 450 Calculus 1         4         T         T         T         T         T           MAE 471 Prin. of Engr. Design         3         C         D         F         G         4			11				E							
MAE 316 Analy. of Engr. Sys.         3         A         B         H         J         3           MAE 320 Thermodynamics         3         B         E         H         J         3           MAE 321 Applied Thermodynamics         3         B         E         J         2           MAE 321 Applied Thermodynamics         3         B         G         2         2           MAE 321 Applied Thermodynamics         3         A         J         2         2           MAE 331 Fluid Mechanics         3         A         J         2         2           MAE 342 Dynamics of Machines         3         A         B         J         2         2           MAE 342 Dynamics of Machines         3         A         B         F         P         2         2           MAE 411 Advanced Mechatronics         3         B         B         K         2         2           MAE 431 Machine Design and Mfg.         3         C         E         H         J         3           MAE 454 Machine Design and Mfg.         3         C         E         K         2           MAE 471 Prin. of Engr. Design         3         C         D         F         G <td>· ·</td> <td></td> <td></td> <td>B</td> <td></td> <td>X</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>K</td> <td></td>	· ·			B		X							K	
MAE 320 Thermodynamics         3         E         H         J         3           MAE 321 Applied Thermodynamics         3         E         J         2           MAE 322 Thermal and Fluids Lab.         3         B         G         2           MAE 331 Fluid Mechanics         3         A         J         2           MAE 342 Dynamics of Machines         3         E         F         2           MAE 343 Intermed. Mech. Matls.         3         A         I         2           MAE 434 Intermed. Mech. Matls.         3         A         I         2           MAE 441 Advanced Mechatronics         3         B         K         2           MAE 423 Heat Transfer         3         C         H         J         3           MAE 454 Machine Design and Mfg.         3         C         E         I         3           MAE 460 Automatic Controls         3         C         E         K         2           MAE 471 Prin. of Engr. Design         3         C         D         F         G         4           No. of courses/outcome         55         5         3         5         2         7         3         3         2         2			Α	<u>.</u>										
MAE 321 Applied Thermodynamics         3         B         E         J         2           MAE 322 Thermal and Fluids Lab.         3         B         G         2           MAE 321 Fluid Mechanics         3         A         J         2           MAE 342 Dynamics of Machines         3         E         F         J         2           MAE 343 Intermed. Mech. Matls.         3         A         I         I         2           MAE 441 Advanced Mechatronics         3         B         K         2           MAE 443 Heat Transfer         3         C         H         J         3           MAE 454 Machine Design and Mfg.         3         C         E         H         J         3           MAE 456 CAD & Finite Elem. Ana.         3         C         E         K         2           MAE 450 Automatic Controls         3         C         E         K         2           MAE 450 CAD & Finite Elem. Ana.         3         C         E         K         2           MAE 450 CAD & Finite Elem. Ana.         3         C         D         F         G         4           No. of courses/outcome         55         5         3         5 <td< td=""><td></td><td></td><td>11</td><td></td><td></td><td></td><td>E</td><td></td><td></td><td>Н</td><td></td><td>Ī</td><td>17</td><td>3</td></td<>			11				E			Н		Ī	17	3
MAE 322 Thermal and Fluids Lab.         3         B         G         2           MAE 331 Fluid Mechanics         3         A         J         2           MAE 342 Dynamics of Machines         3         A         E         F         2           MAE 343 Intermed. Mech. Matls.         3         A         I         2           MAE 411 Advanced Mechatronics         3         B         K         2           MAE 413 Heat Transfer         3         C         H         J         3           MAE 454 Machine Design and Mfg.         3         C         E         I         3           MAE 456 CAD & Finite Elem. Ana.         3         C         E         K         3           MAE 460 Automatic Controls         3         C         D         F         G         K         2           MAE 471 Prin. of Engr. Design         3         C         D         F         G         4         K         2           MATH 155 Calculus 1         4         r         r         r         r         r         r         r         r         r         r         r         r         r         r         r         r         r         r         r										11				2
MAE 331 Fluid Mechanics         3         A         B         J         2           MAE 342 Dynamics of Machines         3         B         E         F         C         2           MAE 343 Intermed. Mech. Matls.         3         A         I         2         2           MAE 411 Advanced Mechatronics         3         B         K         2           MAE 423 Heat Transfer         3         C         H         J         3           MAE 454 Machine Design and Mfg.         3         C         E         I         3           MAE 456 CAD & Finite Elem. Ana.         3         C         E         K         2           MAE 460 Automatic Controls         3         E         K         2           MAE 471 Prin. of Engr. Design         3         C         D         F         G         4           No. of courses/outcome         55         5         3         5         2         7         3         2         2         4         5           MATH 155 Calculus 1         4         r         r         r         r         r         r         r         r         r         r         r         r         r         r				R					G			- 3		
MAE 342 Dynamics of Machines         3         E         F         2           MAE 343 Intermed. Mech. Matls.         3         A         I         2           MAE 411 Advanced Mechatronics         3         B         K         2           MAE 423 Heat Transfer         3         C         H         J         3           MAE 454 Machine Design and Mfg.         3         C         E         I         3           MAE 456 CAD & Finite Elem. Ana.         3         C         E         K         3           MAE 460 Automatic Controls         3         E         E         K         2           MAE 471 Prin. of Engr. Design         3         C         D         F         G         4           No. of courses/outcome         55         5         3         5         2         7         3         3         2         2         4         5           MATH 155 Calculus 1         4         r <td< td=""><td></td><td></td><td>Δ</td><td>ע</td><td></td><td></td><td></td><td></td><td>U</td><td></td><td></td><td>T</td><td></td><td>2</td></td<>			Δ	ע					U			T		2
MAE 343 Intermed. Mech. Matls.         3         A         I         2           MAE 411 Advanced Mechatronics         3         B         K         2           MAE 423 Heat Transfer         3         C         H         J         3           MAE 454 Machine Design and Mfg.         3         C         E         I         3           MAE 456 CAD & Finite Elem. Ana.         3         C         E         K         3           MAE 460 Automatic Controls         3         E         E         K         2           MAE 471 Prin. of Engr. Design         3         C         D         F         G         4           No. of courses/outcome         55         5         3         5         2         7         3         3         2         2         4         5           MATH 155 Calculus 1         4         r         r         r         r         r         F         G         4         5           MATH 155 Calculus 1         4         r         r         r         r         r         r         r         r         r         r         r         r         r         r         r         r         r         r			- 1				F	F				3		2
MAE 411 Advanced Mechatronics         3         B         K         2           MAE 423 Heat Transfer         3         C         H         J         3           MAE 454 Machine Design and Mfg.         3         C         E         I         3           MAE 456 CAD & Finite Elem. Ana.         3         C         E         K         3           MAE 460 Automatic Controls         3         E         K         2           MAE 471 Prin. of Engr. Design         3         C         D         F         G         4           No. of courses/outcome         55         5         3         5         2         7         3         3         2         2         4         5           MATH 155 Calculus 1         4         r         r         r         r         r         ENGR 109 Orientation to Engr.         1         r	· ·		Δ				L	1			ī			
MAE 423 Heat Transfer       3       C       H       J       3         MAE 454 Machine Design and Mfg.       3       C       E       I       3         MAE 456 CAD & Finite Elem. Ana.       3       C       E       K       3         MAE 460 Automatic Controls       3       E       K       2         MAE 471 Prin. of Engr. Design       3       C       D       F       G       4         No. of courses/outcome       55       5       3       5       2       7       3       3       2       2       4       5         MATH 155 Calculus 1       4       r       r       r       r       r       r       r       r       r       r       r       r       ENGR 199 Orientation to Engr.       1       r			11	R							1		K	2
MAE 456 CAD & Finite Elem. Ana.         3         C         E         K         3           MAE 460 Automatic Controls         3         E         K         2           MAE 471 Prin. of Engr. Design         3         C         D         F         G         4           No. of courses/outcome         55         5         3         5         2         7         3         3         2         2         4         5           MATH 155 Calculus 1         4         r         r         r         r         r         r         r         ENGR 199 Orientation to Engr.         1         r				ע	С					н		T	11	3
MAE 456 CAD & Finite Elem. Ana.         3         C         E         K         3           MAE 460 Automatic Controls         3         E         K         2           MAE 471 Prin. of Engr. Design         3         C         D         F         G         4           No. of courses/outcome         55         5         3         5         2         7         3         3         2         2         4         5           MATH 155 Calculus 1         4         r         r         r         r         r         r         r         ENGR 199 Orientation to Engr.         1         r							F			11	ī	- 3		3
MAE 460 Automatic Controls         3         E         K         2           MAE 471 Prin. of Engr. Design         3         C         D         F         G         4           No. of courses/outcome         55         5         3         5         2         7         3         3         2         2         4         5           MATH 155 Calculus 1         4         r											1		K	3
MAE 471 Prin. of Engr. Design         3         C         D         F         G         4           No. of courses/outcome         55         5         3         5         2         7         3         3         2         2         4         5           MATH 155 Calculus 1         4         r <t< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>2</td></t<>														2
No. of courses/outcome					С	D	L	F	G				11	
CHEM 115 Fund. of Chemistry         4         r<			5	3			7			2	2	4	5	_
CHEM 115 Fund. of Chemistry       4       r	MATH 155 Calculus 1	4	r											
ENGR 199 Orientation to Engr.       1       r <t< td=""><td>CHEM 115 Fund. of Chemistry</td><td></td><td>r</td><td>r</td><td></td><td></td><td></td><td>r</td><td></td><td></td><td></td><td></td><td></td><td></td></t<>	CHEM 115 Fund. of Chemistry		r	r				r						
ENGL 101 Composition and Rhetoric       3       r       r       r         MATH 156 Calculus 2       4       r       r       r       r         ENGR 102 Engr. Problem Solving 2       3       r       r       r       r       r         PHYS 111 General Physics       4       r	ENGR 199 Orientation to Engr.	1	r		r		r	r	r		r	r		
ENGR 102 Engr. Problem Solving 2         3         r         <	ENGL 101 Composition and Rhetoric	3												
ENGR 102 Engr. Problem Solving 2       3       r	MATH 156 Calculus 2	4	r								r			
PHYS 111 General Physics       4       r </td <td>ENGR 102 Engr. Problem Solving 2</td> <td></td> <td></td> <td></td> <td>r</td> <td></td> <td>r</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>	ENGR 102 Engr. Problem Solving 2				r		r							
PHYS 112 General Physics       4       r </td <td>PHYS 111 General Physics</td> <td></td> <td></td> <td>r</td> <td></td> <td></td> <td></td> <td></td> <td>r</td> <td></td> <td></td> <td></td> <td></td> <td></td>	PHYS 111 General Physics			r					r					
ENGL 102 Composition & Rhetoric       3       r       r       r         MATH 251 Multivariable Calculus       4       r       r       r         MATH 261 Elem. Diff. Equations       4       r       r       r         IENG 302 Manufacturing Processes       2       r       r       r         IENG 303 Manufact. Processes Lab       1       r       r       r         EE 221 Intro. to Electrical Engr.       3       r       r       r         EE 222 Intro. to Electrical Engr. Lab       1       r       r       r         GEC (21 hours)       21       r       r       r	PHYS 112 General Physics	4		r			r				r			
MATH 251 Multivariable Calculus       4       r       r       r         MATH 261 Elem. Diff. Equations       4       r       r       r         IENG 302 Manufacturing Processes       2       r       r       r         IENG 303 Manufact. Processes Lab       1       r       r       r         EE 221 Intro. to Electrical Engr.       3       r       r       r         EE 222 Intro. to Electrical Engr. Lab       1       r       r       r       r         GEC (21 hours)       21       r       r       r       r	ENGL 102 Composition & Rhetoric													
MATH 261 Elem. Diff. Equations       4       r       r       r         IENG 302 Manufacturing Processes       2       r       r       r       r         IENG 303 Manufact. Processes Lab       1       r       r       r       r         EE 221 Intro. to Electrical Engr.       3       r       r       r       r         EE 222 Intro. to Electrical Engr. Lab       1       r       r       r       r         GEC (21 hours)       21       r       r       r       r	MATH 251 Multivariable Calculus		r											
IENG 302 Manufacturing Processes       2       r       r       r       r         IENG 303 Manufact. Processes Lab       1       r       r       r       r       r         EE 221 Intro. to Electrical Engr.       3       r       r       r       r         EE 222 Intro. to Electrical Engr. Lab       1       r       r       r       r         GEC (21 hours)       21       r       r       r       r	MATH 261 Elem. Diff. Equations													
IENG 303 Manufact. Processes Lab       1       r					r	r					_			
EE 221 Intro. to Electrical Engr.       3       r       r       r       r         EE 222 Intro. to Electrical Engr. Lab       1       r       r       r       r         GEC (21 hours)       21       r       r       r       r       r				r										
EE 222 Intro. to Electrical Engr. Lab         1         r	- v						r							
GEC (21 hours) 21 r r r				r										
	_								r	r		r		
		6								r	r	r	r	

Outcome		ABET Assessment Team members To conduct Assessment of Year 2014
a	Ismail Celik, Yu Gu, Mario Perhinschi and Pat Browning	Outcome a "Graduates will have an ability to apply knowledge of mathematics, science and engineering."
b	Marvin Cheng, Alfred Lynam and Marcello Napolitano	Outcome b "Graduates will have an ability to design and conduct experiments, as well as to analyze data."
С	Ken Means, Terry Musho and Greg Thompson	Outcome c "Graduates will have an ability to design a system, component or process to meet desired needs."
d	Kostas Sierros, Jim Smith and Scott Wayne	Outcome d "Graduates will have an ability to function on multidisciplinary teams."
e	Ever Barbero, John Kuhlman, Andrew Nix and Jason Gross	Outcome e "Graduates will have an ability to identify, formulate and solve engineering problems."
f	Wade Huebsch and David Mebane	Outcome f "Graduates will have an understanding of professional and ethical responsibility."
o <sub>D</sub>	Salva Akkerman, Cosmin Dumitrescu and Nithi Sivaneri	Outcome g "Graduates will have an ability to communicate effectively."
h	Victor Mucino and John Christian	Outcome h "Graduates will have the broad education necessary to understand the impact of engineering solutions in a global and societal context".
i	Xingbo Liu, Ed Sabolsky and Samir Shoukry	Outcome i "Graduates will have a recognition of the need for, and an ability to engage in, life-long learning".
j	Bruce Kang, Sam Mukdadi and Nick Wu	Outcome j "Graduates will have knowledge of contemporary issues."
k	Larry Banta, Hailin Li and Xueyan Song	Outcome k "Graduates will have an ability to use the techniques, skills and modern engineering tools necessary for engineering practice."

MECHANICAL ENGINEERING I						Outcome I-2014				
Outcome I  "Graduates will have a recognition of the need for, and an ability to engage in, life-long learning".					Assessment Team: Xingbo Liu, Ed Sabolsky and Saminr Shoukry					
PI1. Awareness	Perfor and understan	rmance Indicated in the contract of the contra	tors:	nplications			Rubrics for F	Performance Indi	icators:	
PI2. Developme PI3. Grade avera		_				Poor (1)	Fair (2)	Good (3)	Very good (4)	Excellent (5)
PI3. Grade average for the entire class.  Performance: P = (PI1 + PI2 + GA) / 3 P = Performance PI1 = Performance Indicator 1 PI2 = Performance Indicator 2 GA = Average grade of class in assignment* (if GA is based on 100 pt scale, divide by 20; if GA is based on 4 pt scale, multiply by 1.25)					PI1	No notion of life-long- learning (LLL)	LLL barely Mentioned, some creative use of resources	LLL Addressed in context with some creative use of resources	LLL Addressed in context and illustrated, creative use of resources	LLL Addressed, illustrated and discussed. creative use of resources
					PI2	No evidence of self- taught skills	Some evidence of self-taught skills	Self-taught skills used in problem solving	Self-taught skills used and illustrated	Self-taught skills used and clearly illustrated and documented
Course/Term	PI1	PI2	Grade Average*	Performance		•	Observation	s (Score expla	anation)	
MAE 343										
MAE 454										
Other ??										
0	verall Perfor	mance 2014								
	Average									
Follow-up or Corrective Actions:					Responsible Person/Team/Cmte.					
							To: A	E CC		
							To: I	nstructor (by (	Course)	
								nstructor (by 0		
							To: In	nstructor (by (	Course)	

MECHANICAL EN	GINEERIN	$\mathbf{G}$		MAE 343			Outcome	I-2014		
Outcome I						37' 1		sment Team		
"Graduates will have a recognition of the need for, and an ability to engage in, life-long learning".						Xingbo	Liu, Ed Sat	oolsky and Sa	ımınr Shoukr	У
		ance Indicator								
PI1. Awareness and	understandin	g of long life le	earning (LLL) in	nplications			Rubrics for Po	erformance Indi	cators:	
PI2. Development of						Poor	Fair	Good	Very good	Excellent
PI3. Grade average f						(1)	(2)	(3)	(4)	(5)
Performance: P = (PI1 + PI2 + GA) / 3 P = Performance PI1 = Performance Indicator 1 PI2 = Performance Indicator 2 GA = Average grade of class in assignment* (if GA is based on 100 pt scale, divide by 20; if GA is based on 4 pt. scale, multiply by 1.25)					PI1	No notion of life-long- learning (LLL)	LLL barely Mentioned, some creative use of resources	LLL Addressed in context with some creative use of resources	LLL Addressed in context and illustrated, creative use of resources	LLL Addressed, illustrated and discussed. creative use of resources
					PI2	No evidence of self- taught skills	Some evidence of self-taught skills	Self-taught skills used in problem solving	Self-taught skills used and illustrated	Self-taught skills used and clearly illustrated and documented
Course MAE 343	PI1	PI2	Class Grade Ave.	Average		0	bservations	(Score expla	anation)	
Key Asg. 1 (HW)										
Key Asg. 2 (HW)										
Key Asg. 3 (HW)										
Test 1 (Problem)										
Test 2 (Problem)										
Other (Project)										
Total Average										
	erall Perforr									
Ov	erall Perforr	nance 2013								

Follow-up or Corrective Actions:	Responsible Person/Team/Cmte.
	To: AE CC
	To: Instructor (by Course)

MECHANICAL ENGINEERING MAE 454						Outcome I-2014				
Outcome I  "Graduates will have a recognition of the need for, and an ability to engage in, life-long learning".					Assessment Team: Xingbo Liu, Ed Sabolsky and Saminr Shoukry					
PI1. Awareness and	<b>Performs</b> understanding	ance Indicator g of long life le	s:	nplications			Rubrics for P	erformance Indi	cators:	
PI2. Development of	_					Poor	Fair	Good	Very good	Excellent
PI3. Grade average f						(1)	(2)	(3)	(4)	(5) LLL
P= P0 PI1 = PI2 = GA=	Performance: P = (PI1 + PI2 + GA) / 3 P = Performance PI1 = Performance Indicator 1 PI2 = Performance Indicator 2 GA = Average grade of class in assignment* (if GA is based on 100 pt scale, divide by 20; if GA is based on 4 pt. scale, multiply by 1.25)						LLL barely Mentioned, some creative use of resources	LLL Addressed in context with some creative use of resources	LLL Addressed in context and illustrated, creative use of resources	Addressed, illustrated and discussed. creative use of resources
					PI2	No evidence of self- taught skills	Some evidence of self-taught skills	Self-taught skills used in problem solving	Self-taught skills used and illustrated	Self-taught skills used and clearly illustrated and documented
Course MAE 454	PI1	PI2	Class Grade Ave.	Average		O	bservations	(Score expla	anation)	
Key Asg. 1 (HW)										
Key Asg. 2 (HW)										
Key Asg. 3 (HW)										
Test 1 (Problem)										
Test 2 (Problem)										
Other (Project)										
Total Average										
Ov										
	erall Perforn						T			
Follow-up or Correc	ctive Actions	:				Responsible Person/Team/Cmte.				
							To: AE CC			

To: Instructor (by Course)

**Assessment Tool:** 

**Alumni Survey** 

# MAE Alumni Survey of Educational Success

Dear Alum, in an effort to improve the quality of our Educational Programs in Mechanical and Aerospace Engineering, we would like to request few minutes of your time to help us assess the level of attainment of our Educational Objectives and Learning Outcomes that our graduates exhibit in the development of their professional activity. This survey will serve as a tool for the assessment of our Program and is not intended to be used to evaluate you individually.

Please tell us your year of graduation and the degree that you earned.

and		
This is	a required	l question

In my work, I am able to apply knowledge of math, science and engineering effectively.

- Strongly Agree
- o O Agree
- Neutral
- o O Disagree
- Strongly Disagree
- Not Applicable

#### This is a required question

In my work, I am able to design and conduct experiments, and analyze data.

- Strongly Agree
- Agree
- Neutral
- o O Disagree
- Strongly Disagree
- Not Applicable

### This is a required question

In my work, I am able to design a system, component or process to meet desired needs and constraints.

- Strongly Agree
- Agree
- o Neutral
- o O Disagree
- Strongly Disagree
- Not Applicable

#### This is a required question

In my work, I am able to function productively on multidisciplinary teams.

- Strongly Agree
- o O Agree
- o O Neutral

0	<ul><li>Disagree</li></ul>
0	<ul> <li>Strongly Disagree</li> </ul>
0	Not Applicable
This i	s a required question
[n my	work, I am able to identify, formulate and solve engineering problems.
0	<ul> <li>Strongly Agree</li> </ul>
0	O Agree
0	O Neutral
0	<ul><li>Disagree</li></ul>
0	<ul> <li>Strongly Disagree</li> </ul>
0	<ul><li>Not Applicable</li></ul>
	s a required question
[n m	work, I have a good understanding of professional and ethical responsibility.
0	<ul><li>Strongly Agree</li></ul>
0	O Agree
0	O Neutral
0	<ul><li>Disagree</li></ul>
0	<ul> <li>Strongly Disagree</li> </ul>
0	Not Applicable
	s a required question
n my	work, I am able to communicate effectively, both verbally and in writing.
0	<ul><li>Strongly Agree</li></ul>
0	O Agree
0	O Neutral
0	<ul><li>Disagree</li></ul>
0	<ul> <li>Strongly Disagree</li> </ul>
0	Not Applicable
	s a required question
-	work, I understand the impact of engineering solutions in a global and societal
conte	xt.
0	<ul><li>Strongly Agree</li></ul>
0	Agree
0	O Neutral
0	Disagree
0	Strongly Disagree
0	O Not Applicable
	s a required question
ln my	work, I recognize the need for, and engage in, life-long learning.
0	Strongly Agree
0	Agree
0	Neutral
0	Disagree
0	Strongly Disagree
0	Not Applicable
l'his i	s a required question

In my work, I am aware of and appreciate contemporary engineering issues.

<ul> <li>Strongly A</li> </ul>	gree				
<ul><li>Agree</li></ul>					
<ul> <li>Neutral</li> </ul>					
<ul> <li>O Disagree</li> </ul>					
<ul> <li>O Strongly D</li> </ul>	isagree				
<ul> <li>Not Applic</li> </ul>	able				
This is a required que	estion				
In my work, I am j	proficient in the	e use of techniq	ques, skills and	modern tools i	necessary for
engineering practi	ce.				
<ul> <li>O Strongly A</li> </ul>	gree				
<ul><li>Agree</li></ul>					
<ul> <li>Neutral</li> </ul>					
<ul> <li>O Disagree</li> </ul>					
<ul> <li>Strongly D</li> </ul>	isagree				
<ul> <li>Not Applic</li> </ul>	able				
This is a required que	estion				
In my work, I am j	prepared to me	et the varying	demands of the	workforce in	the
technological aren	a.				
<ul> <li>Strongly A</li> </ul>	gree				
<ul><li>Agree</li></ul>					
<ul> <li>Neutral</li> </ul>					
<ul> <li>O Disagree</li> </ul>					
o O Strongly D	isagree				
<ul> <li>Not Applic</li> </ul>	_				
This is a required que					
Please add comme	nts below to cla	rify or add to	any of your ans	swers above, or	r to provide
general comments	about the level	of satisfaction	you have with	the way your e	education in
the MAE departm	ent has prepare	ed you for your	career.		
This is a required que	estion				
In general, How w		ourself in the f	ollowing catego	ories	
	Poor	Fair	Good	Very Good	Excellent
Your proficiency in your field	0	0	0	0	0
Your drive to learn on your own.	0	0	$\circ$	0	0
Your preparedness					
to meet the	0	$\circ$	0	0	$\circ$
demands of the job-market					
Please enter one resp	onse per row				
Submit	•				
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**Assessment Tool:** 

**Employer Survey** 

## Employer Survey of MAE Graduates

Dear Employer, in an effort to improve the quality of our Educational Programs in Mechanical and Aerospace Engineering, we would like to request few minutes of your time to help us assess the level of attainment of our Educational Objectives and Learning Outcomes that our graduates exhibit in the development of their professional activity in your company. This survey will serve as a tool for the assessment of our Program and is not intended to be used to evaluate the graduate's work for you or in your company.

Please tell us how many WVU MAE graduates you employ, and for how long.

#### This is a required question

WVU MAE graduates in my employ are able to apply knowledge of math, science and engineering effectively.

- Strongly Agree
- o O Agree
- Neutral
- o O Disagree
- Strongly Disagree
- Not Applicable

#### This is a required question

WVU MAE graduates in my employ are able to design and conduct experiments, and analyze data.

- Strongly Agree
- o O Agree
- Neutral
- o O Disagree
- Strongly Disagree
- Not Applicable

#### This is a required question

WVU MAE graduates in my employ are able to design a system, component or process to meet desired needs and constraints.

- Strongly Agree
- o O Agree
- Neutral
- o O Disagree
- Strongly Disagree
- Not Applicable

#### This is a required question

WVU MAE graduates in my employ are able to function productively on multidisciplinary teams.

- Strongly Agree
- o O Agree

∘ ○ Neutral						
O D:						
<ul> <li>Strongly Disagree</li> <li>Not Applicable</li> </ul>						
This is a required question						
WVU MAE graduates in my employ are able to identify, formulate and solve engineering						
problems.						
O Strongly Agree						
O Agree						
<ul><li>Neutral</li></ul>						
<ul> <li>O Disagree</li> </ul>						
<ul> <li>Strongly Disagree</li> </ul>						
<ul> <li>Strongly Disagree</li> <li>Not Applicable</li> </ul>						
This is a required question						
WVU MAE graduates in my employ have a good understanding of professional and ethical						
responsibility.						
<ul> <li>Strongly Agree</li> </ul>						
<ul> <li>Agree</li> </ul>						
<ul><li>Neutral</li></ul>						
o Disagree						
<ul> <li>Strongly Disagree</li> </ul>						
<ul> <li>Not Applicable</li> </ul>						
This is a required question						
WVU MAE graduates in my employ are able to communicate effectively, both verbally and						
in writing.						
Strongly Agree						
∘ ○ Agree						
o ○ Neutral						
o O Disagree						
<ul> <li>Strongly Disagree</li> </ul>						
Not Applicable						
This is a required question						
WVU MAE graduates in my employ understand the impact of engineering solutions in a						
global and societal context.						
<ul> <li>Strongly Agree</li> </ul>						
∘ ○ Agree						
Neutral						
o O Disagree						
<ul> <li>Strongly Disagree</li> </ul>						
<ul> <li>Not Applicable</li> </ul>						
This is a required question						
WVU MAE graduates in my employ recognize the need for, and engage in, life-long						
learning.						
Strongly Agree						
o O Agree						
○ ○ Neutral						

<ul> <li>O Disagree</li> </ul>		○ ○ Disagree					
<ul> <li>Strongly I</li> </ul>	Strongly Disagree						
Not Applicable							
This is a required question							
WVU MAE graduates in my employ are aware of and appreciate contemporary							
engineering issues.							
Strongly A	Strongly Agree						
∘ ○ Agree							
○ ○ Neutral							
o O Disagree							
<ul> <li>Strongly Disagree</li> </ul>							
Γhis is a required question							
WVU MAE graduates in my employ are proficient in the use of techniques, skills and							
modern tools necessary for engineering practice.							
O Strongly Agree							
o O Agree	15100						
<ul> <li>Neutral</li> </ul>							
o Disagree							
<ul> <li>Strongly Disagree</li> </ul>							
<ul> <li>O Not Applicable</li> </ul>							
This is a required question							
WVU MAE graduates in my employ are prepared to meet the varying demands of the							
workforce in the technological arena.							
o Agree							
Neutral     Discourses							
_	o Disagree						
Strongly I	_						
Not Applicable  This is a required question							
This is a required question							
Please add comments below to clarify or add to any of your answers above, or to provide							
general comments about the level of satisfaction you have with graduates of the MAE							
department at WVU.							
This is a required question In general, How would you rate WVU MAE graduates in the following categories							
In general, How v	vould you ra	te WVU MA	E graduates in th	e following categ	gories		
	Poor	Fair	Good	Very Good	Excellent		
Proficiency in							
his/her field	0		0	0	O		
Drive to learn on	0		0				
his/her own							
Preparedness to							
meet the demands of the job market	0	O	O	O	0		

#### Please enter one response per row

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