

Please rate how important the following competencies and attitudes have been to you in your professional experience and how well you feel the undergraduate program at the University of Michigan prepared you in these areas?

*Circle the appropriate number for A & B using the following scales:*

- |           |                             |           |                                |
|-----------|-----------------------------|-----------|--------------------------------|
| <b>A:</b> | <b>5=always necessary</b>   | <b>B:</b> | <b>5=excellent preparation</b> |
|           | <b>4=often useful</b>       |           | <b>4=good preparation</b>      |
|           | <b>3=useful</b>             |           | <b>3=some preparation</b>      |
|           | <b>2=rarely useful</b>      |           | <b>2=slight preparation</b>    |
|           | <b>1=never used, needed</b> |           | <b>1=no preparation</b>        |

	Always Necessary	Often Useful	Useful	Rarely Useful	Never Used	Excellent	Good Preparation	Some Preparation	Slight Preparation	No Preparation
Math, science and engineering skills										
Ability to design and conduct experiments										
Ability to design a system, component or process										
Ability to function on a team										
Engineering problem-solving skills										
Appreciation for the ethical values of being a professional										
Communication skills										
Understanding of the social, economic and environmental										

impact of my work										
Interest and ability to keep up-to-date through continuing education (formal or informal)										
Knowledge of contemporary issues that affect my work										
Ability to use modern engineering techniques, skills & tools										

This last term, alumni from the classes of 96, 93, and 88 were sent surveys and the results were compiled. Each outcome that was measured is reported below in percent of responses per category above. The three classes were combined to give a total sample size of 31 alumni responding.

**a. an ability to apply knowledge of mathematics, science and engineering**

**Student evaluation questions:**

The prerequisite science course was adequate preparation for this course.

I increased my ability to apply math and science knowledge to engineering problems.

**Alumni Survey questions:**

	Always Necessary	Often Useful	Useful	Rarely Useful	Never Used	Excellent	Good Preparation	Some Preparation	Slight Preparation	No Preparation
Math, science and engineering skills	38.7%	35.5%	22.6%	3.2%	0.0%	45.2%	38.7%	12.9%	3.2%	0.0%

**b. an ability to design and conduct experiments, as well as analyze and interpret data**

**Student evaluation questions:**

I increased my ability to analyze and interpret data.

I increased my ability to collect original data.

**Alumni Survey questions:**

	Always Necessary	Often Useful	Useful	Rarely Useful	Never Used	Excellent	Good Preparation	Some Preparation	Slight Preparation	No Preparation
Ability to design and conduct experiments	45.2%	29.0%	12.9%	6.5%	6.5%	12.9%	51.6%	25.8%	9.7%	0.0%

**c. an ability to design a system, component, or process to meet desired needs**

**Student evaluation questions:**

I increased my ability to design a system, component, or process.

**Alumni Survey question:**

	Always Necessary	Often Useful	Useful	Rarely Useful	Never Used	Excellent	Good Preparation	Some Preparation	Slight Preparation	No Preparation
Ability to design a system, component or process	19.4%	32.3%	25.8%	16.1%	6.5%	6.5%	16.1%	54.8%	22.6%	0.0%

**d. an ability to function on multidisciplinary teams**

**Student evaluation questions:**

I gained valuable experience working in teams in this course.

**Alumni Survey questions:**

	Always Necessary	Often Useful	Useful	Rarely Useful	Never Used	Excellent	Good Preparation	Some Preparation	Slight Preparation	No Preparation
Ability to function on a team	66.7%	13.3%	16.7%	3.3%	0.0%	12.9%	32.3%	29.0%	19.4%	6.5%

**e. an ability to identify, formulate and solve engineering problems**

**Student evaluation questions:**

I increased my ability to formulate, and solve engineering problems.

**Alumni Survey questions:**

	Always Necessary	Often Useful	Useful	Rarely Useful	Never Used	Excellent	Good Preparation	Some Preparation	Slight Preparation	No Preparation
Engineering problem-solving skills	61.3%	32.3%	6.5%	0.0%	0.0%	32.3%	51.6%	12.9%	3.2%	0.0%

**f. an understanding of professional and ethical responsibility**

**Student evaluation questions:**

I developed a greater understanding of my responsibilities as a professional.

**Alumni Survey questions:**

	Always Necessary	Often Useful	Useful	Rarely Useful	Never Used	Excellent	Good Preparation	Some Preparation	Slight Preparation	No Preparation
Appreciation for the ethical values of being a professional	32.3%	29.0%	35.5%	3.2%	0.0%	22.6%	22.6%	29.0%	19.4%	6.5%

**g. an ability to communicate effectively**

**Student evaluation questions:**

My oral communication skills improved because of this course.

My writing improved because of this course.

This course improved my ability to communicate technical information, designs and analyses

**Alumni Survey questions:**

	Always Necessary	Often Useful	Useful	Rarely Useful	Never Used	Excellent	Good Preparation	Some Preparation	Slight Preparation	No Preparation
Communication skills	71.0%	19.4%	6.5%	3.2%	0.0%	9.7%	48.4%	29.0%	12.9%	0.0%

**h. the broad education necessary to understand the impact of engineering solutions in a global/societal context**

**Student evaluation questions:**

I developed a greater understanding of the impact of engineering on society.

I developed a greater understanding of the impact of engineering on the environment.

**Alumni Survey questions:**

	Always Necessary	Often Useful	Useful	Rarely Useful	Never Used	Excellent	Good Preparation	Some Preparation	Slight Preparation	No Preparation
Understanding of the social, economic and environmental impact of my work	16.1%	16.1%	51.6%	16.1%	0.0%	3.2%	19.4%	45.2%	25.8%	6.5%

**i. a recognition of the need for and an ability to engage in life-long learning**

**Student evaluation questions:**

There were no student evaluation questions because we do not explicitly teach this in a class setting.

**Alumni Survey questions:**

This is the primary assessment tool to measure this outcome. No other tool is better than direct measurement of the attitudes that our alumni have about this issue.

	Always Necessary	Often Useful	Useful	Rarely Useful	Never Used	Excellent	Good Preparation	Some Preparation	Slight Preparation	No Preparation
Interest and ability to keep up-to-date through continuing education (formal or informal)	25.8 %	45.2 %	25.8 %	3.2%	0.0 %	13.3 %	33.3 %	36.7 %	10.0 %	6.7%

**i. a knowledge of contemporary issues**

**Student evaluation questions:**

I now have a greater understanding of the contemporary issues in this field.

**Alumni Survey questions:**

	Always Necessary	Often Useful	Useful	Rarely Useful	Never Used	Excellent	Good Preparation	Some Preparation	Slight Preparation	No Preparation
Knowledge of contemporary issues that affect my work	19.4%	41.9%	35.5%	3.2%	0.0%	6.5%	25.8%	32.3%	32.3%	3.2%

k. *an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice*

**Student evaluation questions:**

I increased my ability to apply engineering tools and methods.

**Alumni Survey questions:**

	Always Necessary	Often Useful	Useful	Rarely Useful	Never Used	Excellent	Good Preparation	Some Preparation	Slight Preparation	No Preparation
Ability to use modern engineering techniques, skills & tools	35.5%	25.8%	25.8%	9.7%	3.2%	29.0%	38.7%	19.4%	12.9%	0.0%