Mission, Objectives, and Outcomes

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Mission, Objectives, Outcomes

Mission – broader mission of University, College, and Program

Objectives – broader objectives of the program

Outcomes – individual outcomes that are being measured

Mission Statements

New Mexico State University:

New Mexico State University is the state's land grant university, serving the educational needs of New Mexico's diverse population through comprehensive programs of education, research, extension education and public service.

College of Engineering:

The College of Engineering will uphold the land grant mission of NMSU through nationally recognized programs in education, research, and professional & public service.

The mission statement for the Engineering Physics Program is as follows:

The mission of Engineering Physics at New Mexico State University is to offer an ABET-accredited degree that combines high-quality engineering and physics programs to best prepare our graduating students for careers in state-of-the art industry or to move on to advanced study in engineering or physics.

NMSU Objectives

Academic Recognition. To be nationally and internationally recognized for its academic programs at all academic levels

Program Quality. To have high quality, diverse faculty, staff and student body at all academic levels.

Recognition in Research. To be nationally and internationally recognized in research and creative activity

Economic Engine. To serve as an engine for economic, social, educational and community development in New Mexico.

Stewardship. To be an excellent steward of all resources.

College Objectives

Land Grant Mission. The College of Engineering will uphold the land-grant mission of NMSU through nationally recognized programs in education, research, and professional and public service.

World-Class College. Provide world-class engineers and engineering technologists for industrial, government, and academic constituents of the College of Engineering.

University of Choice. To be the “University of Choice” for undergraduate engineering and engineering technology education in the region.

EP Objectives

Competitiveness. Graduates are competitive in internationally recognized academic, government and industrial environments;

Adaptability. Graduates exhibit success in solving complex technical problems in a broad range of disciplines subject to quality engineering processes;

Teamwork and Leadership. Graduates have a proven ability to function as part of and/or lead interdisciplinary teams.

Outcomes

Engineering Physics uses the prescribed ABET outcomes a-k for assessment.

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 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 lifelong learning

j) a knowledge of contemporary issues

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

Engineering outcomes are evaluated via measurements made in different classes by different instructors:

- Force Concept Inventory exam in freshman and upper division courses.
- Physics GRE questions embedded in tests.
- Specific embedded questions in tests.
- Outcome assessment tools in Mastering Physics.
- Evaluations of oral and written presentations.
- Evaluations of group effort in labs.

We also use nationally normed tests:

- Force Concept Inventory (introductory level mechanics exam)
- Graduate Record Exam in Physics (GRE)
- Physics Major Field Test (by Educational Testing Service)

And Alumni Surveys too.

Outcomes measurements matrix matching outcomes and physics courses.

Courses in engineering departments are independently assessed for these outcomes by those departments.

NMSU Engineering Physics Outcomes Matrix

	Outcome										
Course number	a	b	c	d	e	f	g	h	i	j	k
213	x										
213L		x									
214	x										
214L		x									
215	x										
215L		x									
216	x										
216L		x									
217	x										
217L		x									
315	x					x		x	x	x	
315L		x	x	x		x	x				x
454					x						
455					x						
495											x
451					x						
461					x						
462					x						
471		x	x	x		x	x				x
475		x	x	x		x	x				x
480					x						
470						x		x	x	x	
476			x								x
488						x		x	x	x	
489						x		x	x	x	

Outcomes

a) an ability to apply knowledge of mathematics, science, and engineering
b) an abilty 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 impact of engineering solutions in a global, economic, environmental, and societal context
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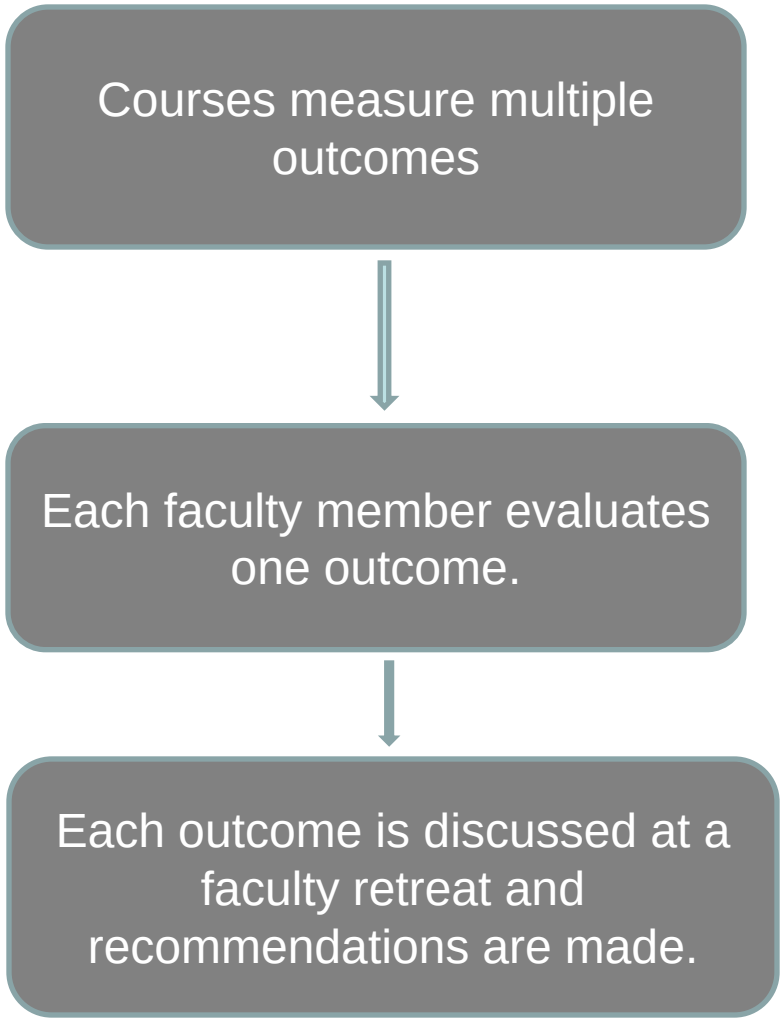
Outcomes map to current objectives:

Table 3.2: Relationship between EP Educational Objectives and Program Outcomes. The relationships of primary importance with a formal feedback loop are marked '**X**', significant relationships with no formal feedback are marked '**s**', an empty box represents a negligible relationship.

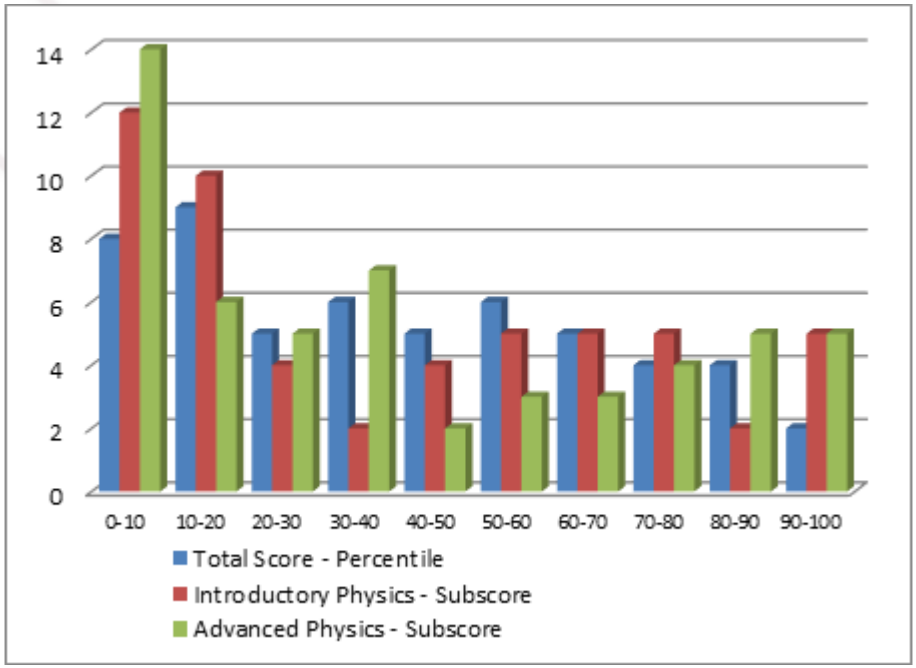
EP Educational Objectives	Program Outcomes										
	(a) Scientific Expertise	***(b)*** Experimental Training	***(c)*** Design Abilities	***(d)*** Teamwork	***(e)*** Problem Solving	***(f)*** Professional Responsibilit	***(g)*** Communicati on Skills	***(h)*** Societal Impact	***(i)*** Life-long Learning	***(j)*** Contemporar y Issues	***(k)*** Technical Know-How
EP Objective 1: Skills	**X**	**X**	**s**		**s**		**s**				**s**
EP Objective 2: Career Preparation	**s**	**s**	**X**	**s**	**X**	**s**	**X**	**s**	**s**	**s**	**X**
EP Objective 3: Professional Adaptation				**X**			**s**	**s**	**X**	**X**	
EP Objective 4: Ethics						**X**		**X**	**s**	**s**	

Outcome evaluation procedure.

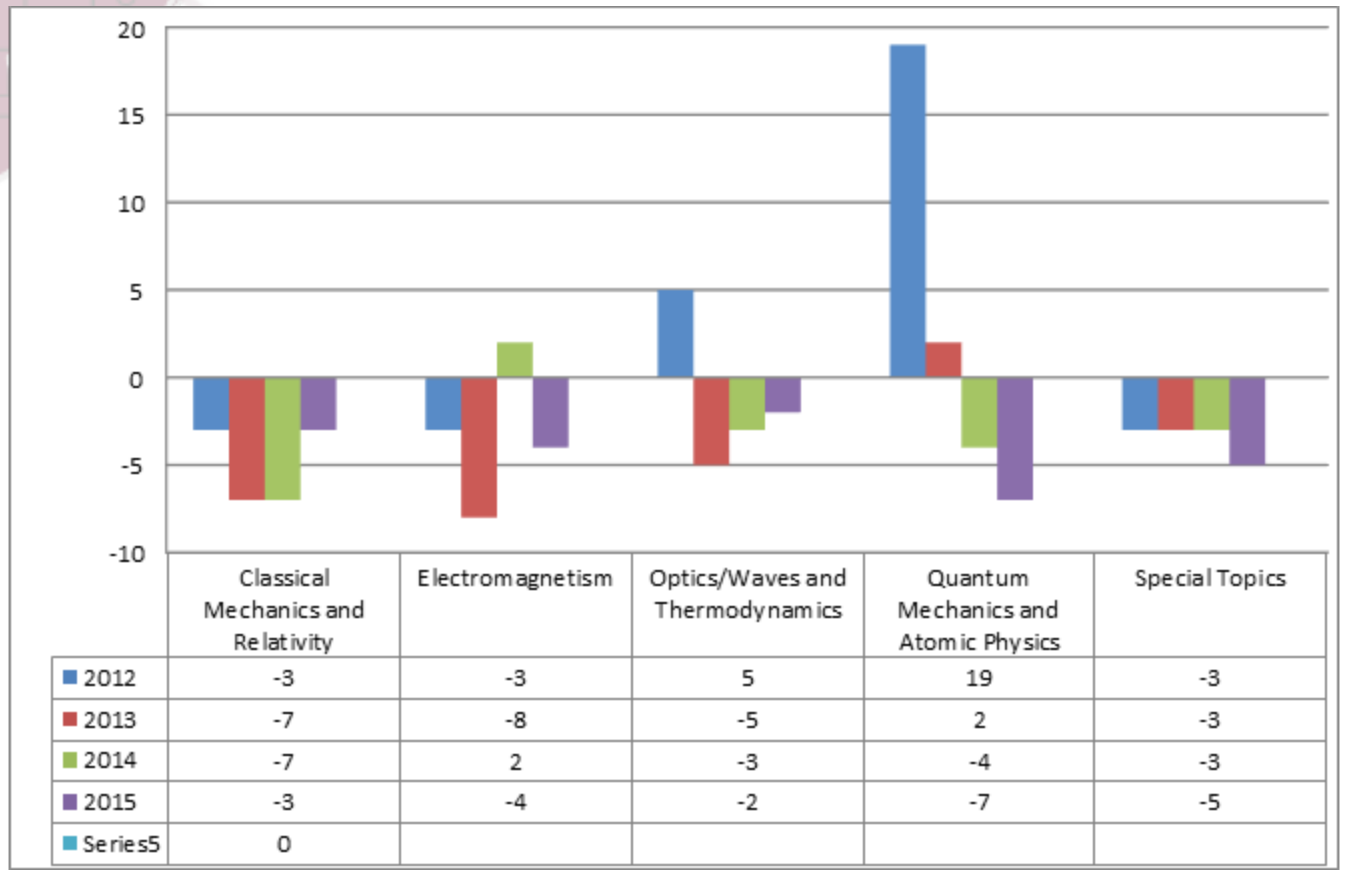
The current procedure involves all the faculty by having each review one of the outcomes. We have done this for the past two years. Prior to that the EP committee evaluated the outcomes.



Physics Major Field Test
Cumulative score distribution of NMSU Physics Students 2012-2015



Physics Major Field Test
Subject Subscores - Percentage Difference to National Average



	Classical Mechanics and Relativity	Electromagnetism	Optics/Waves and Thermodynamics	Quantum Mechanics and Atomic Physics	Special Topics
2012	-3	-3	5	19	-3
2013	-7	-8	-5	2	-3
2014	-7	2	-3	-4	-3
2015	-3	-4	-2	-7	-5
Series5	0				

Summary:

Some excellent students who transfer to top institutions or get good jobs. This shows we provide the necessary opportunity.

Most students are in the middle. These students are capable of attending graduate schools and also obtaining good jobs.

We also have C level students. Often these students are working, single parents, or commuters. These are students who would not have the opportunity to major in physics at many other campuses.

We are succeeding at NMSU's Land-Grant Mission:

> *New Mexico State University is the state's land grant university, serving the educational needs of New Mexico's diverse population through comprehensive programs of education, research, extension education and public service.*