

Physics and Astronomy Department Learning Outcomes

Spring 2011 revision

BS, BA Physics and Astronomy

Goals and associated learning outcomes

1. Students know basic physics principles
 - 1.1 Students can demonstrate an understanding of Newton's laws
 - 1.2 Students can demonstrate an understanding of Maxwell's equations
 - 1.3 Students can demonstrate an understanding of the Schrödinger equation
 - 1.4 Students can answer qualitative and quantitative problems in classical mechanics
 - 1.5 Students can answer qualitative and quantitative problems in electricity and magnetism
 - 1.6 Students can answer qualitative and quantitative problems in quantum mechanics
 - 1.7 Students can demonstrate an understanding of the thermodynamics and statistical mechanics
2. Students can apply their knowledge to practical, theoretical and experimental problems
 - 2.1 Students can develop experiments that decisively test a hypothesis
 - 2.2 Students can analyze experimental results and draw reasonable conclusions from them
 - 2.3 Students can interpret experimental data to draw meaningful conclusions from properly conducted experiments
3. N/A (Goal#3 applies only to the masters program)
4. Students are prepared for careers in science, industry and education.
 - 4.1 Students can identify and use standard laboratory equipment and instrumentation
 - 4.2 Students have developed critical thinking skills (and can apply these skills to solving problems in physics)

BS, BA Physics and Astronomy Learning Objectives

	1.1	1.2	1.3	1.4	1.5	1.6	1.7	2.1	2.2	2.3	4.1	4.2
PHYS 050: General Physics/ Mechanics	I			I				I	I	I	I	I
PHYS 050W: General Physics/ Mechanics Workshop	I*			I*								I
PHYS 051: General Physics/ Electricity and Magnetism		I			I			I	I	I	I	I
PHYS 051W: General Phys / Electricity and Magnetism		I*			I*							I
PHYS 052: General Physics/ Heat and Light		R			R			I	I	I	I	I
PHYS 053: General Physics/ Atomic Physics			I			I	I					I
PHYS 070: Mechanics	I			I								I
PHYS 071: Electricity and Magnetism		I			I							I
PHYS 072: Atomic Physics			I			I						I

PHYS 126: Introductio n to Nuclear Science			R			R						R		
PHYS 140: Computatio nal Methods in Physics				R	R	R					A	A*		
PHYS 158: Modern Optics		R			R							A		
PHYS 160: Thermodyn amics and Statistical Physics												A*	A	
PHYS 163: Quantum Mechanics												A*	A	
PHYS 168: Lasers		R				R							A	
PHYS 175A: Solid State Physics													R	A
PHYS 175B: Solid State Physics													R	A

* indicates
planned

- I - Introduced assessment
- R - Reinforced
- A - Advanced

MS Physics and Astronomy

Goals and associated learning outcomes

1. Students know basic physics principles

1.1 Students can demonstrate an understanding of Newton's laws

1.2 Students can demonstrate an understanding of Maxwell's equations

1.3 Students can demonstrate an understanding of the Schrödinger equation

1.4 Students can answer qualitative and quantitative problems in classical mechanics

1.5 Students can answer qualitative and quantitative problems in electricity and magnetism

1.6 Students can answer qualitative and quantitative problems in quantum mechanics

1.7 Students can demonstrate an understanding of the thermodynamics and statistical mechanics

2. N/A (Goal #2 applies only to the BS and BA programs)

3. Students can effectively communicate with the physics community through scientific journals, poster presentations and scientific talks.

3.1 Students can locate research results by searching electronic and traditional databases

3.2 Students can present research in a form consistent with the AIP style manual

4. Students are prepared for careers in science, industry and education.

4.1 Students can identify and use standard laboratory equipment and instrumentation

4.2 Students have developed critical thinking skills (and can apply these skills to solving problems in physics)

MS Physics and Astronomy learning objective

	1.1	1.2	1.3	1.4	1.5	1.6	1.7	3.1	3.2	4.1	4.2
PHYS 205: Advanced Dynamics	A*			A*							
PHYS 208: Introduction to Electro- Optics		A			A						
PHYS 210: Electromag netic Theory		A*			A*						
PHYS 220E: MODERN OPTICS LAB								I*	A*	A*	
PHYS 230: Methods in Mathematic al Physics											R
PHYS 240: Computatio nal Physics											A*
PHYS 248: Optical Metrology		R			R						R
PHYS 250: Semiconduc tor Physics			R			R					
PHYS 255C: Celestial Mechanics	A			A							R
PHYS 258: Optics		R			R						R
PHYS 260: Statistical Mechanics							A*				R
PHYS 263A: Quantum Theory			A*			A*					R

PHYS 263B: Quantum Theory			A			A					R
PHYS 265: Elementary Particles and Nuclear Physics			R			R					R
PHYS 268: Laser Spectroscopy		R*			R*						R
PHYS 275: Solid State Physics			R			R					R
PHYS 277: Superconductivity and Magnetism in Solids			R			R					R
PHYS 285: Seminar											I
PHYS 298: Research								A			
PHYS 299: Master's Thesis									A*		A

I -
Introduced
R -
Reinforced
A-
Advanced

indicates
planned
assessment