

**Department of Physics and Astronomy**  
**Learning Objectives of the Graduate Program**  
**Adopted September 26, 2011**

**Master of Science -- Coursework**

1. Ability to use advanced mathematics to model, describe and analyze physical phenomena.
2. Ability to apply scientific concepts and principles.
3. Deep understanding and proficiency in the fundamental areas of physics:

Classical Mechanics  
Electricity and Magnetism  
Quantum Mechanics  
Thermal Physics

**Master of Science – Thesis**

1. Ability to use advanced mathematics to model, describe and analyze physical phenomena.
2. Ability to apply scientific concepts and principles.
3. Deep understanding and proficiency in the fundamental areas of physics:

Classical Mechanics  
Electricity and Magnetism  
Quantum Mechanics

4. Ability to carry out original research.
5. Ability to communicate scientific ideas and results effectively, orally and in writing, to professional colleagues.

## **Doctor of Philosophy**

1. Proficiency in the fundamental fields of classical and quantum physics:

- Classical Mechanics
- Electricity and Magnetism
- Quantum Mechanics
- Thermal Physics

2. Deep understanding of a selected specialized area of physics or astrophysics, including the tools and techniques of research in the field.
3. Familiarity with the fundamental phenomena, concepts and methods of at least one other area outside of the student's field of specialization.
4. Ability to carry out independent, original research.
5. Ability to communicate scientific ideas and results effectively, orally and in writing, to professional colleagues.
6. Professional skills such as problem-solving, technical writing, collaborating and teaching.