MINOR IN COMPUTATIONAL ASTROPHYSICS

Overview

Modern astrophysics has evolved from the study of individual object on photographic plates to the analysis and modeling of large and complex datasets and systems, requiring a higher level of programming skill. Computational Astrophysics is now considered its own subfield within astrophysics, with dedicated journals such as “Nature – Computational Astrophysics” and it is defined as “the study of the phenomena that occur in space using computer simulations. This can involve modelling processes that take place over millions of years, such as colliding galaxies or the slow destruction of a star by a black hole. This also includes understanding the high-energy phenomena that take place in stars.”

The minor in Computational Astrophysics at the University of Miami provides students with basic skills that they will need if they want to continue in the field of astrophysics, namely an introduction to astrophysics and to computer programming. Combined with a major, for example, in Physics, Computer Science, or Engineering, it will give the students what they need to apply to graduate school to pursue either Astrophysics or Astronomy. The Minor also provides students with basic problem solving skills and experience with large data analysis that could be reinvested in a future career in the private sector.

The minor requires 9 credits from the Department of Physics and 7 credits from the Department of Computer Science. The courses required are Modern Physics (which covers, among others special relativity and properties of light), Introduction to Astrophysics (which covers fundamental tools in astrophysics and a study of the properties of astrophysical objects), Computer Programming I, 3 additional credits in Astrophysics, through either a special topic course in Astrophysics (currently including Cosmology, General Relativity, or High Energy Astrophysics) and/or research in Astrophysics with one of the active groups in the Physics Department, and 3 additional credits in Computer Science, through either Computer Programming II or Introduction to Python for Scientists.

NOTE #1: This minor includes the University Physics sequence as prerequisite.

NOTE #2: The minor cannot be combined with the Physics major to fulfill the graduation requirements for the College of Arts and Sciences.

NOTE #3: Students cannot pursue both the Astrophysics and Computational Astrophysics minor

Curriculum Requirements

Code	Title	Credit Hours
Prerequisite		
University Physics Sequence		
Modern Physics		**3**
PHY 360	Introduction to Modern Physics	
Introduction to Astrophysics		**3**
PHY 545	Introduction to Astrophysics	
Introduction to Programming		**4**
CSC 120	Computer Programming I	
Three credits in "Special Topics in Astrophysics" or "Research in Astrophysics"		**3**
PHY 502	Research in Astrophysics	
PHY 518	Special Topics in Astrophysics	
Three additional credits in Computer Science		
CSC 220	Computer Programming II	3-4
or CSC 315	Introduction to Python for Scientists	
Total Credit Hours		**16**