

# **ASTR 23900 The Physics of Galaxies**

## **Course description**

This course will provide a comprehensive introduction to galaxies, the interstellar and intergalactic mediums. We will examine the basic properties of galaxies and the physical process involved in their structure and evolution. Topics will include the stellar content of galaxies and the dynamics of stars within galaxies, the Milky Way galaxy, the physical state of the interstellar gas, central supermassive black holes and active galactic nuclei, galaxy clusters and the hot intergalactic medium. We will discuss the formation of galaxies and processes that shape the distribution of dark matter and baryonic matter.

## **Syllabus**

Week 1: Introduction and basic properties of galaxies (brightness, color, morphology)  
Week 2: Cosmic distance ladder, cosmological distances  
Week 3: Dynamics of stars in galaxies  
Week 4: Interstellar medium and dust  
Week 5: Dark matter halos; Milky Way: structure, kinematics  
Week 6: Star formation; fundamental scaling relations  
Week 7: Galaxy clusters; hot intracluster medium; active galactic nuclei  
Week 8: Elements of galaxy formation and evolution  
Week 9: Summary/overview: project paper presentations

## **Textbooks**

1. "Galaxy Formation and Evolution" by H. Mo, F. van den Bosch, S. White
2. "Galaxy Formation" by M. S. Longair
3. "Galactic Dynamics" by J. Binney and S. Tremaine
4. "Galaxies in the Universe" by L. S. Sparke and J. S. Gallagher

## **Prerequisites**

General physics, calculus, basic astronomy: PHYS 131-133, ASTR 133, MATH 151-153.