

ASTR 320

Astronomical Spectroscopy

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ASTR 320 is an introduction to astronomical spectroscopy. Students will learn the different characteristics of spectra produced by a variety of astronomical sources (stars, nebulae, galaxies), and what kind of information can be extracted from them. They will be exposed to the complexity of atomic and molecular energy levels, and will understand the formation of absorption and emission lines in widely different physical conditions. A good understanding of these topics will allow the student to fully appreciate the array of observational techniques regularly used in

collecting the empirical knowledge that allows to build and test astrophysical theories.

Prerequisites – The course is designed to be taken after ASTR 240 or 242. It is complementary to ASTR 300, 300L, while PHYS 152 (or 274), and MATH 216 (or 242 or 252A) are prerequisites. Students should be familiar with quantum physics and calculus concepts, including multiple integrals, derivatives, and ordinary differential equations.

Study material – Lecture notes provided by the instructor.

TOPICS

Basics of radiation theory

Atomic and molecular structure

Radiative transitions

Spectral lines

Radiative transfer

Collisions and forbidden lines

Continuous processes

Photoionized nebulae

Neutral gas

Stellar atmospheres

Mass loss and stellar winds

SPRING 2015

Tu/Th 10:30-11:45 Watanabe 415

phone 956 8306

office Watanabe 423 (after class)

IfA C-208 (appointment)

HOMEWORK

Sets are due one week after having been assigned, at the start of class. Late homework can be handed in on the next class (75% credit).

GRADES

Homework	30%
Midterms	2 x 20%
Final exam	30%

FINAL SCORE

85-100%	A
70-84%	B
55-69%	C
40-54%	D
below 40%	F
