

# ASTRONOMY 407: PHYSICS OF THE INTERESTELLAR MEDIUM

Fall 2013

Instructor: Edward Schmidt  
Office: Jorgensen 244G (mail box in room 208)  
Phone: 472-2788  
email: eschmidt1@unl.edu  
Required Text: *The Physics of the Interstellar Medium*  
by J.E. Dyson & D.A. Williams  
Class: Tuesday/Thursday, 11:00-12:15, Jorgensen 247  
Office Hours: Tuesday/Thursday, 13:30-14:30, Jorgensen 244G  
Other times by appointment or just drop in or call  
Prerequisites: ASTR 204, PHYS 213 or permission  
Attendance policy: Students are expected to attend all classes. No make-up exams will be allowed except in extraordinary circumstances.

COURSE DESCRIPTION: Theoretical and observational aspects of the various components of the interstellar medium, including gaseous nebulae, dust, molecules, clouds and star forming regions.

GRADING AND EXAMS: The grades in this course will be determined as follows:

20% Midterm exam  
30% Final exam  
25% Homework assignments  
25% Literature discussions

EXAMINATIONS: The examinations will be open book—bring any written materials you feel may be helpful including the text, the discussion articles, your notes, etc.

Most of the exam will consist of quantitative problems but there will also be at least one essay question on each exam.

**JOURNAL DISCUSSIONS:** We will discuss an article from the astronomical literature approximately every two weeks. The purpose of this is to learn about recent developments in the field and to explore issues that go beyond what is covered in the text. Thus, the emphasis of the discussion will be what the article contributes to our understanding of some aspect of the interstellar medium.

The articles will be distributed at least a week before the in-class discussion. Read each one thoroughly and come to class ready to discuss it. Prepare a summary of the main points of the article (again, with the emphasis on the scientific issues and how the article addresses them) and at least one question or issue that we can discuss together. The summary and question are to be handed in following the discussion.

**THE POWERPOINT PRESENTATIONS:** The PowerPoint slides will be available on the Black Board site for the class under the "Course Documents" tab. They will generally be updated weekly.

**THE SCHEDULE AND THE READINGS:** The schedule below represents a tentative indication of the topics to be discussed. The rate at which we progress through them will depend how things go; if we encounter difficulties with a particular topic we will take time to resolve them or if a topic proves to be of special interest we may spend more time on it. In the (highly) unlikely event that we finish all of them before the end of the semester, we will consider other topics based on student interest. The book is both a source of background information and a reference to consult as needed. The readings listed in the schedule are intended for background and should be read before the start of each topic. As we go along, the instructor will direct you to other pages or sections to which you should pay particular attention. Some of the material in the book may require more background

than students have. If that happens, come to class prepared to ask appropriate questions. In addition to the book, we will read and discuss some articles from the current astronomical literature.

**Tentative Schedule of Topics and Reading**

Class Dates	Topic		Relevant sections in Dyson and Williams*
Aug. 27 to 29	1	Introduction, The constituents and general nature of the Interstellar Medium, background physics	Ch 1 and 2
Sep 3 to Oct 24	2	Emission nebulae, proplyds, HI clouds	3.2.1, 3.2.2, 3.3.2, Ch 5, 7.1
Oct 29		Midterm Exam	
Oct 31 to Nov 19	3	Interstellar Extinction and the Properties of Interstellar Dust	4.1-4.5
Nov 21 to Dec 12	4	Interstellar Molecules	3.2.3.4, 4.6
Dec 16		Final exam from 3:30 to 5:30 p.m.	

\* These portions of the book are listed here for general guidance. As we go along the instructor will point out particular things you should read for upcoming classes.