

## **Astrophysics & Stellar Astronomy – Syllabus, Fall 2013**

### **AST 5010 / PHY 5010**

**Lecture:** Tuesday and Thursday, 1:25pm – 2:50pm

**Location:** 245 Physics

**Professor:** Edward Cackett

**Office:** 337 Physics (666 W. Hancock)

**E-mail:** ecackett@wayne.edu

**Phone:** (313) 577 9355

**Office hours:** Tuesday and Thursday 11:30am – 12:30pm or by appointment

**Text:**

*An Introduction to the Theory of Stellar Structure & Evolution* (2<sup>nd</sup> Edition) by Dina Prialnik (Cambridge University Press, 2010). This textbook is *required* for the course. An additional textbook that is also useful is *The Physics of Stars* (2<sup>nd</sup> Edition) by A. C. Phillips (Wiley). This textbook is not required, but is a good additional resource, if needed. There are 2 copies of it available in the Science and Engineering library.

**Course synopsis:**

This is a 3-credit course which covers an introduction to the physics of stars.

**Blackboard:**

Course announcements, grades, etc will be made using the Blackboard system (blackboard.wayne.edu). Please make sure you check it regularly.

**Exams:**

- There will be 2 mid-term exams and 1 final exam.
- As per the university's exam schedule, the final exam will be held on **Thursday, December 12 from 1:20pm – 3:50pm** (note the different time).
- Material covered on each exam will be announced in class, and through Blackboard
- The final is a cumulative exam, i.e. covers all the material seen through the semester.
- There will be **no make-up exams**.
- **If you do not take the final exam, your course final grade will be automatically 'F' – no exception.**
- **If you miss more than one mid-term, your course final grade will automatically be 'F' – no exception.**

**Homework:**

There are weekly homework problems associated with each lecture. Homework from the previous week is due on Tuesday.

**Group presentations:**

There will be two approximately 10-minute presentations made in groups of 3 – 4 during the class .

**Performance Evaluation:**

Your final grade in this course will be based on the following items:

Mid-terms	40%	(each mid-term counts for 20%)
Final Exam	30%	
Homework	25%	
Group presentations	5%	(each presentation counts for 2.5%)

**Final Grades:**

Final grades will be given using the grading scale in the table below, however, it is almost impossible to set ‘perfect’ exams, and so grades may be curved, if necessary.

A	90 – 100 %
A-	85 – 89
B+	80 – 84
B	75 – 79
B-	70 – 74
C+	65 – 69
C	60 – 64
C-	55 – 59
D+	50 – 54
D	45 – 49
D-	40 – 44
F	< 40

**Advice:**

1. **Get the text**, read it before class, go to class, take notes and participate in the discussion.
2. **Come to class!** Research has shown that students who come to class do better, on average, than those that don't.
3. **Ask questions in class.** If things aren't clear, or even if you just want me to leave something up for longer to write it down, **don't be afraid to ask.** You will likely not be the only one with the same question/request.

4. You cannot skip the final exam because you feel you are getting a good enough grade without it. If you miss the final exam you will receive a grade of 'F'. No exceptions.

**Student e-mails:**

I am happy to answer questions via e-mail. However, please be sure to look for announcements on Blackboard and check this syllabus before emailing the me with questions. Please also follow proper professional etiquette in your emails. For instance it is appropriate to use full sentences with proper grammar and punctuation (i.e. no 'text' slang, please). **Rude or improper emails will not be answered.**

**Students with Disabilities:**

If you have a documented disability that requires accommodations, you will need to register with Student Disability Services for coordination of your academic accommodations. The Student Disability Services (SDS) office is located at 1600 David Adamany Undergraduate Library in the Student Academic Success Services department. SDS telephone number is 313-577-1851 or 313-577-3365 (TTY: telecommunication device for the deaf; phone for hearing impaired students only). Once you have your accommodations in place, I will be glad to meet with you privately during my office hours to discuss your special needs. Student Disability Services' mission is to assist the university in creating an accessible community where students with disabilities have an equal opportunity to fully participate in their educational experience at Wayne State University.

**Course Schedule:**

This is the expected schedule for the course, though it is subject to change as needed.

Day	Date	Lecture Topics	Chapter
Th	8/29	Introduction, Stellar Basics, HR Diagram	1
Tu	9/3	Equilibrium, dynamics	2.1 – 2.4
Th	9/5	Evolution, timescales	2.5 – 2.8
Tu	9/10	Problem solving Chp 1 & 2	
Th	9/12	Group presentation prep (choose a topic from chp 1 – 4)	
Tu	9/17	Group presentations & Equation of State, Pressure	3.1 – 3.4
Th	9/19	Radiation, Radiative Transfer	3.5 – 3.7
Tu	9/24	Nuclear reactions, Hydrogen burning	4.1 – 4.4
Th	9/26	He, C, O, Si Burning, Heavy elements	4.5 – 4.10
Tu	10/1	Problem solving Chp 3 & 4	1 – 4
Th	10/3	<b>Exam 1</b> (Chapters 1 – 4)	1 – 4
Tu	10/8	Simple stellar models I	5.1 – 5.4
Th	10/10	Simple stellar models II	5.5 – 5.7
Tu	10/15	Thermal stability, Dynamic stability	6.1 – 6.4
Th	10/17	Convection	6.5 – 6.7
Tu	10/22	T- $\rho$ evolution. The Main sequence	7.1 – 7.4
Th	10/24	Late evolution	7.5 – 7.6
Tu	10/29	Review	5 – 7
Th	10/31	Pre-main sequence, Main-sequence phase	9.1 – 9.3
Tu	11/5	<b>Exam 2</b> (Chapters 5 – 7)	5 – 7
Th	11/7	Group presentation prep (choose a topic from chp 9 – 12)	
Tu	11/12	Group presentations & Red Giant phase	9.4 – 9.6
Th	11/14	Star death & Massive stars	9.7 – 9.10
Tu	11/19	Supernovae	10.1 – 10.3
Th	11/21	Neutron stars & Black Holes	10.4 – 10.6
Tu	11/26	Binary Stars	11
Th	11/28	<b>Thanksgiving – no class</b>	
Tu	12/3	Stellar life cycle	12
Th	12/5	Review	1 - 12
Tu	12/10	<b>Study day – no class</b>	
Th	12/12	<b>Final Exam</b>	