

ASTRONOMY 300 A

Fall Semester 2015

Prof. Rodger Thompson

Office: 320 Steward Observatory

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Office Hours: by appointment or anytime I am in

SYLLABUS

TEXTBOOK: Astrophysics in a Nutshell - Daniel Maoz

ADDITIONAL REFERENCES

Astrophysical Processes - Hale Bradt

Modern Astrophysics - Bradley Carroll and Dale Ostlie

The Physical Universe - Frank H. Shu

Galactic Dynamics- James Binney and Scott Tremaine

The Cambridge Handbook of Physics Formulas - Woan

Astrophysical Formulae - Lang

Allen's Astrophysical Quantities - Cox, editor

General Relativity Workbook- Moore

COURSE PURPOSE

Astronomy 300 A is the first in a set of four courses, 300 A,B and 400 A,B, that form the core upper division astronomy courses. They are designed to prepare students for graduate work in astronomy and are aimed at students intending to become professional research astronomers and astrophysicists. 300 A will introduce you to several of the topics that will be the subject of further concentration in the remaining 3 courses. It covers the basic physical concepts that will be required for further work and introduces those areas that form the framework of modern astrophysical research. We will concentrate on the computational skills, analytical skills, and logical approaches needed to solve problems. Estimation techniques are emphasized both in the book and the course.

COURSE FORMAT AND GRADING POLICY

Students are expected to read the assigned material before the class period scheduled for the discussion of the material. The lectures are designed to point out the fundamental physical processes at work in the discussed subject rather than as an attempt to thoroughly discuss the subject matter. The written exams constitute 90% of the grade with the two hour final counting twice as much as one of the 3 one hour exams. The homework constitutes 10% of your grade. The grades are calculated on the weighted sum of the exams in the following manner,

$$\text{Grade} = 0.36 \times \text{final} + 0.18 \sum_{1}^{3} \text{hourexams} + 0.1 \times \text{homework}$$

The final course letter grade is awarded on the basis of the numerical grade in the above equation. The relative performance of the student to the class performance is taken into account in assigning a grade. Students wishing clarification of any part of this policy should see me. Any absences from the examinations must be discussed with the instructor prior to the day of the exam. It is the responsibility of the student to attend and participate in the exams. Excuses for absences will be granted only for such unavoidable circumstances such as severe illness or injury.

HOMEWORK AND EXAMS (important reading)

The assigned homework is to be done individually and turned in at the beginning of class on the due date of the homework. Working collectively on the homework is considered academic dishonesty and will be dealt with as described in the section on academic dishonesty. Solutions to the homework problems will be distributed when the homework is returned. Based on the performance on the homework sets a homework problem will be selected to review in class. It will most likely be the problem that the class had the most trouble with.

The hour exams consist of 3 problems that are to be worked out on the sheets provided with the exams. The final exam consists of six problems. See EXAMS below for the dates of the exams and general policy.

POLICY ON ACADEMIC DISHONESTY

Academic dishonesty is any submission of material, homework, examinations, or other course requirements that is not the students sole work or is not carried out under the rules and regulations set forth for the submission. All exams will be taken with no written aids, calculators, or other materials. Penalty for academic dishonesty will be at a minimum forfeiture of all credit for the submission. The student should be aware that there are University policies for appeal of any action taken by the instructor with regard to Academic Dishonesty.

Code of Academic Integrity

<http://deanofstudents.arizona.edu/academicintegrity>

Calendar of Religious Holidays

<http://www.registar.arizona.edu/religiousholidays/calendar.htm>

Students with Disabilities

If you anticipate barriers related to the format or requirements of this course, please meet with me so that we can discuss ways to ensure your full participation in the course. If you determine that disability-related accommodations are necessary, please register with Disability Resources (621-3268; drc.arizona.edu) and notify me of your eligibility for reasonable accommodations. We can then plan how best to coordinate your accommodations.

LECTURE NOTES

Lecture notes will be posted on d2l accessible at <http://d2l.arizona.edu>. The notes are copies of the notes projected in class. The notes will be posted the day before the class. Note that updates or replacements may occur if the notes require correction or clarification.

HOMEWORK AND EXAM SOLUTIONS

The homework will be in the form of problem sets produced by the instructor. The homework solutions will be discussed in class when the homework

is handed back. Any questions will be answered then. Similarly the examination solutions will also be discussed in the class they are handed back in and questions answered at that time.

UNITS

Consistent with professional publications in Astronomy and Astrophysics the units employed are in the cgs (centimeter gram second) system. Please use these units in all of your homework and examination solutions.

ASTRONOMICAL CONSTANTS

Speed of Light in cm/second = 2.9979×10^{10}

Gravitational Constant G in dyne $\text{cm}^2 \text{g}^{-2}$ = 6.67×10^{-8}

Solar Mass in grams = 1.989×10^{33}

Solar Radius in cm = 6.96×10^{10}

Solar Luminosity in ergs/sec = 3.827×10^{33}

Parsec in cm = 3.086×10^{18}

Fine Structure Constant $2\pi e^2/hc$ = 1/137.036

COURSE CALENDAR

Classes 11:00 - 11:50 MWF

LECTURE	DATE	ASSIGNMENT
1	Aug. 24	Preface and Chapt. 1
2	Aug. 26	2.1
3	Aug. 28	2.2.1-3
4	Aug. 31	2.2.4-2.3
5	Sept. 2	3.1-3.2
6	Sept. 4	3.3-3.4
7	Sept. 9	3.5-3.6
8	Sept. 11	3.7-3.8
9	Sept. 14	3.9-3.10
10	Sept. 16	3.11-3.12
11	Sept. 18	4.1
12	Sept. 21	4.2
13	Sept. 23	Exam 1
14	Sept. 25	4.3
15	Sept. 28	4.4
16	Sept. 30	4.5
17	Oct. 2	4.6
18	Oct. 5	5.1
19	Oct. 7	5.2
20	Oct. 9	5.3
21	Oct. 12	5.4
22	Oct. 14	6.1
23	Oct. 16	6.2
24	Oct. 19	6.3
25	Oct. 21	6.4
26	Oct. 23	7.1
27	Oct. 26	7.2
28	Oct. 28	Exam. 2
29	Oct. 30	7.3
30	Nov. 2	7.4
31	Nov. 4	7.5
32	Nov. 6	8.1

33	Nov. 9	8.2
34	Nov. 13	8.3
35	Nov. 16	8.4
36	Nov. 18	8.5
37	Nov. 20	9.1
38	Nov. 23	Exam. 3
39	Nov. 25	9.2
40	Nov. 30	9.3
41	Dec. 2	9.4
42	Dec. 4	9.5
43	Dec. 7	9.5
44	Dec. 9	Review
	Dec. 16	Final Exam <u>10:30-12:30</u>

EXAMS

Hour Exams: Sept. 23, Oct. 28, Nov. 23 during regular class time

Final Exam: Dec. 16, **10:30 AM to 12:30 PM**

All exams are closed book with no notes or calculators. Only writing materials are allowed in exams. You are responsible for providing your own pencils and pens. Space for calculations and answers will be provided on the examination sheets. All students must stay for at least 20 minutes in all exams and no student will be admitted 15 minutes after the start of an examination.

