

# Astronomy 129 - Cosmology

Fall 2014

## Syllabus and Information

The weekly seminar meetings present an opportunity for each student to solidify their knowledge and understanding of the material we're reading that week. Students will be expected to participate in discussion, solve problems and give presentations at the board, and answer questions that other students ask.

The preparation for our seminar meetings is critical. We will be using Ryden's *An Introduction to Cosmology*, which is a very good book, and which we'll be following quite closely. I will generally give you an assignment each week that includes notes, pointers, things to look out for as you read, and topics/questions that I'll expect you to discuss if not totally answer in seminar the following week, and it will also include a few questions and problems (often from the textbook) that you'll have to write up formal answers to which you'll hand in on Tuesday morning, the day before seminar. I will give you feedback on your work by Tuesday evening, which you can use to prepare for seminar (often my comments will involve additional things you should be thinking about for the seminar discussion of a given problem or telling you that you're on the wrong track in your solution to a particular problem). I will grade that written work simply as adequate or not (i.e. you'll get full credit based on effort and completeness, but only if the work is handed in on time; late work will not get full credit and I also may not give you feedback on it).

We'll have a midterm (in class, the week after break) and a final exam. These will count for 2/3 of your grade in total, with the weekly assignments and class participation counting for the other 1/3.

Topics:

Week 1: Scale of the universe, cosmological principle, basic observational evidence for the Hot Big Bang model (Chs. 1 & 2)

Week 2: Basics of general relativity, equivalence principle, curvature of space (Ch. 3)

Week 3: Special topics in General Relativity (Tristan Smith)

Week 4: Cosmic dynamics, the Friedmann equation (Ch. 4)

Week 5: Model universes – single component (Ch. 5)

Week 6: Model universes – multiple components (Ch. 6)

(Fall break)

Week 7: Midterm (in class)

Week 8: Measuring cosmological parameters, distance ladder, the accelerating universe (Ch. 7)

Week 9: Dark matter, lensing, observational properties of dark matter (Ch. 8, Bullet Cluster article)

Week 10: Cosmic microwave background, anisotropies, and precision cosmology (Ch. 9)

Week 11: Nucleosynthesis and the early universe (Ch. 10)

Week 12: Inflation and the very early universe (Ch. 11)

Week 13: Large scale structure (Ch. 12)