Astronomy 101 – Descriptive Astronomy – The University of Mississippi

Perhaps you have wondered: Why is the sky blue? Where did the solar system come from? Why is the Earth or Moon or Sun round? Why does the Earth have seasons? Why is the Moon at times full, at times not? What is a star, how does it shine and why does it 'twinkle'? What is a black hole? What is a galaxy? How old is the Universe? From where do the elements come? &c. Such a course as this, a course in the basics of astronomy and astrophysics, seeks answers to such questions. Understanding will be both qualitative and quantitative.

The Universe is full of many interesting and mysterious things, from planets harbouring life and exotic nebulae to galaxies with masses of thousand billion Suns. We will see many of these in images and try to understand the features seen. However, an astronomy course is not really complete without some observations and practical outdoor skills, and so we shall have several observation sessions during the semester, using some of the telescopes at our disposal (a 15-inch refractor from the 1890s and a 25-inch reflector), so that you may see for yourself some of these objects. Objects to be seen could include: the planet Jupiter, globular star clusters, open star clusters, nebulae and double stars. We will also identify constellations and give a general familiarity with the nighttime sky. It is hoped that by the end of the course, you would have gained a deeper understanding and appreciation for the Universe.

It is hoped, that the class session will be a discussion. This means that *all of us* contribute, and your equal (active) contribution of questions, comments and insights are expected. Historically, readings are a) beneficial and b) most beneficial if done before the class, with review after. Evaluation is open for discussion. Short exercise sets will be made available to those wishing to challenge themselves. They will be worth extra considerations toward the final grade. Random, unannounced quizzes will be given, so that both you and I may gauge your understanding. Every missed quiz will lower the final grade by half a grade. Every missed observation session lowers the final grade by one.

Suggested Text: *The Essential Cosmic Perspective* by Bennett, Donahue, Schneider and Voit
Class sessions: Tuesday and Thursday from 19:00 to 20:15 in Lewis Hall room 101
Course Examination: Thursday, 8th December, at 19:30 in Lewis Hall room 101
Office Hour: Tuesday 15:00 - 16:00, or any mutually agreeable time.

Brian Mazur
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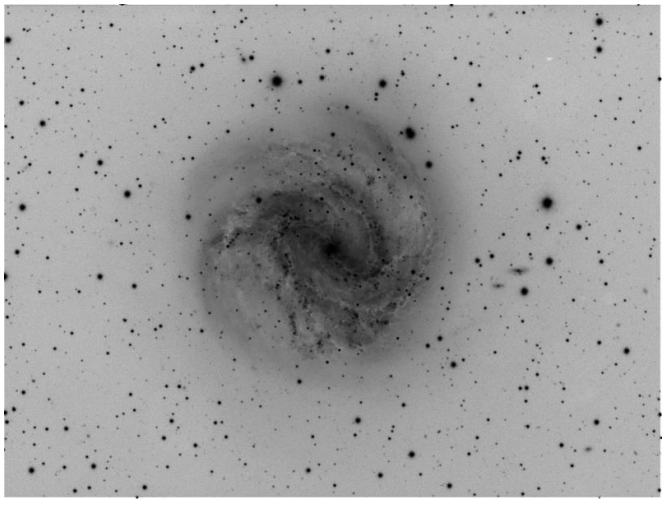
Kennon Observatory, room 1



Lecture Plan:

Part I – Basic Astronomy [Readings: **chapters 1 - 5 of Bennett et al.**]

Topics covered will include the celestial sphere, distance scales, a history of ancient astronomy, phases of the Moon, seasons, tides, basic physics of light and matter, telescopes &c.

Part II – Stellar Astronomy [Readings: **chapters 10 - 13 of Bennett et al.**]

The stars are the essential building blocks of galaxies. Beyond that, stars are essential for life. We will investigate the conditions and processes of their formation out of giant molecular clouds, their evolution and eventual death and return to be reformed again. Included also, are star clusters (which turn out to be the main mode of formation), both galactic and globular.

Part III – Planetary Astronomy [Readings: **chapters 6 - 9, 18 of Bennett et al.**]

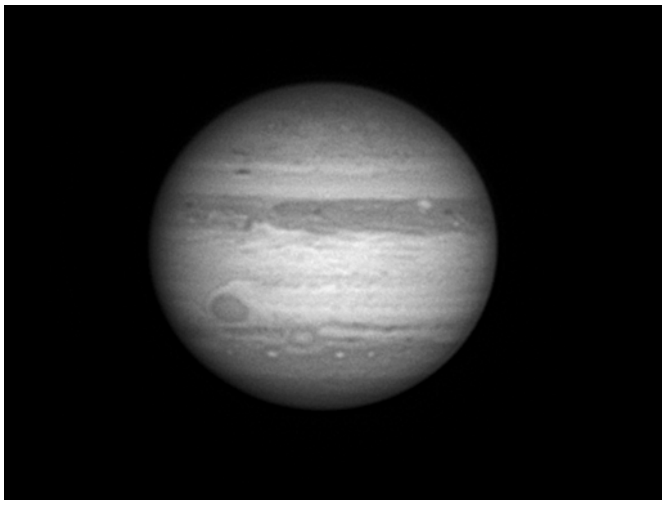
He will shall discuss the formation of planetary systems, in particular our own, the interiors, surfaces and atmospheres of the planets, the formation of moons, asteroids, comets, the Sun &c.

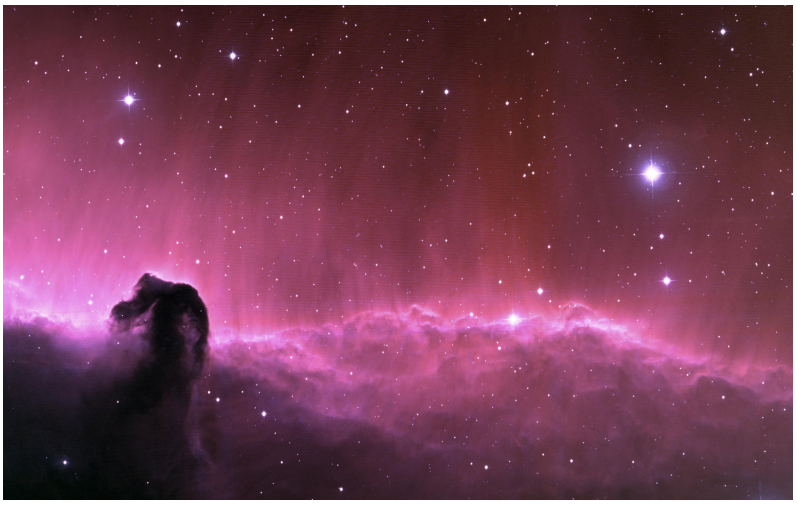
Part IV – Galactic Astronomy [Readings: **chapters 14 - 16 of Bennett et al.**]

This part is devoted to the basic building blocks of the Universe: the galaxies. These objects, which can be collections of a few to a hundred million suns, have their own structure, dynamics and evolution. It is these that we shall discuss here.

Part V – Cosmology [Readings: **chapters 16 - 17 of Bennett et al.**]

Finally, cosmology is the study of the Universe as a whole. We shall ask and attempt to answer questions such as: How did it form? How does it evolve? How will it end?





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Evaluation Addendum:

There will be three (3) tests, including the course examination, with tentative dates:

27th September

3rd or 10th November

8th December – Course Examination

The course grade will be determined from the tests (term plus course examination) averaged and compared with the course examination alone, the higher of the two will be taken. Quizzes/observations will then affect the final grade accordingly.

Envisioned[1] grades are:

Letter	Percentage
A	85 - 100
A –	70 - 85
B +	60 - 70
B	50 - 60
B –	40 - 50
C	30 - 40
D	20 - 30
F	0 - 20

[1] Will depend on performance of group on first examination