In the first paper, I am asking you to reflect upon some aspect of the material in Kragh, *Conceptions of Cosmos*, and to expand Kragh’s discussion via research—whether on the internet or in the SF State library—on one of the topics listed in the section below. Aim your paper at a physicist who has not read Kragh, but is familiar with the current cosmological model (i.e., do not spend a lot of time explaining the current Big Bang model).

- The paper should be 6-12 pages, double-spaced, in 11pt font. The paper should be emailed to me no later than 5PM on the above dates. Focus on quality rather than quantity: I would prefer to receive a very crisp 6 page paper that is the result of hard work, than 12 page paper that could use more editing.

- This first paper should consist primarily of historical discussion; the second and third papers in the course will be primarily scientific/mathematical in nature. However, even within this first paper, there are opportunities to include some mathematics should you wish them.

- The paper counts for 20% of your total grade. Half of this is based on the original draft; another half will be based on the revised version, based on my comments.

- You are to use a minimum of 5 (five) outside sources other than Kragh in your discussion. While I encourage you to use Wikipedia for initial background reading, you may not use Wikipedia itself or other encyclopedias as one of your five sources. Your source must be a reputable authority on the history of astronomy or physics (i.e., either the author of a published paper book, or if a purely online source, an academic or journalist at a reputable publishing or academic institution. If in doubt, ask me).

- The paper must include citations when appropriate—either when directly quoting a source, or when making use of an idea primarily taken from a source. The paper should also include a bibliography.

Topics (select one):

1. From ancient times through the writings of Ptolemy, Galileo, Copernicus, Kepler, Newton, through the early twentieth century, there have been a multitude of cosmological models. Most of these models, we now know, are in one way or other inconsistent with observations (i.e., wrong). However, in many cases, the proponents of these flawed models did consider the answer we now consider correct, only to reject it based on either specious thinking, poor data quality, or philosophical prejudice. Trace the theme of the correct answer considered, but then rejected, throughout one or more historical periods of your choosing. Be sure to address mathematical, philosophical, as well as technological reasons for this phenomenon.

2. The notion of an infinite, everlasting, overall static universe is strong in a few of the ancient mythologies we have studied; it later became an obsession of the Enlightenment, and had such a strong draw that it led to Einstein’s cosmological constant. In what way has the notion of infinity played a role in the development of cosmological thought throughout the ages? As part of this topic, you must try the calculation outlined in Kragh section 2.4.3 (p. 108), using your present knowledge of physics. Does an infinite universe lead to infinite accelerations within a finite time?

3. Forget about the planets—what role did the fixed stars and galaxies play in the history of cosmology from ancient times to the twentieth century? How have ideas regarding the distribution of stars, the location of the Sun, and the nature of the Milky Way changed, beginning with Greek and other ancient writers, through the Middle Ages and the Enlightenment, to recent times? Who were the most important thinkers in the evolution of the thought regarding the nature of stars and the Milky Way? How have ideas of the location of the Sun in the universe changed with time, and what experimental results and techniques were important in these discussions?