The final examination will be held on Thursday, December 19, at 4 PM, in Hasbrouck Lab 134. It will consist of one essay and several short answer questions. You will have 2 hours (120 minutes) to complete the examination, which should be more than enough time. The examination will be closed-book and closed-note; however, we encourage you to study by outlining or writing answers to the questions.

See the tips from the first exam for guidelines on studying; they are also available on the course web page as Adobe Acrobat (PDF) files.

The exam will include one of the following five questions (you will not have a choice as to which question to answer):

1. Explain how Galileo and Bacon responded to sixteenth-century skepticism. Which aspects of traditional scientific knowledge did skepticism challenge, and how did Bacon and Galileo respond to those challenges? How did their natural philosophies go beyond traditional Aristotelian natural philosophy?

2. Compare Bacon’s scientific method, as described in The Great Instauration and The New Atlantis, with Aristotle’s. Was Bacon’s emphasis on induction wholly new, or did it constitute a shift in the emphasis of scientific work? That is, did Aristotle think induction was unnecessary, or did he think instead that it was unproblematic? How did the social organization of Bacon’s new science differ from that of Aristotle’s old science? Are the differences explicable by the role induction played for each thinker?

3. In this course we have looked at many technological innovations, from agriculture and large-scale irrigation in the ancient world, to the heavy plow, horse collar, three-field rotation, windmills, water-mills, the mechanical clock, and the printing press. Which of these was most revolutionary, and why? For your choice, explain the consequences it had for society, and suggest why these were more significant than one or two possible competitors.

4. Galileo and other seventeenth-century thinkers believed that the physical world could be explained by reference to the “primary qualities” of matter, which inhered in tiny, invisible corpuscles (particles) that constituted a mechanism of the world. Furthermore, the action of these corpuscles could be explained with mathematics. Discuss the relationship between these ideas and the rise in the 14th century of the mechanical clock and the growth of commerce, banking, and trade in early modern Europe. Can the new science be explained, at least in part, by a more general trend toward quantification and mechanical ways of thinking?

5. Compare the social organization of science in the ancient Greek world with that of science in non-Western societies and with the early modern European scientific societies (the ideal ones, like Bacon’s New Atlantis, and the real ones, like the Royal Society and the French Academy of Sciences). How was scientific activity organized, how was it supported, and why? What was the goal of scientific knowledge?