 Date: March 2013

**History of Science Part II –
From the 12th Century Renaissance to modern Science**

**Year of Studies:** 2013-2014  **Semester:** Spring **Hours/credits:** 2

1. **Course Goals**

Understanding the broad outlines of scientific-conceptual development from ancient to modern times within a broad cultural perspective; acquaintance with ancient scientific writings, core secondary literature; various perspectives of the history of ideas..

1. **Course Content**

The course follows the history of science and technology through key developmental periods: High middle ages (1200-1400 C.E); the renaissance and early modernity.

Three levels of analysis will be devoted to each period: the material foundations of thought (writing, representation, knowledge dissemination); cultural and political background; scientific principles and world system.
A perspective of these will be considered also from the Jewish point of view.

**Topical Structure (in order of lectures):**

1. Jewish contribution to medieval science in the Golden Age of Islamic Science – Maimonides, Gershonides, Ibn Ezra; Jewish Navigators and Cartographers
2. Science in Medieval Europe: Natural Philosophy at School and University, Scholasticism, Science in the Monastic Orders, Theology and Aristotle – Opening the possibilities of experimental and theoretical science.
3. Medieval Latin Alchemy and Astrology; Medieval Physics and Earth Science
4. The Middle Ages and the Renaissance; Renaissance and Background to a new Science: Disintegration of the social, political and theological order; humanistic thought, art and science, status of mathematics in the Italian renaissance, court culture and the shift in status of scientific curiosity.
5. Renaissance Natural Magic (Styles of thought in the Renaissance, Yates- Magic and Hermeticism in science); Renaissance Technology.
6. Printing and print culture- the effect on science, theology, society.
7. The Copernican Revolution and its Meaning (Tyco, Kepler and Galileo); Copernicus and Calendrical Reform.
8. Voyages of Discovery and Natural History.
9. Mechanical Philosophy and Revived Atomism; Mechanism and Vitalism
10. Jews and Jentiles in Science and Medicine -- The Ghetto and cross-cultural Scientific growth.
11. The birth of Modern science – multiple dimensions (paradigmatic analysis, epistemes); Mechanical Philosophy and Revived Atomism; Mechanism and Vitalism; Experiment and Theory.
12. Special topic: The Golem – from Sefer Yetzirah to Information Technology.
13. **Course Requirements:**

Prior courses required: recommended - Course No. 27825 (Introduction to the History of Science Part I)

Reading assignments from course-book; Exam.

1. **Bibliography:**

**Course Book:**

Deming, David. 2010. *Science and Technology in World History, Vol. 2: Early Christianity, the Rise of Islam and the Middle Ages*. McFarland.

Deming, David. 2012. *Science and Technology in World History, Volume 3: The Black Death, the Renaissance, the Reformation and the Scientific Revolution*. McFarland & Company.

**Primary Literature**

Bacon, Francis. *The New Organon*. New York: Bobbs-Merrill, 1960.

Copernicus, Nicolaus. *On the Revolutions of the Heavenly Spheres*. New York: Prometheus, 1995

Galilei, Galileo. *Dialogue Concerning the Two Chief World Systems*, 2nd rev. ed. Berkeley: University of Wisconsin Press, 1963.

Nicole Oresme, *Le livre du ciel et du monde*, ed. and trans. A. D. Menut and A. J.
Denomy. Madison, 1968 (excerpts).

Robert Grosseteste, *De luce*

**Secondary and Supplementary Literature:**

Ann Blair (1992). "Humanist Methods in Natural Philosophy: The Commonplace Book," *Journal of the History of Ideas*, 53:541-551

Ashworth, William B. (Jr.) (1990) "Natural History and the Emblematic World View," in *Reappraisals of the Scientific Revolution*. Eds. David C. Lindberg and Robert S. Westman, pp. 303-332

Baird, Davis. *Thing Knowledge: A Philosophy of Scientific Instruments*. Berkeley: University of California Press, 2004

Biagioli, Mario (1989). "The Social Status of Italian mathematicians, 1450-1600," *History of Science* 27: 41-95.

Cardwell, D., Wheels, Clocks, and Rockets: A History of Technology, New York 2001. pp. 79-133.

Chidester, David (1983). “The Symboliosm of Learning in St. Augustine,” *Harvard Theological Review* 76: 73-90.

Drachmann, A. G. (1962) *The Mechanical Technology of Greek and Roman Antiquity*. Madison: University of California Press.

Efron, N. J., *Judaism and Science: A Historical Introduction*, Greenwood Guides to Science and Religion, 2007

Eisenstein, Elizabeth L. (2005) *The Printing Revolution in Early Modern Europe*. Cambridge: Cambridge University Press.

Elkana, Yehuda (1974) *The Discovery of the Conservation of Energy*. Cambridge, MA: Harvard University Press, 1974.

Findlen, Paula (1990), "Jokes of Nature and Jokes of Knowledge: The Playfulness of Scientific Discourse in Early Modern Europe,"*Renaissance Quarterly*, 43:292-331.

Grant, Edward (1978). "Aristotelianism and the Longevity of the Medieval World View," *History of Science* 16:93-106.

Grattan-Guinness, Ivor. (1997) *The Norton History of the Mathematical Sciences: The Rainbow of Mathematics*. New York: Norton, 1997.

Howard, N. (2009), *The Book: The Life Story of a Technology*, Baltimore.

Jens Hoyrup (1987). "The Formation of 'Islamic Mathematics': Sources and Formation," *Science in Context* 1: 281-329.

Lindberg, David C. (1987). "Roger Bacon and the Origins of *Perspectiva* in the West," in *Mathematics and Its Application to Science and Natural Philosophy in the Middle Ages.* Eds. E. Grant and J. E. Murdoch, pp. 249-268.

Lindberg, David C. (1992). *The Beginnings of Western Science: The European Scientific Tradition in Philosophical, Religious, and Institutional Context, 600 B.C. to A.D. 1450.*

McClellan, J. (2001), *Science and Technology in World History: An Introduction*, Baltimore 2001.

Miles, Margaret (1983). “Vision: The Eye of the Body and the Eye of the Mind in St. Augustine’s *De Trinitate* and *Confessions*,” *Journal of Religion* 63:125-142.

Misa, T.J (2001), *Leonardo to the Internet : Technology and Culture from the Renaissance to the Present*, Baltimore 2001. pp. 33-58.

Murray, Alexander (1985). *Reason and Society in the Middle Ages*, 213-233

Nisbet, Robert. *A History of the Idea of Progress*. Piscataway, NJ: Transaction, 1994

Nye, Mary Jo (1996). *Before Big Science: The Pursuit of Modern Chemistry and Physics, 1800–1940*. New York: Twayne, 1996

Parsons, William Barclay (1968). *Engineers and Engineering in the Renaissance.* Cambridge, MA: MIT Press, 1968.

Remmert, Volker R. (2007). "Visual Legitimisation of Astronomy in the Sixteenth and Seventeenth Centuries: Atlas, Hercules and Tycho’s Nose." *Stud. Hist. Phil. Sci.* 38:327–362.

Smith, A. Mark (1981), Getting the Big Picture in Perspectivist Optics, *Isis*, 72:568-589

Sylla, Edith (1987), "The Oxford Calculators in Context," *Science in Context* 1:257-279.

Vernant, J. P. (1982), *The Origin of Greek Thought*, chaps. 4,6,8.

Westman, Robert S. (1980), "The Astronomer's Role in the Sixteenth Century: A Preliminary Study." *History of Science* 18: 1105-147.

Yates, Frances. 2001. *The Rosicrucian Enlightenment*. 2nd ed. Routledge.

**Online Resources:**

*The Art of Renaissance Science*. (Joseph Dauben - art, mathematics science of the Renaissance)
[www.mcm.edu/academic/galileo/ars/arshtml/arstoc.html](file:///C%3A%5CDocuments%20and%20Settings%5CAdministrator%5CMy%20Documents%5CMy%20Dropbox%5CSyllabi%5Chistory%20of%20sci%20and%20Judaism%5Cwww.mcm.edu%5Cacademic%5Cgalileo%5Cars%5Carshtml%5Carstoc.html)

*The Galileo Project*.
<http://galileo.rice.edu>

*The Newton Project*.
[www.newtonproject.ic.ac.uk](file:///C%3A%5CDocuments%20and%20Settings%5CAdministrator%5CMy%20Documents%5CMy%20Dropbox%5CSyllabi%5Chistory%20of%20sci%20and%20Judaism%5Cwww.newtonproject.ic.ac.uk)

*The MacTutor History of Mathematics Archive*[www-history.mcs.st-and.ac.uk](http://www.mcm.edu/academic/galileo/ars/arshtml/arstoc.html)

*Selected Classic Papers from the History of Chemistry*.
<http://web.lemoyne.edu/~giunta/papers.html>

*Stanford Encyclopedia of Philosophy*.
<http://plato.stanford.edu.>

University of Delaware Library (*History of Science and Technology)*
[www2.lib.udel.edu/subj/hsci/internet.html](file:///C%3A%5CDocuments%20and%20Settings%5CAdministrator%5CMy%20Documents%5CMy%20Dropbox%5CSyllabi%5Chistory%20of%20sci%20and%20Judaism%5Cwww2.lib.udel.edu%5Csubj%5Chsci%5Cinternet.html)