Objective: To study the historical development of modern chemistry, primarily from a scientific perspective but also in light of cultural, political, and economic factors.

While our modern conception of chemistry began to emerge in the “Chemical Revolution” of the late 18th Century, the roots of chemistry extend far into antiquity. Two intertwined questions underlie inquiries of a chemical nature: (a) what is matter? and (b) how does it change? In this course, we will study the origins of “matter theory” in Ancient Greece, follow its meandering path through the Roman and Islamic Empires, and then investigate the practice of Alchemy in the Latin West through the Middle Ages and beyond. The evolution of theories regarding chemical change, from the “phlogiston” theory to modern mechanistic ideas, will be followed in parallel. The period from the late 17th to early 19th Century, during which a shift from alchemical ideas to more modern chemical concepts occurred, will be examined in particular. We will conclude with the introduction of modern concepts of chemical structure and reactivity that appeared in the late 19th Century.

This is a chemistry course, not a history course. Our approach will be to examine how specific experiments were designed, how they were executed, and how the data were interpreted and conclusions reached — all within the general context of the historical period, which we would be at peril to ignore. Questions that we will examine include: Why was Greek “matter theory” so enduring? Why was the concept of “atomism” so controversial? What was alchemy and to what extent were iconic figures such as Robert Boyle influenced by it? What was the “Chemical Revolution”? Why were women generally excluded from studies in chemistry until relatively recently? Less than a century transpired for the transition from the “Four Elements” theory of matter to the first Periodic Table, which had 56 elements — who were the key players in effecting this transformation and how did they make such astonishing progress?

Instructor:
Dr. J. Aldstadt  Office: CHM 445  aldstadt @ uwm.edu  Office Hours: TBD & by appointment

Class Schedule:
Lecture:  MW  9:00-9:50 am  CHEM 169

Pre-requisites:  General Chemistry I & II (Chem 102 and 104); Elementary Quantitative Analysis (Chem 221); Organic Chemistry I (Chem 341 or 343); junior standing.

Required Course Materials:

• Selections from the following will also be studied (provided by the instructor): Plato’s Timaeus, Aristotle’s Physics and Meteorologica, Lucretius’ On the Nature of Things, Geber’s The Sum of the Height of Perfection, Boyle’s The Sceptical Chymist, Black’s On Magnesia Alba, and Lavoisier’s Elements of Chemistry. Additional readings will include select writings of Priestley, Dalton, Berzelius, Cannizzaro, Mendeleev, & others.

POLICIES.

Department of Chemistry. You are expected to fully understand the policies posted on the bulletin boards across from Room 195 and adjacent to Room 164.

Academic Dishonesty. Cheating will result in a course grade of F — referral to the University Judiciaries may also occur. In short, academic dishonesty in any form will not be tolerated. These policies are discussed in detail in UWS Chapter 14 and Faculty Document No. 1686, which can be found at: www4.uwm.edu/acad_aff/policy/academicmisconduct.cfm

Attendance. You are responsible for all material presented in class.

COURSE STRUCTURE.

The course grade will be determined from the following elements:

Formal Essays 60% eight formal essays at approx. two-week intervals
Exploratory Writing 20% short, informal in-class exercises on an approx. weekly basis
Engagement 20% the extent of your participation in discussions