Catalog Description: Three hours lecture, three hours lab per week. Completion of or concurrent enrollment in MAC 1105 and completion of CHM 1025C with a grade of “C” or better or one year of high school college preparatory chemistry within the last three years. These courses meet Area V requirements for A.A./A.A.S./A.S. general education requirements. A rigorous study of chemical principles for students who have already studied basic concepts of chemistry. These courses are intended for science and science related majors.

Performance Standards:

At the successful completion of this course, the student should be able to:

1. Define and apply the concepts of scientific method, chemical and physical properties and changes, kinetic and potential energy.
2. Use dimensional analysis, significant figures and scientific notation to perform calculations involving unit conversions, density and percentage.
3. Describe matter, including its subdivision from most complex to simplest form.
4. Describe the evolution of Dalton’s atomic theory and the modern view of atomic structure.
5. Show trends in electron configuration, atomic size, ionization energy, electronegativity and electron affinity, using the Periodic Table of the Elements.
6. Write formulas for elements and compounds. Name compounds given their formulas.
7. Perform stoichiometric calculations involving both chemical composition and balanced equations.
8. Perform calculations related to solution chemistry, including quantitative concentrations.
9. Determine the limiting reagent and theoretical yield for a balanced chemical equation. If possible determine the percent yield.
10. Describe thermodynamic and thermochemical processes using current terminology and mathematical relationships.
11. Perform calculations relating thermodynamic properties, including specific heat capacity and state functions.
12. Diagram the basic aspects of the valence bond and molecular orbital approaches to chemical bonding, including the valence shell electron pair repulsion method of predicting molecular geometry.
13. Perform calculations involving gas laws and describe the behavior of ideal gases, including the postulates of the kinetic molecular theory, and the differences observed in real gases.
14. Describe the behavior and theoretical basis of strong and weak electrolytes and be able to write total and net ionic equations.
15. Write balanced equations to represent oxidation-reduction reactions and half-
16. Distinguish between the different classes of organic compounds by the way they are named and how they react, Organic nomenclature.

Optional Topics:
1. Write simple characteristic reactions for aliphatic and aromatic hydrocarbons, alcohols, carboxylic acids, esters, aldehydes, ketones and organic halides.