Chemistry Course Descriptions

CHEM 195, 295, 395, 495 – Special Topics (1-12)

CHEM 198, 298, 398, 498 – Tutorial (1-3)

CHEM 100 – Chemistry (3-4) Selected chemical topics of biological, consumer and environmental importance. For students who need a firm base in the sciences, but who will not major in the sciences. Fall and Spring. Gen Ed: SP credit; also FS credit for 4 hour section.

CHEM 105 – General Chemistry 1: Lecture (3) An introductory chemistry course for students majoring in a science curriculum or for students who wish to study additional science. Experience in high school science and mathematics is recommended. Laboratory required. Recitation offered at instructor's discretion. Fall. Gen Ed: SP & LB credit.

CHEM 106 – General Chemistry 2: Lecture (3) Continuation of CHEM 105. Prerequisite: CHEM 105 or equivalent. Laboratory required. Recitation offered at instructor's discretion. Spring. Gen Ed: SP & LB credit.

CHEM 125 – Matter and Energy: Lecture (2) This lecture-lab course is designed for Early Childhood and Childhood Education majors. Matter and Energy is a physical science course which addresses the properties of matter, both physical and chemical, the various forms of energy and the interconnectedness of matter and energy. Laboratory required. Gen Ed: SP & LB credit.

CHEM 301 – Fundamentals of Environmental Science (3) A one-semester, non-majors lecture course. After an overview of some science and environment fundamentals, a few issues of current interest are covered in depth. Issues recently covered include stratospheric ozone depletion, global warming, alternative fuels, and acid rain. Prerequisite: one semester of college science. Fall and/or Spring. Gen Ed: SP credit.

CHEM 304 – Chemical Laboratory Techniques (1-2) Practical experience in assisting in the teaching of chemistry laboratories. Prerequisites: one or two years of college chemistry and permission. Fall and Spring.

CHEM 308 – Chemistry Topics (1) The emphasis is on the use of the chemical literature, writing a scientific paper and participating in seminars given by invited speakers from academe and industry. Prerequisite: two years of college chemistry or permission. Fall.

CHEM 309 – Seminar in Chemistry (1) Continuation of CHEM 308. The emphasis is on presenting a seminar from the chemical literature. Prerequisite: CHEM 308 or permission. Spring. Gen Ed: SI credit.

CHEM 311 – Quantitative Analysis: Lecture (2) Classical and modern methods of chemical quantitative analysis relevant to biology, chemistry, geology and physics. Prerequisite: CHEM 106 or equivalent. 2 credit laboratory required. Recitation offered at instructor's discretion. Fall.

CHEM 315 – Forensic Science (3) A one-semester, non-major's lecture course which studies the techniques of forensic evaluation of the physical evidence of a crime. Emphasis is placed on the physical science of the analytical techniques used in evaluating the evidence. Prerequisite: one semester of college science. Spring. Gen Ed: SP credit.

CHEM 332 – Radioactive and Nuclear Chemistry (3) Experimental and theoretical nuclear chemistry. Prerequisite: two years of chemistry. As demand warrants.

CHEM 341 – Organic Chemistry 1: Lecture (3) Emphasis is on structure, reactions and reaction mechanisms of organic molecules. Various functional groups are considered while incorporating discussion of experimental methods. Prerequisite: CHEM 106. Laboratory required. Recitation offered at instructor's discretion. Fall.

CHEM 342 – Organic Chemistry 2: Lecture (3) Continuation of CHEM 341. Prerequisite: CHEM 341. Laboratory required. Recitation offered at instructor's discretion. Spring.

CHEM 415 – Instrumental Analysis: Lecture (2) Instruments and their use in chemical analysis, materials characterization, identification and imaging. Course is of great importance not only for Chemistry majors, but also for Biology, Geology and Physics majors. Laboratory required: experiments involve hands-on experience with spectroscopic, chromatographic, electrochemical and microscopic methods including Scanning Electron Microscopy, Atomic Force Microscopy, Scanning Tunneling Microscopy and Friction Force Microscopy. Spring. Gen Ed: lab section receives WI credit.

CHEM 421 – Biochemistry (3) Chemistry of biological systems. Prerequisite: CHEM 342. Fall or Spring. Gen Ed: Recitation section receives SI credit.

CHEM 425 – Biochemistry 1: Lecture (3) The study of biomolecules. Topics include protein structure and function, lipids, enzyme function and regulation, biomembranes and membrane transport, carbohydrates, nucleic acid structure, bioenergetics, and aspects of molecular genetics. Prerequisite: CHEM 342. Laboratory required: methods may include protein purification, molecular visualization, enzyme kinetics, chromatography, bioinformatics, electrophoresis, blotting, sequence analysis, and molecular genetic techniques such as DNA cloning, PCR, restriction endonuclease analysis and sequencing of DNA. Fall.

CHEM 426 – Biochemistry 2: Lecture (3) A continuation of Biochemistry 1 topics with an emphasis on metabolism. Topics include the metabolism of carbohydrates, lipids, nucleic acids, and amino acids, integrated with the production and utilization of cellular energy. Other advanced topics may be included as time permits. Prerequisite: CHEM 425. Laboratory required. Spring.

CHEM 433 – Inorganic Chemistry (3) Descriptive inorganic chemistry based oh physical and theoretical concepts. Co-requisite: CHEM 451. Fall.

CHEM 434 – Inorganic Chemistry Laboratory (1) A laboratory course in which the emphasis is on the synthesis and characterization of inorganic compounds while using modern synthetic and instrumental techniques. Prerequisite: CHEM 433. Spring.

CHEM 444 – Advanced Organic Chemistry (3) Modern methods of organic synthesis, including synthesis design, experimental aspects, and the total synthesis of natural products and other complex molecules.

CHEM 448 – Advanced NMR Spectroscopy: Lecture (2) The basic principles of Nuclear Magnetic Resonance (NMR) spectroscopy will be introduced and discussed and selected experiments will be used to teach the basic skills needed to operate the instrument and to interpret data. More advanced topics, skills and experiments will follow. Laboratory required.

CHEM 451 – Physical Chemistry 1: Lecture (3) Application of fundamental physical laws and theories to the study of chemistry, concentrating on gas properties, thermodynamics and electrochemistry. Prerequisites: PHYS 104, 204 and MATH 151, 152. Prerequisite or Co-requisite: CHEM 311. Laboratory required. Recitation offered at instructor's discretion. Fall. Gen Ed: lab section receives WI credit.

CHEM 452 – Physical Chemistry 2: Lecture (3) Continuation of CHEM 451, concentrating on kinetics, quantum mechanics and spectroscopy. Prerequisite: CHEM 451. Laboratory required. Recitation offered at instructor's discretion. Spring. Gen Ed: lab section receives WI credit.

CHEM 462 – Chemical Spectroscopy and Reaction Dynamics (3) An advanced physical chemistry course which focuses on photochemistry, chemical kinetics, spectroscopy and reaction dynamics. Prerequisite: CHEM 452. Fall or Spring.

CHEM 480 – Advanced Analytical Chemistry: The objective of this course is to introduce the theoretical and experimental bases of new, modern analytical techniques including Scanning Tunneling Microscopy (STM), Atomic Force Microscopy (AFM), Friction Force Microscopy (FFM), advanced voltammetric techniques, the Electrochemical Quartz Crystal Nanobalance (EQCN), Stripping Voltammetry, Photoelectrochemistry and Spectroelectrochemistry. Practical applications of these techniques will be discussed as they apply to the following topics: measurements of forces between molecules, including antigen/antibody interactions, DNA hybridization, defective gene detection, characterization of new

nanostructured materials, solar cells, corrosion studies and detection of heavy metals and pesticides. Prerequisite: CHEM 311.

CHEM 497 – Research Problems (1-3) Laboratory research problem with direction of faculty member. Prerequisite: Permission. Fall and Spring.