## CHEMISTRY

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| **CHEM 1101K – Intro to Chemistry ………………4.00 credits**  This course is designed to prepare students with little, if any, chemistry or math backgrounds for the General Chemistry I and General Chemistry II sequence (CHEM 1211/1212). Topics to be studied include matter, measurement, units and unit conversions, graphing, atomic structure, nomenclature, bonding, the periodic table, chemical equations, chemical reactions, stoichiometry. Exercises designed to improve science study skills will be included. The emphasis of the lecture will be on problem solving strategies, skill building and real life applications.  **CHEM 1151K - Survey of Chemistry I ……...... 4.00 Credits** This course is the first in a two-semester sequence covering elementary principles of general and organic chemistry and biochemistry designed for allied health profession majors. Topics to be covered include elements and compounds, chemical equations, nomenclature, and molecular geometry. Laboratory exercises will supplement the lecture material.  *Prerequisite: Permission of instructor.*  **CHEM 1152K - Survey of Chemistry II ……... 4.00 Credits** The second course in a two-semester sequence covers elementary principles of general and organic chemistry and biochemistry and is designed for allied health profession majors. Laboratory exercises will supplement the lecture material.  *Prerequisite(s): CHEM 1151K US D.*  **CHEM 1211K - General Chemistry I .............. 4.00 Credits** This course involves the study of the states of matter, stoichiometry, atomic and molecular structure, solutions, acid base theory, and chemical equilibrium.  **CHEM 1212K - General Chemistry II................. 4.00 Credits**  This course is designed to investigate ionic equilibria of electrolytes, chemical kinetic, thermodynamics, electro- chemistry and redox reactions, chemical properties of metals and non-metals, and qualitative analytical separations.  *Prerequisite(s): CHEM 1211K US D*  **CHEM 2301K - Organic Chemistry I ................ 4.00 Credits**  In this course the student will examine modern concepts of reactions from a structural, synthetic and mechanistic approach exploring detailed studies of aliphatic nucleophilic, aromatic electrophilic and free-radical reaction types. The chemistry of carbonation and free- radical intermediates are also covered extensively.  *Prerequisite(s): CHEM 1212K US C*  **CHEM 2302K - Organic Chemistry II ................. 4.00 Credits**  In this course, a continuation of the sequences including the study of carbonyl-bearing compounds, the chemistry of carbonium ions is explored and the concept of resonance is further examined. Spectroscopic methods of analysis, including infrared, ultraviolet/visible, mass spectroscopy and nuclear magnetic resonance spectroscopy will be included.  *Prerequisite(s): CHEM 2301K US D.*  **CHEM 2310K - Scientific Mathematics ................2.00 Credits** Designed to acquaint students with mathematical concepts used in scientific studies including those required for the laboratory and publications.  *Prerequisite: Permission of instructor.*  **CHEM 2320K - Laboratory**  **Research Techniques.................................... 3.00 Credits** Designed to acquaint students with basic important laboratory techniques and manipulations that are essential for conducting general and biomedical research.  *Prerequisite: Permission of instructor.*  **CHEM 2351K - Quantitative Analysis I ……….... 4.00 Credits**  This course involves the study of theory and practice of gravimetric and titrimetric analysis with emphasis on solution equilibria as applied to acid-base, precipitation, and complexometric methods. *Prerequisite(s): CHEM 1212K US C*  **CHEM 2352K - Quantitative Analysis II.............. 4.00 Credits**  This course involves a continuation of the study of analytical methods including oxidation-reduction, titration and an introduction to instrumental methods--potentiometric, spectrophotometric, and chromatographic.  *Prerequisite(s): CHEM 2351K US D.*  **CHEM 2415 - Scientific Writing ...........................3.00 Credits** This course is designed to acquaint learners with disco- very-inquiry processes and to provide competencies for writing scientific papers. Prerequisite: permission of instructor.  **CHEM 3221K - Physical Chemistry I................... 4.00 Credits**  In this course, the principles of thermodynamics, including chemical/thermal equilibrium, reversible and irreversible processes, kinetic molecular theory, and reaction kinetics as well as other areas of dynamics are investigated.  *Prerequisite(s): MATH 2212 US C or taken concurrently, PHYS 2222K US C, and CHEM 2301K US C or CHEM 2351 US C.*  **CHEM 3222K - Physical Chemistry II ................. 4.00 Credits**  The theory and application of quantum theory and bonding; magnetic and spectral properties of atoms and molecules; and statistical mechanics are studied in this course.  *Prerequisite(s): MATH 2212 US C or taken concurrently, PHYS 2222K US C, and CHEM 2301K US C or CHEM 2351 US C.*  **CHEM 3231 - Intermediate**  **Inorganic Chemistry I .............................................3.00 Credits**  A systematic source in inorganic chemistry that investigates topics in group theory, bonding, acid-base chemistry, non-aqueous solvents, the solid state, and chemistry of the main elemental groups.  *Prerequisite(s): CHEM 3222K US C or CHEM 3222 US C.* | **CHEM 3250K - Biochemistry ................................ 4.00 Credits**  In this course, the student examines the structure function, and metabolism of carbohydrates, amino acids and proteins, lipids, and nucleic acids. (Topics include bioenergetics, enzyme kinetics, photosynthesis, and the interdependence of the various metabolic pathways of intermediate metabolism)  *Prerequisite(s): CHEM 2302K US C*  **CHEM 3330 Nanoscience and Nanotechnology 3.00 Credits**  The important concepts and applications of nanoscience and nanotechnology to multidisciplinary audience such as chemists, physicists, biologists and engineers. Tools and principles relevant at the nanoscale dimension will be discussed. It also provides an overview of current and future nanotechnology applications in materials, physics, chemistry, biology, electronics, energy and, medicine  *Prerequisite(s): CHEM 2302K US C , BIOL2111K US and (PHYS1112K US C or PHYS2222K US C)*  **CHEM 3400 Polymer Science …………………….3.00 Credits**  This course involves a study of the fundamental physical and chemical properties of polymers such as their molecular, thermal, mechanical, and electrical properties. In addition, how these materials are synthesized, evaluated, and their commercial applications are explored.  *Prerequisite(s): CHEM 2302K US C*  **CHEM 4100K - Instrumental Analysis ................ 4.00 Credits**  In this course, the student will study the principles and application of modern instrumental methods of analysis with special emphasis onspectrophotometric, chromatographic, electroanalytical and radiochemical techniques.  *Prerequisite(s): CHEM 3222K US C*  **CHEM 4110 - Chemical Literature.......................1.00 Credits**  A course designed to acquaint the student with ethics, governmental regulations of chemicals in the work place, and sources of information from journals to databases that are currently available.  *Prerequisite: Senior status.*  **CHEM 4111 - Junior Seminar ................................1.00 Credits**  A course designed to train students in using science literature and presenting scientific information. Students will review scientific writing styles and presentation formats, prepare a poster presentation, and observe and evaluate scientific presentations by invited guest, ASU faculty and senior students.  *Prerequisite: Junior status.*  **CHEM 4120 - Senior Research I ...........................1.00 Credits**  Must be enrolled in one of the following Class(s): Senior  In this course, students will present preliminary plans/ background of their senior research problem after a review of the current literature.  *Prerequisite: CHEM 4111 US C.*  **CHEM 4130K - Senior Research II........................ 3.00 Credits**  Must be enrolled in one of the following Class(s): Senior In this course, students select a research area in chemistry and the final written report is completed as a senior thesis (Off campus research experience or industrial co-op/ internships may be substituted if taken at the junior/senior level).  *Prerequisite(s): CHEM 4120 US C*.  **CHEM 4140 - Advanced Biochemistry.................3.00 Credits** This course examines detailed biochemical pathways and elucidates the nature and mechanism of these reactions with special emphasis on the quantification of the chemical components of cells.  *Prerequisite(s): CHEM 3250K US C.*  **CHEM 4150K - Computational Chemistry 3.00 Credits** Computer application of molecular orbital calculation using semi- empirical and abinitio programs incorporating molecular modeling aspects are investigated in this course.  *Prerequisite(s): CHEM 3222K US C.*  **CHEM 4160 - Special Topics in Chemistry ..........2.00 Credits** Must be enrolled in one of the following Class(s): Junior, Senior This course is designed to allow students and faculty to explore some topics in greater detail than in a regular classroom setting, or to allow the introduction of such additional topics as specific areas of biochemistry, chemical physics, polymer chemistry, bio- analytical and environmental chemistry.  *Prerequisite: permission of instructor. (May be repeated twice.)*  **CHEM 4170L - Special Laboratory Problems......2.00 Credits** This course is similar to Special Topics in Chemistry (CHEM 4160) but involves laboratory experiences.  *Prerequisite: Senior status and permission of instructor.*  **CHEM 4180K - Topics in**  **Research Technology ............................................... 4.00 Credits**  This course examines relevant methods and techniques that are used in biomedical research.  *Prerequisite: Permission of instructor.*  **CHEM4200 Environmental Chemistry……….......4.00 credits**  This course will include an overview of the earth and its atmosphere and a study of the chemical processes that occur in this environment. The chemical structure and toxic properties of chemical pollutants and the reactions in the environment is included, as well as a discussion of the sources of chemical contamination and methods for controlling pollution  *Prerequisite(s): CHEM 2302K US C, MATH1113 US C*  **CHEM4210 NanoScale Analytical Methods…...…4.00 credits**  This course is designed to explore the principles of nonoscale analytical methods that are essential to nanoscience and nanomaterial chemistry. This course will also provide fundamental theoretical and practical knowledge on how to fabricate nanostrucures, and how to investigate the morphological structure and electronic structure of nanomaterials.  *Prerequisite: CHEM 2352K US C.* |