Chemistry

**CHEM 1111 (CHEM 1111)** General Chemistry Laboratory I (1 semester hour) Introduction to the chemistry laboratory. Experiments are designed to demonstrate concepts covered in **CHEM 1311**; including properties and reactions of inorganic substances and elementary qualitative and quantitative analysis. Corequisite: **CHEM 1311**. (0-3) S

**CHEM 1112 (CHEM 1112)** General Chemistry Laboratory II (1 semester hour) A continuation of **CHEM 1111** demonstrating the concepts covered in **CHEM 1312**, including acid-base chemistry, reaction kinetics, electrochemistry, polymers, and organic synthesis. Prerequisite: **CHEM 1111** or **CHEM 1115**. Corequisite: **CHEM 1312**. (0-3) S

**CHEM 1115** Honors Freshman Chemistry Laboratory I (1 semester hour) This course and its follow-on (CHEM 1116) reinforce the concepts of Freshman Chemistry via experiments. Students are offered the opportunity to acquire basic laboratory skills and an appreciation for the presence of chemistry in daily living through a combination of laboratory and computer experiments and applied research modules. Corequisite: **CHEM 1315**. (0-6) Y

**CHEM 1116** Honors Freshman Chemistry Laboratory II (1 semester hour) A continuation of **CHEM 1115**. This course reinforces concepts presented in **CHEM 1316**. Prerequisite: **CHEM 1115**. Corequisite: **CHEM 1316**. (0-6) Y

**CHEM 1311 (CHEM 1311)** General Chemistry I (3 semester hours) Introduction to elementary concepts of chemistry theory. The course emphasizes chemical reactions, the mole concept and its applications, and molecular structure and bonding. Students will also be registered for the exam section. Corequisite: **CHEM 1111**. (3-0) S

**CHEM 1312 (CHEM 1312)** General Chemistry II (3 semester hours) A continuation of **CHEM 1311** treating metals; solids, liquids, and intermolecular forces; chemical equilibrium; electrochemistry; organic chemistry; rates of reactions; and environmental, polymer, nuclear, and biochemistry. Students will also be registered for the exam section. Prerequisite: **CHEM 1311** or **CHEM 1315**. Corequisite: **CHEM 1112**. (3-0) S

**CHEM 1315** Honors Freshman Chemistry I (3 semester hours) An advanced course dealing with the principles of structure and bonding and the physical laws that govern the interactions of molecules. The course is intended for students who have a solid background in chemistry at the secondary level and the desire to explore general chemistry concepts more deeply. Corequisite: **CHEM 1115**. (3-0) Y

**CHEM 1316** Honors Freshman Chemistry II (3 semester hours) A continuation of the presentation of concepts begun in **CHEM 1315**. This course will present advanced topics including those in organic, biochemistry, and environmental chemistry. Prerequisite: **CHEM 1315** or instructor consent required. Corequisite: **CHEM 1116**. (3-0) Y

**CHEM 2123 (CHEM 2123)** Introductory Organic Chemistry Laboratory I (1 semester hour) The experimental skills associated with organic functional group reactions. Corequisite: **CHEM 2323**. (0-4) S

**CHEM 2125 (CHEM 2125)** Introductory Organic Chemistry Laboratory II (1 semester hour) Continuation of
Introductory Organic Chemistry Laboratory I (CHEM 2123). Prerequisites: CHEM 2123 and CHEM 2323. Corequisite: CHEM 2325. (0-4) S

CHEM 2130 Introductory Organic Chemistry for Medical Science Laboratory (1 semester hour) The experimental skills associated with organic functional group reactions. Topics covered include fundamental skills, as well as selected experiments developed in a traditional two-semester Introductory Organic Chemistry Laboratory sequence (CHEM 2123 and CHEM 2125). Required course for students in the Partnership in Advancing Clinical Transition (UT-PACT) Program. Does not satisfy the basic organic chemistry laboratory requirements for pre-health profession students. Prerequisite: Instructor consent required. Corequisite: CHEM 2330. (0-4) Y

CHEM 2323 (CHEM 2323) Introductory Organic Chemistry I (3 semester hours) The covalent bond. Organic chemistry: aliphatic and aromatic compounds; covalent inorganic and organometallic compounds; a survey of the organic functional groups and their typical reactions; stereochemistry. The first course in organic chemistry. Satisfies the basic organic chemistry lecture requirements for pre-health profession students. Prerequisite: CHEM 1312 or CHEM 1316. Corequisite: CHEM 2123. (3-0) S


CHEM 2330 Introductory Organic Chemistry for Medical Science (3 semester hours) Covers fundamental concepts and selected material developed in a traditional two-semester Introductory Organic Chemistry lecture sequence (CHEM 2323 and CHEM 2325). Required course for students in the Partnership in Advancing Clinical Transition (UT-PACT) Program. Does not satisfy the basic organic chemistry lecture requirements for pre-health profession students. Prerequisites: (CHEM 1312 or CHEM 1316) and instructor consent required. Corequisite: CHEM 2130. (3-0) Y

CHEM 2401 (CHEM 2401) Introductory Quantitative Methods in Chemistry (4 semester hours) A study of the theory, applications, and calculations involved in the methods of analysis. Theory and practice of volumetric, gravimetric, and spectrophotometric methods. Prerequisites: CHEM 1112 and CHEM 1312. (2-6) Y

CHEM 2v01 Topics in Chemistry (1-3 semester hours) Subject matter will vary from semester to semester. May be repeated for credit as topics vary (9 hours maximum). Prerequisite: Instructor consent required. ([1-3]-0) R

CHEM 3321 Physical Chemistry I (3 semester hours) Fundamental properties of macroscopic biophysical chemical systems are introduced and described in quantitative terms. A core of topics in thermodynamics, molecular motion, kinetics, molecular distributions and statistical thermodynamics is supplemented with topics germane to students taking physical chemistry with biophysical applications. Prerequisites: CHEM 23 25 and (MATH 2415 or MATH 2451) or instructor consent required. (CHEM 3361 is recommended). (3-0) Y

CHEM 3322 Physical Chemistry II (3 semester hours) Fundamental microscopic properties of matter and radiation are discussed. A core of topics including quantum chemistry, atomic and molecular structure and spectroscopy, non-bonded interactions, and computational chemistry is supplemented with topics germane to students taking physical chemistry with biophysical applications. Prerequisites: CHEM 3321
CHEM 3341  Inorganic Chemistry I (3 semester hours) Survey of inorganic chemistry with emphasis on the modern concepts and theories of inorganic chemistry including electronic and geometric structure of inorganic compounds. Topics address contemporary physical and descriptive inorganic chemistry. Prerequisites: (CHEM 2323 and CHEM 2325) or equivalent. (3-0) Y

CHEM 3361  Biochemistry I (3 semester hours) Structures and chemical properties of amino acids; protein purification and characterization; protein structure and thermodynamics of polypeptide chain folding; catalytic mechanisms, kinetics and regulation of enzymes; energetics of biochemical reactions; generation and storage of metabolic energy associated with carbohydrates; oxidative phosphorylation and electron transport mechanisms; photosynthesis. Prerequisites: CHEM 2323 and CHEM 2325. Corequisite: BIOL 316 1. (Same as BIOL 3361) (3-0) S

CHEM 3362  Biochemistry II (3 semester hours) Breakdown and synthesis of lipids; membrane structure and function; nitrogen metabolism and fixation; nucleotide metabolism; structure and properties of nucleic acids; sequencing and genetic engineering; replication, transcription, and translation; chromosome structure; hormone action; biochemical basis of certain pathological processes. Prerequisite: (BIOL 3361 or CHEM 3361) or its equivalent, or instructor consent required. Corequisite: BIOL 3162. (Same as BIOL 3362) (3-0) S

CHEM 3471  Advanced Chemical Synthesis Laboratory (4 semester hours) Careful handling practices and controlled variation of reaction parameters to obtain high yield syntheses. Use of standard separation techniques and spectrophotometric methods to identify reaction products and assess their purity. Prerequisite: (CHEM 2125 and CHEM 2401) or instructor consent required. (1-7) Y

CHEM 3472  Instrumental Analysis (4 semester hours) Basic processes, instrumentation and applications of ultraviolet, visible, fluorescence, atomic and mass spectroscopy, electrochemistry, surface and microanalysis, and separations. Emphasis will be placed upon acquisition, treatment, and interpretation of data and report writing. Prerequisite: CHEM 2401. (2-6) Y

CHEM 3v92  Undergraduate Research in Biochemistry (2-6 semester hours) Students will pursue an independent project under the supervision of a member of the Chemistry, Biology, or UT Southwestern faculty. May be repeated for credit (9 hours maximum). Prerequisite: Instructor consent required. [(2-6)-0] S

CHEM 4335  Polymer Chemistry (3 semester hours) Macromolecules. Synthesis, structure, and properties of polymers. Polymer-polymer and polymer-solvent interactions. Applications in industry and biochemistry. Prerequisite: CHEM 3321 or instructor consent required. (CHEM 3322 recommended). (3-0) Y

CHEM 4355  Computational Modeling (3 semester hours) This course will introduce students to computational modeling approaches commonly used to tackle chemical and biophysical problems. Prerequisites: (CHEM 3321 and MATH 2451) or instructor consent required. (3-0) Y

CHEM 4381  Green Chemistry & Green Fuels (3 semester hours) This course encompasses the study of the sources, reactions, transport, effects, and fates of chemical species in water, soil, and air environments and the effects of technology thereon. Prerequisite: CHEM 2325 or instructor consent required. (3-0) T
CHEM 4390 Research and Advanced Writing in Chemistry (3 semester hours) For students conducting independent research and scientific writing. Students will pursue an independent project under the supervision of a member of the Chemistry faculty. Subject and scope to be determined on an individual basis. This course satisfies the university advanced writing requirement. Prerequisites: at least 3 semester hours of undergraduate research (e.g. CHEM 4V91), and consent of supervising faculty and (filing a research plan approved by supervising faculty and the Undergraduate Committee in Chemistry prior to the 12th class day). (3-0) S

CHEM 4399 Research and Advanced Writing in Chemistry for Honors Students (3 semester hours) For students conducting independent research for honors theses or projects. Satisfies the university advanced writing requirement. Prerequisites: Senior level standing with at least 3 semester hours of undergraduate research (e.g. CHEM 4V91), and consent of supervising faculty and (filing a research plan approved by supervising faculty and the Undergraduate Committee in Chemistry prior to the 12th class day). (3-0) S

CHEM 4473 Physical Measurements Laboratory (4 semester hours) Modules may include topics in physical chemistry and biophysics such as bio-nanotechnology, calorimetry, centrifugation, computational methods, computer-instrument interfaces, electrochemistry, electronics, kinetics, literature skills, property of matter, spectroscopy, and statistical methods. Prerequisites: (CHEM 3321 and CHEM 3472) or instructor consent required. (1-7) Y

CHEM 4v01 Topics in Chemistry (1-9 semester hours) Subject matter will vary from semester to semester. Examples would include, as required, bioorganic chemistry, industrial processes, applied spectroscopy, drugs and people, practical analysis, or other topics that span several subdisciplines. May be repeated for credit (9 hours maximum). Prerequisite: Instructor consent required. ([1-9]-0) R

CHEM 4v91 Research in Chemistry (2-6 semester hours) Students will pursue an independent project under the supervision of a member of the Chemistry faculty. May be repeated for credit (12 hours maximum). Prerequisite: Instructor consent required. ([2-6]-0) S