

# CHEMISTRY (CHEM)

**CHEM 111 Chemistry I Lab (1 Credits)****Lecture:** 0, **Lab:** 3

General Chemistry Laboratory I (1) Introduction to the methods and techniques of chemical experimentation. Three hours of laboratory per week. Prerequisite: Credit for or concurrent enrollment in CHEM 131. Listed as CHEM 1111 in the Texas Common Course Numbering System.

**College/School:** Col of Science, Engr & Tech**Department:** Department of Chemistry**TCCN:** CHEM 1111**CHEM 112 Chemistry II Lab (1 Credits)****Lecture:** 0, **Lab:** 3

General Chemistry Laboratory II (1) Continuation of CHEM 111. Three hours of laboratory per week. Prerequisites: CHEM 111 and credit for or concurrent enrollment in CHEM 132. Listed as CHEM 1112 in the Texas Common Course Numbering System.

**Prerequisite(s):** CHEM 111**College/School:** Col of Science, Engr & Tech**Department:** Department of Chemistry**TCCN:** CHEM 1112**CHEM 143 Inorganic Chemistry (4 Credits)****Lecture:** 3, **Lab:** 2

Inorganic Chemistry (4) Course for pre-nursing, human services/consumer sciences, and technology majors. Important topics: atomic structure, periodic classification of the elements, acid-base theory, oxidation, and reduction. Three hours of lecture and two hours of laboratory per week.

**College/School:** Col of Science, Engr & Tech**Department:** Department of Chemistry**CHEM 143L Inorganic Chemistry Lab (0 Credits)****Lecture:** 0, **Lab:** 0**College/School:** Col of Science, Engr & Tech**Department:** Department of Chemistry**CHEM 144 Organic Chemistry (4 Credits)****Lecture:** 3, **Lab:** 2

Organic Chemistry (4) Survey course for pre-nursing and human services/consumer sciences majors. Study of the structure, physical properties, and reactions of alcohols, aldehydes, ketones, esters, amides, and amines. Three hours of lecture and two hours of laboratory per week.

Prerequisite: CHEM 143 or CHEM 131.

**Prerequisite(s):** (CHEM 143 or CHEM 131)**College/School:** Col of Science, Engr & Tech**Department:** Department of Chemistry**CHEM 211 Organic Chem I Lab (1 Credits)****Lecture:** 0, **Lab:** 3

Organic Chemistry Laboratory I (1) Introduction to the techniques involved in the separation, purification, isolation, and characterization of typical organic compounds. An introduction to organic synthesis. Three hours of laboratory per week. Prerequisites: CHEM 111, CHEM 112, and credit for or concurrent enrollment in CHEM 231. Listed as CHEM 2123 in the Texas Common Course Numbering System.

**Prerequisite(s):** CHEM 112 and CHEM 111**College/School:** Col of Science, Engr & Tech**Department:** Department of Chemistry**TCCN:** CHEM 2123**CHEM 212 Organic Chem II Lab (1 Credits)****Lecture:** 0, **Lab:** 3

Organic Chemistry Laboratory II (1) Multistep synthesis and introduction to the interpretation of infrared and nuclear magnetic resonance spectra. Three hours of laboratory per week. Prerequisites: CHEM 211 and credit for or concurrent enrollment in CHEM 232. Listed as CHEM 2125 in the Texas Common Course Numbering System.

**Prerequisite(s):** CHEM 211 and CHEM 111 and CHEM 112**College/School:** Col of Science, Engr & Tech**Department:** Department of Chemistry**TCCN:** CHEM 2125**CHEM 231 Organic Chem I (3 Credits)****Lecture:** 3, **Lab:** 0

Organic Chemistry I (3) Course for science majors dealing with the fundamentals of structure (including stereochemistry), nomenclature, physical properties, and chemical reactions of aliphatic and aromatic hydrocarbons and their derivatives. Three hours of lecture per week. Prerequisite: CHEM 132. Listed as CHEM 2323 in the Texas Common Course Numbering System.

**Prerequisite(s):** CHEM 132**College/School:** Col of Science, Engr & Tech**Department:** Department of Chemistry**TCCN:** CHEM 2323**CHEM 232 Organic Chem II (3 Credits)****Lecture:** 3, **Lab:** 0

Organic Chemistry II (3) Continuation of CHEM 231. Study of the structure (including stereochemistry), nomenclature, physical properties, and chemical reactions for alcohols, aldehydes, ketones, carboxylic acids and their derivatives, phenols and amines. Three hours of lecture per week. Prerequisite: CHEM 231. Listed as CHEM 2325 in the Texas Common Course Numbering System.

**Prerequisite(s):** CHEM 231**College/School:** Col of Science, Engr & Tech**Department:** Department of Chemistry**TCCN:** CHEM 2325**CHEM 322 Quan Analysis Lab (2 Credits)****Lecture:** 0, **Lab:** 4

Quantitative Analysis Laboratory (2) Practical application of theory dealing with volumetric and gravimetric analysis. Four hours of laboratory per week. Prerequisites: CHEM 111, CHEM 112, and credit for or concurrent enrollment in CHEM 332.

**Prerequisite(s):** CHEM 112 and CHEM 111**College/School:** Col of Science, Engr & Tech**Department:** Department of Chemistry**CHEM 323 Forensic Chemistry Laboratory (2 Credits)****Lecture:** 0, **Lab:** 6

Focus on laboratory techniques used in forensic chemistry. Emphasize on instrumentation, data acquisition and analysis. Topics to be covered might include serological and DNA analysis, soil and glass analysis, drug analysis, arson and explosive analysis, fabric analysis, gunshot residue analysis, paint and ink analysis, and protein identification by MALDI-TOF-MS. Prerequisites: CHEM 212, CHEM 232, CHEM 322, CHEM 332 and CHEM 350.

**Prerequisite(s):** CHEM 212 or CHEM 232 or CHEM 322 or CHEM 350**College/School:** Col of Science, Engr & Tech**Department:** Department of Chemistry

**CHEM 332 Quan Analysis Lec (3 Credits)****Lecture:** 3, **Lab:** 0

Quantitative Analysis (3) Study of reactions in solution, homogeneous and heterogeneous equilibrium concepts, and acid-base theory and the application of these concepts to volumetric and gravimetric analysis. Three hours of lecture per week. Prerequisite: CHEM 132.

**Prerequisite(s):** CHEM 132**College/School:** Col of Science, Engr & Tech**Department:** Department of Chemistry**CHEM 343 Biochemistry (3 Credits)****Lecture:** 3, **Lab:** 0

Biochemistry (3) Course for human services/consumer sciences majors. Study of the chemistry of carbohydrates, proteins, lipids, digestion, and metabolism. Three hours of lecture and three hours of laboratory per week. Prerequisite: CHEM 231.

**Prerequisite(s):** CHEM 231**College/School:** Col of Science, Engr & Tech**Department:** Department of Chemistry**CHEM 343L Biochemistry Lab (1 Credits)****Lecture:** 0, **Lab:** 1**Prerequisite(s):** (CHEM 211)**College/School:** Col of Science, Engr & Tech**Department:** Department of Chemistry**CHEM 350 Forensic Chemistry I (3 Credits)****Lecture:** 3

Study important aspects of chemical fundamentals to forensic science. Focus on statistical analysis of data. Advanced analytical methods will be discussed in-depth, including microscopy, spectroscopy, mass spectrometry, elemental analysis, chromatography, micro-spectrophotometry and electrophoresis. Prerequisites: CHEM 212, CHEM 232, CHEM 322 and CHEM 332

**Prerequisite(s):** (CHEM 212 and CHEM 232 and CHEM 322 and CHEM 332)**College/School:** Col of Science, Engr & Tech**Department:** Department of Chemistry**CHEM 351 Forensic Chemistry II (3 Credits)****Lecture:** 3

Focus on major facets of forensic chemistry. Topics to be covered including drugs as physical evidence, forensic drug analysis, drugs in the body, the chemistry of combustion and arson, explosives and trace evidence analysis. Prerequisites: CHEM 350 and previous credit for or concurrent enrollment in CHEM 323.

**Prerequisite(s):** CHEM 350 and CHEM 323 (may be taken concurrently)**College/School:** Col of Science, Engr & Tech**Department:** Department of Chemistry**CHEM 411 Physical Chem I Lab (1 Credits)****Lecture:** 0, **Lab:** 3

Physical Chemistry Laboratory I (1) Course involving application of the theory of physical chemistry to experimental procedures. An introduction of the use of computers to solve chemistry problems and to write laboratory reports. Three hours of laboratory per week. Prerequisites: CS 116, CHEM 322, and credit for or concurrent enrollment in CS 117, CHEM 431, and MATH 241.

**Prerequisite(s):** (CS 116 and CHEM 322 and CS 117 (may be taken concurrently) and CHEM 431 (may be taken concurrently) and MATH 241 (may be taken concurrently))**College/School:** Col of Science, Engr & Tech**Department:** Department of Chemistry**CHEM 412 Physical Chem II Lab (1 Credits)****Lecture:** 0, **Lab:** 3

Physical Chemistry Laboratory II (1) Continuation of CHEM 411. Three hours of laboratory per week. Prerequisites: CS 117, CHEM 411, and credit for or concurrent enrollment in CHEM 432.

**Prerequisite(s):** CS 117 (may be taken concurrently) and CHEM 411 and CHEM 432 (may be taken concurrently)**College/School:** Col of Science, Engr & Tech**Department:** Department of Chemistry**CHEM 431 Physical Chem I (3 Credits)****Lecture:** 3, **Lab:** 0

Physical Chemistry I (3) Study of important theory associated with states of matter, changes of state, chemical equilibria, thermochemistry, and thermodynamics. An introduction to vibration and rotational spectra. Three hours of lecture per week. Prerequisites: CHEM 232, CHEM 332, PHYS 238, and previous credit for or concurrent enrollment in MATH 241.

**Prerequisite(s):** (CHEM 232 and CHEM 332 and PHYS 238 and MATH 241 (may be taken concurrently))**College/School:** Col of Science, Engr & Tech**Department:** Department of Chemistry**CHEM 432 Physical Chem II (3 Credits)****Lecture:** 3, **Lab:** 0

Physical Chemistry II (3) Continuation of CHEM 431. Three hours of lecture per week. Prerequisites: CHEM 431 and previous credit for or concurrent enrollment in MATH 242.

**Prerequisite(s):** (CHEM 431 and MATH 242 (may be taken concurrently))**College/School:** Col of Science, Engr & Tech**Department:** Department of Chemistry**CHEM 445 Biochemistry (3 Credits)****Lecture:** 3, **Lab:** 0

Biochemistry (4) Structure, physical properties, and chemical reactions of lipids, proteins, enzymes, and vitamins. An in-depth study of the processes of digestion and metabolism. Two hours of lecture and four hours of laboratory per week. Prerequisites: CHEM 212 and CHEM 232.

**Prerequisite(s):** (CHEM 232 and CHEM 212 and CHEM 231 and CHEM 211)**College/School:** Col of Science, Engr & Tech**Department:** Department of Chemistry**CHEM 445L Biochem Lab (1 Credits)****Lecture:** 0, **Lab:** 1**Prerequisite(s):** (CHEM 231 and CHEM 211 and CHEM 232 and CHEM 212)**College/School:** Col of Science, Engr & Tech**Department:** Department of Chemistry**CHEM 450 Inorganic Chemistry I (3 Credits)****Lecture:** 3, **Lab:** 3

Inorganic Chemistry I (3) Upper-level course covering an in-depth study of inorganic compounds, including coordination theory, molecular-orbital theory, and ligand-field theory. Three hours of lecture per week. Prerequisites: MATH 242 and credit for or concurrent enrollment in CHEM 431 or consent of the Faculty Chair.

**Prerequisite(s):** (MATH 242 and CHEM 431 (may be taken concurrently))**College/School:** Col of Science, Engr & Tech**Department:** Department of Chemistry**CHEM 450L Inorganic Chem Lab (0 Credits)****Lecture:** 0, **Lab:** 0**College/School:** Col of Science, Engr & Tech**Department:** Department of Chemistry

**CHEM 451 Inorganic Chemistry II (3 Credits)****Lecture:** 3, **Lab:** 3

Inorganic Chemistry II (3) Upper-level course covering an in-depth study of the chemical elements and their compounds, including their structure, physical properties, methods of preparation, chemical reactions, and uses. Two hours of lecture and three hours of laboratory per week.

Prerequisite: CHEM 450 or approval of the Faculty Chair.

**Prerequisite(s):** (CHEM 450)

**College/School:** Col of Science, Engr & Tech

**Department:** Department of Chemistry

**CHEM 451L Inorganic Chem Lab (0 Credits)****Lecture:** 0, **Lab:** 0

**College/School:** Col of Science, Engr & Tech

**Department:** Department of Chemistry

**CHEM 453 Instrumental Analysis Methods (3 Credits)****Lecture:** 1, **Lab:** 6

Instrumental Methods (3) Essentials of instrumental chemical analysis.

Two hours of lecture and four hours of laboratory per week. Prerequisites: CHEM 322, CHEM 332, credit for or concurrent enrollment in CHEM 411, and CHEM 431.

**Prerequisite(s):** CHEM 332 and CHEM 322 and CHEM 411 (may be taken concurrently) and CHEM 431

**College/School:** Col of Science, Engr & Tech

**Department:** Department of Chemistry

**CHEM 453L Instrumental Analysis Lab (0 Credits)****Lecture:** 0, **Lab:** 0

**College/School:** Col of Science, Engr & Tech

**Department:** Department of Chemistry

**CHEM 454 Research (3 Credits)****Lecture:** 0, **Lab:** 0

Research (3) Upper-level chemistry majors select a problem for investigation in one or a combination of several areas of chemistry under the supervision of a member of the faculty designated by the Faculty Chair of the Department. Prerequisites: CHEM 132, CHEM 232, CHEM 332, CHEM 432, or approval of the Faculty Chair.

**Prerequisite(s):** (CHEM 232 and CHEM 332 and CHEM 432)

**College/School:** Col of Science, Engr & Tech

**Department:** Department of Chemistry

**CHEM 460 Forensic Toxicology (3 Credits)****Lecture:** 3

This is a one-semester course focused on the collection, extraction and analysis of drugs and poisons that are most likely encounter in forensic toxicology. Analytical methods for identification of toxicants will also be discussed. Case studies are reviewed where drug use may become a topic for forensic toxicology. Prerequisites: CHEM 323 and CHEM 350.

**Prerequisite(s):** CHEM 323 and CHEM 350

**College/School:** Col of Science, Engr & Tech

**Department:** Department of Chemistry

**CHEM 476 Organic Mechanisms (3 Credits)****Lecture:** 3, **Lab:** 3

Organic Mechanisms (3) Study of the reaction intermediates and the mechanisms associated with the important, in vitro substitution, elimination, and addition reactions of aliphatic and aromatic molecules. Three hours of lecture per week. Prerequisite: CHEM 232. Offered as needed.

**Prerequisite(s):** (CHEM 232)

**College/School:** Col of Science, Engr & Tech

**Department:** Department of Chemistry

**CHEM 477 Environmental Chem (3 Credits)****Lecture:** 3, **Lab:** 0

Environmental Chemistry (3) Principles of air, water, and soil chemistry. The fate and assessment of toxicants, pesticides, and water pollutants, including phytotoxins, mycotoxins, and heavy metals. Three hours of lecture per week. Prerequisite: CHEM 232. Offered as needed.

**Prerequisite(s):** CHEM 232

**College/School:** Col of Science, Engr & Tech

**Department:** Department of Chemistry

**CHEM 478 Polymer Chemistry (3 Credits)****Lecture:** 3

Polymer Chemistry (3) This course focuses on the fundamental knowledge of polymer chemistry, especially chemical synthesis, macromolecular behaviors, physical properties and characterizations of polymeric systems. Prerequisite: CHEM 231 and CHEM 232.

**College/School:** Col of Science, Engr & Tech

**Department:** Department of Chemistry

**CHEM 478L Polymer Chemistry Lab (0 Credits)****Lab:** 3

**College/School:** Col of Science, Engr & Tech

**Department:** Department of Chemistry

**CHEM 479 Biological Inorganic Chemistry (3 Credits)**

Biological Inorganic Chemistry (3) Senior level course with topics in metal ions and proteins, transport and storage of metal ions and electron transfer in biological system. Prerequisite: CHEM 231, CHEM 232 and CHEM 445.

**College/School:** Col of Science, Engr & Tech

**Department:** Department of Chemistry

**CHEM 479L Biol Inorganic Chem Lab (0 Credits)****Lab:** 3

**College/School:** Col of Science, Engr & Tech

**Department:** Department of Chemistry

**CHEM 480 Selected Topics in Chemistry (1 Credits)**

This course reviews selected topics in undergraduate chemistry education. Topics to be reviewed include important concepts and principles in general chemistry, analytical chemistry, and organic chemistry. Instrumentations for chemical analysis and characterization will also be discussed. 1 credit hour per week.

**Prerequisite(s):** CHEM 212 and CHEM 232 and CHEM 322 and CHEM 332

**College/School:** Col of Science, Engr & Tech

**Department:** Department of Chemistry

**CHEM 499 Seminar (1 Credits)****Lecture:** 1

Seminar (1) Attendance and participation in weekly seminars required. Recent research developments in a wide variety of fields discussed. Students must give at least one seminar during the semester(s) that they are enrolled. May be repeated for credit to four (4) credits maximum. Prerequisite: Consent of the Faculty Chair.

**College/School:** Col of Science, Engr & Tech

**Department:** Department of Chemistry

**CHEM 1311 Chemistry I (3 Credits)****Lecture:** 3, **Lab:** 0

General Chemistry I (3) Introduction to modern theories of atomic structure, periodic trends, chemical bonding, molecular geometry, chemical reactions, including oxidation-reduction and stoichiometric calculations. Three hours of lecture per week. Corequisite: MATH 133. Listed as CHEM 1311 in the Texas Common Course Numbering System.

**College/School:** Col of Science, Engr & Tech

**Department:** Department of Chemistry

**CHEM 1312 Chemistry II (3 Credits)**

**Lecture:** 3

General Chemistry II (3) Study of the states of matter, solution chemistry, concepts associated with rates of reaction, homogeneous and heterogeneous equilibria, acid-base chemistry, and fundamental thermodynamics. Three hours of lecture per week. Prerequisites: CHEM 1311 and MATH 1314.

**Prerequisite(s):** CHEM 1311 and (MATH 1314 or MATH 133)

**College/School:** Col of Science, Engr & Tech

**Department:** Department of Chemistry

**TCCN:** CHEM 1312