

# Chemistry Courses

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## Courses

### **CHEM 1105. Laboratory for CHEM 1305.**

General Chemistry I Laboratory: [TCCN CHEM 1111] Students will master chemical principles and experimental methods for investigating the properties and reactions of chemical substances.

**Department:** Chemistry

**1 Credit Hour**

**3 Total Contact Hours**

3 Lab Hours

0 Lecture Hours

0 Other Hours

**Corequisite(s):** CHEM 1305

### **CHEM 1106. Laboratory for CHEM 1306.**

General Chemistry II Laboratory: [TCCN CHEM 1112] Students will master chemical principles and experimental methods for investigating the properties and reactions of chemical substances. A continuation of CHEM 1105 laboratory.

**Department:** Chemistry

**1 Credit Hour**

**3 Total Contact Hours**

3 Lab Hours

0 Lecture Hours

0 Other Hours

**Corequisite(s):** CHEM 1306

### **CHEM 1107. Intro General Chemistry Lab.**

Introduction to General Chemistry Laboratory: [TCCN CHEM 1105] Students will learn about basic concepts in Chemistry such as atomic and molecular structure, the periodic table and periodicity, chemical stoichiometry, reactions, and properties of gases, liquids, and solids. Laboratory of basic concepts relating to composition, structure, and transformation of matter. Satisfies the chemistry requirement for nursing. Students who need a foundation for work in advanced chemistry and related sciences or engineering fields should take CHEM 1305, CHEM 1105, CHEM 1306, and CHEM 1106.

**Department:** Chemistry

**1 Credit Hour**

**3 Total Contact Hours**

3 Lab Hours

0 Lecture Hours

0 Other Hours

**Prerequisite(s):** (MATH 0311 w/C or better ) OR (MATH 1508 w/C or better ) OR (MATH 1309 w/C or better ) OR (MATH 1310 w/C or better ) OR (MATH 1312 w/C or better ) OR (MATH 1411 w/C or better ) OR (MATH 2313 w/C or better ) OR (MATH 2326 w/C or better)

**Corequisite(s):** CHEM 1307

### **CHEM 1108. Intro Organic & Biochem Lab.**

Introduction to Organic and Biochemistry Laboratory: [TCCN CHEM 1107] Students will learn about reactions of organic compounds and biochemical concepts. A continuation of CHEM 1107 laboratory.

**Department:** Chemistry

**1 Credit Hour**

**3 Total Contact Hours**

3 Lab Hours

0 Lecture Hours

0 Other Hours

**Prerequisite(s):** (CHEM 1107 w/C or better AND MATH 0311 w/C or better)

**Corequisite(s):** CHEM 1308

**CHEM 1305. General Chemistry.**

General Chemistry I: [TCCN CHEM 1311] Descriptive and quantitative aspects of chemistry suitable for students intending a degree in science or engineering; Includes fundamental concepts underlying the discipline, atomic structure, stoichiometry, chemical reactions, thermochemistry, chemical bonding and molecular structure. Corequisite: CHEM 1105, if required in student's degree plan. MATH 1508 may be taken concurrently with CHEM 1305.

**Department:** Chemistry

**3 Credit Hours**

**5 Total Contact Hours**

2 Lab Hours

3 Lecture Hours

0 Other Hours

**Prerequisite(s):** (MATH 1508 w/C or better ) OR (MATH 1411 w/C or better ) OR (MATH 1312 w/C or better ) OR (MATH 2313 w/C or better ) OR (MATH 2326 w/C or better ) OR (A02 score between 26 and 36 ) OR (S02 score between 600 and 800 ) OR (MATH 2301 w/C or better ) OR (MATH 1310 w/C or better ) AND (MATH 1508 w/C or better ) OR (MATH 2301 w/C or better ) OR (MATH 1411 w/C or better ) OR (MATH 1312 w/C or better ) OR (MATH 2313 w/C or better ) OR (MATH 2326 w/C or better ) OR (BANM score between 4 and 5 ) OR (ACCL score between 081 and 120 AND BANM score between 4 and 5 ) OR (BANM score between 4 and 5 AND EPCM score between 081 and 120 ) OR (MATH 1411A w/C or better AND MATH 1411B w/C or better AND MATH 1411C w/C or better ) OR (MATH 1508A w/C or better AND MATH 1508B w/C or better AND MATH 1508C w/C or better ) OR (MATH 1310 w/C or better )

**Corequisite(s):** CHEM 1105

**CHEM 1306. General Chemistry.**

General Chemistry II: [TCCN CHEM 1312] A continuation of CHEM 1305; Includes intermolecular forces, quantitative aspects of chemical kinetics, equilibrium, acids and bases, thermodynamics, and electrochemistry.

**Department:** Chemistry

**3 Credit Hours**

**5 Total Contact Hours**

2 Lab Hours

3 Lecture Hours

0 Other Hours

**Prerequisite(s):** (CHEM 1105 w/C or better AND CHEM 1305 w/C or better ) AND (MATH 1508 w/C or better ) OR (MATH 1411 w/C or better ) OR (A02 score of 26 ) OR (S02 score of 600 ) OR (MATH 1312 w/C or better ) OR (MATH 2313 w/C or better ) OR (MATH 2326 w/C or better ) OR (MATH 1310 w/C or better)

**Corequisite(s):** CHEM 1106

**CHEM 1307. Intro to General Chemistry.**

Introduction to General Chemistry: [TCCN CHEM 1305] Basic concepts relating to composition, structure, and transformation of matter. Satisfies the chemistry requirement for nursing. Students who need a foundation for work in advanced chemistry and related sciences or engineering fields should take CHEM 1305, CHEM 1105, CHEM 1306, and CHEM 1106.

**Department:** Chemistry

**3 Credit Hours**

**3 Total Contact Hours**

0 Lab Hours

3 Lecture Hours

0 Other Hours

**Prerequisite(s):** (MATH 0311 w/C or better ) OR (MATH 1310 w/C or better ) OR (MATH 1508 w/C or better ) OR (MATH 1411 w/C or better ) OR (MATH 2313 w/C or better ) OR (MATH 2326 w/C or better)

**Corequisite(s):** CHEM 1107

**CHEM 1308. Intro Organic & Biochemistry.**

Introduction to Organic & Biochemistry: [TCCN CHEM 1307] A continuation of CHEM 1307 lecture. Includes surveys of organic chemistry and biochemistry.

**Department:** Chemistry

**3 Credit Hours**

**3 Total Contact Hours**

0 Lab Hours

3 Lecture Hours

0 Other Hours

**Prerequisite(s):** (CHEM 1107 w/C or better AND CHEM 1307 w/C or better AND MATH 0311 w/C or better)

**Corequisite(s):** CHEM 1108

**CHEM 2124. Lab for Organic Chemistry 2324.**

Laboratory for Organic Chemistry 2324: Many not be counted in addition to CHEM 3221. The Chemistry Department offers a Departmental Examination to award upper division credit for CHEM 2321 and CHEM 2322 (the current majors' organic chemistry lecture sequence) by successful performance on an examination covering the fundamental aspects of the two-semester organic chemistry sequence to students who have taken sophomore level organic lecture coursework at other institutions of higher education.

**Department:** Chemistry

**1 Credit Hour**

**3 Total Contact Hours**

3 Lab Hours

0 Lecture Hours

0 Other Hours

**Prerequisite(s):** (CHEM 1306 w/C or better ) AND (CHEM 1106 w/C or better)

**Corequisite(s):** CHEM 2324

**CHEM 2125. Lab for Organic Chemistry 2325.**

Laboratory for Organic Chemistry: Many not be counted in addition to CHEM 2221. The Chemistry Department offers a Departmental Examination to award upper division credit for CHEM 2321 and CHEM 2322 (the current majors' organic chemistry lecture sequence) by successful performance on an examination covering the fundamental aspects of the two-semester organic chemistry sequence to students who have taken sophomore level organic lecture coursework at other institutions of higher education.

**Department:** Chemistry

**1 Credit Hour**

**3 Total Contact Hours**

3 Lab Hours

0 Lecture Hours

0 Other Hours

**Prerequisite(s):** (CHEM 2324 w/C or better)

**Corequisite(s):** CHEM 2325

**CHEM 2161. Laboratory for CHEM 2261.**

Periodic Table Laboratory: Provides hands-on, laboratory experience that puts into practice the chemical principles and concepts presented in CHEM 2261. This laboratory will survey the chemistry of elements across the periodic table while providing an emphasis on the chemistry and importance of the main group elements.

**Department:** Chemistry

**1 Credit Hour**

**3 Total Contact Hours**

3 Lab Hours

0 Lecture Hours

0 Other Hours

**CHEM 2221. Organic Chemistry I Lab.**

Organic Chemistry I Lab: Students work individually to enhance an in-depth experience in safe organic chemistry lab practices, including full organic syntheses, qualitative analyses, and the use of NMR, IR, photochemistry, electronic absorption and emission spectroscopies.

**Department:** Chemistry

**2 Credit Hours**

**6 Total Contact Hours**

6 Lab Hours

0 Lecture Hours

0 Other Hours

**Corequisite(s):** CHEM 2321

**CHEM 2222. Organic Chemistry II Lab.**

Laboratory for CHEM 2322. Corequisite: CHEM 2322. Course fee required.

**Department:** Chemistry

**2 Credit Hours**

**6 Total Contact Hours**

6 Lab Hours

0 Lecture Hours

0 Other Hours

**Corequisite(s):** CHEM 2322

**CHEM 2321. Organic Chemistry I.**

Organic Chemistry I: A study of the chemical bonding and structure in organic molecules, functional group synthesis and reactions, reaction mechanisms, nomenclature, stereochemistry and isomerism. Intended for chemistry majors and others requiring a comprehensive approach to organic chemistry. May not be counted in addition to CHEM 2324. Corequisite: CHEM 2221. Prerequisites: CHEM 1306 and CHEM 1106, each with a grade of "C" or better.

**Department:** Chemistry

**3 Credit Hours**

**3 Total Contact Hours**

0 Lab Hours

3 Lecture Hours

0 Other Hours

**Prerequisite(s):** (CHEM 1106 w/C or better AND CHEM 1306 w/C or better)

**Corequisite(s):** CHEM 2221

**CHEM 2322. Organic Chemistry II.**

Organic Chemistry II: A continuation of CHEM 2321. Intended for chemistry majors and others requiring a comprehensive approach to organic chemistry. May not be counted in addition to CHEM 2325. Corequisite: CHEM 2222.

**Department:** Chemistry

**3 Credit Hours**

**3 Total Contact Hours**

0 Lab Hours

3 Lecture Hours

0 Other Hours

**Prerequisite(s):** (CHEM 2221 w/C or better AND CHEM 2321 w/C or better)

**Corequisite(s):** CHEM 2222

**CHEM 2324. Organic Chemistry.**

Organic Chemistry: A study of the fundamental types of carbon compounds. intended for students not requiring the detailed comprehensive courses specified for the BS degree in Chemistry. May not be counted in addition to CHEM 2321. The Chemistry Department offers a Departmental Examination to award upper division credit for CHEM 2321 and CHEM 2322 (the current majors' organic chemistry lecture sequence) by successful performance on an examination covering the fundamental aspects of the two-semester organic chemistry sequence to students who have taken sophomore level organic lecture coursework at other institutions of higher education.

**Department:** Chemistry

**3 Credit Hours**

**3 Total Contact Hours**

0 Lab Hours

3 Lecture Hours

0 Other Hours

**Prerequisite(s):** (CHEM 1306 w/C or better ) AND (CHEM 1106 w/C or better ) OR (CHEM 2124 w/C or better)

**Corequisite(s):** CHEM 2124

**CHEM 2325. Organic Chemistry.**

Organic Chemistry: A continuation of CHEM 2324 with emphasis on organic compounds and their reactions to living systems. May not be counted in addition to CHEM 2322. The Chemistry department offers a Departmental Examination to award upper division credit for CHEM 2321 and CHEM 2322 (the current majors' organic chemistry lecture sequence) by successful performance on an examination covering the fundamental aspects of the two-semester organic chemistry sequence to students who have taken sophomore level organic lecture coursework at other institutions of higher education.

**Department:** Chemistry

**3 Credit Hours**

**3 Total Contact Hours**

0 Lab Hours

3 Lecture Hours

0 Other Hours

**Prerequisite(s):** (CHEM 2124 w/C or better AND CHEM 2324 w/C or better)

**Corequisite(s):** CHEM 2125

**CHEM 2361. The Periodic Table.**

The Periodic Table: A survey course that expounds the principles of periodicity in the descriptive chemistry of the elements. Among the areas covered will be the alkali earth metals, the carbon/silicon/germanium/tin and lead group, the chemistry of nitrogen, phosphorus, and the halogen. Where possible, pertinent technical applications of the elements, and materials derived from them, will be presented, e.g., medicinal, inorganic polymer, and semiconductor applications.

**Department:** Chemistry

**3 Credit Hours**

**3 Total Contact Hours**

0 Lab Hours

3 Lecture Hours

0 Other Hours

**Prerequisite(s):** (CHEM 2221 w/C or better AND CHEM 2321 w/C or better ) OR (CHEM 2324 w/C or better)

**Corequisite(s):** CHEM 2161

**CHEM 3110. Lab for Chemistry 3310.**

Laboratory for CHEM 3310: This course provides practical laboratory experience in fundamental quantitative chemical analysis and improve your experimental skills in analytical chemistry such as acid-base titration, gravimetric analysis, quantitation of unknown, and so on.

**Department:** Chemistry

**1 Credit Hour**

**4 Total Contact Hours**

4 Lab Hours

0 Lecture Hours

0 Other Hours

**Corequisite(s):** CHEM 3310

**CHEM 3131. Lab for Chemistry.**

Laboratory for CHEM 3330: Provides practical laboratory experience in techniques of biochemical assay and analysis.

**Department:** Chemistry

**1 Credit Hour**

**4 Total Contact Hours**

4 Lab Hours

0 Lecture Hours

0 Other Hours

**Prerequisite(s):** (CHEM 2221 w/C or better AND CHEM 2321 w/C or better ) OR (CHEM 2124 w/C or better AND CHEM 2324 w/C or better)

**Corequisite(s):** CHEM 3330

**CHEM 3151. Lab for Chemistry 3351.**

Laboratory for Chemistry 3351: This is an experimental laboratory complementary to Physical Chemistry I CHEM 3351 that focuses in demonstrating principles in reaction kinetics, thermodynamics, and methods of data analysis with emphasis in solutions, calorimetry, electrochemistry and chemical equilibria.

**Department:** Chemistry

**1 Credit Hour**

**4 Total Contact Hours**

4 Lab Hours

0 Lecture Hours

0 Other Hours

**Corequisite(s):** CHEM 3351

**CHEM 3152. Lab for Chemistry 3352.**

Laboratory for Chemistry 3352: This is an experimental laboratory complementary to Physical Chemistry II CHEM 3352 that demonstrates concepts in quantum mechanics with emphasis in spectroscopy in chemical systems using modern instrumentation.

**Department:** Chemistry

**1 Credit Hour**

**4 Total Contact Hours**

4 Lab Hours

0 Lecture Hours

0 Other Hours

**Corequisite(s):** CHEM 3352

**CHEM 3301. Molecular Modeling & Chem Info.**

Molecular Modeling and Chemical Information: Introduction to computational methods for molecular visualization, optimization, characterization, and reactivity; includes strategies for chemical data analysis, programming, and obtaining chemical information from electronic sources.

**Department:** Chemistry

**3 Credit Hours**

**3 Total Contact Hours**

0 Lab Hours

3 Lecture Hours

0 Other Hours

**Prerequisite(s):** (CHEM 2221 w/C or better AND CHEM 2321 w/C or better)

**CHEM 3310. Analytical Chemistry.**

Analytical Chemistry: Quantitative measurements and calculations, chemical equilibrium as applied to analyses and separations. This course is designed for Chemistry majors.

**Department:** Chemistry

**3 Credit Hours**

**3 Total Contact Hours**

0 Lab Hours

3 Lecture Hours

0 Other Hours

**CHEM 3330. Biochem I:Struc & Function.**

Biochemistry I: Structure and Function: A study of the major classes of biomolecules, including amino acids, proteins, nucleic acids, carbohydrates and lipids and their physiological relevance; with introductions to biochemical techniques and enzyme kinetics.

**Department:** Chemistry

**3 Credit Hours**

**3 Total Contact Hours**

0 Lab Hours

3 Lecture Hours

0 Other Hours

**Prerequisite(s):** (CHEM 2221 w/C or better AND CHEM 2321 w/C or better ) OR (CHEM 2124 w/C or better AND CHEM 2324 w/C or better)

**Corequisite(s):**

**CHEM 3332. Biochem II: Metabol & Bioenerg.**

Biochemistry II: Metabolism & Bioengineering: The study of bioenergetics, cellular metabolism, and regulation of enzyme function.

**Department:** Chemistry

**3 Credit Hours**

**3 Total Contact Hours**

0 Lab Hours

3 Lecture Hours

0 Other Hours

**Prerequisite(s):** (CHEM 3330 w/C or better)

**CHEM 3351. Physical Chemistry I.**

Physical Chemistry I: Properties of substances in gaseous, liquid and solid states; solutions, thermodynamics, kinetics and other advanced topics.

**Department:** Chemistry

**3 Credit Hours**

**3 Total Contact Hours**

0 Lab Hours

3 Lecture Hours

0 Other Hours

**Prerequisite(s):** (CHEM 1106 w/C or better AND CHEM 1306 w/C or better ) AND (PHYS 2421 w/C or better ) OR (PHYS 2121 w/C or better AND PHYS 2321 w/C or better ) AND (MATH 2313 w/C or better)

**CHEM 3352. Physical Chemistry II.**

Physical Chemistry II: Applications of quantum mechanics to spectroscopy and chemical bonding.

**Department:** Chemistry

**3 Credit Hours**

**3 Total Contact Hours**

0 Lab Hours

3 Lecture Hours

0 Other Hours

**Prerequisite(s):** (CHEM 3351 w/C or better)

**CHEM 4134. Structural Biochemistry Lab.**

Structural Biochemistry Laboratory: Methods to analyze bio-macromolecule structure and function. Students will interpret current literature and will clone, express, purify, and crystallize a protein for X-ray data collection and structure determination. Course fee required.

**Department:** Chemistry

**1 Credit Hour**

**4 Total Contact Hours**

4 Lab Hours

0 Lecture Hours

0 Other Hours

**Prerequisite(s):** (CHEM 3131 w/C or better AND CHEM 3330 w/C or better)

**Corequisite(s):** CHEM 4334

**CHEM 4165. Inorganic Chemistry Lab.**

Laboratory for Inorganic Chemistry: Provides laboratory practical exposure for students taking Inorganic CHEM 4365.

**Department:** Chemistry

**1 Credit Hour**

**4 Total Contact Hours**

4 Lab Hours

0 Lecture Hours

0 Other Hours

**Corequisite(s):** CHEM 4365

**CHEM 4176. Introduction to Research.**

Introduction to Research: An independent, original research investigation based on prior arrangement between the student and a supervising faculty of the Department. Can be repeated for credit up to a cumulative six (6) credit hours of CHEM 4176 and CHEM 4376; All credit accrued will be counted as elective hours only. Prerequisite: Department approval. Fees required.

**Department:** Chemistry

**1 Credit Hour**

**3 Total Contact Hours**

0 Lab Hours

0 Lecture Hours

3 Other Hours

**CHEM 4211. Instrumental Meths Analyt Chem.**

Instrumental Methods of Analytical Chemistry: A study of spectroscopic and electrochemical methods of chemical analysis. This course is esigned for Chemistry and Biochemistry majors.

**Department:** Chemistry

**2 Credit Hours**

**3 Total Contact Hours**

0 Lab Hours

3 Lecture Hours

0 Other Hours

**Prerequisite(s):** (CHEM 2322 w/C or better ) OR (CHEM 2325 w/C or better ) AND (CHEM 3110 w/C or better ) AND (CHEM 3310 w/C or better)

**CHEM 4212. Lab for Chemistry 4211.**

Laboratory for Chemistry 4211

**Department:** Chemistry

**2 Credit Hours**

**6 Total Contact Hours**

6 Lab Hours

0 Lecture Hours

0 Other Hours

**Prerequisite(s):** (CHEM 3110 w/C or better)

**CHEM 4328. Advanced Topics Organic Chem.**

Advanced Topics in Organic Chemistry: Selected topics at the undergraduate level which are not usually covered in introductory courses in organic chemistry. Course may be repeated for credit when topics vary.

**Department:** Chemistry

**3 Credit Hours**

**3 Total Contact Hours**

0 Lab Hours

3 Lecture Hours

0 Other Hours

**Prerequisite(s):** (CHEM 3322 w/C or better ) OR (CHEM 3325 w/C or better ) OR (CHEM 2322 w/C or better ) OR (CHEM 2325 w/C or better)

**CHEM 4334. Structural Biochemistry.**

Structural Biochemistry: Examines bio-macromolecules from a structural point of view, focusing primarily on protein complexes. Includes interpretation of different levels of biomolecular structure (primary to tertiary), structure and function relationships and three dimensional structure determination techniques such as x-ray crystallography and cryo- electron microscopy.

**Department:** Chemistry

**3 Credit Hours**

**3 Total Contact Hours**

0 Lab Hours

3 Lecture Hours

0 Other Hours

**Prerequisite(s):** (CHEM 3131 w/C or better AND CHEM 3330 w/C or better)

**Corequisite(s):** CHEM 4134

**CHEM 4335. Biophysical Chemistry.**

Biophysical Chemistry: Application of physical chemistry to the study of biological systems and the major classes of macromolecular biological structures; emphasis on the relation of structure to biological function.

**Department:** Chemistry

**3 Credit Hours**

**3 Total Contact Hours**

0 Lab Hours

3 Lecture Hours

0 Other Hours

**Prerequisite(s):** (CHEM 4131 w/C or better AND CHEM 4330 w/C or better ) OR (CHEM 3131 w/C or better AND CHEM 3330 w/C or better)

**Corequisite(s):**

**CHEM 4362. Structure of Matter.**

Structure of Matter: Introduction to quantum theory; atomic and molecular structure; atomic and molecular spectra; chemical bonding. This course meets the American Chemical Society requirements for an advanced course in inorganic chemistry.

**Department:** Chemistry

**3 Credit Hours**

**3 Total Contact Hours**

0 Lab Hours

3 Lecture Hours

0 Other Hours

**Prerequisite(s):** (PHYS 2421 w/C or better ) OR (PHYS 2121 w/C or better AND PHYS 2321 w/C or better ) AND (CHEM 3352 w/C or better)



**CHEM 4365. Inorganic Chemistry.**

Inorganic Chemistry: Principles of molecular structure and chemical reactivity of inorganic compounds; coordination chemistry and introduction to ligand field theory, symmetry and group theory; kinetics and mechanisms of inorganic reactions; organometallic compounds; chemistry of nonmetals and physical methods in inorganic chemistry.

**Department:** Chemistry

**3 Credit Hours**

**3 Total Contact Hours**

0 Lab Hours

3 Lecture Hours

0 Other Hours

**Prerequisite(s):** (CHEM 2261 w/C or better AND CHEM 2322 w/C or better)

**CHEM 4376. Introduction to Research.**

Introduction to Research: An independent, original research investigation based on prior arrangement between the student and a supervising faculty of the Department. Can be repeated for credit up to a cumulative of six (6) credit hours of CHEM 4176 and CHEM 4376; all credit accrued will be counted as elective hours only.

**Department:** Chemistry

**3 Credit Hours**

**9 Total Contact Hours**

0 Lab Hours

0 Lecture Hours

9 Other Hours