

# COURSE DESCRIPTIONS

- CHEM 111R Chemistry III: Recitation 0 CREDITS**  
An add on to the Chemistry 111 course aimed at bolstering students' math, problem-solving and deductive reasoning skills.
- CHEM 300 Organometallic Synthesis Lab 2 CREDITS**  
This a research-based laboratory course that incorporates current research literature in inorganic and organic methods for the synthesis and characterization of small molecules. Students will use inorganic and organic synthetic and characterization techniques such as air-free, high/low temperature, cyclic voltammetry, and spectroscopy (NMR, UV-Vis, and FT-IR). Students will engage in experiments and collect data that they will then analyze to draw conclusions about the success of their reactions. This laboratory course will reinforce and expand on techniques learned in CHEM 303L and CHEM 304L.
- CHEM 300M Biochemistry of Nutrients 2 CREDITS**  
This course provides an overview of the biochemistry of macro- and micronutrients with an emphasis on chemical structures/properties, metabolism and function, including a limited focus on medical aspects of nutrient deficiencies and metabolism.
- CHEM PLAN2 Upper Division Elective 4 CREDITS**  
Placeholder for upper division chemistry course.
- CHEM 103 Introduction to Chemistry and Lab 4 CREDITS**  
A general introductory course dealing with the basic fundamentals of chemistry, specifically for pre-nursing students. Emphasis is placed on atomic structure, states of matter, the periodic table and chemical bonding, chemical symbols, nomenclature and chemical equations, types of chemical reactions, calculations from chemical equations, the characteristics of gases, and the chemistry of solutions and colloids. A basic understanding of algebra is strongly recommended (MATH 105 or higher).
- CHEM 111 Principles of Chemistry I and Lab, and Lab 4 CREDITS**  
A course in inorganic chemistry designed for students majoring in chemistry, biology, pre-professional programs in the sciences, and other science fields. Emphasis is placed on a detailed analysis of the fundamental principles of chemistry on both a theoretical and descriptive level.
- CHEM 112 Principles of Chemistry II and Lab, and Lab 4 CREDITS**  
A course in inorganic chemistry designed for students majoring in chemistry, biology, pre-professional programs in the sciences, and other science fields. Emphasis is placed on a detailed analysis of the fundamental principles of chemistry on both a theoretical and descriptive level.
- CHEM 201 Organic and Biochemistry 4 CREDITS**  
A descriptive introduction to organic chemistry and biochemistry with a biological/pharmacological emphasis. The course involves a brief introduction to organic structures, nomenclature and functional groups followed by a detailed discussion of proteins, lipids, carbohydrates, nucleic acids, energy transfer and metabolism.
- CHEM 300 Special Topics in Chemistry 2 to 4 CREDITS**  
Topics of interest and importance to students majoring in chemistry, biology, and physics will be offered as needed. Special Topics may be used as elective hours in the Chemistry majors or minors.
- CHEM 303 Organic Chemistry I and Lab 4 CREDITS**  
A detailed study of the chemistry of aliphatic and aromatic organic compounds. Topics covered include structure and nomenclature, the basic reactions of organic functional groups, reaction mechanisms, stereochemistry, organic synthesis and spectroscopy. The class is designed for chemistry, biology and pre-professional science majors. Prerequisites: CHEM 111, 112. CHEM 303 is a prerequisite for CHEM 304. (4-4)
- CHEM 304 Organic Chemistry II and Lab 4 CREDITS**  
A detailed study of the chemistry of aliphatic and aromatic organic compounds. Topics covered include structure and nomenclature, the basic reactions of organic functional groups, reaction mechanisms, stereochemistry, organic synthesis and spectroscopy. The class is designed for chemistry, biology and pre-professional science majors. Prerequisites: CHEM 111, 112. CHEM 303 is a prerequisite for CHEM 304. (4-4)
- CHEM 306 Quantitative Analysis and Lab 4 CREDITS**  
A study of the theory and practice of quantitative analytical chemistry. Topics include kinetics, chemical equilibrium, acid-base chemistry, complex formation, ionic strength effects, and oxidation-reduction reactions. The lab involves an in-depth study of gravimetric and volumetric methods, as well as a range of instrumental analyses with a focus on quality assurance/quality control. Students will gain experience with multiple modes of scientific communication, and will learn to apply statistics to data collected in the lab, with statistical tests covered including one-sample t-test, two sample t-test, paired t-test, linear regression, and ANOVA. The course includes a multi-week community based lab and science global learning outreach component which requires attendance at least one evening during the term outside normal class or lab time. (WCore: EWRLD)
- CHEM 307 Instrumental Analysis and Lab 4 CREDITS**  
Theory and laboratory work in absorption and emission spectroscopy (AA, UV-vis, IR and fluorometry); electroanalytical chemistry and chromatography as they apply to analytical chemistry. Offered spring of even years. Prerequisites: CHEM 111, 112; PHYS 151 or 211. (4)
- CHEM 320 Inorganic Chemistry and Lab 4 CREDITS**  
Inorganic chemistry is concerned with the chemistry of all of the elements except carbon. Selected topics that give the student broad exposure to the modern applications of inorganic chemistry are presented, as well as the underlying theories on which the subject is based. Topics include symmetry and group theory, bonding in inorganic compounds, the solid state, chemical forces, and coordination chemistry. Interesting aspects of the chemistry of selected elements are covered. The students gain laboratory experience with the synthetic techniques of inorganic chemistry including vacuum line synthesis techniques. They also learn how to characterize inorganic materials using instrumental techniques. Offered spring of odd year. Prerequisites: CHEM 111, 112. (4)
- CHEM 350 Biochemistry and Lab 4 CREDITS**  
A study of the chemistry of living organisms. Begins with a review of basic biology and organic chemistry as it applies to the biological system, the structure and function of the cell, water and its importance in the biological system and energy considerations. Detailed discussion of the structure and function of proteins, enzymology, carbohydrate structure and metabolism by both aerobic and anaerobic metabolism, and the structure and function of lipids and biological membranes.
- CHEM 370 Scientific Computing 4 CREDITS**  
An introduction to programming techniques that apply to a wide range of scientific disciplines. Topics include basic programming principles, equation solving, and model simulation. Offered spring of odd year. Prerequisites: PHYS 211, or both PHYS 151 and MATH 201 or equivalent. Students who have completed CMPT 201 may not take this course without instructor's approval. Same as BIOL 370 and PHYS 370 (4)
- CHEM 400 Advanced Topics in Chemistry 1 to 5 CREDITS**  
A class designed to meet the special course needs of chemistry majors. Subject offerings include: (a) Organic Reaction Mechanisms, (b) Organic Qualitative Analysis, (c) Organic Synthesis, and (d) Advanced Inorganic Chemistry. The specific course offerings depend upon student need and interest.
- CHEM 401 Directed Studies in Chemistry 1 to 4 CREDITS**  
A tutorial-based course used only for student-initiated proposals for intensive individual study of topics not otherwise offered in Chemistry Program. Prerequisites: senior standing and consent of instructor and school dean. This course is repeatable for credit.
- CHEM 421 Quantum Chemistry and Lab 4 CREDITS**  
A study of the basic principles of quantum mechanics and its application to atomic structure, molecular structure and spectroscopy. A laboratory section accompanies the lecture. Offered fall semester.

**CHEM 422      Thermodynamics & Statistical Mechanics      4  
CREDITS**

A study of the theoretical macroscopic properties of matter. An introduction to statistical mechanics and chemical thermodynamics with applications to gases, solutions, and phase and chemical equilibria. A laboratory section accompanies the lecture.

**CHEM 430      Undergraduate Research      1 to 4 CREDITS**

Students undertake a portion of a research project and learn all aspects of scientific inquiry. One credit hour equates to three hours per week in the laboratory. This course may be taken one credit at a time. This course is repeatable for credit.

**CHEM 440      Internship      1 to 8 CREDITS**

Offers students the opportunity to integrate classroom knowledge with practical experience. Prerequisites: junior or senior standing (for transfer students, at least 15 hours completed at Westminster), minimum 2.5 GPA, and consent of program director and Career Center internship coordinator. This course is repeatable for credit. REGISTRATION NOTE: Registration for internships is initiated through the Career Center website and is finalized upon completion of required paperwork and approvals. More info: 801-832-2590 <a href="https://westminstercollege.edu/internships">https://westminstercollege.edu/internships</a>

**CHEM 487      Undergraduate Teaching      1 CREDIT**

Provides an opportunity for teaching experience in lower-division laboratories by junior- and senior-level chemistry majors and minors. CHEM 487 may not be used as elective hours in the chemistry majors or minors. This course is graded on a credit/no credit basis. Permission of program director required. This course is repeatable for credit.