

# CHEMISTRY

*Program Purpose: Students participating in the Chemistry program will use the process of scientific inquiry to qualitatively and quantitatively solve chemistry problems by gathering evidential information, analyzing data, forming appropriate conclusions, and communicating these results through written and oral expressions.*

The Chemistry Department offers the opportunity for students to excel by providing the latest information and technology in both the lecture and laboratory settings. A comprehensive set of undergraduate courses fulfill the general education and transfer requirements of students through onsite offerings. Students may obtain an AS in chemistry; major requirements optimize preparation for advanced degrees in chemistry at four-year institutions. A background in chemistry is essential for many high-paying, challenging careers. Opportunities await the chemist in such fields as medicine and pharmaceuticals, metals and polymers, petroleum, electrochemistry, nanotechnology, forensics, aerospace, paper, food technology, business, and education.

## Transfer Information

Students planning to transfer need to consult with a counselor, prepare a Student Education Plan, and take advantage of the support services available in the Career Transfer Center located in Fountain Hall, (805) 378-1536.

**NOTE:** Some courses may have credit limitations. Refer to the **Credit Limitations** and **UC Credit Limitations** areas or see the UC Transfer Course Agreement (<http://catalog.vcccd.edu/moorpark/transfer-information/transfer-uc/#uctcatext>) page for details.

### CHEM M01A General Chemistry I 5 Units

*In-Class Hours:* 70 lecture, 52.5 laboratory

*Prerequisites:* CHEM M11 or CHEM M12 or equivalent AND MATH M03 (Intermediate Algebra) or equivalent as determined by the college's multiple measures assessment process

*C-ID:* CHEM 110, CHEM 120S (with CHEM M01B)

Studies atomic theory and stoichiometry; nomenclature and chemical reactions; thermochemistry; quantum theory and the electronic structure of atoms; chemical bonding and molecular structure; physical behavior of gases; states of matter and phase equilibria; and solutions. Addresses, through hands-on laboratory activities, spectroscopy; distillations; quantitative, qualitative and statistical analyses; titrations; thermochemistry; gravimetric and volumetric analyses; and colligative properties.

**Grade Modes:** Letter Graded, Student Option- Letter/Credit, Pass/No Pass Grading

**Credit Limitations:** Credit will not be awarded for both the honors and regular versions of a course. Credit will be awarded only for the first course completed with a grade of "C" or better or "P". Moorpark College Honors Program requires a letter grade.

**Degree Applicability:** Applies to Associate Degree

**AA/AS GE:** A2

**Transfer Credit:** CSU, UC

**UC Credit Limitations:** None

**CSU GE-Breadth:** B1, B3

**IGETC:** 5A, 5C

### CHEM M01AH Honors: General Chemistry I 5 Units

*In-Class Hours:* 70 lecture, 52.5 laboratory

*Prerequisites:* CHEM M11 or CHEM M12 or equivalent AND MATH M03 (Intermediate Algebra) or equivalent as determined by the college's multiple measures assessment process

*C-ID:* CHEM 110, CHEM 120S (with CHEM M01B)

Studies atomic theory and stoichiometry; nomenclature and chemical reactions; thermochemistry; quantum theory and the electronic structure of atoms; chemical bonding and molecular structure; physical behavior of gases; states of matter and phase equilibria; and solutions. Addresses, through hands-on laboratory activities, spectroscopy; distillations; quantitative, qualitative and statistical analyses; titrations; thermochemistry; gravimetric and volumetric analyses; and colligative properties. Honors work challenges students to be more analytical and creative through expanded assignments, real-world applications and enrichment opportunities.

**Grade Modes:** Letter Graded, Student Option- Letter/Credit, Pass/No Pass Grading

**Field Trips:** May be required

**Credit Limitations:** Course Credit Limitations: Credit will not be awarded for both the honors and regular versions of a course. Credit will be awarded only for the first course completed with a grade of "C" or better or "P". Moorpark College Honors Program requires a letter grade.

**Degree Applicability:** Applies to Associate Degree

**AA/AS GE:** A2

**Transfer Credit:** CSU, UC

**UC Credit Limitations:** None

**CSU GE-Breadth:** B1, B3

**IGETC:** 5A, 5C

### CHEM M01B General Chemistry II 5 Units

*In-Class Hours:* 70 lecture, 52.5 laboratory

*Prerequisites:* CHEM M01A or CHEM M01AH and MATH M05 or equivalent

*C-ID:* CHEM 120S (with CHEM M01A or CHEM M01AH)

Examines chemical kinetics; phase equilibria; equilibria in gases and solutions; acids and bases; solubility and complex ions; thermodynamics; electrochemistry; qualitative and quantitative chemical analyses.

Provides an overview of nuclear chemistry, coordination chemistry, and organic chemistry. Addresses, through hands-on laboratory activities, chemical kinetics; equilibria; thermodynamics; spontaneous oxidation-reduction reactions and electrolysis; selective precipitation; titrations; and exposure to ultraviolet, infrared, and nuclear magnetic resonance spectroscopy.

**Grade Modes:** Letter Graded, Student Option- Letter/Credit, Pass/No Pass Grading

**Degree Applicability:** Applies to Associate Degree

**AA/AS GE:** A2

**Transfer Credit:** CSU, UC

**UC Credit Limitations:** None

**CSU GE-Breadth:** B1, B3

**IGETC:** 5A, 5C

**CHEM M07A Organic Chemistry I 5 Units***In-Class Hours:* 52.5 lecture, 105 laboratory*Prerequisites:* CHEM M01B or equivalent*C-ID:* CHEM 150, CHEM 160S (with CHEM M07B)

Emphasizes molecular structure, chemical and physical properties, and the preparation and reactivities of organic molecules with an emphasis on reaction mechanisms, synthesis, structure determination, and applications. Involves, through hands-on laboratory work, the use of appropriate methods, techniques, and instrumentation for the synthesis, purification and identification of organic compounds discussed in the lecture portion.

**Catalog Notes:** Course requires use of a lab coat and goggles.**Grade Modes:** Letter Graded, Student Option- Letter/Credit, Pass/No Pass Grading**Degree Applicability:** Applies to Associate Degree**AA/AS GE:** A2**Transfer Credit:** CSU, UC**UC Credit Limitations:** None**CSU GE-Breadth:** B1, B3**IGETC:** 5A, 5C**CHEM M07B Organic Chemistry II 5 Units***In-Class Hours:* 52.5 lecture, 105 laboratory*Prerequisites:* CHEM M07A or equivalent*C-ID:* CHEM 160S (with CHEM M07A)

Continues the study of functional groups such as carboxylic acids and their derivatives, other carbonyl-containing compounds, amines and aromatics. Emphasizes reaction mechanisms, synthesis, and structure determination using nuclear magnetic resonance and infrared spectroscopy. Introduces aspects of biochemistry including the study of proteins, carbohydrates, and nucleic acids. Involves, through hands-on laboratory work, multi-step synthetic routes, chromatography, and applications of basic techniques.

**Catalog Notes:** Course requires a lab coat and goggles.**Grade Modes:** Letter Graded, Student Option- Letter/Credit, Pass/No Pass Grading**Degree Applicability:** Applies to Associate Degree**AA/AS GE:** A2**Transfer Credit:** CSU, UC**UC Credit Limitations:** None**CSU GE-Breadth:** B1, B3**IGETC:** 5A, 5C**CHEM M11 Foundations of General, Organic, and Biochemistry 5 Units***In-Class Hours:* 70 lecture, 52.5 laboratory*Prerequisites:* MATH M01 or one year high school algebra or equivalent

Covers general, organic, and biological chemistry with an emphasis placed on medical applications. Explores topics in general chemistry such as the modern view of the atom, molecules, chemical compounds, reactions, and calculations. Includes topics in organic and biochemistry such as hydrocarbons, alcohols, aldehydes and ketones, amines, carboxylic acids and their derivatives, carbohydrates, lipids, proteins, and nucleic acids.

**Catalog Notes:** This course is designed for students who are Allied Health Science majors and for students not planning to take CHEM M01A or CHEM M01AH.**Grade Modes:** Letter Graded, Student Option- Letter/Credit, Pass/No Pass Grading**Degree Applicability:** Applies to Associate Degree**AA/AS GE:** A2**Transfer Credit:** CSU, UC**UC Credit Limitations:** CHEM M11 and CHEM M12 combined: maximum credit, 1 course**CSU GE-Breadth:** B1, B3**IGETC:** 5A, 5C**CHEM M12 Introductory Chemistry I 4 Units***In-Class Hours:* 52.5 lecture, 52.5 laboratory*Prerequisites:* Elementary Algebra (MATH M01) or equivalent or placement as determined by the college's multiple-measure assessment process*C-ID:* CHEM 101

Introduces basic principles of chemistry with reference to measurement, chemical nature of matter and energy, and atomic theory. Presents the chemical concepts of elements and compounds, the periodic table, bonding, molecular structure, nomenclature, chemical reactions, equations, and calculations.

**Grade Modes:** Letter Graded, Student Option- Letter/Credit, Pass/No Pass Grading**Credit Limitations:** No credit if taken after CHEM M01A or CHEM M01AH.**Degree Applicability:** Applies to Associate Degree**AA/AS GE:** A2**Transfer Credit:** CSU, UC**UC Credit Limitations:** CHEM M11 and CHEM M12 combined: maximum credit, 1 course**CSU GE-Breadth:** B1, B3**IGETC:** 5A, 5C

**CHEM M13 Introductory Chemistry II 5 Units**

*In-Class Hours:* 70 lecture, 52.5 laboratory

*Prerequisites:* CHEM M11 or CHEM M12 or equivalent college course

*C-ID:* CHEM 102

Introduces fundamental concepts of general chemistry including kinetics, equilibria, pH, thermodynamics, electrochemistry, and nuclear chemistry. Covers topics in organic and biochemistry including structure, nomenclature, and reactions of organic compounds and metabolism of carbohydrates, lipids, proteins, enzymes, and nucleic acids.

**Grade Modes:** Letter Graded, Student Option- Letter/Credit, Pass/No Pass Grading

**Degree Applicability:** Applies to Associate Degree

**AA/AS GE:** A2

**Transfer Credit:** CSU, UC

**UC Credit Limitations:** No credit if taken after CHEM M07A or CHEM M07B

**CSU GE-Breadth:** B1, B3

**IGETC:** 5A, 5C

**CHEM M80 Internship in Chemistry 1-4 Units**

*In-Class Hours:* 60-240 unpaid cooperative, 75-300 paid cooperative

*Prerequisites:* Completion of or concurrent enrollment in one course in the discipline and instructor approval

Provides on-the-job learning to develop effective work habits, attitudes, and career awareness in paid or unpaid internships that are related to the discipline. Involves the development and documentation of learning objectives and the completion of an internship paper, presentation, or project. Includes both workplace supervisor and faculty adviser feedback and/or written evaluations. Course Credit Limitation: To take this course, contact the Career Transfer Center. Requires orientation session. Students receive one unit of credit for each 60 hours unpaid or 75 hours paid work. May enroll in up to 4 units a semester with a maximum of 16 total units of any type of work experience.

**Grade Modes:** Letter Graded, Student Option- Letter/Credit, Pass/No Pass Grading

**Repeatable for Credit:** Course may be taken up to 3 times for credit.

**Field Trips:** May be required

**Degree Applicability:** Applies to Associate Degree

**AA/AS GE:** None

**Transfer Credit:** CSU

**UC Credit Limitations:** None

**CSU GE-Breadth:** None

**IGETC:** None

**CHEM M122 Independent Study - Chemistry 0.5-3 Units**

*Formerly:* CHEM M22A

*In-Class Hours:* 26.25-157.5 laboratory

*Prerequisites:* Completion of one course in Chemistry and instructor approval

Allows independent study for students who wish to extend their knowledge of a particular area of Chemistry through research and study. Utilizes an approved independent project. Includes one-on-one work with instructor. Interested students should contact a Chemistry instructor for assistance in developing a contract for learning about a specific topic.

**Grade Modes:** Letter Graded, Student Option- Letter/Credit, Pass/No Pass Grading

**Field Trips:** May be required

**Degree Applicability:** Applies to Associate Degree

**AA/AS GE:** None

**Transfer Credit:** CSU

**UC Credit Limitations:** None

**CSU GE-Breadth:** None

**IGETC:** None

- Chemistry, Associate in Science for UC Transfer (<http://catalog.vcccd.edu/moorpark/programs-courses/chemistry/chemistry-uctp/>)
- Chemistry, Associate in Science (<http://catalog.vcccd.edu/moorpark/programs-courses/chemistry/chemistry-as/>)

## Dean

Robert Cabral, Phone (805) 378-1572

## Faculty

Vincent Crisostomo, Deanna Franke, Steve Joiner, Jennifer Mallory, Robert Keil, Tiffany Pawluk

## Counselors

Daniel Aguilar, Chuck Brinkman, Trevor Hess, Samantha Zaldivar