CHEMISTRY (CM-UY)

CM-UY 1 Pre-college Chemistry (0 Credits)
Typically offered not typically offered
The course covers mole concept and stoichiometry, gaseous molecular behavior, gas law equilibrium and Le Chatelaine's principle.
Grading: Ugrd Tandon Pass/Fail
Repeatable for additional credit: No

CM-UY 440 Polymer Chemistry (4 Credits)
This course introduces polymer chemistry. It covers the principles of various polymerization methods, characterization and physical chemistry of polymers. A laboratory is included. | Prerequisites: CM-UY 2214 and CM-UY 2514 or CM-UY 2614.
Grading: Ugrd Tandon Graded
Repeatable for additional credit: No

CM-UY 471X Guided Studies in Chemistry (1-4 Credits)
Typically offered occasionally
Special project (experimental, theoretical, computational or literature search). Maximum 6 credits (including the credits of BMS-UY 471X) count toward the degree requirements. | Prerequisite: adviser's approval; CM-UY 5040, if project involves experiments, and either CM-UY 1004 or CM-UY 1014.
Grading: Ugrd Tandon Graded
Repeatable for additional credit: Yes

CM-UY 1001 General Chemistry for Engineers Laboratory (1 Credit)
Typically offered Fall and Spring
This is a one-semester introductory laboratory course in general chemistry. It covers chemical equations, stoichiometry, thermodynamics, gases, atomic and molecular structure, periodic table, chemical bonding, states of matter, chemical equilibrium, organic, inorganic and polymeric materials and electrochemistry. It is a foundation course for most engineering and science majors. | Co-requisites: CM-UY 1003
Grading: Ugrd Tandon Graded
Repeatable for additional credit: No
Prerequisites: Co-requisites: CM-UY 1003.

CM-UY 1003 General Chemistry for Engineers (3 Credits)
Typically offered occasionally
This is a one-semester introductory lecture course in general chemistry. It covers chemical equations, stoichiometry, thermodynamics, gases, atomic and molecular structure, periodic table, chemical bonding, states of matter, chemical equilibrium, organic, inorganic and polymeric materials and electrochemistry. It is a foundation course for most engineering and science majors. | Corequisite: EX-UY 1
Grading: Ugrd Tandon Graded
Repeatable for additional credit: No
Corequisites: EX-UY 1.

CM-UY 1004H General Chemistry for Honors Engineers (4 Credits)
Typically offered not typically offered
A one-semester introductory course in general chemistry. Chemical equations, stoichiometry, thermodynamics, gases, atomic and molecular structure, periodic table, chemical bonding, states of matter, chemical equilibrium, organic, inorganic, polymeric materials and electrochemistry. A discussion of chemical innovations will be introduced where appropriate. | Corequisite(s): EX-UY 1, and must be in Honors Program
Grading: Ugrd Tandon Graded
Repeatable for additional credit: No

CM-UY 1011 General Chemistry Laboratory I (1 Credit)
Typically offered Fall
First half of a two-semester general chemistry laboratory course, covering chemical equations, stoichiometry, thermochemistry, properties of gases, atomic structure, periodic table, chemical bonding and molecular structure. It is a required course for all Biomolecular Science (BMS) majors and for all pre-med students. | Corequisites: CM-UY 1013
Grading: Ugrd Tandon Graded
Repeatable for additional credit: No

CM-UY 1013 GENERAL CHEMISTRY I (3 Credits)
Typically offered Fall
First half of a two-semester general chemistry course, covering chemical equations, stoichiometry, thermochemistry, properties of gases, atomic structure, periodic table, chemical bonding and molecular structure. It is a required course for all Biomolecular Science (BMS) majors and for all pre-med students. | Corequisite: EX-UY 1.
Grading: Ugrd Tandon Graded
Repeatable for additional credit: No
Corequisites: EX-UY 1.

CM-UY 1021 General Chemistry Laboratory II (1 Credit)
Typically offered Spring
Second half of a two-semester general chemistry laboratory course, covering thermodynamics, kinetics, atomic and molecular structure, chemical bonding, states of matter, chemical equilibrium, acid-base chemistry, organic chemistry, polymeric materials and electrochemistry. It is a required course for all Biomolecular Science (BMS) majors and for all pre-med students. | Prerequisites: CM-UY 1001 or CM-UY 1011; Co-requisites: CM-UY 1023
Grading: Ugrd Tandon Graded
Repeatable for additional credit: No

CM-UY 1023 General Chemistry II (3 Credits)
Typically offered Spring
Second half of a two-semester general chemistry course, covering chemical equations, stoichiometry, thermochemistry, properties of gases, atomic structure, periodic table, chemical bonding and molecular structure. It is a required course for all Biomolecular Science (BMS) majors and for all pre-med students. | Prerequisite: CM-UY 1013 or CM-UY 1003. Corequisite: EX-UY 1.
Grading: Ugrd Tandon Graded
Repeatable for additional credit: No
Prerequisites: CM-UY 1013 or CM-UY 1003.
Corequisites: EX-UY 1.

CM-UY 1032 INTRODUCTION TO BIOMOLECULAR SCIENCE (2 Credits)
Typically offered Spring
This is a one-semester overview course in chemistry, providing examples of important discoveries and important chemical innovators, with a strong emphasis on cutting-edge research. Field opportunities are developed to allow students to contribute to the discipline. | Prerequisite: Only first-year students are permitted to enroll in this introductory level course.
Grading: Ugrd Tandon Graded
Repeatable for additional credit: No

CM-UY 1034 General Chemistry for Computer Science (4 Credits)
Typically offered all terms
This is a one-semester introductory course in general chemistry. It covers chemical equations, stoichiometry, thermodynamics, gases, atomic and molecular structure, periodic table, chemical bonding, states of matter, chemical equilibrium, organic, inorganic and polymeric materials and electrochemistry. It is a foundation course for most engineering and science majors. Registration will be limited to online undergraduate CS students.
Grading: Ugrd Tandon Graded
Repeatable for additional credit: No

CM-UY 1101 Numerical Methods for Chemistry (1 Credit)
Typically offered Fall
This is a one-semester introductory course in numerical methods needed for BMS and CM courses. Students learn spreadsheet calculation, chart displays, curve fitting and good lab-record keeping. | Co-requisite: CM-UY 1014.
Grading: Ugrd Tandon Graded
Repeatable for additional credit: No

CM-UY 2102 MOLECULAR MODELING IN CHEMISTRY (2 Credits)
Typically offered Spring
This one-semester introductory course covers computer modeling of organic compounds. Students learn to use Chem Draw and Chem3D, standard applications in chemistry. | Prerequisites: CM-UY 1101, CM-UY 2213, Co-requisite: CM-UY 2223.
Grading: Ugrd Tandon Graded
Repeatable for additional credit: No

CM-UY 2211 ORGANIC CHEMISTRY LABORATORY I (1 Credit)
Typically offered Fall
This Laboratory course teaches students how to prepare, isolate and purify typical organic compounds. Experiments illustrate basic techniques. Lab fee required. | Co/prerequisite CM-UY 2213.
Grading: Ugrd Tandon Graded
Repeatable for additional credit: No

CM-UY 2213 ORGANIC CHEMISTRY I (3 Credits)
Typically offered Fall and Spring
This course covers chemistry of organic molecules: structure, nomenclature, properties and reactions of carbon compounds with emphasis on aliphatic compounds. It also introduces reaction mechanisms and stereochemistry. | Prerequisite: CM-UY 1004 or CM-UY 1024
Grading: Ugrd Tandon Graded
Repeatable for additional credit: No

CM-UY 2221 ORGANIC CHEMISTRY LABORATORY II (1 Credit)
Typically offered Spring
This laboratory stresses complex preparation, purification, characterization and identification of organic compounds by chemical and physical means. It introduces instrumental methods of analysis and identification. Lab fee required. | Prerequisite: CM-UY 2211, Co/prerequisite: CM-UY 2223.
Grading: Ugrd Tandon Graded
Repeatable for additional credit: No

CM-UY 2223 ORGANIC CHEMISTRY II (3 Credits)
Typically offered Fall and Spring
This course continues CM-UY 2213 and emphasizes finding the principles of organic chemistry in industrial practice and biochemical mechanisms. It introduces instrumental methods of analysis and identification. | Prerequisite: CM-UY 2213. Co-requisite EX-UY 1
Grading: Ugrd Tandon Graded
Repeatable for additional credit: No
Prerequisites: (CM-UY 2213 with a Minimum Grade of D OR CM-UY 2214 with a Minimum Grade of D).

CM-UY 2234 Industrial Organic Chemistry (4 Credits)
Typically offered occasionally
This course demonstrates the basic ideas of organic chemistry, using industrial processes and important commercial materials. It covers the petroleum-based foundations of organic materials and shows how these petroleum-derived molecules ultimately lead, via important chemical reactions and intermediates, to the commercial products produced by the chemical industry. The course demonstrates how the principles of organic chemistry are intertwined with the many changes that characterize the chemical industry. The material is couched in a historical context. | Prerequisite: CM-UY 1004 or equivalent.
Grading: Ugrd Tandon Graded
Repeatable for additional credit: No

CM-UY 2514 Chemical and Biological Equilibria (4 Credits)
Typically offered not typically offered
This course covers chemical thermodynamics with applications to solution, phase and chemical equilibria, as well as chemical and biological kinetics. | Prerequisites: CM-UY 1004 and MA-UY 1124 or MA-UY 1154 and PH-UY 1004.
Grading: Ugrd Tandon Graded
Repeatable for additional credit: No

CM-UY 3114 Inorganic Chemistry (4 Credits)
This course covers atomic structures of elements as the basis for periodic classification. Also covered is descriptive chemistry of elements and their compounds and theories of chemical bonds. Coordination chemistry is introduced. | Prerequisite: CM-UY 2514 or CM-UY 2614.
Grading: Ugrd Tandon Graded
Repeatable for additional credit: No

CM-UY 3314 Biochemistry I (4 Credits)
Typically offered Fall
This course surveys modern biochemistry and emphasizes current areas of research. Also covered are structure-function relationships in proteins; enzymes and their mechanisms of action; bioenergetics principles and energy production; and biochemical theories and techniques. | Prerequisites: CM-UY 2213 or CM-UY 2214 or CM-UY 2234 or instructor's permission.
Grading: Ugrd Tandon Graded
Repeatable for additional credit: No

CM-UY 3323 BIOCHEMISTRY II (3 Credits)
Typically offered Spring
This course is a continuation of Biochemistry I, focusing on cellular metabolism, including metabolism of proteins/amino acids, lipids and carbohydrates. We will also cover the basic principle of hormone regulation and biochemistry of nutrition. | Prerequisites: CM-UY 3314 or instructor's/advisor's permission
Grading: Ugrd Tandon Graded
Repeatable for additional credit: No

CM-UY 3324 Biochemistry II (4 Credits)
Typically offered Spring
This course continues Biochemistry I. It covers principles of intermediary metabolism: energetic membrane structure and transport; structure and function of DNA and RNA; principles of molecular biology; the immune system; and hormonal regulation and cancer. | Prerequisite: CM-UY 3314 or instructor's permission.
Grading: Ugrd Tandon Graded
Repeatable for additional credit: No

CM-UY 3334 BIOCHEMISTRY FOR ENGINEERS (4 Credits)
Typically offered Fall
This course is aimed at familiarizing engineering students with basic principles of biochemistry with emphasis placed on the relationship between chemical structure and function of major classes of biomolecules in the living cell. The chemistry underlying a number of key cellular processes will be covered in some detail. Also, some industrial and/or biomedical applications of, for example, enzymes will be briefly discussed. | Prerequisite: CM-UY 2213 and CM-UY 2614 or instructor's/advisor's permission
Grading: Ugrd Tandon Graded
Repeatable for additional credit: No
Prerequisites: CM-UY 2213 or instructor's/advisor's permission.

CM-UY 3514 Analytical Chemistry (4 Credits)
Typically offered Spring
This course covers theories and applications of instrumentation techniques in modern analytical chemistry, including spectroscopy (UVVIS absorption, infrared absorption, fluorescence, Raman scattering, nuclear magnetic resonance), chromatography (gas, liquid) and other techniques (mass spectroscopy, electrophoresis). The accompanying laboratory part focuses on practical skills. | Prerequisite: CM-UY 2514 or CM-UY 2614.
Grading: Ugrd Tandon Graded
Repeatable for additional credit: No

CM-UY 3614 Physical Chemistry II (4 Credits)
Typically offered occasionally
This course covers chemical kinetics and molecular structures and interactions and their relationship to the bulk properties of matter. The laboratory component introduces the experimental quantitative methods of analytical and physical chemistry, including volumetric, calorimetric and optical techniques. Also covered are computer analysis of data and report writing. | Prerequisite: CM-UY 2514 or CM-UY 2614.
Grading: Ugrd Tandon Graded
Repeatable for additional credit: No

CM-UY 3714 Physical Chemistry I (4 Credits)
Typically offered Spring
This course provides a molecular approach to physical chemistry. The course covers quantum mechanics and its applications to atomic and molecular structure and to molecular spectroscopy. An introduction to statistical thermodynamics is also covered. | Prerequisites: (CM-UY 1003 or CM-UY 1023) and (MA-UY 1124 or MA-UY 1154) and PH-UY 1013.
Grading: Ugrd Tandon Graded
Repeatable for additional credit: No

CM-UY 3714G Physical Chemistry I (4 Credits)
This course provides a molecular approach to physical chemistry. The course covers quantum mechanics and its applications to atomic and molecular structure and to molecular spectroscopy. An introduction to statistical thermodynamics is also covered. | Prerequisites: (CM-UY 1003 or CM-UY 1023) and (MA-UY 1124 or MA-UY 1154) and PH-UY 1013.
Grading: Ugrd Tandon Graded
Repeatable for additional credit: No

CM-UY 4011 INFORMATION SOURCES FOR THE CHEMICAL SCIENCES (1 Credit)
Typically offered Spring
This hands-on course introduces methods and tools for searching. It includes both electronic (CD-ROM and online) and print databases. Students may emphasize topics related to their research. Required of all BS students in biomolecular science.
Grading: Ugrd Tandon Graded
Repeatable for additional credit: No

CM-UY 4314 Biomaterials (4 Credits)
Typically offered occasionally
This course covers natural macromolecules, including polypeptides, polysaccharides, lignin, biodegradable polymers and special characterizations of these biopolymers. | Prerequisite: CM-UY 4414 or CM-UY 4413.
Grading: Ugrd Tandon Graded
Repeatable for additional credit: No

CM-UY 4413 Polymer Science (3 Credits)
Typically offered Fall
This course provides a broad perspective of polymer science and its application in everyday life. The course has three major components: a survey of polymers, polymer synthesis and aspects of polymer physics. | Prerequisites: CM-UY 2214 and CM-UY 2614 or CM-UY 2514.
Grading: Ugrd Tandon Graded
Repeatable for additional credit: No

CM-UY 4414 Polymer Chemistry (4 Credits)
Typically offered occasionally
This course introduces polymer chemistry. It covers the principles of various polymerization methods, characterization and physical chemistry of polymers. A laboratory is included. | Prerequisites: CM-UY 2214 and CM-UY 2514 or CM-UY 2614.
Grading: Ugrd Tandon Graded
Repeatable for additional credit: No

CM-UY 4811 SPECIAL TOPICS IN CHEMISTRY (1 Credit)
Typically offered Spring
This course covers topics of special interest in Chemistry to promote students' exposure to new and emerging technologies that are not covered in the regular program's course offerings. | Prerequisite: Advisor's Approval
Grading: Ugrd Tandon Graded
Repeatable for additional credit: Yes

CM-UY 4812 SPECIAL TOPICS IN CHEMISTRY (2 Credits)
Typically offered Spring
This course covers topics of special interest in Chemistry to promote students' exposure to new and emerging technologies that are not covered in the regular program's course offerings. | Prerequisite: Advisor's Approval
Grading: Ugrd Tandon Graded
Repeatable for additional credit: Yes

CM-UY 4813 SPECIAL TOPICS IN CHEMISTRY (3 Credits)
Typically offered Spring
This course covers topics of special interest in Chemistry to promote students' exposure to new and emerging technologies that are not covered in the regular program's course offerings. | Prerequisite: Advisor's Approval
Grading: Ugrd Tandon Graded
Repeatable for additional credit: Yes

CM-UY 4814 SPECIAL TOPICS IN CHEMISTRY (4 Credits)
Typically offered Spring
This course covers topics of special interest in Chemistry to promote students' exposure to new and emerging technologies that are not covered in the regular program's course offerings. | Prerequisite: Advisor's Approval
Grading: Ugrd Tandon Graded
Repeatable for additional credit: Yes

CM-UY 4914 UNDERGRAD RESEARCH IN CHEMISTRY (4 Credits)
In this course, students conduct original investigations guided by staff members. Careful literature research is required before laboratory work starts. Continued reference to chemical literature is expected as well as active participation in conferences and seminars, both of which are scheduled as work progresses. A written report is required. Fulltime students are expected to register for 8 credits of thesis during senior year. A research (lab) fee is required. | Prerequisites: CM-GY 5011 and CM-GY 5040.
Grading: Ugrd Tandon Graded
Repeatable for additional credit: No

CM-UY 4924 UNDERGRADUATE RESEARCH IN CHEMISTRY (4 Credits)
Typically offered occasionally
In this course, students conduct original investigations guided by staff members. Careful literature research is required before laboratory work starts. Continued reference to chemical literature is expected as well as active participation in conferences and seminars, both of which are scheduled as work progresses. A written report is required. Fulltime students are expected to register for 8 credits of thesis during senior year. A research (lab) fee is required. | Prerequisites: CM-GY 5011 and CM-GY 5040.
Grading: Ugrd Tandon Graded
Repeatable for additional credit: No