CHM: Chemistry Courses

Courses

CHM 1020 Concepts in Chemistry
College of Sci and Engineering, Department of Chemistry

3 sh (may not be repeated for credit)

This course provides students with an introduction to chemical principles and applications for the non-science major. Students will engage in problem solving and critical thinking while applying chemical concepts. Topics will include the scientific method of problem solving, classification of matter, atomic theory, the periodic table, gases, chemical reactions, energy, and chemical bonds. Meets General Education requirement in Natural Sciences.

CHM 1905 Directed Study
College of Sci and Engineering, Department of Chemistry

1-12 sh (may be repeated indefinitely for credit)

CHM 2030 General Chemistry 1 for Laboratory Health Sciences
College of Sci and Engineering, Department of Chemistry

3 sh (may not be repeated for credit)
Prerequisite: MAC 1105 OR MAC 1105C OR MAC 1140 OR MAC 2311

This course serves as an introduction to chemical and physical properties, relationship between observables and concepts and the development of a theoretical framework as these relate to Laboratory Health Sciences. Topics covered include atomic and molecular structure, theories of bonding, properties of the elements and periodicity. This course cannot be used to replace CHM 2045.

CHM 2031 General Chemistry 2 for Laboratory Health Sciences
College of Sci and Engineering, Department of Chemistry

3 sh (may not be repeated for credit)
Prerequisite: CHM 2030 OR CHM 2045

Continuation of General Chemistry 1 for Laboratory Health Sciences with emphasis on chemical calculations and problem-solving as they relate to Laboratory Health Sciences. Topics include thermodynamics, equilibria, kinetics, and an introduction to transition metal complexes. This course cannot be used to replace CHM 2046.

CHM 2045 General Chemistry I
College of Sci and Engineering, Department of Chemistry

3 sh (may not be repeated for credit)
Prerequisite: MAC 1105 OR MAC 1105C OR MAC 1114* OR MAC 1147* OR MAC 2311*

This course is designed for students pursuing careers in the sciences or who need a more rigorous presentation of chemical concepts than is offered in an introductory course. Students will engage in problem solving and critical thinking while applying chemical concepts. Topics will include the principles of chemistry including atomic theory, electronic and molecular structure, measurement, stoichiometry, bonding, periodicity, thermochemistry, nomenclature, solutions, and the properties of gases. A grade of "C-" or higher is required in prerequisite courses. Meets General Education requirement in Natural Sciences.

CHM 2045L General Chemistry I Laboratory
College of Sci and Engineering, Department of Chemistry

1 sh (may not be repeated for credit)
Prerequisite: CHM 2045*

Introduction to laboratory safety, experimental techniques, graphing of data, chemical reactivity and separations, calorimetry and volumetric analysis. Material and supply fee will be assessed. Students taking CHM 2045 concurrently are required to withdraw from CHM 2045L if they withdraw from CHM 2045. A grade of "C-" or higher is required in prerequisite courses.

CHM 2046 General Chemistry II
College of Sci and Engineering, Department of Chemistry

3 sh (may not be repeated for credit)
Prerequisite: CHM 2045/L

Continuation of CHM 2045 with emphasis on chemical calculations and problem solving. Topics include thermodynamics, equilibria, kinetics and an introduction to transition metal complexes. A grade of "C-" or higher is required in prerequisite courses. Meets General Education requirement in Natural Sciences.

CHM 2046L General Chemistry II Laboratory
College of Sci and Engineering, Department of Chemistry

1 sh (may not be repeated for credit)
Prerequisite: CHM 2045L AND CHM 2046*

Experiments based on colligative properties, qualitative analysis, solution equilibria, kinetics, electrochemistry, radioactivity and synthesis. Material and supply fee will be assessed. Students taking CHM 2046 concurrently are required to withdraw from CHM 2046L if they withdraw from CHM 2046. A grade of "C-" or higher is required in prerequisite courses.

CHM 2202 Organic Chemistry for Laboratory Health Sciences
College of Sci and Engineering, Department of Chemistry

3 sh (may not be repeated for credit)
Prerequisite: CHM 2046 OR CHM 2031

This course is a continuation of Organic Chemistry for MLS and covers topics related to nomenclature, structure, fundamental reactions, mechanistic interpretation of reactions, and spectroscopy. Nucleophilic and electrophilic substitution reactions, additions, eliminations, redox and rearrangement reactions, carbohydrates, amino acids, peptides, isoprenoids. The lecture is only for MLS students and require MLS approval for enrollment. This course does not cover the same content as CHM 2210/L and can not be used as a substitute.

CHM 2202L Organic Chemistry Lab for MLS
College of Sci and Engineering, Department of Chemistry

1 sh (may not be repeated for credit)
Prerequisite: CHM 2046L AND CHM 2202*

This course provides an introduction to virtual laboratory techniques in Organic Chemistry specifically for Medical Lab Science (MLS) students. The lecture and lab are only for MLS students and require MLS department approval for enrollment. This course does not cover the same content as CHM 2210/L and can not be used as a substitute.

CHM 2210 Organic Chemistry I
College of Sci and Engineering, Department of Chemistry

3 sh (may not be repeated for credit)
Prerequisite: CHM 2046

Nomenclature, structure, fundamental reactions, mechanistic interpretation of reactions, and spectroscopy.

CHM 2210L Organic Chemistry I Laboratory
College of Sci and Engineering, Department of Chemistry

1 sh (may not be repeated for credit)
Prerequisite: CHM 2046L AND CHM 2210*

Introduction to laboratory techniques in Organic Chemistry. Isolation, purification, and synthesis. Material and supply fee will be assessed. Students taking CHM 2210 concurrently are required to withdraw from CHM 2210L if they withdraw from CHM 2210. A grade of "C-" or higher is required in prerequisite courses.

CHM 2211 Organic Chemistry II
College of Sci and Engineering, Department of Chemistry

3 sh (may not be repeated for credit)
Prerequisite: CHM 2210

Nucleophilic and electrophilic substitution reactions, additions, eliminations, redox and rearrangement reactions, carbohydrates, amino acids, peptides, isoprenoids. A grade of "C-" or higher is required in prerequisite courses.

CHM 2211L Organic Chemistry II Lab
College of Sci and Engineering, Department of Chemistry

1 sh (may not be repeated for credit)
Prerequisite: CHM 2210/L AND CHM 2211*

Multistep synthesis, separation of mixtures, identification of unknown organic compounds by classical and spectroscopic techniques. Material and supply fee will be assessed. Students taking CHM 2211 concurrently are required to withdraw from CHM 2211L if they withdraw from CHM 2211. A grade of "C-" or higher is required in prerequisite courses.

CHM 2933 STEMinar
College of Sci and Engineering, Department of Chemistry

0 sh (may be repeated indefinitely for credit)

Seminar course for STEM Scholars and STEM LLC residents.

CHM 3120 Analytical Chemistry
College of Sci and Engineering, Department of Chemistry

3 sh (may not be repeated for credit)
Prerequisite: CHM 2045 AND CHM 2046

Fundamentals of quantitative chemical analysis; introduction to modern techniques. Material and supply fee will be assessed for corresponding lab. 8 sh of general chemistry required. A grade of "C-" or higher is required in prerequisite courses.

CHM 3120L Analytical Chemistry Lab
College of Sci and Engineering, Department of Chemistry

1 sh (may not be repeated for credit)
Prerequisite: CHM 2046L AND CHM 3120*

Fundamentals of quantitative chemical analysis; introduction to modern techniques. Material and Supply Fee will be assessed. 8 sh of general chemistry required. A grade of "C-" or better is required in the prerequisite.

CHM 3230 Organic Chemistry III
College of Sci and Engineering, Department of Chemistry

3 sh (may not be repeated for credit)
Prerequisite: CHM 2210/L AND CHM 2211/L*

Focuses on spectroscopic techniques used to understand the structure of molecules, stereochemistry and stereoselective syntheses. While most examples will arise from organic chemistry, structures of selected organometallics and inorganic complexes will be discussed. Concepts of resonance and aromaticity are presented as they impact on the structure of molecules. Use of Molecular Mechanics calculations is introduced. 8 sh of organic chemistry required. A grade of "C-" or higher is required in prerequisite courses.

CHM 3400C Basic Physical Chemistry
College of Sci and Engineering, Department of Chemistry

4 sh (may not be repeated for credit)
Prerequisite: ((CHM 2211/L AND MAC 2312)) AND (PHY 2054/L OR PHY 2049/L)

A survey of the principles of Structure, Equilibrium, and Dynamics, applied to chemical systems. Includes experiments and other hands-on learning experiences.

CHM 3410 Physical Chemistry I
College of Sci and Engineering, Department of Chemistry

5 sh (may not be repeated for credit)
Prerequisite: CHM 2211 AND MAC 2312 AND PHY 2049/L*

Properties of gases, kinetic theory, chemical thermodynamics, heterogeneous equilibria, electrochemistry. A grade of "C-" or higher is required in prerequisite courses.

CHM 3411 Physical Chemistry II
College of Sci and Engineering, Department of Chemistry

4 sh (may not be repeated for credit)
Prerequisite: CHM 3410

Atomic, molecular structure, spectroscopy, introduction to quantum theory and statistical mechanics. A grade of "C-" or higher is required in prerequisite courses.

CHM 3740L Advanced Laboratory Techniques
College of Sci and Engineering, Department of Chemistry

2 sh (may not be repeated for credit)
Prerequisite: CHM 2211L AND CHM 3230*

Experimental work including advanced laboratory techniques for the synthesis and purification of organic, organometallic and inorganic complexes. Training in the use of instrumentation (chromatographic techniques, NMR, GC / MS, IR, UV-Vis, ORD / CD, etc.) for the purification and characterization of these materials. Students will be introduced to the use of the chemical literature, as well as record keeping and report writing. Material and supply fee will be assessed.

CHM 3741L Physical Chemistry Laboratory
College of Sci and Engineering, Department of Chemistry

2 sh (may not be repeated for credit)
Prerequisite: CHM 3410 AND CHM 3411* AND CHM 3740L

Several experiments will be performed to illustrate various aspects of Physical Chemistry. Material and supply fee will be assessed.

CHM 3801 Responsible Conduct of Research
College of Sci and Engineering, Department of Chemistry

1 sh (may not be repeated for credit)

A wide range of topics will be discussed, including (but not limited to) mentoring, authorship and peer review, ownership and professional standards of data of data collection, handling, and analysis, use of animals and humans in research, and conflict of interest.

CHM 3805 RCR Ethics, Rigor, Data Reproducibility
College of Sci and Engineering, Department of Chemistry

2 sh (may not be repeated for credit)

A wide range of topics will be discussed, including (but not limited to) mentoring, authorship and peer review, ownership and professional standards of data of data collection, handling, and analysis, use of animals and humans in research, and conflict of interest.

CHM 3905 Directed Study
College of Sci and Engineering, Department of Chemistry

1-12 sh (may be repeated indefinitely for credit)

CHM 3940 Chemistry Internship
College of Sci and Engineering, Department of Chemistry

1 sh (may not be repeated for credit)

Placement in an appropriate chemical company for the purposes of gaining some experience in the field. Faculty and agency personnel will supervise as the student participates in a wide range of services available in the setting. Goals and objectives will be planned by the student, instructor and agency supervisor. Reports will be required on a regular basis with a final report. Graded on a Satisfactory/ Unsatisfactory basis only. Permission is required.

CHM 4130 Instrumental Analysis
College of Sci and Engineering, Department of Chemistry

3 sh (may be repeated for up to 4 sh of credit)
Prerequisite: (CHM 3120) AND (CHM 3400C OR CHM 3411)

Physical chemical methods of chemical analysis. Required lab. Material and Supply Fee will be assessed for corresponding lab. A grade of "C-" or higher is required in prerequisite courses. Offered concurrently with CHM 5134; graduate students will be assigned additional work.

CHM 4130L Instrumental Analysis lab
College of Sci and Engineering, Department of Chemistry

1 sh (may not be repeated for credit)
Prerequisite: (CHM 3120) AND (CHM 3400C OR CHM 3411) AND (CHM 3120L)
Co-requisite: CHM 4130

Corresponding lab for Instrumental Analysis lab.

CHM 4455 Introduction to Polymer Science
College of Sci and Engineering, Department of Chemistry

2 sh (may not be repeated for credit)
Prerequisite: ((CHM 2210/L AND CHM 2211/L)) AND (CHM 3400C OR CHM 3410)
Co-requisite: CHM 4455L

Intended to introduce students to some of the major concepts Polymer Science: An Introduction to Macromolecules - Terms and Definitions; Structure and Bonding in Polymers; Step Growth Polymerization; Chain Growth Polymerization; Ionic Polymerization and Living Polymers; Copolymers; Chain Configurations, the Theta State and Chi Parameter; The Glass Transition Temperature; Biological Polymers; and Plastics Recycling.

CHM 4455L Introduction to Polymer Science Laboratory
College of Sci and Engineering, Department of Chemistry

1 sh (may not be repeated for credit)
Prerequisite: ((CHM 2210/L AND CHM 2211/L)) AND (CHM 3400C OR CHM 3410)
Co-requisite: CHM 4455

Laboratory to accompany CHM 4455. Will provide fundamental laboratory skills in polymer synthesis and analysis. Material and supply fee will be assessed.

CHM 4610L Inorganic Synthesis
College of Sci and Engineering, Department of Chemistry

1 sh (may not be repeated for credit)
Prerequisite: (CHM 3741L OR CHM 3400C) AND (CHM 3740L)
Co-requisite: CHM 4611

Modern techniques in the synthesis, separation, purification and characterization of inorganic compounds. Material and Supply fee will be assessed.

CHM 4611 Inorganic Chemistry
College of Sci and Engineering, Department of Chemistry

4 sh (may not be repeated for credit)
Prerequisite: CHM 3400C OR CHM 3411

The structure, reactivity, kinetics and reaction mechanisms of inorganic and organometallic compounds.

CHM 4905 Directed Study
College of Sci and Engineering, Department of Chemistry

1-12 sh (may be repeated indefinitely for credit)

CHM 4912 Undergraduate Chemistry Research
College of Sci and Engineering, Department of Chemistry

1-4 sh (may be repeated for up to 12 sh of credit)
Prerequisite: ((CHM 2211L AND MAC 2312)) AND (PHY 2049L OR PHY 2054L)

Undergraduate research is conducted with a faculty advisor or mentor. The student's research project is typically based on the faculty mentor's research interests. The mentor meets regularly with the student to make research plans, assess risks associated with the proposed research, and review results. The student is encouraged to take primary responsibility for the project and to make substantial input into its direction. A formal written report or thesis is required upon completion of the course. Permission is required.

CHM 4930 Seminar: Special Topics in Advanced Chemistry
College of Sci and Engineering, Department of Chemistry

3-4 sh (may be repeated for up to 12 sh of credit)
Prerequisite: CHM 3400C OR CHM 3411

Will focus on advanced topics in chemistry that will extend the knowledge learned in the core chemistry courses. Specific topic will vary depending on instructor. Offered concurrently with CHM 5932; graduate students will be assigned additional work.

CHM 4931 Seminars in Chemistry
College of Sci and Engineering, Department of Chemistry

3 sh (may not be repeated for credit)
Prerequisite: CHM 2211

The course will include seminars by visiting scientists, university faculty and students on current research in chemistry, as well as scientific literacy, professional ethics, hazard waste regulations, resume writing, data management, responsible conduct in research, national certification on chemical safety, components of professional/ graduate school applications and presentation skills.

* This course may be taken prior to or during the same term.