

Chemistry

Chairperson: Adam Fiedler, Ph.D.

Department of Chemistry website (<http://www.marquette.edu/chem/>)

The Marquette University Chemistry Department offers several areas of study with outstanding facilities and research opportunities for undergraduate students interested in pursuing careers related to chemistry or biochemistry. Three different majors are available: Chemistry, Biochemistry/Molecular Biology (jointly with Biological Sciences) and Chemistry and Science Education (for students enrolled in the College of Education or as a secondary major). Students majoring in Chemistry can apply for the Disciplinary Honors Program in Chemistry, which provides experiential learning opportunities, such as independent research, internships, research-based laboratory courses and accompanying seminars. A minor in chemistry is also available.

The chemistry major offers five distinct concentrations, each of which leads to a Bachelor of Science degree: American Chemical Society Certified, Chemistry of Materials, Energy and the Environment, Medicinal Chemistry/Pre-pharmacy, and Forensic Chemistry. Each concentration requires 23 credits of core chemistry course work and 8 credits of cognates in Physics along with 29-38 credits of additional course work depending on the concentration chosen.

Through course and laboratory work, we emphasize developing the whole scientist. This prepares students for many fields, including research and development, chemistry, dental and medical careers, pharmacy, business, technical sales and marketing, law and education.

In addition, together with the Graduate School of Management, the Department of Chemistry offers a five-year B.S./M.B.A. accelerated degree program.

- Chemistry and Science Education Grades 4-12, Major (<https://bulletin.marquette.edu/arts-sciences/chemistry/chemistry-education/>)
- Chemistry, BS (<https://bulletin.marquette.edu/arts-sciences/chemistry/chemistry-bs/>)
- Chemistry, Minor (<https://bulletin.marquette.edu/arts-sciences/chemistry/chemistry-minor/>)

Graduate Programs

- Chemistry, MS (<https://bulletin.marquette.edu/graduate/chemistry-ms/>)
- Chemistry, PHD (<https://bulletin.marquette.edu/graduate/chemistry-phd/>)

CHEM 1000 Essentials of Chemistry (0-1 credits)

The study of chemistry is central to many fields and disciplines, and general college chemistry (i.e. CHEM 1001/1002) is a necessary pre-requisite for many STEM (Science, Technology, Engineering and Mathematics) majors. The goal is to develop the chemical concepts, scientific reasoning, critical thinking skills and study habits needed to succeed in CHEM 1001/1002.; previous or subsequent enrollment in CHEM 1001; students who have completed CHEM 1001 with a grade of C or better are not eligible to enroll in CHEM 1000.

Prerequisite: Cons. of dept.

Level of Study: Undergraduate

Last four terms offered: 2022 Fall Term, 2021 Fall Term, 2020 Fall Term, 2019 Fall Term

Schedule of Classes (<https://bulletin.marquette.edu/class-search/?details&code=CHEM%201000>)

CHEM 1001 General Chemistry 1 (4 credits)

Introductory college chemistry. Fundamental principles of chemistry including stoichiometry, physical states of matter, energy relationships, periodic table, atomic and molecular structure and solutions. The following mathematical concepts are used in CHEM 1001 and CHEM 1002: Scientific notation, logarithms, the quadratic equation and proportionality. 3 hrs. lec., 3 hrs. lab., 1 hr. disc.

Level of Study: Undergraduate

Last four terms offered: 2023 Summer Term, 2023 Spring Term, 2022 Fall Term, 2022 Summer Term

Schedule of Classes (<https://bulletin.marquette.edu/class-search/?details&code=CHEM%201001>)

CHEM 1001H Honors General Chemistry 1 (4 credits)

Introductory college chemistry. Fundamental principles of chemistry including stoichiometry, physical states of matter, energy relationships, periodic table, atomic and molecular structure and solutions. The following mathematical concepts are used in CHEM 1001H and CHEM 1002H: Scientific notation, logarithms, the quadratic equation and proportionality. As an Honors Program course, includes a more intensive research or project component. 3 hrs. lec., 3 hrs. lab., 1 hr. disc.

Prerequisite: Admission to Marquette University Honors Program.

Level of Study: Undergraduate

Last four terms offered: 2022 Fall Term, 2021 Fall Term, 2020 Fall Term, 2019 Fall Term

Schedule of Classes (<https://bulletin.marquette.edu/class-search/?details&code=CHEM%201001H>)

CHEM 1002 General Chemistry 2 (4 credits)

Continuation of CHEM 1001. Chemistry of metals and nonmetals, kinetics, chemical equilibrium, aqueous equilibria, free energy relationships, electrochemistry, nuclear chemistry, organic chemistry, and chemistry of the transition metals. Qualitative analysis included as part of the laboratory work. 3 hrs. lec., 3 hrs. lab., 1 hr. disc.

Prerequisite: CHEM 1001 or 1013.

Level of Study: Undergraduate

Marquette Core Curriculum: NSM Basic Needs & Justice

Last four terms offered: 2023 Summer Term, 2023 Spring Term, 2022 Fall Term, 2022 Summer Term

Schedule of Classes (<https://bulletin.marquette.edu/class-search/?details&code=CHEM%201002>)

CHEM 1002H Honors General Chemistry 2 (4 credits)

Continuation of CHEM 1001 or CHEM 1001H. Chemistry of metals and nonmetals, kinetics, chemical equilibrium, aqueous equilibria, free energy relationships, electrochemistry, nuclear chemistry, organic chemistry, and chemistry of the transition metals. Qualitative analysis included as part of the laboratory work. As an Honors Program course, includes a more intensive research or project component. 3 hrs. lec., 3 hrs. lab., 1 hr. disc.

Prerequisite: CHEM 1001 or CHEM 1001H and admission to Marquette University Honors Program.

Level of Study: Undergraduate

Marquette Core Curriculum: NSM Basic Needs & Justice

Last four terms offered: 2023 Spring Term, 2022 Spring Term, 2021 Spring Term, 2020 Spring Term

Schedule of Classes (<https://bulletin.marquette.edu/class-search/?details&code=CHEM%201002H>)

CHEM 1013 General Chemistry 1 for Majors (4 credits)

Introductory college chemistry, designed for students majoring in the natural sciences. Fundamental principles of chemistry including stoichiometry, physical states of matter, energy relationships, periodic table, atomic and molecular structure and solutions. The following mathematical concepts are used: Scientific notation, logarithms, the quadratic equation and proportionality. 3 hrs. lec., 3 hrs. lab. Students cannot receive credit for both CHEM 1001 and CHEM 1013.

Level of Study: Undergraduate

Last four terms offered: 2022 Fall Term, 2021 Fall Term, 2020 Fall Term, 2019 Fall Term

Schedule of Classes (<https://bulletin.marquette.edu/class-search/?details&code=CHEM%201013>)

CHEM 1013H Honors General Chemistry 1 for Majors (4 credits)

Introductory college chemistry, designed for students majoring in the natural sciences. Fundamental principles of chemistry including stoichiometry, physical states of matter, energy relationships, periodic table, atomic and molecular structure and solutions. The following mathematical concepts are used: Scientific notation, logarithms, the quadratic equation and proportionality. As an Honors Program course, includes a more intensive research or project component. 3 hrs. lec., 3 hrs. lab. Students cannot receive credit for both CHEM 1001 and CHEM 1013.

Prerequisite: Admission to Marquette University Honors Program.

Level of Study: Undergraduate

Last four terms offered: 2022 Fall Term, 2021 Fall Term, 2020 Fall Term, 2019 Fall Term

Schedule of Classes (<https://bulletin.marquette.edu/class-search/?details&code=CHEM%201013H>)

CHEM 1014 General Chemistry 2 for Majors (4 credits)

Continuation of CHEM 1001 or 1013. Intended for students majoring in the natural sciences. Emphasis in the lecture is on kinetics, equilibrium, electrochemistry, nuclear chemistry, symmetry in coordination and organic chemistry, and industrial processes as applied from thermodynamic principles. The laboratory consists of experiments designed to correlate with lecture; introduction of some research-grade instrumentation is given. 3 hrs. lec., 3 hrs. lab. Students cannot receive credit for both CHEM 1002 and CHEM 1014.

Prerequisite: CHEM 1001 or CHEM 1013.

Level of Study: Undergraduate

Marquette Core Curriculum: NSM Expanding Our Horizons

Last four terms offered: 2023 Spring Term, 2022 Spring Term, 2021 Spring Term, 2020 Spring Term

Schedule of Classes (<https://bulletin.marquette.edu/class-search/?details&code=CHEM%201014>)

CHEM 1014H Honors General Chemistry 2 for Majors (4 credits)

Continuation of CHEM 1001 or 1013. Intended for students majoring in the natural sciences. Emphasis in the lecture is on kinetics, equilibrium, electrochemistry, nuclear chemistry, symmetry in coordination and organic chemistry, and industrial processes as applied from thermodynamic principles. The laboratory consists of experiments designed to correlate with lecture; introduction of some research-grade instrumentation is given. As an Honors Program course, includes a more intensive research or project component. 3 hrs. lec., 3 hrs. lab. Students cannot receive credit for both CHEM 1002 and CHEM 1014.

Prerequisite: CHEM 1001 or CHEM 1001H or CHEM 1013H and admission to Marquette University Honors Program.

Level of Study: Undergraduate

Last four terms offered: 2023 Spring Term, 2022 Spring Term, 2021 Spring Term, 2020 Spring Term

Schedule of Classes (<https://bulletin.marquette.edu/class-search/?details&code=CHEM%201014H>)

CHEM 1021 CHEM 1001 Laboratory Only (1 credits)

Designed to provide students with a formal course number in which they may register for a laboratory in CHEM 1001 (first semester general chemistry), without taking lecture or discussion.

Prerequisite: Cons. of dept. ch.

Level of Study: Undergraduate

Last four terms offered: 2023 Spring Term, 2022 Fall Term, 2020 Fall Term, 2018 Fall Term

Schedule of Classes (<https://bulletin.marquette.edu/class-search/?details&code=CHEM%201021>)

CHEM 1022 CHEM 1002 Laboratory Only (1 credits)

Designed to provide students with a formal course number in which they may register for a laboratory in CHEM 1002 (second semester general chemistry), without taking lecture or discussion.

Prerequisite: Cons. of dept. ch.

Level of Study: Undergraduate

Last four terms offered: 2023 Spring Term, 2017 Spring Term, 2015 Summer Term, 2015 Spring Term

Schedule of Classes (<https://bulletin.marquette.edu/class-search/?details&code=CHEM%201022>)

CHEM 1031 CHEM 1001 Lecture Only (3 credits)

Designed to provide students with a formal course number in which they may register for a lecture in CHEM 1001 (first semester general chemistry), without taking laboratory.

Prerequisite: Cons. of dept. ch.

Level of Study: Undergraduate

Last four terms offered: 2020 Fall Term, 2018 Fall Term, 2017 Fall Term, 2017 Summer Term

Schedule of Classes (<https://bulletin.marquette.edu/class-search/?details&code=CHEM%201031>)

CHEM 1032 CHEM 1002 Lecture Only (3 credits)

Designed to provide students with a formal course number in which they may register for a lecture in CHEM 1002 (second semester general chemistry), without taking laboratory.

Prerequisite: Cons. of dept. ch.

Level of Study: Undergraduate

Last four terms offered: 2023 Spring Term, 2019 Fall Term, 2018 Fall Term, 2018 Summer Term

Schedule of Classes (<https://bulletin.marquette.edu/class-search/?details&code=CHEM%201032>)

CHEM 1080 Chemistry in the World (4 credits)

Introduction to chemical concepts and their applications in the world, with focus on applications in energy, the environment, air and water pollution, agriculture, food and drug development. Intended for non-science majors. 3 hrs. lecture, 2 hrs. lab.

Level of Study: Undergraduate

Interdisciplinary Studies: Environmental Ethics, Environmental Studies

Last four terms offered: 2019 Spring Term, 2017 Spring Term, 2016 Spring Term, 2014 Spring Term

Schedule of Classes (<https://bulletin.marquette.edu/class-search/?details&code=CHEM%201080>)

CHEM 2111 Organic Chemistry 1 (4 credits)

Modern theories of bonding, stereochemistry, synthesis and reaction mechanism. The chemistry of aliphatic hydrocarbons and their functional group derivatives. Laboratory: basic organic manipulations such as distillation, recrystallization, including simple synthesis. 3 hrs. lec., 4 hrs. lab., 1 hr. disc.

Prerequisite: CHEM 1002 or CHEM 1014.

Level of Study: Undergraduate

Last four terms offered: 2023 Summer Term, 2023 Spring Term, 2022 Fall Term, 2022 Summer Term

Schedule of Classes (<https://bulletin.marquette.edu/class-search/?details&code=CHEM%202111>)

CHEM 2112 Organic Chemistry 2 (4 credits)

Continuation of CHEM 2111. Extension of the chemistry of the remaining mono and polyfunctional, and aromatic compounds. Bonding, stereochemistry, mechanisms, synthesis, applied spectroscopy, heterocycles and natural products. Laboratory: synthesis, instrumental application, organic qualitative analysis. 3 hrs. lec., 4 hrs. lab., 1 hr. disc.

Prerequisite: CHEM 2111 or CHEM 2113.

Level of Study: Undergraduate

Last four terms offered: 2023 Summer Term, 2023 Spring Term, 2022 Summer Term, 2022 Spring Term

Schedule of Classes (<https://bulletin.marquette.edu/class-search/?details&code=CHEM%202112>)

CHEM 2113 Organic Chemistry for Majors 1 (4 credits)

Intended to be taken by chemistry majors, honors students, and other interested science majors. Principles of bonding, stereochemistry, mechanisms, kinetics, and spectrometry applied to aliphatic and aromatic hydrocarbons and simple monofunctional organic molecules. Laboratory: modern techniques using research instruments. 3 hrs. lec., 1 hr. disc., 4 hrs. lab. Students cannot receive credit for both CHEM 2111 and CHEM 2113.

Prerequisite: CHEM 1002 or CHEM 1014.

Level of Study: Undergraduate

Last four terms offered: 2022 Fall Term, 2021 Fall Term, 2020 Fall Term, 2019 Fall Term

Schedule of Classes (<https://bulletin.marquette.edu/class-search/?details&code=CHEM%202113>)

CHEM 2114 Organic Chemistry for Majors 2 (4 credits)

Continuation of CHEM 2113. Mechanisms, structure-reactivity relationships, and complex syntheses applied to the remaining principle classes of organic compounds. Laboratory: organic qualitative analysis. 3 hrs. lec., 1 hr. disc., 4 hrs. lab. Students cannot receive credit for both CHEM 2112 and CHEM 2114.

Prerequisite: CHEM 2111 or CHEM 2113.

Level of Study: Undergraduate

Last four terms offered: 2023 Spring Term, 2022 Spring Term, 2021 Spring Term, 2020 Spring Term

Schedule of Classes (<https://bulletin.marquette.edu/class-search/?details&code=CHEM%202114>)

CHEM 2121 CHEM 2111 Laboratory Only (1 credits)

Designed to provide students with a formal course number in which they may register for a laboratory in CHEM 2111 (organic chemistry 1), without taking lecture.

Prerequisite: Cons. of dept. ch.

Level of Study: Undergraduate

Last four terms offered: 2020 Spring Term, 2016 Fall Term, 2016 Spring Term, 2014 Fall Term

Schedule of Classes (<https://bulletin.marquette.edu/class-search/?details&code=CHEM%202121>)

CHEM 2122 CHEM 2112 Laboratory Only (1 credits)

Designed to provide students with a formal course number in which they may register for a laboratory in CHEM 2112 (organic chemistry 2), without taking lecture.

Prerequisite: Cons. of dept. ch.

Level of Study: Undergraduate

Last four terms offered: 2023 Spring Term, 2019 Spring Term, 2017 Spring Term, 2016 Spring Term

Schedule of Classes (<https://bulletin.marquette.edu/class-search/?details&code=CHEM%202122>)

CHEM 2131 CHEM 2111 Lecture Only (3 credits)

Designed to provide students with a formal course number in which they may register for a lecture in CHEM 2111 (organic chemistry 1), without taking lab.

Prerequisite: Cons. of dept. ch.

Level of Study: Undergraduate

Last four terms offered: 2018 Summer Term, 2016 Summer Term, 2013 Fall Term

Schedule of Classes (<https://bulletin.marquette.edu/class-search/?details&code=CHEM%202131>)

CHEM 2132 CHEM 2112 Lecture Only (3 credits)

Designed to provide students with a formal course number in which they may register for a lecture in CHEM 2112 (organic chemistry 2), without taking lab.

Prerequisite: Cons. of dept. ch.

Level of Study: Undergraduate

Last four terms offered: 2020 Summer Term, 2018 Summer Term, 2016 Summer Term

Schedule of Classes (<https://bulletin.marquette.edu/class-search/?details&code=CHEM%202132>)

CHEM 3120 Chemistry Laboratory Only: Upper Division (1-2 credits)

This is a variable title, variable credit course designed to provide students with a formal course number in which they may register for a laboratory without lecture basis for existing upper division chemistry courses.

Prerequisite: Cons. of dept. ch.

Level of Study: Undergraduate

Last four terms offered: 2010 Fall Term, 2009 Fall Term, 1995 Fall Term, 1994 Fall Term

Schedule of Classes (<https://bulletin.marquette.edu/class-search/?details&code=CHEM%203120>)

CHEM 3130 Lecture Only - Upper Division (1-3 credits)

This is a variable title, variable credit course designed to provide students with a formal course number in which they may register for a lecture without laboratory basis for existing upper division chemistry courses.

Prerequisite: Cons. of dept. ch.

Level of Study: Undergraduate

Last four terms offered: 2001 Fall Term, 2001 Spring Term, 1999 Fall Term, 1995 Fall Term

Schedule of Classes (<https://bulletin.marquette.edu/class-search/?details&code=CHEM%203130>)

CHEM 3201 Foundations of Analytical Chemistry (4 credits)

Introduction to the methods and tools of chemical analysis. Topics include statistical analysis, spectrophotometric methods of analysis, equilibrium-based methods, methods of wet chemical analysis, electrochemical methods, and analytical separations. 3 hrs. lec., 4 hrs. lab.

Prerequisite: CHEM 1002 or CHEM 1014.

Level of Study: Undergraduate

Last four terms offered: 2022 Fall Term, 2021 Fall Term, 2020 Fall Term, 2019 Fall Term

Schedule of Classes (<https://bulletin.marquette.edu/class-search/?details&code=CHEM%203201>)

CHEM 3210 Advanced Methods and Instrumentation for Chemical Analysis (4 credits)

In-depth treatment of instrumentation and methods in modern chemical analysis, building upon topics in CHEM 3201. 3 hrs. lec., 4 hrs. lab.

Prerequisite: CHEM 3201, CHEM 4433 or 4431, and PHYS 1002 or PHYS 1004 or PHYS 1014.

Level of Study: Undergraduate

Last four terms offered: 2023 Spring Term, 2022 Spring Term, 2021 Spring Term, 2020 Spring Term

Schedule of Classes (<https://bulletin.marquette.edu/class-search/?details&code=CHEM%203210>)

CHEM 3320 Inorganic Synthesis (2 credits)

Synthesis and characterization of transition and post-transition inorganic and organometallic compounds. Emphasis on structure elucidation through electronic and nuclear magnetic spectroscopy; handling of air-sensitive compounds; high-vacuum line techniques; homogeneous catalysis. 1 lab-recit., 4 hrs. lab.

Prerequisite: CHEM 4330, which must be taken concurrently, and CHEM 4431 or 4433 or 4434.

Level of Study: Undergraduate

Last four terms offered: 2020 Fall Term, 2019 Fall Term, 2018 Fall Term, 2017 Fall Term

Schedule of Classes (<https://bulletin.marquette.edu/class-search/?details&code=CHEM%203320>)

CHEM 3420 Physical Chemistry Laboratory (2 credits)

Laboratory experiments illustrating the principles of physical chemistry. 5 hrs. lab.

Prerequisite: CHEM 4433 and CHEM 4434, which must be taken concurrently.

Level of Study: Undergraduate

Last four terms offered: 2021 Spring Term, 2020 Spring Term, 2019 Spring Term, 2018 Spring Term

Schedule of Classes (<https://bulletin.marquette.edu/class-search/?details&code=CHEM%203420>)

CHEM 3931 Topics in Chemistry (1-3 credits)

Topics of current interest in inorganic, organic, analytical, physical or biochemistry.

Prerequisite: CHEM 4434, which may be taken concurrently, or cons. of instr.

Level of Study: Undergraduate

Last four terms offered: 2008 Spring Term, 2004 Fall Term, 2002 Fall Term, 2000 Spring Term

Schedule of Classes (<https://bulletin.marquette.edu/class-search/?details&code=CHEM%203931>)

CHEM 3954 Introduction to Research (1 credits)

Attend introductory research talks by departmental faculty, receive instruction on navigating chemistry research literature and reading papers, read and discuss papers, and attend select departmental seminars with visiting speakers. Take turns leading discussions of these papers and seminars. Meet with faculty members to explore prospective research projects before writing brief proposals/work plans to guide potential research projects in the following term.

Prerequisite: CHEM 2112 or CHEM 2114.

Level of Study: Undergraduate

Schedule of Classes (<https://bulletin.marquette.edu/class-search/?details&code=CHEM%203954>)

CHEM 4130 Characterization of Organic Compounds (3 credits)

Fundamental theory of spectral methods used to identify organic compounds. Structure elucidation through application of nuclear magnetic resonance, ultraviolet, infrared and mass spectroscopy. 3 hrs. lec.

Prerequisite: CHEM 4431 or CHEM 4433 or CHEM 4434.

Level of Study: Undergraduate

Last four terms offered: 2023 Spring Term, 2021 Spring Term, 2019 Spring Term, 2017 Spring Term

Schedule of Classes (<https://bulletin.marquette.edu/class-search/?details&code=CHEM%204130>)

CHEM 4230 Forensic Chemistry (3 credits)

Examines the chemistry of forensics. Topics include: the science behind forensic analysis, methods for data analysis and applications of analytical methods in forensic science.

Prerequisite: CHEM 3201, which may be taken concurrently.

Level of Study: Undergraduate

Last four terms offered: 2020 Spring Term, 2018 Spring Term

Schedule of Classes (<https://bulletin.marquette.edu/class-search/?details&code=CHEM%204230>)

CHEM 4330 Inorganic Chemistry (3 credits)

Structure and bonding as related to physical and chemical properties; concepts relating to mechanisms; metal complexes; organometallic chemistry; molecular symmetry; catalysis; and descriptive chemistry to demonstrate applications of principles.

Prerequisite: CHEM 4431 or CHEM 4433 or CHEM 4434.

Level of Study: Undergraduate

Last four terms offered: 2022 Fall Term, 2021 Fall Term, 2020 Fall Term, 2019 Fall Term

Schedule of Classes (<https://bulletin.marquette.edu/class-search/?details&code=CHEM%204330>)

CHEM 4430 Introduction to Quantum Chemistry (3 credits)

Elementary quantum theory and applications to atoms, molecules, and chemical bonding.

Prerequisite: CHEM 4434.

Level of Study: Undergraduate

Last four terms offered: 2014 Fall Term, 1996 Spring Term, 1994 Spring Term, 1992 Spring Term

Schedule of Classes (<https://bulletin.marquette.edu/class-search/?details&code=CHEM%204430>)

CHEM 4431 Physical Chemistry: Fundamentals with Applications in Biological Sciences (3 credits)

One-term course in Physical Chemistry with focus on basic principles, using examples drawn from applications to biological systems. Covers macroscopic, statistical, and microscopic descriptions of matter. Emphasis on thermodynamics, chemical and physical equilibria, transport properties, and kinetics.

Prerequisite: CHEM 1002 or CHEM 1014; and MATH 1410 or MATH 1450; and PHYS 1002 or PHYS 1004 or PHYS 1014.

Level of Study: Undergraduate

Last four terms offered: 2023 Spring Term, 2022 Spring Term, 2021 Spring Term, 2020 Spring Term

Schedule of Classes (<https://bulletin.marquette.edu/class-search/?details&code=CHEM%204431>)

CHEM 4433 Physical Chemistry 1 (3 credits)

Foundations of quantum mechanics, applications to chemical systems, atomic and molecular structure and spectroscopy, foundations of statistical mechanics, states of matter, laws of thermodynamics, phase and chemical equilibrium, electrochemistry, transport properties and chemical kinetics. 3 hrs. lec.

Prerequisite: CHEM 2114, MATH 1451, and PHYS 1002 or PHYS 1004 or PHYS 1014.

Level of Study: Undergraduate

Last four terms offered: 2022 Fall Term, 2021 Fall Term, 2020 Fall Term, 2019 Fall Term

Schedule of Classes (<https://bulletin.marquette.edu/class-search/?details&code=CHEM%204433>)

CHEM 4434 Physical Chemistry 2 (3 credits)

Continuation of CHEM 4433. 3 hrs. lec.

Prerequisite: CHEM 4433.

Level of Study: Undergraduate

Last four terms offered: 2023 Spring Term, 2022 Spring Term, 2021 Spring Term, 2020 Spring Term

Schedule of Classes (<https://bulletin.marquette.edu/class-search/?details&code=CHEM%204434>)

CHEM 4530 Biochemistry 1: Macromolecular Structure and Function (3 credits)

Chemistry and biology of the component molecules of living cells, with an emphasis on the structure and function of proteins, nucleic acids and biochemical cofactors. Underlying principles include bonding, kinetics, thermodynamics, biochemical transformations, molecular recognition, protein folding, enzyme catalysis, protein-nucleic acid structure and function and evolution at the biochemical level.

Prerequisite: CHEM 2111 or CHEM 2113.

Level of Study: Undergraduate

Marquette Core Curriculum: NSM Basic Needs & Justice

Last four terms offered: 2022 Fall Term, 2021 Fall Term, 2020 Fall Term, 2019 Fall Term

Schedule of Classes (<https://bulletin.marquette.edu/class-search/?details&code=CHEM%204530>)

CHEM 4630 Introduction to Polymer Science (3 credits)

Theory and practice of molecular weight determination for macromolecules. Characterization of polymers, including spectroscopic, chemical and mechanical procedures. Synthesis of polymers, including kinetics of reaction. Polymer additives and technology.

Prerequisite: CHEM 2112 and CHEM 4431 or CHEM 4433 or CHEM 4434.

Level of Study: Undergraduate

Last four terms offered: 2018 Fall Term, 2015 Fall Term, 2008 Spring Term, 2006 Spring Term

Schedule of Classes (<https://bulletin.marquette.edu/class-search/?details&code=CHEM%204630>)

CHEM 4710 Advanced Integrated Laboratory 1 (3 credits)

Integrated advanced laboratory course emphasizing laboratory and professional skill development. Laboratory modules focus on integrated chemistry topics. 1 hr. lec., 8 hrs. lab per week.

Prerequisite: CHEM 4433, which may be taken concurrently.

Level of Study: Undergraduate

Last four terms offered: 2022 Fall Term, 2021 Fall Term

Schedule of Classes (<https://bulletin.marquette.edu/class-search/?details&code=CHEM%204710>)

CHEM 4720 Advanced Integrated Laboratory 2 (3 credits)

Integrated advanced laboratory course emphasizing laboratory and professional skill development. Laboratory modules focus on integrated chemistry topics. 1 hr. lec., 8 hrs. lab per week.

Prerequisite: CHEM 4434, which may be taken concurrently.

Level of Study: Undergraduate

Last four terms offered: 2023 Spring Term, 2022 Spring Term

Schedule of Classes (<https://bulletin.marquette.edu/class-search/?details&code=CHEM%204720>)

CHEM 4931 Topics in Chemistry (1-3 credits)

Analysis of selected topics under faculty supervision. S/U grade assessment.

Prerequisite: CHEM 2112, 2114 or 2114H.

Level of Study: Undergraduate

Last four terms offered: 2018 Fall Term

Schedule of Classes (<https://bulletin.marquette.edu/class-search/?details&code=CHEM%204931>)

CHEM 4931H Honors Topics in Chemistry (1-3 credits)

Analysis of selected topics under faculty supervision. As a Honors Program course, includes a more intensive research or project component. S/U grade assessment. Students cannot receive credit for both CHEM 4931 and CHEM 4931H.

Prerequisite: CHEM 2112, 2114 or 2114H; admission to the CHEM Disciplinary Honors Program.

Level of Study: Undergraduate

Last four terms offered: 2018 Fall Term

Schedule of Classes (<https://bulletin.marquette.edu/class-search/?details&code=CHEM%204931H>)

CHEM 4932 Advanced Topics in Chemistry (1-3 credits)

Advanced topics of current interest in inorganic, organic, analytical, physical or biochemistry.

Prerequisite: CHEM 4434.

Level of Study: Undergraduate

Schedule of Classes (<https://bulletin.marquette.edu/class-search/?details&code=CHEM%204932>)

CHEM 4953 Undergraduate Seminar (1-3 credits)

Emphasis on critical reading, analysis, and oral reporting of current literature sources in Chemistry.

Prerequisite: CHEM 4434.

Level of Study: Undergraduate

Last four terms offered: 1991 Spring Term, 1990 Spring Term, 1989 Spring Term, 1987 Spring Term

Schedule of Classes (<https://bulletin.marquette.edu/class-search/?details&code=CHEM%204953>)

CHEM 4956 Undergraduate Research in Chemistry (1-3 credits)

Research project conducted under the direction of a faculty adviser. A written progress report is required that follows the American Chemical Society's Committee on Professional Training guidelines, "Preparing a Research Report." May be repeated; however, only a maximum of six (6) cr. hrs. of CHEM 4956 and CHEM 4995 combined, can be counted toward the major.

Prerequisite: Cons. of instr.

Level of Study: Undergraduate

Last four terms offered: 2023 Spring Term, 2022 Fall Term, 2022 Spring Term, 2021 Fall Term

Schedule of Classes (<https://bulletin.marquette.edu/class-search/?details&code=CHEM%204956>)

CHEM 4956H Honors Undergraduate Research in Chemistry (1-3 credits)

Research project conducted under the direction of a faculty adviser. A written progress report is required that follows the American Chemical Society's Committee on Professional Training guidelines, "Preparing a Research Report." As a Honors Program course, includes a more intensive research or project component. May be repeated; however, only a maximum of six (6) cr. hrs. of CHEM 4956 and CHEM 4995 combined, can be counted towards the major.; admission to the CHEM Disciplinary Honors Program.

Prerequisite: Cons. of instr.

Level of Study: Undergraduate

Schedule of Classes (<https://bulletin.marquette.edu/class-search/?details&code=CHEM%204956H>)

CHEM 4995 Independent Study in Chemistry (1-3 credits)

Faculty-supervised, independent study/research of a specific area or topic in Chemistry. May be repeated; however, a maximum of six (6) cr. hrs. of CHEM 4956 and CHEM 4995, combined, can apply toward the major.

Prerequisite: CHEM 4434 and cons. of dept. ch.

Level of Study: Undergraduate

Last four terms offered: 2023 Spring Term, 2022 Spring Term, 2021 Fall Term, 2014 Spring Term

Schedule of Classes (<https://bulletin.marquette.edu/class-search/?details&code=CHEM%204995>)

CHEM 4999 Senior Thesis (2-4 credits)

Laboratory work leading to a thesis under the direction of an adviser.

Prerequisite: CHEM 4434 and cons. of dept. ch.

Level of Study: Undergraduate

Last four terms offered: 2010 Summer Term, 2009 Fall Term, 2009 Summer Term, 2008 Fall Term

Schedule of Classes (<https://bulletin.marquette.edu/class-search/?details&code=CHEM%204999>)

CHEM 5130 Characterization of Organic Compounds (3 credits)

Fundamental theory of spectral methods used to identify organic compounds. Structure elucidation through application of nuclear magnetic resonance, ultraviolet, infrared, and mass spectroscopy. 3 hr. lecture.

Level of Study: Graduate

Last four terms offered: 2023 Spring Term, 2021 Spring Term, 2019 Spring Term, 2017 Spring Term

Schedule of Classes (<https://bulletin.marquette.edu/class-search/?details&code=CHEM%205130>)

CHEM 5230 Forensic Chemistry (3 credits)

Examines the chemistry of forensics. Topics include: the science behind forensic analysis, methods for data analysis and applications of analytical methods in forensic science.

Level of Study: Graduate

Last four terms offered: 2020 Spring Term

Schedule of Classes (<https://bulletin.marquette.edu/class-search/?details&code=CHEM%205230>)

CHEM 5330 Inorganic Chemistry (3 credits)

Structure and bonding as related to physical and chemical properties; concepts relating to mechanisms; metal complexes; organometallic chemistry; molecular symmetry; catalysis; and descriptive chemistry to demonstrate applications of principles.

Level of Study: Graduate

Last four terms offered: 2022 Fall Term, 2021 Fall Term, 2020 Fall Term, 2019 Fall Term

Schedule of Classes (<https://bulletin.marquette.edu/class-search/?details&code=CHEM%205330>)

CHEM 5430 Introduction to Quantum Chemistry (3 credits)

Elementary quantum theory and applications to atoms, molecules, and chemical bonding.

Level of Study: Graduate

Last four terms offered: 2014 Fall Term

Schedule of Classes (<https://bulletin.marquette.edu/class-search/?details&code=CHEM%205430>)

CHEM 5431 Physical Chemistry: Fundamentals with Applications in Biological Sciences (3 credits)

Focuses on basic principles, using examples drawn from applications to biological systems. Covers macroscopic, statistical, and microscopic descriptions of matter. Emphasis on thermodynamics, chemical and physical equilibria, transport properties, and kinetics.

Level of Study: Graduate

Last four terms offered: 2015 Fall Term, 2014 Fall Term

Schedule of Classes (<https://bulletin.marquette.edu/class-search/?details&code=CHEM%205431>)

CHEM 5433 Physical Chemistry 1 (3 credits)

Foundations of quantum mechanics, applications to chemical systems, atomic and molecular structure and spectroscopy, foundations of statistical mechanics, states of matter, laws of thermodynamics, phase and chemical equilibrium, electrochemistry, transport properties and chemical kinetics. 3 hrs. lec.

Level of Study: Graduate

Last four terms offered: 2022 Fall Term, 2021 Fall Term, 2020 Fall Term, 2019 Fall Term

Schedule of Classes (<https://bulletin.marquette.edu/class-search/?details&code=CHEM%205433>)

CHEM 5434 Physical Chemistry 2 (3 credits)

Continuation of CHEM 5433. Three hrs. lec.

Level of Study: Graduate

Last four terms offered: 2016 Spring Term

Schedule of Classes (<https://bulletin.marquette.edu/class-search/?details&code=CHEM%205434>)

CHEM 5530 Biochemistry 1: Macromolecular Structure and Function (3 credits)

Chemistry and biology of the component molecules of living cells, with an emphasis on the structure and function of proteins, nucleic acids and biochemical cofactors. Underlying principles include bonding, kinetics, thermodynamics, biochemical transformations, molecular recognition, protein folding, enzyme catalysis, protein-nucleic acid structure and function and evolution at the biochemical level.

Level of Study: Graduate

Last four terms offered: 2022 Fall Term, 2021 Fall Term, 2020 Fall Term, 2019 Fall Term

Schedule of Classes (<https://bulletin.marquette.edu/class-search/?details&code=CHEM%205530>)

CHEM 5630 Introduction to Polymer Science (3 credits)

Theory and practice of molecular weight determination for macromolecules. Characterization of polymers, including spectroscopic, chemical and mechanical procedures. Synthesis of polymers, including kinetics of reaction. Polymer additives and technology.

Level of Study: Graduate

Last four terms offered: 2018 Fall Term, 2015 Fall Term

Schedule of Classes (<https://bulletin.marquette.edu/class-search/?details&code=CHEM%205630>)

CHEM 5932 Advanced Topics in Chemistry (1-3 credits)

Advanced topics of current interest in inorganic, organic, analytical, physical or biochemistry.

Level of Study: Graduate

Schedule of Classes (<https://bulletin.marquette.edu/class-search/?details&code=CHEM%205932>)

CHEM 6101 Modern Concepts of Organic Chemistry (3 credits)

Stereochemistry, structure-reactivity, and linear free energy relationships. Chemistry of reaction intermediates and mechanistic approaches to problems. Offered fall term.

Level of Study: Graduate

Last four terms offered: 2021 Fall Term, 2020 Fall Term, 2019 Fall Term, 2017 Fall Term

Schedule of Classes (<https://bulletin.marquette.edu/class-search/?details&code=CHEM%206101>)

CHEM 6102 Organic Reactions (3 credits)

Scope and limitations of modern techniques of synthesis utilizing addition, elimination, oxidation, reduction, substitution, rearrangement, and concerted reactions. Attention to mechanisms and stereochemistry.

Prerequisite: CHEM 6101.

Level of Study: Graduate

Last four terms offered: 2022 Spring Term, 2018 Spring Term, 2016 Spring Term, 2014 Spring Term

Schedule of Classes (<https://bulletin.marquette.edu/class-search/?details&code=CHEM%206102>)

CHEM 6103 Mechanisms of Organic Reactions (3 credits)

Fundamental principles of physical organic chemistry. Mechanisms of common organic reactions with emphasis on polar mechanisms. Introduction to Huckel and extended Huckel molecular orbital calculations.

Prerequisite: CHEM 6101.

Level of Study: Graduate

Last four terms offered: 2016 Fall Term, 2015 Spring Term, 2013 Spring Term, 2010 Spring Term

Schedule of Classes (<https://bulletin.marquette.edu/class-search/?details&code=CHEM%206103>)

CHEM 6201 Physical Methods of Analysis (3 credits)

Review of equilibria, principles and practice of spectrophotometry, electroanalysis and separation methods.

Level of Study: Graduate

Last four terms offered: 2015 Spring Term, 2014 Spring Term, 2011 Fall Term, 2010 Fall Term

Schedule of Classes (<https://bulletin.marquette.edu/class-search/?details&code=CHEM%206201>)

CHEM 6202 Spectrochemical Methods of Analysis (3 credits)

Discussion of modern instrumentation for spectrochemical analysis including conventional sources, lasers, monochromators and detection systems.

Review and comparison of methods and applications of various spectrochemical techniques for the analysis of atomic and molecular species.

Level of Study: Graduate

Last four terms offered: 2019 Fall Term, 2016 Fall Term, 2014 Fall Term, 2013 Spring Term

Schedule of Classes (<https://bulletin.marquette.edu/class-search/?details&code=CHEM%206202>)

CHEM 6203 Electroanalytical Methods (3 credits)

Electroanalytical methods for analysis and as a probe of homogeneous and heterogeneous redox processes with major emphasis on voltammetric, coulometric, potentiostatic and potentiometric methods. Also the redox chemistry of important organic, inorganic and organometallic compounds.

Level of Study: Graduate

Last four terms offered: 2018 Fall Term, 2017 Fall Term, 2016 Spring Term, 2015 Spring Term

Schedule of Classes (<https://bulletin.marquette.edu/class-search/?details&code=CHEM%206203>)

CHEM 6204 Analytical Separations (3 credits)

Emphasis on gas chromatography and high performance liquid chromatography. Also included: other forms of chromatography, electrophoresis and related techniques, distillation, extraction, dialysis.

Level of Study: Graduate

Last four terms offered: 1997 Fall Term, 1994 Spring Term, 1992 Spring Term, 1990 Fall Term

Schedule of Classes (<https://bulletin.marquette.edu/class-search/?details&code=CHEM%206204>)

CHEM 6301 Advanced Inorganic Chemistry 1 (3 credits)

Atomic and molecular structure, chemistry of the compounds of metals, transition metals and nonmetals, introduction to symmetry, ligand field theory, mechanisms, acids and bases, non-aqueous solvents, organometallic compounds, and applications of spectroscopy.

Level of Study: Graduate

Last four terms offered: 2022 Spring Term, 2020 Spring Term, 2018 Spring Term, 2015 Spring Term

Schedule of Classes (<https://bulletin.marquette.edu/class-search/?details&code=CHEM%206301>)

CHEM 6302 Advanced Inorganic Chemistry 2 (3 credits)

Special emphasis on such topics as non-aqueous solvents, mechanisms of inorganic reactions, inorganic polymers, descriptive chemistry, coordination chemistry, organometallic chemistry, point group classification, spectroscopy as applied to inorganic compounds, inorganic biochemistry, and current inorganic literature.

Level of Study: Graduate

Last four terms offered: 2015 Fall Term

Schedule of Classes (<https://bulletin.marquette.edu/class-search/?details&code=CHEM%206302>)

CHEM 6401 Computational Chemistry (3 credits)

Survey of the theories, models, and methods of modern computational chemistry. Topics include: molecular mechanics, semiempirical and ab initio molecular orbital theory, and Density Functional theory. Emphasizes applications in vibrational and electronic spectroscopy, thermodynamics, reaction dynamics, and condensed phase phenomena.

Prerequisite: CHEM 5434.

Level of Study: Graduate

Last four terms offered: 2022 Spring Term, 2020 Spring Term, 2018 Fall Term, 2017 Spring Term

Schedule of Classes (<https://bulletin.marquette.edu/class-search/?details&code=CHEM%206401>)

CHEM 6402 Introduction to Spectroscopy (3 credits)

Basic theory of chemical spectroscopy. Time-dependent Schrödinger wave equation, and the emission and absorption of radiation. Group theory and selection rules. Electronic spectra and structure of atoms and molecules. Rotations and vibrations of molecules. Spin resonance spectroscopy.

Prerequisite: CHEM 6405.

Level of Study: Graduate

Last four terms offered: 2021 Fall Term, 2019 Spring Term, 2016 Fall Term, 2015 Spring Term

Schedule of Classes (<https://bulletin.marquette.edu/class-search/?details&code=CHEM%206402>)

CHEM 6403 Statistical Thermodynamics (3 credits)

Applications of statistical methods to chemical systems at equilibrium, including the calculations of thermodynamic functions, the properties of gases, and the theories of the liquid state. Introduction to non-equilibrium statistics and quantum statistics.

Level of Study: Graduate

Last four terms offered: 2002 Spring Term, 1999 Fall Term, 1997 Fall Term, 1996 Spring Term

Schedule of Classes (<https://bulletin.marquette.edu/class-search/?details&code=CHEM%206403>)

CHEM 6404 Chemical Kinetics (3 credits)

Mathematical and phenomenological description of chemical rate processes and application to the solution of chemical problems.

Level of Study: Graduate

Last four terms offered: 2023 Spring Term, 2016 Spring Term, 2006 Fall Term, 2001 Fall Term

Schedule of Classes (<https://bulletin.marquette.edu/class-search/?details&code=CHEM%206404>)

CHEM 6405 Advanced Physical Chemistry (3 credits)

Atomic and molecular structure and chemical bonding from the point of view of quantum mechanics; illustrations from spectroscopy.

Level of Study: Graduate

Last four terms offered: 2003 Spring Term, 1998 Fall Term, 1997 Spring Term, 1995 Spring Term

Schedule of Classes (<https://bulletin.marquette.edu/class-search/?details&code=CHEM%206405>)

CHEM 6406 Infrared and Raman Spectroscopy (3 credits)

General theories of molecular vibrations and applications of infrared and Raman spectroscopy to chemical problems.

Level of Study: Graduate

Last four terms offered: 1990 Fall Term, 1988 Fall Term, 1987 Spring Term

Schedule of Classes (<https://bulletin.marquette.edu/class-search/?details&code=CHEM%206406>)

CHEM 6407 Advanced Quantum Chemistry (3 credits)

The application of advanced topics and methods of quantum mechanics to chemistry.

Prerequisite: CHEM 6405.

Level of Study: Graduate

Schedule of Classes (<https://bulletin.marquette.edu/class-search/?details&code=CHEM%206407>)

CHEM 6931 Topics in Chemistry (1-3 credits)

Topics of current interest in biochemistry.

Level of Study: Graduate

Last four terms offered: 2023 Spring Term, 2022 Fall Term, 2022 Spring Term, 2021 Spring Term

Schedule of Classes (<https://bulletin.marquette.edu/class-search/?details&code=CHEM%206931>)

CHEM 6953 Literature Seminar (0 credits)

Scholarly presentation on a current topic in chemistry. Mandatory for all CHEM graduate students. SNC/UNC grade assessment.

Level of Study: Graduate

Last four terms offered: 2023 Spring Term, 2022 Fall Term, 2022 Spring Term, 2021 Spring Term

Schedule of Classes (<https://bulletin.marquette.edu/class-search/?details&code=CHEM%206953>)

CHEM 6960 Departmental Seminar (0 credits)

Papers and discussions as a means of interpreting present trends in chemical research. Required of all full-time graduate students in chemistry. SNC/UNC grade assessment.

Level of Study: Graduate

Last four terms offered: 2023 Spring Term, 2022 Fall Term, 2022 Spring Term, 2021 Fall Term

Schedule of Classes (<https://bulletin.marquette.edu/class-search/?details&code=CHEM%206960>)

CHEM 6995 Independent Study in Chemistry (1-4 credits)

Faculty-supervised, independent study/research of a specific area or topic in Chemistry.

Prerequisite: Cons. of dept. ch.

Level of Study: Graduate

Last four terms offered: 2023 Spring Term, 2022 Fall Term, 2022 Spring Term, 2021 Fall Term

Schedule of Classes (<https://bulletin.marquette.edu/class-search/?details&code=CHEM%206995>)

CHEM 6998 Essay Project (1-6 credits)

An essay project developed in consultation with the adviser. S/U grade assessment.

Prerequisite: Cons. of dept. ch.

Level of Study: Graduate

Schedule of Classes (<https://bulletin.marquette.edu/class-search/?details&code=CHEM%206998>)

CHEM 6999 Master's Thesis (1-6 credits)

S/U grade assessment.

Prerequisite: Cons. of dept. ch.

Level of Study: Graduate

Last four terms offered: 2023 Spring Term, 2020 Fall Term, 2019 Spring Term, 2018 Fall Term

Schedule of Classes (<https://bulletin.marquette.edu/class-search/?details&code=CHEM%206999>)

CHEM 8953 Research Seminar (0 credits)

Scholarly presentation of student's dissertation research topic in chemistry. Mandatory for all CHEM doctoral students. SNC/UNC grade assessment.

Level of Study: Graduate

Last four terms offered: 2023 Spring Term, 2022 Fall Term, 2022 Spring Term, 2021 Fall Term

Schedule of Classes (<https://bulletin.marquette.edu/class-search/?details&code=CHEM%208953>)

CHEM 8999 Doctoral Dissertation (1-9 credits)

S/U grade assessment.

Prerequisite: Cons. of dept. ch.

Level of Study: Graduate

Last four terms offered: 2023 Spring Term, 2022 Fall Term, 2022 Spring Term, 2021 Fall Term

Schedule of Classes (<https://bulletin.marquette.edu/class-search/?details&code=CHEM%208999>)

CHEM 9503 Competency Exam Prep: Less Than Half-Time (0 credits)

A less than half-time equivalent course, used for those Marquette graduate students who are participating in undergraduate courses in preparation for graduate competency examinations.

Prerequisite: Cons. of the Graduate School.

Level of Study: Graduate

Last four terms offered: 2023 Spring Term, 2022 Fall Term, 2022 Spring Term, 2021 Fall Term

Schedule of Classes (<https://bulletin.marquette.edu/class-search/?details&code=CHEM%209503>)

CHEM 9603 Competency Exam Prep: Less Than Half-Time (0 credits)

A less than half-time equivalent course, used for those Marquette graduate students who are studying, whether in a classroom or independently, in preparation for graduate competency examinations.

Prerequisite: Cons. of the Graduate School.

Level of Study: Graduate

Last four terms offered: 2021 Spring Term, 2020 Spring Term, 2019 Spring Term, 2018 Fall Term

Schedule of Classes (<https://bulletin.marquette.edu/class-search/?details&code=CHEM%209603>)

CHEM 9970 Graduate Standing Continuation: Less than Half-Time (0 credits)

Fee. SNC/UNC grade assessment. Designated as less than half-time status only, cannot be used in conjunction with other courses, and does not qualify students for financial aid or loan deferment.

Prerequisite: Cons. of dept. ch.

Level of Study: Graduate

Last four terms offered: 2008 Spring Term, 2007 Fall Term

Schedule of Classes (<https://bulletin.marquette.edu/class-search/?details&code=CHEM%209970>)

CHEM 9974 Graduate Fellowship: Full-Time (0 credits)

Fee. SNC/UNC grade assessment. Designated as full-time status. If a student is already registered in other courses full time, this continuation course is not needed.

Prerequisite: Cons. of dept. ch.

Level of Study: Graduate

Last four terms offered: 2011 Summer Term, 2009 Fall Term, 2009 Summer Term, 2009 Spring Term

Schedule of Classes (<https://bulletin.marquette.edu/class-search/?details&code=CHEM%209974>)

CHEM 9975 Graduate Assistant Teaching: Full-Time (0 credits)

Fee. SNC/UNC grade assessment. Designated as full-time status. If a student is already registered in other courses full time, this continuation course is not needed.

Prerequisite: Cons. of dept. ch.

Level of Study: Graduate

Last four terms offered: 2012 Spring Term, 2011 Spring Term, 2009 Fall Term, 2009 Spring Term

Schedule of Classes (<https://bulletin.marquette.edu/class-search/?details&code=CHEM%209975>)

CHEM 9976 Graduate Assistant Research: Full-Time (0 credits)

Fee. SNC/UNC grade assessment. Designated as full-time status. If a student is already registered in other courses full time, this continuation course is not needed.

Prerequisite: Cons. of dept. ch.

Level of Study: Graduate

Last four terms offered: 2022 Spring Term, 2021 Fall Term, 2018 Summer Term, 2016 Summer Term

Schedule of Classes (<https://bulletin.marquette.edu/class-search/?details&code=CHEM%209976>)

CHEM 9994 Master's Thesis Continuation: Less than Half-Time (0 credits)

Fee. SNC/UNC grade assessment. Allows a student to be considered the equivalent of less than half-time status. Requires that the student is working less than 12 hours per week on their master's thesis. All six thesis credits required for the degree should be completed before registering for non-credit Master's Thesis Continuation.

Prerequisite: Cons. of dept. ch.

Level of Study: Graduate

Last four terms offered: 2015 Spring Term, 2014 Spring Term, 2012 Spring Term, 2011 Spring Term

Schedule of Classes (<https://bulletin.marquette.edu/class-search/?details&code=CHEM%209994>)

CHEM 9995 Master's Thesis Continuation: Half-Time (0 credits)

Fee. SNC/UNC grade assessment. Allows a student to be considered the equivalent of half-time status. Requires that the student is working more than 12 to less than 20 hours per week on their master's thesis. All six thesis credits required for the degree should be completed before registering for non-credit Master's Thesis Continuation.

Prerequisite: Cons. of dept. ch.

Level of Study: Graduate

Last four terms offered: 2009 Fall Term, 2009 Spring Term, 2008 Fall Term, 2008 Spring Term

Schedule of Classes (<https://bulletin.marquette.edu/class-search/?details&code=CHEM%209995>)

CHEM 9996 Master's Thesis Continuation: Full-Time (0 credits)

Fee. SNC/UNC grade assessment. Allows a student to be considered the equivalent of full-time status. Requires that the student is working 20 hours or more per week on their master's thesis. All six thesis credits required for the degree should be completed before registering for non-credit Master's Thesis Continuation.

Prerequisite: Cons. of dept. ch.

Level of Study: Graduate

Last four terms offered: 2022 Spring Term, 2021 Fall Term, 2021 Summer Term, 2021 Spring Term

Schedule of Classes (<https://bulletin.marquette.edu/class-search/?details&code=CHEM%209996>)

CHEM 9997 Doctoral Dissertation Continuation: Less than Half-Time (0 credits)

Fee. SNC/UNC grade assessment. Allows a student to be considered the equivalent of less than half-time status. Requires that the student is working less than 12 hours per week on their doctoral dissertation. All 12 dissertation credits required for the degree should be completed before registering for non-credit Doctoral Dissertation Continuation.

Prerequisite: Cons. of dept. ch.

Level of Study: Graduate

Last four terms offered: 2010 Fall Term, 2009 Fall Term, 2008 Spring Term, 2007 Fall Term

Schedule of Classes (<https://bulletin.marquette.edu/class-search/?details&code=CHEM%209997>)

CHEM 9998 Doctoral Dissertation Continuation: Half-Time (0 credits)

Fee. SNC/UNC grade assessment. Allows a student to be considered the equivalent of half-time status. Requires that the student is working more than 12 to less than 20 hours per week on their doctoral dissertation. All 12 dissertation credits required for the degree should be completed before registering for non-credit Doctoral Dissertation Continuation.

Prerequisite: Cons. of dept. ch.

Level of Study: Graduate

Last four terms offered: 2021 Spring Term, 2020 Fall Term, 2020 Spring Term, 2019 Fall Term

Schedule of Classes (<https://bulletin.marquette.edu/class-search/?details&code=CHEM%209998>)

CHEM 9999 Doctoral Dissertation Continuation: Full-Time (0 credits)

Fee. SNC/UNC grade assessment. Allows a student to be considered the equivalent of full-time status. Requires that the student is working 20 hours or more per week on their doctoral dissertation. All 12 dissertation credits required for the degree should be completed before registering for non-credit Doctoral Dissertation Continuation.

Prerequisite: Cons. of dept. ch.

Level of Study: Graduate

Last four terms offered: 2023 Summer Term, 2023 Spring Term, 2022 Fall Term, 2022 Summer Term

Schedule of Classes (<https://bulletin.marquette.edu/class-search/?details&code=CHEM%209999>)