CHEMISTRY AND BIOCHEMISTRY

Chemistry and biochemistry are exciting disciplines that seek to understand our world from the viewpoint of atomic and molecular behavior. Chemists and biochemists integrate knowledge from biology, physics, and mathematics to solve problems in a wide variety of areas. Chemistry and biochemistry courses develop critical thinking, problem-solving skills, and experimental technique to provide ample preparation for future career success in a variety of fields, including medicine, dentistry, environmental science, forensic science, pharmacology, materials science, business, law, and more. Fairfield's chemistry and biochemistry curriculum emphasizes these skills and applications through faculty-led research and laboratory-based courses.

The Department of Chemistry & Biochemistry is committed to an environment of inclusion and equity for all members of the community including students, faculty and staff. We embrace the diversity of our community as a strength in fulfilling our teaching, learning and scholarship. We strive to support, uplift, respect and encourage all members of our community, expecting each member of our community to do the same. Diversity is viewed to include, but is not limited to race, ethnicity, socioeconomic status, gender, gender identity, sexual orientation, religion, disability, and place of origin. We welcome diverse viewpoints to be expressed so that all may be included and may learn from each other. Identifying and eliminating racism and other forms of bias is a commitment we make in order to build the community of chemists that includes representation by all members of the community, especially those who have been historically excluded from chemistry such as women, LGBTQIA individuals, persons with disabilities, and people of color. These commitments align with Fairfield's vision of Diversity and Inclusive Excellence (link), the Universal Apostolic Preference to "walk with the excluded" (link) and statements made by the U.S. Conference of Catholic Bishops (link).

The Department of Chemistry and Biochemistry and its curricula are certified by the Committee on Professional Training of the American Chemical Society (ACS). Certified programs are defined by high quality faculty, deep and broad curriculum, modern facilities, and modern instrumentation. The American Chemical Society is actively committed to cultivating a diverse, equitable, inclusive, and respectful community of chemistry professionals. Diversity, equity, inclusion and respect (DEIR) are core values of the ACS and are a pillar of undergraduate education in ACS certified programs. The ACS Statement on Diversity, Equity, Inclusion and Respect can be found here.

Departmental Commitments

The Department of Chemistry and Biochemistry will take the following steps to achieve our inclusive and anti-racist goals in our curricula and pedagogy:

- Faculty will reflect on their curricula to:
  - integrate scientific practices from multiple cultures, worldviews or perspectives.
  - illustrate the historical and/or contemporary context of power, inequity and oppression in the natural sciences.
- Faculty recognize DEI is informed by conversation with current students, alumni and the local community; faculty are committed to engaging in these conversations.
- Faculty will recruit diverse scholars to give research talks in departmental seminars.
- Faculty are committed to recruiting, selecting and retaining diverse and highly engaged colleagues.
- Faculty and staff will curate and disseminate resources that connect course learning goals to scholarships, honor societies, and research opportunities. The Department will lift up opportunities for historically marginalized populations in STEM.
- Faculty and staff will collaborate with other departments to develop anti-racist and inclusive curricula.
- Form a standing departmental committee that annually reviews anti-racist and inclusive practices in curricula, pedagogy and scholarship.

Student Learning Outcomes:

1. Develop an understanding of the fundamentals and the applications of current chemical knowledge in the disciplines of organic, inorganic, biochemical, analytical, and physical chemistry.

2. Identify problems and apply chemical knowledge and problem-solving strategies to solve them.

3. Be able to work independently or in a team in a class or laboratory setting to solve scientific problems.

4. Be able to collect data, properly record data, and critically analyze and interpret experimental results within the context of specific experimental goals and objectives.

5. Develop proficiency in the use of standard laboratory equipment, modern instrumentation and classical techniques used in the chemistry laboratory to conduct experiments.

6. Become skilled in the use of computers for data acquisition, data analysis, and chemical computations.

7. Become competent in searching and using the scientific literature to obtain current information on a scientific topic or problem.

8. Learn and apply best practices for chemical safety and hygiene when working in the laboratory.

9. Develop skills in presenting chemical information or results and conclusions from experiments clearly and concisely in both written and oral form.

10. Learn and demonstrate ethical scientific behavior.

Programs

The bachelor of science degree in chemistry or biochemistry, with or without ACS certification, can be achieved by following the appropriate course sequence listed below. The first sequence describes the basic BS degree in chemistry. The second sequence is the preferred track for students seeking employment in the chemical industry or pursuing a Ph.D. in chemistry and includes ACS certification. The third major sequence is the BS in biochemistry, recommended for students interested in the pharmaceutical industry, medical or dental school, and the pursuit of a Ph.D. in biochemistry or related fields. The biochemistry sequence can also be ACS certified with the additional course work described. The ACS certified sequences feature more in-depth laboratory work and/or a greater emphasis on research.

- Biochemistry Major
- Biochemistry Minor

- Chemistry Major
- Chemistry Major - ACS Certified Curriculum
- Chemistry Minor

Courses

CHEM 1010 Chemistry: Sights and Insights **3 Credits**
This course presents chemistry via lecture, demonstration, and laboratory work. The course provides students with insights into the microscopic world of atoms and molecules to better understand the macroscopic, observable properties of real substances, and applies the models developed in the course to representative substances from inorganic, organic chemistry, and biochemistry. Note: This course counts as a science core course but does not satisfy requirements for the chemistry major or minor. Previously CH 0010.

CHEM 1033 Chemistry of Nutrition **3 Credits**
Attributes: EDCG Educational Studies Cognate, HSST Health Studies: Science and Technology
This course introduces basic chemical concepts, such as the atom, molecules, chemical reactivity and energy, as well as integrating fundamental biological concepts including cell structure and basic anatomy. Further explored, on a chemical level, are the structure and function of basic nutritional components: proteins, carbohydrate, lipids, vitamins, and minerals. With a scientific foundation established, topics pertaining to nutrition and human evolution, the life cycle, and exercise will be discussed. Current social and health issues such as obesity, food technology, and fad dieting will be incorporated throughout the course. Note: This course counts as a science core course but does not satisfy requirements for the chemistry major or minor. Students may take either CHEM 1033 or CHEM 1072 as a core science requirement, but not both. Previously CH 0033.

CHEM 1072 Philosophy and Biochemistry of Food and Eating Practices **3 Credits**
Prerequisite: PHIL 1101.
An essential component of our daily lives, food offers itself as one of the most interesting topics of cultural and scientific discussion. This course is designed to analyze food and eating practices from the twofold perspective of philosophy and biochemistry. The intersections of philosophy and biochemistry will be highlighted in topics such as "Food as Art" (juxtaposing the aesthetic and biomolecular properties of food) and "Food in Culture" (contrasting how societies prepare and eat food with the nutrition and technology of food science). The course combines lecture with activities such as trips to museums, guest lectures, and in-class laboratory activities. Note: Students may take either CHEM 1033 or CHEM 1072 as a core science requirement, but not both. Crosslisted with PHIL 2218. Previously CH 0072.

CHEM 1073 Culinary Chemistry **3 Credits**
This course explores the chemical transformations underlying common culinary processes. Students will gain a molecular-level appreciation of culinary context (salt, fat, acid, heat) and execution (grilling, baking, braising, fermentation). Special attention will be given to data collection, analysis, and interpretation. Students will explore course concepts through hands-on homework. Because cooking is shared across cultures, this class will also devote time to questions of food access, security, and human health. Note: This course counts as a science core course but does not satisfy the requirements for the chemistry major or minor.

CHEM 1076 Environmental Science **3 Credits**
Attributes: EVME Environmental Studies Major Elective, EVNS Environmental Studies: Natural Science, EVPE Environmental Studies Elective, MSID Magis Core: Interdisciplinary
The science of the environment is presented through examination of the interconnections among physical, chemical, and biological fields of inquiry. This course looks at how the global environment is altered by the human population, technology, and production of fuels and food. In this course, students will acquire a scientific understanding of current issues in environmental science and learn to evaluate claims about current environmental problems. Crosslisted with BIOL 1076. Previously CH 0076.

CHEM 1077 Introduction to Forensic Science **3 Credits**
Attributes: EDCG Educational Studies Cognate
This course provides an introduction to the scientific techniques used for the analysis of common types of physical evidence encountered at crime scenes. Using critical thinking and laboratory experiences, students become crime scene investigators. They are charged with the task of solving a mock crime. The investigations include fabric analysis, ink analysis, blood analysis, DNA analysis, fingerprint analysis, ballistics, and/or blood alcohol analysis. The lecture part of the course focuses on exploring the underlying chemical principles behind the techniques and includes discussion of historical case studies. Note: This course counts as a science core course but does not satisfy requirements for the chemistry major or minor. Previously CH 0007.

CHEM 1083 Survey of Chemistry **3 Credits**
This course presumes no previous chemistry and fulfills a science requirement. The course consists of an introduction to atomic and molecular structure and the correlation of structural models to observable phenomena. The course discusses topics of historical and current relevance to society, including environmental issues, energy sources, natural products, and the application of chemistry in industry and medicine. Note: This course counts as a science core course but does not satisfy requirements for the chemistry major or minor. Previously CH 0083.

CHEM 1085 Chemistry, Energy, and the Environment **3 Credits**
Attributes: EDCG Educational Studies Cognate, EVME Environmental Studies Major Elective, EVNS Environmental Studies: Natural Science, EVPE Environmental Studies Elective, MSID Magis Core: Interdisciplinary
This course explores the flow of energy in modern society from the perspective of chemistry. Topics include the fossil fuels coal, petroleum, and natural gas, followed by an exploration of alternatives, including biomass, hydro, solar, tidal, wind, and nuclear energy sources. Students consider the source of energy, how it is harvested, and the short- and long-term environmental consequences of using each energy source and how these consequences are determined. The course uses the concepts of bonding, thermodynamics, kinetics, and work to investigate these and related ideas. The course also discusses economic and political forces that shape our use of energy. Note: This course counts as a science core course but does not satisfy requirements for the chemistry major or minor. Previously CH 0085.

CHEM 1086 Chemistry and Art **3 Credits**
Attributes: EDCG Educational Studies Cognate
This basic chemistry course with a strong orientation to the visual arts fulfills a core science requirement. Basic concepts include atoms, molecules, elements, compounds, the periodic table, chemical bonding and reaction, acids and bases, oxidation and reduction, and polymers. The lab employs these concepts to examine aspects of art media such as light, color, dyes, paint, metals, stone, ceramics, glass, plastics, paper, and fibers. Note: This course counts as a science core course but does not satisfy requirements for the chemistry major or minor. Previously CH 0086.

CHEM 1087 Molecules of Life **3 Credits**
This course explores the modern science of biologically relevant compounds and substances, which exist at the intersection of chemistry, biology, and medicine. We examine the major molecular components of the cell - proteins, nucleic acids, lipids, and more - and illustrate the application of chemical principles to understanding their structure and function. Since our lives are increasingly influenced by the availability of new pharmaceutical agents ranging from drugs that lower cholesterol to those that influence behavior, we develop insights needed to understand drug action and consider the design of new ways to intercede in the disease process. Note: This course counts as a science core course but does not satisfy requirements for the chemistry major or minor. Previously CH 0087.

CHEM 1171 General Chemistry I **3 Credits**
Corequisite: CHEM 1171L.
This course, the first in a two-semester sequence, covers atomic and molecular weights, the mole concept, Avogadro's number, stoichiometry, energy relationships in chemical systems, the properties of gases, the electronic structures of atoms, periodic relationships among the elements, chemical bonding, geometrics of molecules, molecular orbitals, liquids, solids, intermolecular forces, solutions, rates of chemical reactions, chemical equilibrium, free energy, entropy, acids and bases, aqueous equilibria, electrochemistry, nuclear chemistry, chemistry of some metals and nonmetals, and chemistry of coordination compounds. Previously CH 0111.

CHEM 1171L General Chemistry I Lab **1 Credit**
Fee: $120 Science Lab Fee
Corequisite: CHEM 1171.
This lab offers the opportunity to explore and experience the rigors of an experimental physical science. Students make and record observations on simple chemical systems while learning fundamental laboratory manipulative and measurement skills. Experiments demonstrate and supplement concepts introduced in lecture. The first semester emphasizes weighing, filtering, titrating, using volumetric glassware, observing data, and recording and synthetic techniques. The second semester integrates these techniques in experimental procedures and explores physical properties and quantitative analysis of selected chemical systems. Previously CH 0111L.

CHEM 1172 General Chemistry II **3 Credits**
Attributes: HSST Health Studies: Science and Technology
Corequisite: CHEM 1172L.
Prerequisites: CHEM 1171, CHEM 1171L.
This course, the second in a two-semester sequence, covers atomic and molecular weights, the mole concept, Avogadro's number, stoichiometry, energy relationships in chemical systems, the properties of gases, the electronic structures of atoms, periodic relationships among the elements, chemical bonding, geometrics of molecules, molecular orbitals, liquids, solids, intermolecular forces, solutions, rates of chemical reactions, chemical equilibrium, free energy, entropy, acids and bases, aqueous equilibria, electrochemistry, nuclear chemistry, chemistry of some metals and nonmetals, and chemistry of coordination compounds. Previously CH 0112.

CHEM 1172L General Chemistry II Lab **1 Credit**
Fee: $120 Science Lab Fee
Corequisite: CHEM 1172.
This lab offers the opportunity to explore and experience the rigors of an experimental physical science. Students make and record observations on simple chemical systems while learning fundamental laboratory manipulative and measurement skills. Experiments demonstrate and supplement concepts introduced in lecture. The first semester emphasizes weighing, filtering, titrating, using volumetric glassware, observing data, and recording and synthetic techniques. The second semester integrates these techniques in experimental procedures and explores physical properties and quantitative analysis of selected chemical systems. Previously CH 0112L.

CHEM 1184 General Chemistry for Health Science **3 Credits**
Attributes: EDCG Educational Studies Cognate, HSST Health Studies: Science and Technology
Corequisite: CHEM 1184L.
This course introduces the general principles of chemistry (matter and measurement, atomic and molecular structure, energetics, acids and bases, oxidation, and reduction) in a manner that prepares students to relate to properties of organic materials and biologically relevant substances such as carbohydrates, lipids, peptides, proteins, and nucleic acids. The course focuses on general principles and introduces organic and biologically relevant substances. This course is directed to School of Nursing students and students in the Health Studies minor. Previously CH 0084.

CHEM 1184L General Chemistry for Health Science Lab **1 Credit**
Fee: $120 Science Lab Fee
Corequisite: CHEM 1184.
This lab illustrates lecture concepts of CHEM 1184 and allows students to observe relevant physical systems. Previously CH 0084L.

CHEM 2271 Organic Chemistry I **3 Credits**
Corequisite: CHEM 2271L.
Prerequisite: CHEM 1172 and CHEM 1172L.
This course, an introduction to the chemistry of carbon compounds, discusses common functional groups from the perspective of molecular structure. Areas of emphasis include structure and characterization, preparation or organic synthesis, and the relations of physical and chemical properties to molecular structure. Stereochemical concepts introduced early in the course are used throughout.. Previously CH 0211.

CHEM 2271L Organic Chemistry I Lab **1 Credit**
Fee: $120 Science Lab Fee
Corequisite: CHEM 2271.
This lab emphasizes the manipulative techniques of separation, purification, analysis, and simple syntheses. Previously CH 0211L.

CHEM 2272 Organic Chemistry II **3 Credits**
Corequisite: CHEM 2272L.
Prerequisite: CHEM 2271.
This course presents the chemistry of aromatic, carbonyl, acyl, and nitrogen compounds. The course relates the chemical properties of naturally occurring substances such as carbohydrates, lipids, proteins, and nucleic acids to those of simpler monofunctional compounds. Spectroscopic methods of structure determination are introduced early in the course and used throughout. Previously CH 0212.

CHEM 2272L Organic Chemistry II Lab **1 Credit**
Fee: $120 Science Lab Fee
Corequisite: CHEM 2272.
This lab emphasizes investigative experiments, more complex synthesis, and qualitative organic analysis. Previously CH 0212L.

CHEM 2282 Chemical Analysis **3 Credits**
Attributes: EVME Environmental Studies Major Elective, EVNS Environmental Studies: Natural Science
Corequisite: CHEM 2282L.
Prerequisite: CHEM 1172.
This course provides the theoretical basis for the required laboratory. Topics include statistics, chemical equilibria and their analytical applications (acid-base, oxidation-reduction, complex formation, precipitation), electroanalytical chemistry, spectroanalytical chemistry, and chemical separations.and CHEM 1172L. Previously CH 0222.

CHEM 2282L Chemical Analysis Lab **1 Credit**
Attributes: EVNS Environmental Studies: Natural Science, EVPE Environmental Studies Elective
Fee: $120 Science Lab Fee
Corequisite: CHEM 2282.
Students explore quantitative aspects of chemistry through the analysis of unknowns and the characterization of chemical equilibrium, and pursue classical and instrumental methods of analysis. Previously CH 0222L.

CHEM 2291 Chemistry and Social Justice **3 Credits**
Prerequisite: CHEM 2272.
In this course, students will learn about and reflect on the systematic racism and sexism that exist in STEM, and specifically in the chemistry/biochemistry fields. Students will learn historically important scientific discoveries made by Black chemists and research (and celebrate!) contemporary scientists from traditionally underrepresented groups. Students will also learn about technological, industrial, and medical advances and reflect on how these advances can have adverse, and inequitable, effects. The course will explore how principles of green chemistry are being applied in current research programs to solve social justice related issues, like reducing our dependance on non-renewable natural resources.

CHEM 3311 Forensic Science in the Health Care Setting **3 Credits**
This course explores forensic science and its intersection with health care by discussing the interdisciplinary team working to serve patients who may also be victims of crime. From a health care perspective, students learn types of violent crimes, victimology, prevalent population based health issues, trauma-informed care, and forensic healthcare interventions. From a forensic scientific perspective, students explore the scientific techniques used to analyze physical or chemical evidence collected in a health care setting. Students put their learning into practice by participating in caring for victims of mock crimes in simulated clinical rooms, and analyzing collected evidence in the laboratory.

CHEM 3323L Biochemistry Lab **1 Credit**
Fee: $120 Science Lab Fee
Corequisite: BIOL 3324 or BIOL 3325 or CHEM 3324 or CHEM 3325.
This course will investigate classic and most current methodology used in biochemistry. A semester project will be used to introduce techniques used in biochemistry to investigate the structure and function of a protein. In characterizing this protein, the analysis of DNA, lipids and carbohydrates will also be covered. Previously CH 0323L.

CHEM 3324 Biochemistry I **3 Credits**
Prerequisite: CHEM 2272.
This course will investigate the fundamentals of life: chemistry. The structures and functions of biomolecules, including proteins, DNA, RNA, lipids, and carbohydrates will be covered in depth. The concepts behind biological processes will be discussed, including enzyme kinetics and regulatory strategies, membrane functions, signal transduction, and an overview of metabolism. Crosslisted with BIOL 3324. Previously CH 0324.

CHEM 3325 Biochemistry II **3 Credits**
Prerequisite: CHEM 2272.
This course focuses on the regulation of metabolic pathways involved in the synthesis, breakdown, and interconversion of biochemical intermediates that are fundamental to all life. Basic principles of biological thermodynamics will be highlighted in order to understand the processes by which living cells obtain and utilize energy. Students will develop an understanding of basic biomedical principles in the context of overall cell function. Crosslisted with BIOL 3325. Previously CH 0325.

CHEM 3326 Chemical Instrumentation **3 Credits**
Attributes: EVME Environmental Studies Major Elective, EVNS Environmental Studies: Natural Science, EVPE Environmental Studies Elective
Prerequisite: CHEM 2282.
Students study chemical analysis in detail, using modern instrumentation. Students explore current methods of analysis, theory of transduction, implementation of instrumental principles, and physical theory of chemical systems in the context of the goals of the analytical problem and consider examples of applications. Previously CH 0326.

CHEM 3326L Instrumental-Analytical Chemistry Lab **3 Credits**
Attributes: EVME Environmental Studies Major Elective, EVNS Environmental Studies: Natural Science, EVPE Environmental Studies Elective
Fee: $120 Science Lab Fee
Prerequisite: CHEM 3326.
This course exposes students who have already been introduced to the theory of classical (CHEM 2282) and instrumental (CHEM 3326) methods of analysis to problem solving using a variety of physical and chemical methods. The early portion of this course consolidates the classroom principles of analytical chemistry into a holistic understanding of analytical chemistry, giving students a further appreciation of the general considerations made when designing an approach to problem solving in analysis. Students receive hands-on exposure to the following aspects of analytical chemistry: basic electronics as appropriate to common instrumentation, methodology involved in equipment maintenance and troubleshooting, exposure to solving real-world analytical problems, and use of small computers and interfaces in the lab. The course emphasizes oral communication of results among all lab participants. Previously CH 0326L.

CHEM 3341 Advanced Inorganic Chemistry **3 Credits**
Corequisite: CHEM 3361.
This course introduces students to the interdependence of chemical bonding, spectroscopic characteristics, and reactivity properties of coordination compounds and complexes using the fundamental concept of symmetry. The principles of coordination chemistry will be introduced after reviewing atomic structure, the chemical bond, and molecular structure. A basic familiarity with symmetry will be formalized by an introduction to the elements of symmetry and group theory. The students will use symmetry and group theory approaches to understand central atom hybridization, ligand group orbitals, and the construction of qualitative molecular orbital (MO) energy diagrams including both sigma and pi bonding contributions. The students will continue to utilize their understanding of group theory during an introduction of electronic spectroscopy and the use of correlation and Tanabe-Sugano diagrams. MO diagrams will then be used as a starting point for understanding the reactivity properties of coordination complexes. Previously CH 0341.

CHEM 3341L Advanced Inorganic Chemistry Lab **2 Credits**
Fee: $120 Science Lab Fee
Corequisite: CHEM 3341.
This lab is a synthetic inorganic lab with an emphasis placed on characterization. In the laboratory, students will have the opportunity to synthesize, characterize, and investigate the physical and reactive properties of coordination, organometallic, and air-sensitive complexes. Students will utilize the following instrumental methods to characterize their compounds: UV-Visible spectroscopy, magnetic susceptibility, polarimetry, infrared spectroscopy, and NMR spectroscopy. Students write formal laboratory reports for every experiment. Previously CH 0341L.

CHEM 3361 Physical Chemistry I **3 Credits**
Corequisite: CHEM 3361L.
Prerequisites: CHEM 1172 and CHEM 1172L and MATH 1142 or higher, and PHYS 1172.
This course is the first of a two-semester sequence, covering thermodynamics of gasses, pure liquids, and both electrolyte and non-electrolyte solutions. Additional topics include chemical equilibrium, transport phenomena, reaction kinetics, quantum mechanics, spectroscopy, and statistical mechanics and statistical thermodynamics. Previously CH 0261.

CHEM 3361L Physical Chemistry I Lab **1 Credit**
Fee: $120 Science Lab Fee
Corequisite: CHEM 3361.
This course demonstrates and verifies concepts covered in Physical Chemistry lecture courses. Each lab meets weekly for three hours, during which students perform experiments with precision and care. The course incorporates current technology into each experiment and uses computers in data acquisition, reduction, and reporting. The course places special emphasis on data handling techniques and the accurate recording of observations. Previously CH 0261L.

CHEM 3362 Physical Chemistry II **3 Credits**
Corequisite: CHEM 3362L.
Prerequisites: CHEM 1172 and CHEM 1172L; MATH 1142 or higher, and PHYS 1172.
This course is the second of a two-semester sequence, covering thermodynamics of gasses, pure liquids, and both electrolyte and non-electrolyte solutions. Additional topics include chemical equilibrium, transport phenomena, reaction kinetics, quantum mechanics, spectroscopy, and statistical mechanics, and statistical thermodynamics. Previously CH 0262.

CHEM 3362L Physical Chemistry II Lab **1 Credit**
Fee: $120 Science Lab Fee
Corequisite: CHEM 3362.
This course demonstrates and verifies concepts covered in Physical Chemistry lecture. Each lab meets weekly for three hours, during which students perform experiments with precision and care. The course incorporates current technology into each experiment and uses computers in data acquisition, reduction, and reporting. The course places special emphasis on data handling techniques and the accurate recording of observations. Previously CH 0262L.

CHEM 4971 Research and Seminar I **1-3 Credits**
Students undertake a research project in conjunction with a faculty member and present two seminars: one pertaining to a literature topic, the other focused on their research. Enrollment by permission only. Previously CH 0398.

CHEM 4972 Research and Seminar II **1-3 Credits**
Students undertake a research project in conjunction with a faculty member and present two seminars: one pertaining to a literature topic, the other focused on their research. Enrollment by permission only. Previously CH 0398.

CHEM 4973 Research and Seminar III **1-3 Credits**
Students undertake a research project in conjunction with a faculty member and present two seminars: one pertaining to a literature topic, the other focused on their research. Enrollment by permission only. Previously CH 0398.

CHEM 4974 Research and Seminar IV **1-3 Credits**
Students undertake a research project in conjunction with a faculty member and present two seminars: one pertaining to a literature topic, the other focused on their research. Enrollment by permission only. Previously CH 0398.

CHEM 4975 Research and Seminar V **1-3 Credits**
Students undertake a research project in conjunction with a faculty member and present two seminars: one pertaining to a literature topic, the other focused on their research. Enrollment by permission only. Previously CH 0398.

CHEM 4976 Research and Seminar VI **1-3 Credits**
Students undertake a research project in conjunction with a faculty member and present two seminars: one pertaining to a literature topic, the other focused on their research. Enrollment by permission only. Previously CH 0398.

CHEM 4977 Chemistry Research and Seminar **1-3 Credits**
Students undertake a research project in conjunction with a faculty member and present two seminars: one pertaining to a literature topic, the other focused on their research. Enrollment by permission only.

CHEM 4990 Independent Study **1-3 Credits**
Prerequisite: CHEM 3362.
This course, designed for students seeking an in-depth examination of a pre-specified area under the close direction of a faculty member, presents topics not routinely encountered in the normal course sequence. Previously CH 0399.

Faculty

Professors

Harper-Leatherman, *chair*
Kubasik
Miecznikowski

Associate Professors

Smith-Carpenter
Steffen
Van Dyke

Assistant Professor

Stone
Zhang

Visiting Assistant Professors

Khalili
Henke
Nicaise

Lecturers

Betageri
Busto, Laboratory Coordinator
Cusumano
Chintapalli
Fischer, R.
Fischer, S.
Hamada
Harper
Ives
Kamal
Leahy
Sobczynski, *senior laboratory coordinator*
Taddeo
Taiwo
Tinoco

Faculty Emeriti

Boggio
O'Connell
Weddle