CHEM 101 — GENERAL CHEMISTRY I LABORATORY
1 credit.

Chemistry 101 is the laboratory only part of "Chemistry 103: General Chemistry I". CHEM 101 is intended only for students who have earned college credit prior to entering UW-Madison for a course that is equivalent to the lecture part of Chemistry 103, but not the laboratory part. Students need this lab experience or its equivalent before proceeding to Chemistry 104: General Chemistry II, the second semester of the General Chemistry sequence.

Requisites: Consent of instructor
Course Designation: Breadth - Physical Sci. Counts toward the Natural Sci req
Level - Elementary
L&S Credit - Counts as Liberal Arts and Science credit in L&S
Repeatable for Credit: No
Last Taught: Fall 2017

CHEM 102 — GENERAL CHEMISTRY II LABORATORY
1 credit.

Chemistry 102 is the laboratory only part of Chemistry 104: General Chemistry II. CHEM 102 is intended for students who have earned college credit prior to entering UW-Madison for a course that is equivalent to the lecture part of Chemistry 104, but not the laboratory part. Students need this lab experience or its equivalent to proceed to any intermediate level chemistry courses such as Organic Chemistry (341 or 343), Analytical Chemistry (327 or 329), and Inorganic Chemistry (311).

Requisites: Consent of instructor
Course Designation: Breadth - Physical Sci. Counts toward the Natural Sci req
Level - Elementary
L&S Credit - Counts as Liberal Arts and Science credit in L&S
Repeatable for Credit: No
Last Taught: Fall 2017

CHEM 103 — GENERAL CHEMISTRY I
4 credits.

Introduction. Stoichiometry and the mole concept, the behavior of gases, liquids and solids, thermochemistry, electronic structure of atoms and chemical bonding, descriptive chemistry of selected elements and compounds, intermolecular forces. For students taking one year or more of college chemistry, serves as a prereq for CHEM 104; lecture, lab, and discussion.

Requisites: Suitable math placement score or completion of MATH 112, MATH 114, MATH 171 or equivalent; not open to students who have taken CHEM 109 or 115
Course Designation: Breadth - Physical Sci. Counts toward the Natural Sci req
Level - Elementary
L&S Credit - Counts as Liberal Arts and Science credit in L&S
Repeatable for Credit: No
Last Taught: Fall 2017

CHEM 104 — GENERAL CHEMISTRY II
5 credits.

Principles and application of chemical equilibrium, coordination chemistry, oxidation-reduction and electrochemistry, kinetics, nuclear chemistry, introduction to organic chemistry, lecture, lab, and discussion.

Requisites: CHEM 103 and MATH 112, 114, or 171; not open to students who have taken CHEM 109 or 115
Course Designation: Breadth - Physical Sci. Counts toward the Natural Sci req
Level - Elementary
L&S Credit - Counts as Liberal Arts and Science credit in L&S
Repeatable for Credit: No
Last Taught: Fall 2017

CHEM 105 — GENERAL CHEMISTRY I
3 credits.

Stoichiometry and the mole concept, chemical reactions, thermochemistry, electronic structure of atoms, periodic properties, chemical bonding, intermolecular forces, and the behavior of gases, liquids and solids. First semester of a two-semester sequence for students taking one year or more of college chemistry, includes lecture and discussion. CHEM 105 is not open for general enrollment. The course provides a mechanism for awarding credit for experiences with no laboratory component, such as credit by examination. The combination of CHEM 101 and CHEM 105 is equivalent to CHEM 103. Not open to students with credit for CHEM 103, 109, or 115
Requisites: MATH 112, 114, or 171 or placement into MATH 211 or 221.
Course Designation: Breadth - Physical Sci. Counts toward the Natural Sci req
Level - Elementary
L&S Credit - Counts as Liberal Arts and Science credit in L&S
Repeatable for Credit: No
Last Taught: Fall 2017

CHEM 106 — GENERAL CHEMISTRY II
4 credits.

Principles and applications of chemical equilibrium, electrochemistry, thermodynamics, kinetics, organic chemistry and other topics that may include nuclear chemistry, biological chemistry and coordination chemistry. Second semester of a two-semester sequence for students taking one year or more of college chemistry; includes lecture and discussion. CHEM 106 is not open for general enrollment. The course provides a mechanism for awarding credit for experiences with no laboratory component, such as credit by examination. The combination of CHEM 102 and CHEM 106 is equivalent to CHEM 104. Not open to students with credit for CHEM 104, 109 or 115
Requisites: CHEM 103 or (CHEM 101 and CHEM 105) and (MATH 112, 114, or 171 or placement into MATH 211 or 221).
Course Designation: Breadth - Physical Sci. Counts toward the Natural Sci req
Level - Elementary
L&S Credit - Counts as Liberal Arts and Science credit in L&S
Repeatable for Credit: No
Last Taught: Spring 2017
CHEM 108 — CHEMISTRY IN OUR WORLD
5 credits.

Chemistry 108 is a one-semester introductory course that includes selected topics in inorganic and organic chemistry. Emphasis is on relevance to biological, environmental and social issues. Chemistry 108 is not intended for students who expect to take additional chemistry courses and it does not satisfy any prerequisites for further chemistry courses. No HS chemistry required. 1 year HS chemistry is permitted. Open to first year students. Enrollment not permitted for students who have completed CHEM 104, 109 or 115
Requisites: Appropriate for students needing only one semester of chemistry.
Course Designation: Breadth - Physical Sci. Counts toward the Natural Sci req
Level - Elementary
L&S Credit - Counts as Liberal Arts and Science credit in L&S
Repeatable for Credit: No
Last Taught: Summer 2017

CHEM 109 — ADVANCED GENERAL CHEMISTRY
5 credits.

A modern introduction to chemical principles that draws on current research themes. For students with good chemistry and mathematics background preparation who desire a one-semester coverage of general chemistry. Recommended for students intending majors in chemistry or allied fields. Lecture, lab, and discussion. Open to first year students. Enrollment not permitted for those who have completed CHEM 104 or 115
Requisites: At least 1 year HS chemistry; placement into MATH 221 or higher or equivalent math proficiency.
Course Designation: Gen Ed - Quantitative Reasoning Part B Breadth - Physical Sci. Counts toward the Natural Sci req
Level - Elementary
L&S Credit - Counts as Liberal Arts and Science credit in L&S
Repeatable for Credit: No
Last Taught: Fall 2017

CHEM 115 — CHEMICAL PRINCIPLES I
5 credits.

For specially well qualified students majoring in chemistry or chemical engineering. Lecture, lab, and quiz. Open to Fr
Requisites: Adv placement or adv HS chem, cr or con reg in MATH 221 or cons inst.
Course Designation: Gen Ed - Quantitative Reasoning Part B Breadth - Physical Sci. Counts toward the Natural Sci req
Level - Elementary
L&S Credit - Counts as Liberal Arts and Science credit in L&S
Repeatable for Credit: No
Last Taught: Fall 2017

CHEM 116 — CHEMICAL PRINCIPLES II
5 credits.

Continuation of Chemistry 115. Chemistry 115 and 116 satisfy the requirements for general chemistry and introductory analytical chemistry; lecture, lab, and discussion. Open to Fr
Requisites: CHEM 115 or cons inst.
Course Designation: Breadth - Physical Sci. Counts toward the Natural Sci req
Level - Intermediate
L&S Credit - Counts as Liberal Arts and Science credit in L&S
Honors - Accelerated Honors (!)
Repeatable for Credit: No
Last Taught: Spring 2017

CHEM 155 — STUDY ABROAD IN INTRODUCTORY CHEMISTRY
1-6 credits.

Provides equivalency for study abroad courses in introductory chemistry that do not equate to existing UW-Madison chemistry courses.
Requisites: None
Course Designation: Breadth - Physical Sci. Counts toward the Natural Sci req
Level - Elementary
L&S Credit - Counts as Liberal Arts and Science credit in L&S
Repeatable for Credit: No

CHEM 260 — ENTERING RESEARCH I
1 credit.

Seminar course designed primarily for sophomores or transfer students to begin independent research in chemistry. Taken concurrently with 1-3 research credits with faculty member. Supports independent research experience.
Requisites: None
Course Designation: Level - Intermediate
L&S Credit - Counts as Liberal Arts and Science credit in L&S
Repeatable for Credit: No
Last Taught: Fall 2017

CHEM 261 — ENTERING RESEARCH II
1 credit.

Seminar course for primarily sophomores or transfer students continuing independent research in chemistry. Taken concurrently with 1-3 research credits with faculty member. Supports independent research experience.
Requisites: Must have taken CHEM 260, or completed at least one semester of research with a faculty member.
Course Designation: Level - Intermediate
L&S Credit - Counts as Liberal Arts and Science credit in L&S
Repeatable for Credit: No
Last Taught: Spring 2016

CHEM 299 — DIRECTED STUDY
1-4 credits.

Requisites: Consent of instructor
Course Designation: Level - Intermediate
L&S Credit - Counts as Liberal Arts and Science credit in L&S
Repeatable for Credit: Yes, unlimited number of completions
Last Taught: Fall 2017
CHEM 311 — CHEMISTRY ACROSS THE PERIODIC TABLE
4 credits.

Explores the properties, reactions and uses of elements and compounds, with emphasis on coordination chemistry of transition-metal ions, bioinorganic chemistry, solid-state structure and main-group elements. The weekly three-hour laboratory introduces students to the synthesis and characterization of inorganic compounds. Open to Freshmen

Requisites: CHEM 109 or 104.

Course Designation: Breadth - Physical Sci. Counts toward the Natural Sci req
Level - Intermediate
L&S Credit - Counts as Liberal Arts and Science credit in L&S
Repeatability for Credit: No
Last Taught: Fall 2017

CHEM 327 — FUNDAMENTALS OF ANALYTICAL SCIENCE
4 credits.

Fundamentals of chemical measurement in chemistry, biology, engineering, geology, and the medical sciences. Topics include equilibria of complex systems, spectroscopy, electrochemistry, separations, and quantitative laboratory technique. Lecture, lab, and discussion.

Requisites: CHEM 104 or CHEM 109

Course Designation: Breadth - Physical Sci. Counts toward the Natural Sci req
Level - Intermediate
L&S Credit - Counts as Liberal Arts and Science credit in L&S
Repeatability for Credit: No
Last Taught: Fall 2017

CHEM 329 — FUNDAMENTALS OF ANALYTICAL SCIENCE
4 credits.

Fundamentals of chemical measurement in chemistry, biology, engineering, geology, and the medical sciences. Topics include equilibria of complex systems, spectroscopy, electrochemistry, separations, and quantitative laboratory technique. For chemistry majors, chemical engineering majors, and related majors. Lecture, lab, and discussion.

Requisites: CHEM 104 or CHEM 109

Course Designation: Breadth - Physical Sci. Counts toward the Natural Sci req
Level - Intermediate
L&S Credit - Counts as Liberal Arts and Science credit in L&S
Honors - Accelerated Honors (!)
Repeatability for Credit: No
Last Taught: Fall 2017

CHEM 341 — ELEMENTARY ORGANIC CHEMISTRY
3 credits.

Chemistry 341 is a single semester, terminal course covering selected topics in organic chemistry. Chemistry 341 is not equivalent to either Chemistry 343 or 345 and it does not satisfy the prerequisite for enrollment in Chemistry 345.

Requisites: CHEM 104, CHEM 109, or CHEM 116; not open to students who have taken CHEM 343 or CHEM 345

Course Designation: Breadth - Physical Sci. Counts toward the Natural Sci req
Level - Intermediate
L&S Credit - Counts as Liberal Arts and Science credit in L&S
Repeatability for Credit: No
Last Taught: Fall 2017

CHEM 327 — FUNDAMENTALS OF ANALYTICAL SCIENCE
4 credits.

Fundamentals of chemical measurement in chemistry, biology, engineering, geology, and the medical sciences. Topics include equilibria of complex systems, spectroscopy, electrochemistry, separations, and quantitative laboratory technique. Lecture, lab, and discussion.

Requisites: CHEM 104 or CHEM 109

Course Designation: Breadth - Physical Sci. Counts toward the Natural Sci req
Level - Intermediate
L&S Credit - Counts as Liberal Arts and Science credit in L&S
Repeatability for Credit: No
Last Taught: Fall 2017

CHEM 341 — ELEMENTARY ORGANIC CHEMISTRY LABORATORY
1 credit.

Chemistry 342 introduces organic laboratory techniques in synthesis, purification and spectral interpretation. The course is designed to accompany Chemistry 341 and topics closely follow Chemistry 341. For students who expect to take only one semester of organic chemistry and need only a single laboratory credit. Enrollment not permitted for students who have completed CHEM 344

Requisites: Completion of or concurrent enrollment in CHEM 341.

Course Designation: Breadth - Physical Sci. Counts toward the Natural Sci req
Level - Intermediate
L&S Credit - Counts as Liberal Arts and Science credit in L&S
Repeatability for Credit: No
Last Taught: Fall 2017

CHEM 343 — INTRODUCTORY ORGANIC CHEMISTRY
3 credits.

Chemistry 343 covers fundamental aspects of organic molecular structure, including stereochemistry, and introduces basic themes in organic reactivity. It is the first semester of a two-semester organic chemistry sequence. Chemistry 345 is the second course in the sequence. Class is for students expecting to take two semesters of organic chemistry.

Requisites: CHEM 104, 109, or 116

Course Designation: Breadth - Physical Sci. Counts toward the Natural Sci req
Level - Intermediate
L&S Credit - Counts as Liberal Arts and Science credit in L&S
Repeatability for Credit: No
Last Taught: Fall 2017

CHEM 344 — INTRODUCTORY ORGANIC CHEMISTRY LABORATORY
2 credits.

Chemistry 344 introduces the basic synthesis, purification, and characterization techniques of organic chemistry, along with critical interpretation of experimental data. The laboratory includes material from both Chemistry 343 and 345. May not repeat CHEM 344 if previously earned credit for CHEM 344

Requisites: Completion of or concurrent enrollment in CHEM 343.

Course Designation: Breadth - Physical Sci. Counts toward the Natural Sci req
Level - Intermediate
L&S Credit - Counts as Liberal Arts and Science credit in L&S
Repeatability for Credit: No
Last Taught: Fall 2017
CHEM 345 — INTERMEDIATE ORGANIC CHEMISTRY
3 credits.

Chemistry 345 is the second course of a two-semester sequence in organic chemistry. It covers diverse themes in organic reactivity, building on a foundation provided in Chemistry 343. Chemistry 341 does not satisfy the prerequisite for 345.

Requisites: Grade of C or better in CHEM 343
Course Designation: Breadth - Physical Sci. Counts toward the Natural Sci req
Level - Intermediate
L&S Credit - Counts as Liberal Arts and Science credit in L&S
Repeatable for Credit: No
Last Taught: Fall 2017

CHEM 346 — INTERMEDIATE ORGANIC CHEMISTRY LABORATORY
1-2 credits.

Multi-step synthetic processes. Advanced experimental techniques such as high-vacuum distillation. Independent research projects.

Requisites: CHEM 344 and 345
Course Designation: Breadth - Physical Sci. Counts toward the Natural Sci req
Level - Advanced
L&S Credit - Counts as Liberal Arts and Science credit in L&S
Repeatable for Credit: No
Last Taught: Fall 2017

CHEM 350 — COMMUNICATING CHEMISTRY TO THE PUBLIC VIA DEMONSTRATIONS
2 credits.

Through this course, students will gain experience in the safe and proper presentation of chemical demonstrations. They will join an experienced staff who enjoy doing demonstrations and who continue to develop the art of presenting them; students will learn from each other as well as staff and faculty from science departments, music, theater and other performing artists who combine their art with scientific experiments to share the joy and excitement of both artistic and scientific creativity. Public presentations will be offered both on and off campus to a wide variety of audiences (students, teachers, parents and the community at large) in a variety of settings (school settings and public venues).

Requisites: CHEM 103, 108 or 109
Course Designation: Level - Intermediate
L&S Credit - Counts as Liberal Arts and Science credit in L&S
Repeatable for Credit: No
Last Taught: Fall 2017

CHEM 353 — CHEMISTRY FOR HIGH SCHOOL TEACHERS
2-4 credits.

An intensive course for teachers of high school chemistry to strengthen their fundamental knowledge of chemistry. Lectures, laboratory, discussion. Enrollment limited to participants in workshops sponsored by the Institute for Chemical Educ

Requisites: Cons inst.
Course Designation: Breadth - Physical Sci. Counts toward the Natural Sci req
Level - Intermediate
L&S Credit - Counts as Liberal Arts and Science credit in L&S
Repeatable for Credit: No
Last Taught: Summer 2009

CHEM 355 — STUDY ABROAD IN INTERMEDIATE CHEMISTRY
1-6 credits.

Provides equivalency for study abroad courses in intermediate chemistry that do not equate to existing UW-Madison chemistry courses.

Requisites: None
Course Designation: Breadth - Physical Sci. Counts toward the Natural Sci req
Level - Intermediate
L&S Credit - Counts as Liberal Arts and Science credit in L&S
Repeatable for Credit: No

CHEM 375 — INTERMEDIATE TOPICS IN CHEMISTRY
1-4 credits.

Various topics in chemistry at the intermediate level; intended for undergraduates. Offerings will require that students have completed a college level general chemistry course as a minimum. Additional requirements may apply depending on the topic.

Requisites: Consent of instructor
Course Designation: Breadth - Physical Sci. Counts toward the Natural Sci req
Level - Intermediate
L&S Credit - Counts as Liberal Arts and Science credit in L&S
Repeatable for Credit: Yes, unlimited number of completions
Last Taught: Spring 2017

CHEM/M S & E 421 — POLYMERIC MATERIALS
3 credits.

Polymer chemistry and physics terminologies, structure-property relationship, polymer characterization, polymer synthesis, material requirements for optoelectronics including conjugated polymers, thin film transistors, light emitting diodes, non-linear optical materials, holographic data storage and liquid crystal polymers.

Requisites: CHEM 341 or equiv
Course Designation: Breadth - Physical Sci. Counts toward the Natural Sci req
Level - Intermediate
L&S Credit - Counts as Liberal Arts and Science credit in L&S
Repeatable for Credit: No
Last Taught: Spring 2017

CHEM/CBE/E M A/M E 425 — UNDERGRADUATE RHEOLOGY SEMINAR
1 credit.

Rheology seminar course encouraged for all interested in professions related to polymers, suspensions or rheology; will not count toward credit requirement of the major.

Requisites: Junior standing
Course Designation: Level - Advanced
L&S Credit - Counts as Liberal Arts and Science credit in L&S
Repeatable for Credit: Yes, unlimited number of completions
Last Taught: Fall 2011
CHEM/CBE 505 — ASPECTS OF INDUSTRIAL CHEMISTRY AND BUSINESS FUNDAMENTALS
3 credits.

The objective of this course is to educate students in the chemistry and chemical engineering that defines societies' standard of living. Commercial chemical processes will be reviewed. Practical realities of how a discovery moves from research to commercial product will be taught through examples and case studies. Financial concepts that guide investment will be reviewed.

**Requisites:** Junior standing and CHEM 345
**Course Designation:** Level - Advanced
L&S Credit - Counts as Liberal Arts and Science credit in L&S
**Repeatable for Credit:** No
**Last Taught:** Spring 2016

CHEM 509 — SENIOR SEMINAR
2 credits.

Senior Seminar provides an integrative experience that requires students to synthesize the knowledge and skills that have been introduced across the Chemistry curriculum. Through a series of seminars by faculty and advanced graduate students, specific research challenges will be identified. Groups of students will be formed and assigned the task of using the chemical literature to identify routes to the solutions of these problems, presenting their findings both in class presentations and written assignments.

**Requisites:** CHEM 561 or CHEM 565; completion of or concurrent enrollment in CHEM 563
**Course Designation:** Level - Advanced
L&S Credit - Counts as Liberal Arts and Science credit in L&S
**Repeatable for Credit:** No
**Last Taught:** Spring 2016

CHEM 511 — ADVANCED INORGANIC CHEMISTRY
3 credits.

Emphasizes the symmetry, structure and bonding of inorganic compounds. Selected topics may include applications in transition metal chemistry, organometallic chemistry, industrial catalysis, advanced bioinorganic chemistry, solid-state chemistry or main group chemistry. Students majoring or intending to major in chemistry should take CHEM 311 prior to taking CHEM 511.

**Requisites:** Students must have junior standing AND have taken or be concurrently enrolled in CHEM 345.
**Course Designation:** Breadth - Physical Sci. Counts toward the Natural Sci req
Level - Advanced
L&S Credit - Counts as Liberal Arts and Science credit in L&S
Honors - Accelerated Honors (!)
**Repeatable for Credit:** No
**Last Taught:** Spring 2016

CHEM 524 — CHEMICAL INSTRUMENTATION
3 credits.

Instrumental methods of measurements, as applied to modern chemical analysis; lecture and lab.

**Requisites:** CHEM 343, (CHEM 329 or 327), and PHYSICS (208 or 202)
**Course Designation:** Breadth - Physical Sci. Counts toward the Natural Sci req
Level - Advanced
L&S Credit - Counts as Liberal Arts and Science credit in L&S
Honors - Accelerated Honors (!)
**Repeatable for Credit:** No
**Last Taught:** Spring 2017

CHEM 547 — ADVANCED ORGANIC CHEMISTRY
3 credits.

A third semester of descriptive organic chemistry.

**Requisites:** CHEM 345
**Course Designation:** Breadth - Physical Sci. Counts toward the Natural Sci req
Level - Advanced
L&S Credit - Counts as Liberal Arts and Science credit in L&S
Honors - Accelerated Honors (!)
**Repeatable for Credit:** No
**Last Taught:** Fall 2017

CHEM 555 — STUDY ABROAD IN ADVANCED CHEMISTRY
1-6 credits.

Provides equivalency for study abroad courses in advanced chemistry that do not equate to existing UW-Madison chemistry courses.

**Requisites:** None
**Course Designation:** Breadth - Physical Sci. Counts toward the Natural Sci req
Level - Advanced
L&S Credit - Counts as Liberal Arts and Science credit in L&S
**Repeatable for Credit:** No

CHEM 561 — PHYSICAL CHEMISTRY
3 credits.

Macroscopic theory: equilibrium thermodynamics, chemical kinetics and transport properties. Not for credit for those who have taken CHEM 565

**Requisites:** CHEM 327 or 329; MATH 222; PHYSICS 201 or 207.
**Course Designation:** Breadth - Physical Sci. Counts toward the Natural Sci req
Level - Advanced
L&S Credit - Counts as Liberal Arts and Science credit in L&S
Honors - Accelerated Honors (!)
**Repeatable for Credit:** No
**Last Taught:** Fall 2017
CHEM 562 — PHYSICAL CHEMISTRY
3 credits.
Molecular theory: quantum chemistry, molecular structure and spectra, statistical mechanics, selected topics in the molecular theory of matter in bulk.
Requisites: CHEM 561 or 565 or ChE 211; PHYSICS 202 or 208
Course Designation: Breadth - Physical Sci. Counts toward the Natural Sci req
Level - Advanced
L&S Credit - Counts as Liberal Arts and Science credit in L&S
Honors - Accelerated Honors (!)
Repeatable for Credit: No
Last Taught: Fall 2017

CHEM 563 — PHYSICAL CHEMISTRY LABORATORY
1-2 credits.
Principles of experimental physical chemistry applied to the acquisition of thermodynamic and kinetic data; use of basic physical laboratory equipment; related computations, analysis of errors, interpretation of results.
Requisites: CHEM 561 or 565 or ChE 211
Course Designation: Breadth - Physical Sci. Counts toward the Natural Sci req
Level - Advanced
L&S Credit - Counts as Liberal Arts and Science credit in L&S
Repeatable for Credit: Yes, for 2 number of completions
Last Taught: Fall 2017

CHEM 564 — PHYSICAL CHEMISTRY LABORATORY
1 credit.
Principles of experimental physical chemistry applied to the acquisition and interpretation of basic data on molecular structure and dynamics, and properties of macromolecules; principles and use of spectroscopic and other electronic instrumentation. Not for cr for those who have taken 567
Requisites: CHEM 562 and 563.
Course Designation: Breadth - Physical Sci. Counts toward the Natural Sci req
Level - Advanced
L&S Credit - Counts as Liberal Arts and Science credit in L&S
Repeatable for Credit: Yes, unlimited number of completions
Last Taught: Fall 2017

CHEM 565 — BIOPHYSICAL CHEMISTRY
4 credits.
Equilibrium thermodynamics, chemical kinetics, and transport properties, with emphasis on solution behavior and applications to biological macromolecules in solution. For students interested primarily in the biological applications of physical chemistry. Not for credit for those who have taken CHEM 561
Requisites: CHEM 327 or 329; MATH 222; PHYSICS 201 or 207; Biocore 303, or BIOCHEM 501 or concurrent registration, or consent of instructor.
Course Designation: Breadth - Physical Sci. Counts toward the Natural Sci req
Level - Advanced
L&S Credit - Counts as Liberal Arts and Science credit in L&S
Repeatable for Credit: No
Last Taught: Fall 2017

CHEM 567 — PHYSICAL CHEMISTRY LABORATORY
2 credits.
Principles of experimental physical chemistry applied to the acquisition of thermodynamic and kinetic data; acquisition and interpretation of basic data on molecular structure and dynamics, and properties of macromolecules; principles and use of spectroscopic and other electronic instrumentation use of basic physical laboratory equipment; related computations, analysis of errors, interpretation of results. Not for cr for those who have taken 563 or 564
Requisites: Cr or con reg in CHEM 562.
Course Designation: Level - Advanced
L&S Credit - Counts as Liberal Arts and Science credit in L&S
Repeatable for Credit: No
Last Taught: Spring 2012

CHEM 575 — ADVANCED TOPICS IN CHEMISTRY
1-4 credits.
Various topics in chemistry intended for advanced undergraduates. Students enrolling in this course will be required to have completed at least a college level general chemistry course and some 300 level chemistry course work. Additional requirements may apply depending on the topic.
Requisites: Consent of instructor
Course Designation: Breadth - Physical Sci. Counts toward the Natural Sci req
Level - Advanced
L&S Credit - Counts as Liberal Arts and Science credit in L&S
Repeatable for Credit: Yes, unlimited number of completions

CHEM 605 — SPECTROCHEMICAL MEASUREMENTS
3 credits.
Mass spectrometry and applied nuclear magnetic resonance. Two lecture sessions, or lectures, and one problem session per week.
Requisites: CHEM 562 or cons inst
Course Designation: Breadth - Physical Sci. Counts toward the Natural Sci req
Level - Advanced
L&S Credit - Counts as Liberal Arts and Science credit in L&S
Grad 50% - Counts toward 50% graduate coursework requirement
Repeatable for Credit: No
Last Taught: Spring 2017

CHEM 606 — PHYSICAL METHODS FOR STRUCTURE DETERMINATION
1-3 credits.
A survey of spectroscopic methods for inorganic structure determination. This course will introduce the major non-crystallographic techniques with an emphasis on the application to structural analysis. The basic theory and methodology of each form of spectroscopy will be presented. Topics covered include: ligand field theory, electronic absorption, IR/ Raman, Mossbauer and EPR spectroscopies, and magnetic susceptibility.
CHEM 608 or equiv recommended
Requisites: CHEM 511 562 or cons inst.
Course Designation: Breadth - Physical Sci. Counts toward the Natural Sci req
Level - Advanced
L&S Credit - Counts as Liberal Arts and Science credit in L&S
Grad 50% - Counts toward 50% graduate coursework requirement
Repeatable for Credit: No
Last Taught: Spring 2016
CHEM 607 — LABORATORY SAFETY
1 credit.

Aspects of laboratory safety relating to chemical, electrical, optical, mechanical, cryogenic and radiological hazards will be discussed. Safety equipment, techniques (including first aid), and facilities will be introduced.

Requisites: CHEM 346 or cons inst
Course Designation: Level - Advanced
L&S Credit - Counts as Liberal Arts and Science credit in L&S
Grad 50% - Counts toward 50% graduate coursework requirement
Repeatable for Credit: No
Last Taught: Spring 2017

CHEM 608 — SYMMETRY, BONDING, AND MOLECULAR SHAPES
1-3 credits.

This course provides a solid background in elementary bonding theory and its application to understanding molecular geometry and reactivity. The course emphasizes qualitative methods applied to the bonding of elements from throughout the periodic table.

Requisites: Grad st or cons inst
Course Designation: Level - Advanced
L&S Credit - Counts as Liberal Arts and Science credit in L&S
Grad 50% - Counts toward 50% graduate coursework requirement
Repeatable for Credit: No
Last Taught: Fall 2017

CHEM 613 — CHEMICAL CRYSTALLOGRAPHY
3 credits.

Theory of structural chemistry, experimental methods involved, applications to problems of chemical interest; use of diffractometric equipment and computer data analysis for an actual structure determination.

Requisites: CHEM 562 or cons inst
Course Designation: Breadth - Physical Sci. Counts toward the Natural Sci req
Level - Advanced
L&S Credit - Counts as Liberal Arts and Science credit in L&S
Grad 50% - Counts toward 50% graduate coursework requirement
Repeatable for Credit: No
Last Taught: Spring 2017

CHEM 622 — ORGANIC ANALYSIS
2 credits.


Requisites: CHEM 345 524 or consent of instructor
Course Designation: Breadth - Physical Sci. Counts toward the Natural Sci req
Level - Advanced
L&S Credit - Counts as Liberal Arts and Science credit in L&S
Grad 50% - Counts toward 50% graduate coursework requirement
Repeatable for Credit: No
Last Taught: Fall 2017

CHEM 623 — EXPERIMENTAL SPECTROSCOPY
2-3 credits.

The theory behind current spectroscopic methods employed in chemical analysis with applications in atomic and molecular absorption spectroscopy, infrared and Raman vibrational spectroscopy, fluorescence and light scattering; lecture and laboratory projects.

Requisites: CHEM 562 or consent of instructor
Course Designation: Breadth - Physical Sci. Counts toward the Natural Sci req
Level - Advanced
L&S Credit - Counts as Liberal Arts and Science credit in L&S
Grad 50% - Counts toward 50% graduate coursework requirement
Repeatable for Credit: No
Last Taught: Spring 2016

CHEM 624 — ELECTROCHEMISTRY
2-3 credits.

Theory of interfacial electron transfer and mass transport processes in electrochemistry, with applications to electroanalysis, electrodeposition and electrochemical separations; lecture and laboratory projects.

Requisites: Graduate standing
Course Designation: Breadth - Physical Sci. Counts toward the Natural Sci req
Level - Advanced
L&S Credit - Counts as Liberal Arts and Science credit in L&S
Grad 50% - Counts toward 50% graduate coursework requirement
Repeatable for Credit: No
Last Taught: Fall 2017

CHEM 625 — SEPARATIONS IN CHEMICAL ANALYSIS
2-3 credits.

Fundamentals of transport processes and the origins of chemical potential differences giving rise to separation. Principles of chromatography, electrophoresis and field flow fractionation. Lecture and laboratory projects.

Requisites: 1 sem organic 1 sem phys chem, or cons inst
Course Designation: Breadth - Physical Sci. Counts toward the Natural Sci req
Level - Advanced
L&S Credit - Counts as Liberal Arts and Science credit in L&S
Grad 50% - Counts toward 50% graduate coursework requirement
Repeatable for Credit: No
Last Taught: Fall 2016
CHEM GENETICS 626 — GENOMIC SCIENCE
2 credits.

This course is designed to bring cutting-edge topics in the genomic sciences into the reach of traditionally "pure" chemistry, biology, engineering, computer science statistics students. It is also designed for enabling biologically-oriented students to deal with the advances in analytical science so that they may incorporate new genomic science concepts into their own scientific repertoires. Intended for graduate students and for undergraduates with extensive research experience.

Requisites: Graduate standing
Course Designation: Breadth - Physical Sci. Counts toward the Natural Sci req
Level - Advanced
L&S Credit - Counts as Liberal Arts and Science credit in L&S
Grad 50% - Counts toward 50% graduate coursework requirement
Repeatable for Credit: No
Last Taught: Spring 2017

CHEM/BMOLCHEM 627 — METHODS AND TECHNOLOGIES FOR PROTEIN CHARACTERIZATION
2-3 credits.

This course seeks to engage students interested in chemical instrumentation and those who desire to apply proteomic technologies to current biological problems. Understanding the current proteomics landscape, the limitations of these technologies, and their practical applications are among the course learning objectives.

Requisites: Graduate standing
Course Designation: Breadth - Physical Sci. Counts toward the Natural Sci req
Level - Advanced
L&S Credit - Counts as Liberal Arts and Science credit in L&S
Grad 50% - Counts toward 50% graduate coursework requirement
Repeatable for Credit: No
Last Taught: Spring 2015

CHEM 628 — CHEMICAL INSTRUMENTATION: DESIGN AND CONTROL APPLICATIONS
3 credits.

The design and application of chemical instrumentation; basic principles for monitoring and controlling chemical experiments; optical, electrical and mechanical sensors and transducers of importance to analytical chemical instrumentation; lecture and lab.

Requisites: CHEM 524, 621 or consent of instructor
Course Designation: Breadth - Physical Sci. Counts toward the Natural Sci req
Level - Advanced
L&S Credit - Counts as Liberal Arts and Science credit in L&S
Grad 50% - Counts toward 50% graduate coursework requirement
Repeatable for Credit: No
Last Taught: Spring 2017

CHEM 630 — SELECTED TOPICS IN ANALYTICAL CHEMISTRY
1-3 credits.

Lectures of a specialized nature in advanced analytical chemistry.

Requisites: CHEM 524, 621 or cons inst
Course Designation: Breadth - Physical Sci. Counts toward the Natural Sci req
Level - Advanced
L&S Credit - Counts as Liberal Arts and Science credit in L&S
Grad 50% - Counts toward 50% graduate coursework requirement
Repeatable for Credit: Yes, unlimited number of completions
Last Taught: Fall 2017

CHEM 635 — TOPICS IN COMPUTATIONAL CHEMISTRY
1 credit.

This course is designed to give students a basic understanding of computational chemistry, which can be implemented within students' research. In addition, this course will discuss new techniques and developments in the literature, and specific types of calculations that are relevant to current students' research and needs.

Requisites: Graduate standing
Course Designation: Breadth - Physical Sci. Counts toward the Natural Sci req
Level - Advanced
L&S Credit - Counts as Liberal Arts and Science credit in L&S
Grad 50% - Counts toward 50% graduate coursework requirement
Repeatable for Credit: Yes, unlimited number of completions
Last Taught: Spring 2017

CHEM 636 — TOPICS IN CHEMICAL INSTRUMENTATION: INTRODUCTION TO NMR
2 credits.

This course will instruct students on the theory and practice of NMR spectroscopy. It is a full semester course, consisting of 15 hours of lecture and 30 hours laboratory instruction. Enrollment will be limited based on avail instrumentation for lab exercises

Requisites: Cons inst.
Course Designation: Level - Advanced
L&S Credit - Counts as Liberal Arts and Science credit in L&S
Grad 50% - Counts toward 50% graduate coursework requirement
Repeatable for Credit: No
Last Taught: Fall 2017

CHEM 637 — TOPICS IN CHEMICAL INSTRUMENTATION: ADVANCED METHODS IN NMR
1-2 credits.

This course will instruct students on advanced methods of NMR spectroscopy. It is offered as a seven week module, consisting of 7 hours of lecture, 14 hours of laboratory instruction, 1 hour final exam. Enrollment will be limited based on avail instrumentation for lab exercises

Requisites: Cons inst.
Course Designation: Level - Advanced
L&S Credit - Counts as Liberal Arts and Science credit in L&S
Grad 50% - Counts toward 50% graduate coursework requirement
Repeatable for Credit: Yes, unlimited number of completions
Last Taught: Summer 2017
CHEM 638 — TOPICS IN CHEMICAL INSTRUMENTATION: INTRODUCTION TO MASS SPECTROMETRY
1 credit.

This course will introduce students to the theory and practice of mass spectrometry. It is offered as a 7 week module, consisting of 15 hours of lecture and laboratory instruction. Enrollment will be limited based on avail instrumentation for lab exercises

Requisites: Cons inst.
Course Designation: Level - Advanced
L&S Credit - Counts as Liberal Arts and Science credit in L&S
Grad 50% - Counts toward 50% graduate coursework requirement
Repeatable for Credit: No
Last Taught: Spring 2017

CHEM 641 — ADVANCED ORGANIC CHEMISTRY
3 credits.

Topics in physical organic chemistry.

Requisites: CHEM 345 or cons inst
Course Designation: Breadth - Physical Sci. Counts toward the Natural Sci req
Level - Advanced
L&S Credit - Counts as Liberal Arts and Science credit in L&S
Grad 50% - Counts toward 50% graduate coursework requirement
Repeatable for Credit: No
Last Taught: Fall 2017

CHEM/BME/MED PHYS 650 — BIOLOGICAL OPTICAL MICROSCOPY
3 credits.

This course for graduate students will cover several aspects of state of the art biological and biophysical imaging. We will begin with an overview of geometrical optics and optical and fluorescence microscopy, with an emphasis on instrumentation. The bulk of the course will focus on advanced imaging techniques including nonlinear optical processes (multi-photon excitation, second harmonic generation, and stimulated Raman processes) and emerging super-resolution methods. Special emphasis will be given to current imaging literature and experimental design.

Requisites: Senior or Graduate standing, and CHEM 104 or 109 or 116 and, PHYSICS 104 or 202 or 208
Course Designation: Level - Advanced
L&S Credit - Counts as Liberal Arts and Science credit in L&S
Grad 50% - Counts toward 50% graduate coursework requirement
Repeatable for Credit: No
Last Taught: Spring 2016

CHEM 652 — CHEMISTRY OF INORGANIC MATERIALS
3 credits.

Graduate level course on the materials chemistry of inorganic solids. Focuses on the application of chemical concepts to an understanding of properties of solids and how these properties are manifested in practical applications.

Requisites: Graduate student standing or CHEM 562 or equivalent
Course Designation: Breadth - Physical Sci. Counts toward the Natural Sci req
Level - Advanced
L&S Credit - Counts as Liberal Arts and Science credit in L&S
Repeatable for Credit: No
Last Taught: Fall 2017

CHEM 653 — CHEMISTRY OF NANOSCALE MATERIALS
3 credits.

Introduction to solid state materials chemistry, with an emphasis on contemporary topics in the chemistry of nanomaterials. Incorporates fundamental knowledge of solid-state chemistry and traditional materials chemistry with current nanoscale and nanostructural materials research.

Requisites: Graduate student standing or both CHEM 311 and CHEM 561 or equivalent
Course Designation: Breadth - Physical Sci. Counts toward the Natural Sci req
Level - Advanced
L&S Credit - Counts as Liberal Arts and Science credit in L&S
Repeatable for Credit: No
Last Taught: Spring 2017

CHEM 654 — MATERIALS CHEMISTRY OF POLYMERS
2-3 credits.

Polymer classification, synthesis, and molecular architecture; solid state structure and characterization; glassy state and glass transition; polymer rheology in solids and gels; transport, dielectric and optical properties.

Requisites: CHEM 562 or cons inst
Course Designation: Level - Advanced
L&S Credit - Counts as Liberal Arts and Science credit in L&S
Grad 50% - Counts toward 50% graduate coursework requirement
Repeatable for Credit: No
Last Taught: Fall 2014

CHEM 661 — CHEMICAL AND STATISTICAL THERMODYNAMICS
3 credits.

Basic chemical thermodynamics with applications to chemical and phase equilibria and the study of solutions; introduction to statistical mechanics and calculation of thermodynamic quantities from molecular models; stability and fluctuations.

Requisites: CHEM 561 or 565, CHEM 562; or consent of instructor
Course Designation: Breadth - Physical Sci. Counts toward the Natural Sci req
Level - Advanced
L&S Credit - Counts as Liberal Arts and Science credit in L&S
Grad 50% - Counts toward 50% graduate coursework requirement
Repeatable for Credit: No
Last Taught: Fall 2017

CHEM 664 — PHYSICAL CHEMISTRY OF MACROMOLECULES
2-3 credits.

Structure, thermodynamics, and dynamics of polymers in solution and in the bulk; theoretical models and experimental methods; polymer characterization.

Requisites: CHEM 562 or consent of instructor
Course Designation: Breadth - Physical Sci. Counts toward the Natural Sci req
Level - Advanced
L&S Credit - Counts as Liberal Arts and Science credit in L&S
Grad 50% - Counts toward 50% graduate coursework requirement
Repeatable for Credit: No
Last Taught: Spring 2017
CHEM/BIOCHEM 665 — BIOPHYSICAL CHEMISTRY  
4 credits.

Equilibrium thermodynamics, chemical kinetics and transport properties, with emphasis on solution behavior and application to noncovalent interactions of biological macromolecules in solution. For graduate students interested in the biological applications of physical chemistry. Stdts must meet prereqs for CHEM 565 have some prev background in phys chem  
Requisites: Grad st or cons inst.  
Course Designation: Level - Advanced  
L&S Credit - Counts as Liberal Arts and Science credit in L&S  
Grad 50% - Counts toward 50% graduate coursework requirement  
Repeatable for Credit: No  
Last Taught: Fall 2017

CHEM 668 — BIOPHYSICAL SPECTROSCOPY  
2-3 credits.

Focuses on the underlying principles and applications of spectroscopic and microscopy methods employed to solve biological problems at the atomic and molecular level. Techniques covered in this class include electronic absorption and fluorescence spectroscopy, circular dichroism, light scattering, fluorescence microscopy, multidimensional nuclear magnetic resonance and electron spin resonance. CHEM 562 or equivalent recommended  
Requisites: CHEM 561 or equivalent.  
Course Designation: Level - Advanced  
L&S Credit - Counts as Liberal Arts and Science credit in L&S  
Grad 50% - Counts toward 50% graduate coursework requirement  
Repeatable for Credit: No  
Last Taught: Fall 2017

CHEM 675 — INTRODUCTORY QUANTUM CHEMISTRY  
3 credits.

Basic principles of quantum chemistry, exactly solvable problems, angular momentum, approximation methods, applications to electronic structure.  
Requisites: CHEM 562 or consent of instructor  
Course Designation: L&S Credit - Counts as Liberal Arts and Science credit in L&S  
Grad 50% - Counts toward 50% graduate coursework requirement  
Repeatable for Credit: No  
Last Taught: Fall 2017

CHEM 681 — SENIOR HONORS THESIS  
2-4 credits.

An independent and original study done under the direction of a member of the staff, recommended for seniors majoring in chemistry.  
Requisites: Honors candidacy  
Course Designation: Level - Advanced  
L&S Credit - Counts as Liberal Arts and Science credit in L&S  
Honors - Honors Only Courses (H)  
Repeatable for Credit: Yes, unlimited number of completions  
Last Taught: Fall 2017

CHEM 682 — SENIOR HONORS THESIS  
2-4 credits.

Continuation of 681. Students must enroll for a total of exactly 6 credits between CHEM 681 and 682, taking either 3 credits each semester or 2 credits one semester and 4 credits the other.  
Requisites: Honors candidacy  
Course Designation: Level - Advanced  
L&S Credit - Counts as Liberal Arts and Science credit in L&S  
Honors - Honors Only Courses (H)  
Repeatable for Credit: Yes, unlimited number of completions  
Last Taught: Spring 2017

CHEM 691 — SENIOR THESIS  
2-6 credits.

An independent and original study done under the direction of a member of the staff, recommended for seniors majoring in chemistry.  
Requisites: Consent of instructor  
Course Designation: Level - Advanced  
L&S Credit - Counts as Liberal Arts and Science credit in L&S  
Repeatable for Credit: Yes, unlimited number of completions  
Last Taught: Fall 2017

CHEM 692 — SENIOR THESIS  
2-6 credits.

Continuation of 691.  
Requisites: Consent of instructor  
Course Designation: Level - Advanced  
L&S Credit - Counts as Liberal Arts and Science credit in L&S  
Repeatable for Credit: Yes, unlimited number of completions  
Last Taught: Spring 2017

CHEM 699 — DIRECTED STUDY  
1-6 credits.

Graded on a lettered basis; requires cons inst  
Requisites: Jr or Sr st.  
Course Designation: Level - Advanced  
L&S Credit - Counts as Liberal Arts and Science credit in L&S  
Repeatable for Credit: Yes, unlimited number of completions  
Last Taught: Fall 2017

CHEM/BIOCHEM 704 — CHEMICAL BIOLOGY  
2 credits.

Chemistry and biology of proteins, nucleic acids and carbohydrates; application of organic chemistry to problems in cell biology, biotechnology, and biomedicine.  
Requisites: BIOCHEM 501 or equiv, 1 yr org chem cons inst  
Course Designation: Grad 50% - Counts toward 50% graduate coursework requirement  
Repeatable for Credit: No  
Last Taught: Fall 2017
CHEM 713 — INORGANIC AND ORGANOMETALLIC CHEMISTRY OF THE MAIN GROUP ELEMENTS
1-3 credits.
A modular course consisting of 1) inorganic and 2) organometallic chemistry of main-group elements and 3) organosilicon chemistry.
Requisites: CHEM 511 or equivalent
Course Designation: Grad 50% - Counts toward 50% graduate coursework requirement
Repeatable for Credit: No
Last Taught: Fall 2017

CHEM 714 — ORGANOMETALLIC CHEMISTRY OF THE TRANSITION ELEMENTS
2-3 credits.
Requisites: CHEM 511 or consent of instructor
Course Designation: Grad 50% - Counts toward 50% graduate coursework requirement
Repeatable for Credit: No
Last Taught: Fall 2017

CHEM 715 — MOLECULAR REACTION DYNAMICS
2-3 credits.
Microscopic approach to chemical dynamics.
Requisites: CHEM 562 or cons inst
Course Designation: Grad 50% - Counts toward 50% graduate coursework requirement
Repeatable for Credit: No
Last Taught: Fall 2015

CHEM 762 — MOLECULAR RECOGNITION
2-3 credits.
Requisites: CHEM 561
Course Designation: Grad 50% - Counts toward 50% graduate coursework requirement
Repeatable for Credit: No
Last Taught: Spring 2015

CHEM 775 — ELECTRONIC STRUCTURE OF MOLECULES
2-3 credits.
Applications of quantum mechanics to the electronic structure and properties of molecules.
Requisites: CHEM 675 or cons inst
Course Designation: Grad 50% - Counts toward 50% graduate coursework requirement
Repeatable for Credit: No
Last Taught: Fall 2016

CHEM 777 — PHYSICAL CHEMISTRY OF SURFACES
2-3 credits.
Structure, thermodynamics, kinetics, and reactivity of molecules at the interfaces between gases, liquids and solids, with applications to catalysis, atmospheric chemistry, monolayers, and thin films.
Requisites: CHEM 562 or cons inst
Course Designation: Grad 50% - Counts toward 50% graduate coursework requirement
Repeatable for Credit: No
Last Taught: Fall 2015

CHEM 801 — SELECTED TOPICS IN INORGANIC CHEMISTRY
1-3 credits.
Requisites: Graduate or professional standing
Course Designation: Grad 50% - Counts toward 50% graduate coursework requirement
Repeatable for Credit: Yes, unlimited number of completions
Last Taught: Spring 2017

CHEM 841 — ADVANCED ORGANIC CHEMISTRY
3 credits.
Synthesis of simple and complex organic compounds.
Requisites: CHEM 641
Course Designation: Grad 50% - Counts toward 50% graduate coursework requirement
Repeatable for Credit: No
Last Taught: Spring 2017

CHEM 842 — ADVANCED ORGANIC CHEMISTRY
1-3 credits.
Selected topics.
Requisites: Graduate or professional standing
Course Designation: Grad 50% - Counts toward 50% graduate coursework requirement
Repeatable for Credit: No
Last Taught: Spring 2016

CHEM 843 — ADVANCED ORGANIC CHEMISTRY
1-3 credits.
Requisites: Graduate or professional standing
Course Designation: Grad 50% - Counts toward 50% graduate coursework requirement
Repeatable for Credit: No
Last Taught: Fall 2016
CHEM 860 — SELECTED TOPICS IN PHYSICAL CHEMISTRY
1-3 credits.

Requisites: Graduate or professional standing
Course Designation: Grad 50% - Counts toward 50% graduate coursework requirement
Repeatable for Credit: Yes, unlimited number of completions
Last Taught: Spring 2017

CHEM 864 — STATISTICAL MECHANICS
2-3 credits.

Fundamentals of statistical mechanics; applications to equilibrium and non-equilibrium properties of gases and condensed phases; selected advanced topics.

Requisites: CHEM 661 675 or cons inst
Course Designation: Grad 50% - Counts toward 50% graduate coursework requirement
Repeatable for Credit: No
Last Taught: Spring 2016

CHEM/BIOCHEM 872 — SELECTED TOPICS IN MACROMOLECULAR AND BIOPHYSICAL CHEMISTRY
1-3 credits.

Requisites: Graduate or professional standing
Course Designation: Grad 50% - Counts toward 50% graduate coursework requirement
Repeatable for Credit: Yes, unlimited number of completions
Last Taught: Fall 2017

CHEM 900 — SEMINAR-INORGANIC CHEMISTRY
0 credits.

Requisites: Graduate or professional standing
Course Designation: Grad 50% - Counts toward 50% graduate coursework requirement
Repeatable for Credit: Yes, unlimited number of completions
Last Taught: Fall 2017

CHEM 901 — SEMINAR-TEACHING OF CHEMISTRY
1 credit.

The role of the teaching assistant in undergraduate chemistry instruction. Effective utilization of instructional aids. Innovations for better teaching.

Requisites: Graduate or professional standing
Course Designation: Grad 50% - Counts toward 50% graduate coursework requirement
Repeatable for Credit: Yes, unlimited number of completions
Last Taught: Fall 2017

CHEM 915 — SEMINAR-STRUCTURE AND BONDING IN INORGANIC COMPOUNDS
1 credit.

Requisites: Graduate or professional standing
Course Designation: Grad 50% - Counts toward 50% graduate coursework requirement
Repeatable for Credit: Yes, unlimited number of completions
Last Taught: Fall 2016

CHEM/BIOCHEM 918 — SINGLE MOLECULE APPROACHES TO BIOLOGY
1 credit.

A combination of recent literature and original research presentations relating to the use of single molecule techniques in biochemistry including fluorescence microscopy, tethered particle motion, patch-clamping, cryo-electron microscopy, optical trapping, magnetic tweezers, and super resolution microscopy.

Requisites: Graduate or professional standing
Course Designation: Grad 50% - Counts toward 50% graduate coursework requirement
Repeatable for Credit: Yes, unlimited number of completions
Last Taught: Fall 2017

CHEM 920 — SEMINAR-ANALYTICAL CHEMISTRY
0 credits.

Prepared seminar covering diverse advanced topics.

Requisites: Graduate or professional standing
Course Designation: Grad 50% - Counts toward 50% graduate coursework requirement
Repeatable for Credit: Yes, unlimited number of completions
Last Taught: Fall 2017

CHEM 923 — SEMINAR-SPECTROSCOPY AND SPECTROCHEMICAL ANALYSIS
1 credit.

Requisites: Graduate or professional standing
Course Designation: Grad 50% - Counts toward 50% graduate coursework requirement
Repeatable for Credit: Yes, unlimited number of completions
Last Taught: Fall 2017

CHEM/CBE/E M A/M E 925 — RHEOLOGY RESEARCH SEMINAR
1 credit.

Exploration of the most recent research literature on viscoelasticity, constitutive equations, non-Newtonian flow systems, fluid metering devices, kinetic theory of macromolecules, and rheooptical phenomena. Periodic reports on recent advances made by research workers in the various rheology groups on the Madison campus.

Requisites: Graduate or professional standing
Course Designation: Grad 50% - Counts toward 50% graduate coursework requirement
Repeatable for Credit: Yes, unlimited number of completions
Last Taught: Fall 2011

CHEM 940 — SEMINAR-ORGANIC CHEMISTRY
0 credits.

Requisites: Graduate or professional standing
Course Designation: Grad 50% - Counts toward 50% graduate coursework requirement
Repeatable for Credit: Yes, unlimited number of completions
Last Taught: Fall 2017
CHEM 941 — SEMINAR—SYNTHETIC ORGANIC CHEMISTRY
1 credit.

Requisites: Graduate or professional standing
Course Designation: Grad 50% - Counts toward 50% graduate coursework requirement
Repeatable for Credit: Yes, unlimited number of completions
Last Taught: Fall 2016

CHEM 942 — SEMINAR—PHYSICAL ORGANIC CHEMISTRY
1 credit.

Requisites: Graduate or professional standing
Course Designation: Grad 50% - Counts toward 50% graduate coursework requirement
Repeatable for Credit: Yes, unlimited number of completions
Last Taught: Spring 2016

CHEM 943 — SEMINAR—BIO—ORGANIC CHEMISTRY
1 credit.

Requisites: Graduate or professional standing
Course Designation: Grad 50% - Counts toward 50% graduate coursework requirement
Repeatable for Credit: Yes, unlimited number of completions
Last Taught: Spring 2016

CHEM/BIOCHEM 945 — SEMINAR—CHEMICAL BIOLOGY (ADVANCED)
1 credit.

Recent published research in chemical biology and related areas.
Intended for advanced graduate students, and required of all NIH Chemistry-Biology Interface trainees.
Requisites: Graduate or professional standing
Course Designation: Grad 50% - Counts toward 50% graduate coursework requirement
Repeatable for Credit: Yes, unlimited number of completions
Last Taught: Spring 2017

CHEM 960 — SEMINAR—PHYSICAL CHEMISTRY
2 credits.

Requisites: Graduate or professional standing
Course Designation: Grad 50% - Counts toward 50% graduate coursework requirement
Repeatable for Credit: Yes, unlimited number of completions
Last Taught: Fall 2017

CHEM 964 — SEMINAR: MOLECULAR DYNAMICS
1 credit.

Requisites: Graduate or professional standing
Course Designation: Grad 50% - Counts toward 50% graduate coursework requirement
Repeatable for Credit: Yes, unlimited number of completions
Last Taught: Fall 2017

CHEM 990 — RESEARCH—ORGANIC
1-12 credits.

Requisites: Consent of instructor
Course Designation: Grad 50% - Counts toward 50% graduate coursework requirement
Repeatable for Credit: Yes, unlimited number of completions
Last Taught: Fall 2017

CHEM 991 — RESEARCH GENERAL
1-12 credits.

Requisites: Consent of instructor
Course Designation: Grad 50% - Counts toward 50% graduate coursework requirement
Repeatable for Credit: No
Last Taught: Fall 2014

CHEM 992 — RESEARCH—PHYSICAL
1-12 credits.

Requisites: Consent of instructor
Course Designation: Grad 50% - Counts toward 50% graduate coursework requirement
Repeatable for Credit: No
Last Taught: Fall 2017

CHEM 993 — RESEARCH—ANALYTICAL
1-12 credits.

Requisites: Consent of instructor
Course Designation: Grad 50% - Counts toward 50% graduate coursework requirement
Repeatable for Credit: No
Last Taught: Fall 2017

CHEM 994 — RESEARCH—INORGANIC
1-12 credits.

Requisites: Consent of instructor
Course Designation: Grad 50% - Counts toward 50% graduate coursework requirement
Repeatable for Credit: No
Last Taught: Fall 2017

CHEM 995 — RESEARCH—MACROMOLECULAR CHEMISTRY
1-12 credits.

Requisites: Consent of instructor
Course Designation: Grad 50% - Counts toward 50% graduate coursework requirement
Repeatable for Credit: No
Last Taught: Fall 2017

CHEM 996 — RESEARCH—MATERIALS CHEMISTRY
1-12 credits.

Graduate thesis research in materials chemistry.
Requisites: Consent of instructor
Course Designation: Grad 50% - Counts toward 50% graduate coursework requirement
Repeatable for Credit: Yes, unlimited number of completions
Last Taught: Fall 2017

CHEM 998 — RESEARCH—CHEMICAL BIOLOGY
1-12 credits.

Graduate thesis research in Chemical Biology.
Requisites: Graduate or professional standing
Course Designation: Grad 50% - Counts toward 50% graduate coursework requirement
Repeatable for Credit: Yes, unlimited number of completions
Last Taught: Fall 2017