Chemistry (CHEM)

Courses

CHEM 1001. FYE: Chemistry. 1 Hour.
Strongly recommended for entering freshmen and transfer students with 0-24 credits interested in the BS degree in chemistry. Designed to help students adapt to college life and become integrated into DSU. Students will refine academic skills, learn about college resources and procedures, and explore different fields of study, degree options, and career opportunities. Multiple listed with all other sections of FYE (all 1001 courses and ENGR 1000). Students may only take one FYE course for credit. FA.

CHEM 1010. Intro to Chemistry. 3 Hours.
Fulfills General Education Physical Science requirement for students majoring in Business, Communication, Fine Arts, Humanities, and other non-Science disciplines. Emphasizes basic chemical concepts within daily life. CHEM 1015 lab course recommended but not required. FA, SP, SU.

CHEM 1015. Intro to Chemistry Lab. 1 Hour.
Lab portion of CHEM 1010. Lab fee required. Corequisite: CHEM 1010. FA, SP.

CHEM 1100. Elem General/Organic Chemistry. 4 Hours.
Fulfills General Education Physical Science requirement for students majoring in Health Sciences, Family & Consumer Science, Natural Resources, or Agriculture. Not appropriate for students majoring in Life Sciences, Physical Sciences, pre-Medical, pre-Dental or other pre-professional program. First semester in a 2-course sequence covering fundamental laws and reactions of general inorganic and organic chemistry, including the basic organic functional groups. Successful completion satisfies prerequisite for CHEM 1120. Prerequisite: MATH 1000 or MATH 1010 or Math Placement score 23 or higher. Corequisite: CHEM 1110. FA, SP, SU.

CHEM 1110. Elem General/Organic Chemistry Lab. 1 Hour.
Lab portion of CHEM 1110. Successful completion satisfies pre-requisite for CHEM 1125. Lab fee required. Corequisite: CHEM 1110. FA, SP, SU.

CHEM 1115. Elem General/Organic Chemistry Lab. 1 Hour.
Lab portion of CHEM 1115. Successful completion satisfies pre-requisite for CHEM 1125. Lab fee required. Corequisite: CHEM 1115. FA, SP, SU.

CHEM 1200. Preparation for Gen Chemistry. 3 Hours.
For students with little or no background in Chemistry and is designed to prepare students for General Chemistry. Covers basic topics through lecture and online problems. Prerequisite: MATH 1050 (can be concurrently enrolled).

CHEM 1210. Principles of Chemistry I. 4 Hours.
Fulfills General Education Physical Science requirement for students majoring in Life or Physical Sciences, Engineering, and pre-professional programs (pre-medical, pre-dental, etc.). Provides theoretical and practical framework for further study in the sciences; emphasizes measurement, stoichiometry, the nature of the atom, chemical periodicity, the states of matter, thermodynamics and bonding. Successful completion satisfies prerequisite for CHEM 1220. Completion of a prior Chemistry course is strongly recommended before enrolling in this course. Prerequisite: MATH 1050 (Grade C or higher), or equivalent placement score taken within 2 years prior to enrollment in this course. Corequisite: CHEM 1215. FA, SP.

CHEM 1215. Principles of Chemistry I Lab. 1 Hour.
Lab portion of CHEM 1215. Successful completion satisfies pre-requisite for CHEM 1225. Lab fee required. Corequisite: CHEM 1215. FA, SP.

CHEM 1220. Principles of Chemistry II. 4 Hours.
Continuation of CHEM 1210. Emphasizes kinetics, equilibrium, descriptive chemistry, nuclear chemistry, and special topics. Successful completion prepares students for and satisfies prerequisite for CHEM 2310 and further study in life and physical sciences. Prerequisite: CHEM 1210 (Grade C- or higher). Corequisite: CHEM 1225. FA, SP.

CHEM 1225. Principles of Chemistry II Lab. 1 Hour.
Lab portion of CHEM 1225. Successful completion satisfies prerequisite for CHEM 2315. Lab fee required. Prerequisite: CHEM 1225. Corequisite: CHEM 1220. FA, SP.

CHEM 2310. Organic Chemistry I. 4 Hours.
For Chemistry, Biology, pre-Medical, pre-Dental, pre-Optometry, pre-Pharmacy majors, pre-Chiropractic, pre-Medical Technician, and pre-Veterinary majors. Introduction to functional groups and related reactions, including an introduction to spectroscopy. Successful completion satisfies prerequisite for CHEM 2320. Prerequisite: CHEM 1220 (Grade C- or higher). Corequisite: CHEM 2315. FA, SP.

CHEM 2315. Organic Chemistry I Lab. 1 Hour.
Lab portion of CHEM 2315. Lab fee required. Prerequisite: CHEM 1225 (Grade C- or higher). Corequisite: CHEM 2310. FA, SP.

CHEM 2320. Organic Chemistry II. 4 Hours.
A continuation of CHEM 2310. Further study of functional groups and related reactions, including organic reactions necessary for synthesis of larger molecules. Successful completion prepares students for further study in biochemistry and physical chemistry. Prerequisite: CHEM 2310 (Grade C- or higher). Corequisite: CHEM 2325. FA, SP.
CHEM 2325. Organic Chemistry II Lab. 1 Hour.
Lab portion of CHEM 2320. Lab fee required. Prerequisite: CHEM 2315 (Grade C- or higher). Corequisite: CHEM 2320. FA, SP.

CHEM 2700R. Field Methods in Chemistry Research. 1 Hour.
A preparatory course for undergraduate participation in field research projects in chemistry. Repeatable for a maximum of 3 credits. Prerequisite: CHEM 1215 (Grade B- or higher). Course fee required.

CHEM 2990. Seminar in Chemistry. 0.5-3 Hours.
For students wishing seminar that is not available through other regularly scheduled courses in this discipline. Occasionally, either students request some type of non-traditional instruction, or an unanticipated opportunity for instruction presents itself. This seminar course provides a variable-credit context for these purposes. As requirements, this seminar course must first be pre-approved by the department chair; second, it must provide at least nine contact hours of lab or lecture for each credit hour offered; and third, it must include some academic project or paper (i.e., credit is not given for attendance alone). This course may include standard lectures, travel and field trips, guest speakers, laboratory exercises, or other non-traditional instruction methods. Note that this course is an elective and does not fulfill general education or program requirements. Prerequisite: Instructor permission.

CHEM 3000. Quantitative Chemical Analysis. 4 Hours.
This course is focusing on understanding the principles of analytical chemistry and the application of these principles in various scientific disciplines. This course is addressing aspects of modern chemical analysis with emphasis on chemical equilibrium. Volumetric, gravimetric, and instrumental methods are described. Course will cover basic statistics, chemical equilibrium, gravimetric analysis, volumetric analysis, acid-base chemistry, complexation, spectrophotometry, and separations. Prerequisite: CHEM 1220 (Grade C or higher). FA (even).

CHEM 3060. Physical Chemistry 1. 4 Hours.
A problem-oriented course in atomic and molecular structure, states of matter, and chemical kinetics. Introduction to efficient retrieval of information from the physical chemical literature and thinking critically about the material. Students will understand the difference between classical and quantum mechanics, understanding the time, length, and energy scales on which chemical processes occur, and connect common approximation methods to standard chemical frameworks. Prerequisites: CHEM 1220 and PHYS 2210 (Grade C or higher). FA (odd).

CHEM 3065. Physical Chemistry I Lab. 1 Hour.
A problem-oriented course in atomic and molecular structure, states of matter, and chemical kinetics. Introduction to efficient retrieval of information from the physical chemical literature and thinking critically about the material. Students will understand the difference between classical and quantum mechanics, understanding the time, length, and energy scales on which chemical processes occur, and connect common approximation methods to standard chemical frameworks. Lab fee required. Prerequisites: CHEM 2320 and CHEM 2325 (both Grade C or higher), and PHYS 2210 and PHYS 2215 (both Grade C or higher). Corequisite: CHEM 3060. FA (odd).

CHEM 3070. Physical Chemistry II. 4 Hours.
Introduction to microscopic and bulk thermodynamics, partition functions, theory of electrolytes and electrochemistry, and chemical kinetics. Prerequisites: CHEM 3060 (Grade C or higher) and MATH 2210 (Grade C or higher). SP (even).

CHEM 3075. Physical Chemistry II Lab. 1 Hour.
A problem-oriented course in atomic and molecular structure, states of matter, and chemical kinetics. Introduction to efficient retrieval of information from the physical chemical literature and thinking critically about the material. Students will understand the kinetics and thermochemistry. The will gain understanding in statistical distributions, mechanistic pathways, and energy scales on which chemical processes occur, and connect common approximation methods to standard chemical frameworks. Prerequisite: CHEM 1220 and CHEM 2320 and PHYS 2210 (all Grade C or higher). Corequisite: CHEM 3070. SP (even).

CHEM 3100. Inorganic Chemistry. 4 Hours.
Covers current theory and concepts in inorganic chemistry with an emphasis on general trends and periodic properties of the elements and their compounds. Topics include bonding and structure, acid-base theories, redox properties, molecular symmetry, coordination compounds, and crystal-field theory. Students will expand their knowledge of the role of metals in nature and use gained knowledge and critical thinking skills for problem solving. Prerequisites: CHEM 2320 and CHEM 2325. FA.

CHEM 3300. Instrumental Analysis. 4 Hours.
Focuses on understanding the theory and practice of modern analytical instrumentation. Course emphasis will be placed on chromatography, optical spectroscopy, mass spectrometry, microscopy as well as sample preparation techniques, statistical data treatment, and quality assurance of data. Course fee required. Prerequisite: CHEM 3000 (Grade C or higher). SP (odd).

CHEM 3510. Biochemistry I. 3 Hours.
Covers cellular metabolism of biologically-important molecules (carbohydrate, lipids, proteins, and nucleic acids) as well as regulation of these metabolic processes. Principles will be taught using structure/function relationships. Prerequisites: BIOL 1610 AND BIOL 1615; AND CHEM 2320 AND CHEM 2325 (all Grade C- or higher). Corequisite: CHEM 3515. FA.

CHEM 3515. Biochemistry I Lab. 1 Hour.
Introduction to current biochemical techniques including spectrophotometry, chromatography, and electrophoresis. Includes analysis and manipulation of nucleic acids. Lab fee required. Prerequisite: CHEM 2325 (Grade C or higher). Corequisite: CHEM 3510. FA.

CHEM 3520. Biochemistry II. 3 Hours.
Continuation of Biochemistry I. Introduction into catabolic and anabolic processes of animal and plant metabolism. Includes protein and nucleic acid biosynthesis and signal transduction. Discussion of current biochemical methods. Prerequisite: CHEM 3510 (Grade C or higher). SP.

CHEM 3525. Biochemistry II Lab. 1 Hour.
A laboratory course to be taken concurrently with CHEM 3520. Lab fee required. Prerequisite: CHEM 3515 (Grade C or higher). Corequisite: CHEM 3520. SP.
CHEM 4100. Advanced Inorganic Chemistry. 3 Hours.
A continuation of CHEM 3100. Topics may include more in-depth emphasis on molecular symmetry, group theory, organometallic reactions, bonding and structure, acid-base theories, redox properties, coordination compounds, and crystal-field theory. Students will expand their knowledge of the role of metals in nature and use gained knowledge and critical thinking skills for problem solving. Prerequisite: CHEM 3100 (Grade C or higher). SP (odd).

CHEM 4200. Environmental Chemistry. 3 Hours.
This course will focus on the fundamental principles of chemistry necessary for understanding of the source, fate, and reactivity of compounds in natural and polluted environments. Emphasis will be placed on the environmental implications of energy utilization and on the chemistry of the atmosphere, hydrosphere, and lithosphere. Environmental issues that will be discussed include air pollution, stratospheric ozone depletion, pollution and treatment of water sources, and the utilization of insecticides and herbicides. Prerequisite: CHEM 2320 (Grade C or higher). FA (odd).

CHEM 4310. Adv Organic Chemistry I. 3 Hours.
A problem-oriented course in organic structure, stereochemistry, and thermodynamics and kinetics in organic reaction mechanisms. Introduction to efficient retrieval of information from the organic chemical literature, and to thinking critically about the material. Introduction to molecular orbital theory and aromaticity and resulting spectroscopic properties. Prerequisite: CHEM 2310 (Grade C or higher); AND CHEM 2320 (Grade C or higher); AND CHEM 2325 (Grade C or higher). Offered based upon sufficient student need.

CHEM 4510. Chemistry of Materials. 3 Hours.
Provides the molecular understanding of materials structure and properties, including solid-state chemistry, chemical bonding in bulk materials, and properties of materials as function of local and extended structures. Topics include inorganic solids, organic and coordination polymers, organic conductors, hybrid materials, optical and magnetic materials, and biomaterials. Prerequisites: CHEM 2310, CHEM 2320, CHEM 2325; and either CHEM 3100 or CHEM 4310, or instructor permission. FA, SP.

CHEM 4800R. Independent Research. 1-3 Hours.
An independent research course that allows the students to explore science through the scientific method, and allows close interaction between the student and faculty member to address scientific problems through experiment design and execution. Projects are at the discretion of the faculty member, in line with the student's interests in the various scientific areas. Repeatable up to 6 credits subject to graduation and program restrictions. Prerequisites: CHEM 2310 AND CHEM 2320 AND CHEM 2325; AND ENGL 2010 or ENGL 2010; AND instructor permission. Variable credit: 1-3. Offer based upon sufficient student need.

CHEM 4910. Chemistry Senior Seminar. 1 Hour.
A seminar course where students will share their research results or literature searches with fellow students and faculty in written and oral formats. Prerequisites: CHEM 2320 and CHEM 2325 (Grade C or higher); and ENGL 2010(Grade C or higher); Advanced Standing; and Instructor Permission. FA, SP.