

DEPARTMENT OF CHEMISTRY

Department Chair: Scott Simpson, Ph.D.

Faculty

D. Brestensky, Ph.D.
D. Hilmey, Ph.D.
K. Ogawa, Ph.D.
A. Rupprecht, Ph.D.
P. Schneider, M.A.
S. Simpson, Ph.D.

The department of chemistry provides courses to serve a variety of students. The chemistry major finds a curriculum designed to impart a broad competence in the traditional areas of chemistry. Sufficient flexibility remains to allow secondary concentrations in a wide variety of other areas, such as biology, foreign language, or mathematics, among others. With early planning, double majors are also possible.

The University's general requirements guarantee a well-rounded, liberal arts education. Possible career paths include positions in the chemical industry or in adolescence education, graduate school, medical school, dental school, and law school.

Chemistry majors are required to participate in research projects for credit (see CHEM 498-499). These students expand the boundaries of chemical knowledge as they learn to interpret data critically and solve theoretical and/or synthetic problems; some coauthor a peer-reviewed publication with our faculty before they graduate. Also, internships with local companies are encouraged.

The department houses a substantial suite of instrumentation and theoretical chemistry computing resources. Many brand-new items were acquired in 2018-19. Undergraduates get hands-on access to all instrumentation during classes and research projects. Use links on www.sbu.edu/academics/chemistry to view our current list of instrumentation.

Science students who are not chemistry majors, but take chemistry courses as part of their departmental requirements, gain knowledge of the fundamentals of chemistry to aid in the understanding of their major field.

Please note that chemistry lectures and labs are separate courses.

- Chemistry Adolescence Education, BS (<https://catalog.sbu.edu/undergraduate/arts-sciences/chemistry/chemistry-aded-bs/>)
- Chemistry, BS (<https://catalog.sbu.edu/undergraduate/arts-sciences/chemistry/chemistry-bs/>)
- Chemistry, Minor (<https://catalog.sbu.edu/undergraduate/arts-sciences/chemistry/chemistry-minor/>)

Chemistry (CHEM)

CHEM-091 PROBLEM SOLVING IN CHEMISTRY (1 Credit)

One credit hour of lecture per week. This course will teach the necessary techniques, strategies, and skills for solving problems in general chemistry. The problem solving sessions will follow closely with the subject material as it is presented in CHEM 101 lectures.

Corequisite(s): TAKE CHEM-101

CHEM-100 INTRODUCTION TO CHEM. (3 Credits)

An introduction to the discipline of chemistry and an inventory of the basic materials of chemistry. The course presents a modern view of chemistry suitable for pupils with a wide range of skills and abilities.

Corequisite(s): TAKE CHML-100

CHEM-101 GENERAL CHEMISTRY I (3 Credits)

Three hours of lecture per week. This course covers the atomic theory of matter, stoichiometry, gases, thermochemistry, atomic and molecular structures, condensed phases and solutions.

Corequisite(s): Take CHML-101 High School Chemistry, CHEM-091 or dept chair's permission

CHEM-102 GENERAL CHEMISTRY II (3 Credits)

Three hours of lecture per week. A continuation of Chemistry 101. Topics covered include chemical kinetics, acid-base chemistry, gas-phase and solution equilibria, oxidation-reduction reactions, electrochemistry, and some descriptive chemistry.

Prerequisite(s): Take CHEM-101

Corequisite(s): CHML-102

CHEM-201 ANALYTICAL CHEMISTRY (3 Credits)

Three hours of lecture a week. A study of the theory and techniques of quantitative analysis, including gravimetric, volumetric, potentiometric, spectrophotometric and chromatographic methods.

Prerequisite(s): Take CHEM-102

Corequisite(s): CHML-201

CHEM-301 ORGANIC CHEMISTRY I (3 Credits)

Three hours of lecture a week. This class integrates modern and classical theories of organic chemistry. Topics include structural formulas, equilibrium and rate concepts, stereochemistry, and reaction mechanisms of alkanes, alkenes, haloalkanes, alcohols, and phenols.

Prerequisite(s): Take CHEM-102

Corequisite(s): CHML-301

CHEM-302 ORGANIC CHEMISTRY II (3 Credits)

Three hours of lecture a week. A continuation of Chemistry 301. The structure, properties and reaction mechanisms of aldehydes and ketones, carboxylic acids and their derivatives, amines, and aromatic compounds are discussed. A thorough introduction to structural analysis by NMR and IR spectroscopy is included.

Prerequisite(s): Take CHEM-301

CHEM-401 PHYSICAL CHEMISTRY I (3 Credits)

Three hours of lecture a week. A systematic application of physical and mathematical principles to chemical systems. Topics addressed include classical thermodynamics, equilibrium systems, and chemical kinetics.

Prerequisite(s): Take CHEM-102 CHML-102 MATH-152 or department chair's permission

Corequisite(s): CHML-401 or department chair's permission

CHEM-402 PHYSICAL CHEMISTRY II (3 Credits)

Three hours of lecture a week. Topics addressed include quantum theory, atomic and molecular structure, chemical bonding and spectra, and an introduction to statistical mechanics and chemical dynamics.

Prerequisite(s): Take CHEM-102, CHML-102, & MATH-152 or department chair's permission

Corequisite(s): CHML-402 or department chair's permission

CHEM-427 SEMINAR IN CHEMISTRY (0 Credits)

One hour a week. A lecture-discussion program devoted to current advances in chemistry and their relations to fundamental chemical principles.

Restrictions: RG.86+

CHEM-427A SEMINAR IN CHEMISTRY (1 Credit)

One hour a week. A lecture-discussion program devoted to current advances in chemistry and their relations to fundamental chemical principles.

Restrictions: RGC.119

CHEM-431 INSTRUMENTAL ANALYSIS (3 Credits)

Three hours of lecture a week. A study of the theory and techniques of instrumental analysis, such as, potentiometry, polarography, spectroscopy, chromatography, mass spectrometry, NMR, and other advanced instrumental techniques.

Prerequisite(s): CHEM-302 CHML-302 & PHYS-104

Corequisite(s): Take CHML-431 or department chair's permission

CHEM-441 ADVANCED INORGANIC CHEMISTRY (3 Credits)

Three hours of lecture a week. A study of the basic models and concepts fundamental to inorganic chemistry and an introduction to the bonding, reaction mechanisms and spectroscopic properties of transition metal complexes.

Prerequisite(s): Take CHEM-302 and CHML-302 or department chair's permission

Corequisite(s): Take CHML-441 or department chair's permission

CHEM-470 MECHANISMS IN BIOLOGICAL SYSTM (3 Credits)

Three hours of lecture a week. The well-established mechanistic principles of organic chemistry will be applied to chemical reactions occurring in vivo. Topics include the mechanisms for the metabolism of carbohydrates, fats, and amino acids.

Prerequisite(s): Take CHEM-302

CHEM-480 SP.TOPICS IN CHEMISTRY (2-3 Credits)

An upper level/seminar on a specific topic of special interest to a member of the department's faculty. The specific topic and instructor will be announced prior to registration for the semester in which it is offered.

Prerequisite(s): Take CHEM-302 CHML-302

CHEM-498 UNDERGRADUATE RESEARCH (1-3 Credits)

Original research is performed under the supervision of a faculty member; both library and laboratory work are expected. Prerequisite: at least sophomore standing and consent of the faculty member involved.

Prerequisite(s): Take CHEM-102 CHML-102 and consent of faculty member involved

Restrictions: RG.24+

CHEM-499 UNDERGRADUATE RESEARCH (1-3 Credits)

A continuation of Chemistry 498. A comprehensive written research report is required.

Restrictions: RG.24+

Chemistry Lab (CHML)

CHML-100 INTROD. TO CHEMISTRY LAB (1 Credit)

Three hours of laboratory per week. This laboratory includes hands-on experiments that have real-world applications and/or experiments designed to reinforce concepts taught in CHEM 100.

Corequisite(s): #TAKE CHEM-100

CHML-101 GEN CHEM I LAB (1 Credit)

Three hours of laboratory per week. This laboratory includes experiments designed to reinforce concepts taught in Chemistry 101.

Corequisite(s): Take CHEM-101

CHML-102 GEN CHEM II LAB (1 Credit)

Four hours of laboratory per week. This laboratory includes experiments designed to reinforce concepts taught in Chemistry 102.

Prerequisite(s): Take CHML-101

Corequisite(s): CHEM-102

CHML-201 ANALYTICAL CHEM. LAB (1 Credit)

Four hours of laboratory a week. The analytical determinations will encompass the main techniques considered in Chemistry 201.

Prerequisite(s): Take CHML-102

Corequisite(s): CHEM-201

CHML-301 ORGANIC CHEM I LAB (1 Credit)

Four hours of laboratory a week. This laboratory course integrates the practical aspects of organic chemistry with theory. Experiments are designed to teach basic techniques of separation, purification and analysis, and to synthesize various functional groups discussed in Chemistry 301.

Corequisite(s): Take CHEM-301

CHML-302 ORGANIC CHEM II LAB (1 Credit)

Four hours of laboratory a week. A continuation of Chemistry 301L. Synthetic experiments correlated closely with topics in Chemistry 302.

Prerequisite(s): Take CHML-301

Corequisite(s): CHEM-302

CHML-303 ESSENTIALS OF ORG CHEM LAB (0 Credits)**CHML-401 PHYSICAL CHEM I LAB (1 Credit)**

Four hours of laboratory per week. This laboratory includes experiments designed to reinforce concepts taught in Chemistry 401.

Corequisite(s): Take CHEM-401

CHML-402 PHYSICAL CHEM II LAB (1 Credit)

Four hours of laboratory per week. This laboratory includes experiments designed to reinforce concepts taught in Chemistry 402.

Prerequisite(s): Take CHML-401

Corequisite(s): CHEM-402

CHML-431 INSTRUMENTAL ANALYSIS LAB (1 Credit)

Four hours of laboratory a week. Introduction to analytical techniques associated with utilizing modern instruments, such as a polarograph, UV, NMR, and IR instruments, and a gas chromatograph.

Prerequisite(s): Take CHEM-302 CHML-302 PHYS-104 or department chair's permission

Corequisite(s): Take CHEM-431 or department chair's permission

CHML-441 ADVANCED INORGANIC LABORATORY (1 Credit)

Four hours of laboratory per week. This laboratory includes experiments designed to reinforce concepts taught in CHEM 441.

Corequisite(s): Take CHEM-441 or department chair's permission