CHEMISTRY (CHEM)

CHEM 101 - Fundamental Chemistry I (4 Credits)
A science elective surveying inorganic and solution chemistry. First of a terminal two-semester sequence. Three lecture, one recitation, and two laboratory hours per week.
Carolina Core: SCI

CHEM 102 - Fundamental Chemistry II (4 Credits)
An introductory survey of organic and biochemistry. Three lecture, one recitation, and two laboratory hours per week.
Prerequisites: 1 year high-school chemistry, CHEM 101, CHEM 111, or equivalent.

Carolina Core: SCI

CHEM 105 - Chemistry and Modern Society I (4 Credits)
A conceptual and qualitative approach to chemistry, its evolution, achievements, and goals and its impact on technology, the environment, and modern life and thought. (Specifically designed for non-science majors.) Three lecture and three laboratory hours per week.
Carolina Core: SCI

CHEM 106 - Chemistry and Modern Society II (3 Credits)
A continuation of Chemistry 105. Three lecture hours per week.
Prerequisites: C or higher in CHEM 105.

Carolina Core: SCI

CHEM 106L - Chemistry and Modern Society II Laboratory (1 Credit)
Laboratory associated with CHEM 106. Three hours of laboratory per week.
Prerequisites: CHEM 105.

Corequisite: CHEM 106.

CHEM 107 - Introduction to Forensic Science (3 Credits)
Surveys chemical aspects of criminal investigation and adjudication including drug, arson, DNA, paint, and fiber identification.
Carolina Core: SCI

CHEM 107L - Introduction to Forensic Science Laboratory (1 Credit)
An analytical approach to surveys of criminal investigation and adjudication of crime scene analysis and collection and preservation of evidence. Analysis will include but not be limited to drug, arson, DNA, fingerprints, blood splatter, and fiber identification. Note: Three laboratory hours per week.
Carolina Core: SCI

CHEM 111 - General Chemistry I (3 Credits)
Survey of the principles that underlie all chemistry with applications illustrating these principles. Three lecture and one recitation hours per week.
Prerequisites: C or higher in MATH 111, MATH 115, MATH 122, MATH 141 or higher math (or by placement score into MATH 122, MATH 141 or higher math).

Corequisite: CHEM 111L (unless grade of C or higher in CHEM 111L earned previously).

Carolina Core: SCI

CHEM 111L - General Chemistry I Lab (1 Credit)
Introduction to the principles and techniques of experimental chemistry with emphasis on formula investigations, equations, elementary statistics, and chemical reactivity.
Prerequisites: MATH 111 or MATH 115 or higher.

Prerequisite or Corequisite: CHEM 111.

Carolina Core: SCI

CHEM 112 - General Chemistry II (3 Credits)
Continuation of CHEM 111. Special emphasis on chemical equilibrium. Three lecture and one recitation hours per week.
Prerequisites: C or higher in CHEM 111 and C or higher in MATH 111, MATH 115, MATH 122, MATH 141 or higher math.

Corequisite: CHEM 112L.

Carolina Core: SCI

CHEM 112L - General Chemistry II Lab (1 Credit)
Continuation of CHEM 111L with emphasis on solution properties, kinetics, equilibrium, acids and bases, and qualitative analysis.
Prerequisites: C or higher in CHEM 111 and CHEM 111L or CHEM 141.

Prerequisite or Corequisite: CHEM 112.

Carolina Core: SCI

CHEM 118 - Computational Chemistry I (1 Credit)
Introduction to the use of computers in solving chemical problems. One discussion and two laboratory hours per week.
Corequisite: CHEM 112 and CHEM 112L or CHEM 142 (unless a grade of C or higher earned previously).

CHEM 141 - Principles of Chemistry I (4 Credits)
Advanced general chemistry I. Atoms and chemical bonds. Three lecture hours, one recitation hour, and three laboratory hours per week. Credit cannot be received for both CHEM 111 and CHEM 141.
Prerequisites: high-school chemistry; C or higher in MATH 141 or higher math (or by placement score into MATH 142 or higher math).

Carolina Core: SCI

CHEM 142 - Principles of Chemistry II (4 Credits)
Advanced general chemistry II. Chemical kinetics, equilibria, and thermodynamics. Three lecture hours, one recitation hour, and three laboratory hours per week. Credit cannot be received for both CHEM 112 and CHEM 142.
Prerequisites: C or higher in CHEM 141.

CHEM 318 - Computational Chemistry II (1 Credit)
A continuation of CHEM 118, with applications to more advanced chemical problems. One discussion and two laboratory hours per week.
Prerequisites: C or higher in CSCE 145 or CSCE 106 and in CHEM 118.

CHEM 321 - Quantitative Analysis (3 Credits)
Gravimetric, volumetric, and introductory instrumental analysis. Three lecture and one recitation hours per week.
Prerequisites: C or higher in CHEM 112 and CHEM 112L or in CHEM 142.

Corequisite: CHEM 321L.

CHEM 321L - Quantitative Analysis Laboratory (1 Credit)
Three laboratory hours per week. Credit cannot be received for both CHEM 321L and CHEM 322L.
Corequisite: CHEM 321.

CHEM 322 - Analytical Chemistry (3 Credits)
Qualitative analysis, quantitative analysis, fundamental or method analysis, and molecular characterization.
Prerequisites: C or higher in CHEM 112 and CHEM 112L (or in CHEM 142) and in MATH 141 or higher MATH.

Corequisite: CHEM 322L.

CHEM 322L - Analytical Chemistry Laboratory (1 Credit)
Laboratory skill building in analytical techniques. Applications of stoichiometry, spectroscopy, phase transfer, electrochemistry and kinetics. Credit cannot be received for both CHEM 321L and CHEM 322L.
Prerequisites: C or better in CHEM 112 and CHEM 112L or CHEM 142.

Corequisite: CHEM 322.

CHEM 331L - Essentials of Organic Chemistry Laboratory I (1 Credit)
Laboratory safety, syntheses, separation, and purification of carbon compounds. For non-majors.
Corequisite: CHEM 333 (unless grade of C or higher in CHEM 333 earned previously).

CHEM 332L - Essentials of Organic Chemistry Laboratory II (1 Credit)
Continuation of CHEM 331L. Spectroscopic identification of carbon compounds. For non-majors. Three lab hours per week.
Prerequisites: C or higher in CHEM 331L.

Corequisite: CHEM 334 (unless grade of C or higher in CHEM 334 earned previously).

CHEM 333 - Organic Chemistry I (3 Credits)
Contemporary theories, nomenclature, reactions, mechanisms, and syntheses of carbon compounds. Three lecture and one recitation hours per week.
Prerequisites: C or higher in CHEM 112 or in CHEM 142.

CHEM 333L - Comprehensive Organic Chemistry Laboratory I (2 Credits)
Laboratory safety, synthesis, separation, and purification of carbon compounds. Required for chemistry majors. Six laboratory hours per week.
Corequisite: CHEM 333 (unless grade of C or higher in CHEM 333 earned previously).

CHEM 334 - Organic Chemistry II (3 Credits)
Continuation of CHEM 333. Three lecture and one recitation hours per week.
Prerequisites: C or higher in CHEM 333.

CHEM 334L - Comprehensive Organic Chemistry Laboratory II (2 Credits)
Continuation of CHEM 333L. Spectroscopic identification of carbon compounds. Required for chemistry majors. Six laboratory hours per week.
Prerequisites: C or higher in CHEM 333L.

Corequisite: CHEM 334 (unless grade of C or higher in CHEM 334 earned previously).

CHEM 340 - Elementary Biophysical Chemistry (3 Credits)
A non-calculus approach to the study of the principles of physical chemistry emphasizing their application to significant biochemical and biological systems. Chemical thermodynamics, kinetics, equilibrium, solution chemistry, the structure of macromolecules, and acid-base properties of biomolecules. Credit for a degree will not be given for both CHEM 340 and CHEM 541.
Prerequisites: C or higher in CHEM 112 and CHEM 112L or in CHEM 142.

CHEM 360 - Undergraduate Seminar (1 Credit)
Student seminars and a survey of biochemical and molecular biology research at the University of South Carolina. Required of all biochemistry majors.

CHEM 399 - Independent Study (1-3 Credits)
Contract Required.
Graduation with Leadership Distinction: GLD: Research

CHEM 401 - Industrial Chemistry Capstone Experience (3 Credits)
Prepares students for future roles in chemical industry or graduate school and provides career-enhancing interpersonal skills, including team-building, public speaking, resume preparation, and interviewing.

CHEM 496 - Undergraduate Research (3 Credits)
Introduction to the methods of chemical research. A written report on work accomplished is required at the end of each semester. Nine hours of library and laboratory per week. Contract Required.
Graduation with Leadership Distinction: GLD: Research

CHEM 497 - Undergraduate Research (3 Credits)
Introduction to the methods of chemical research. A written report on work accomplished is required at the end of each semester. Nine hours of library and laboratory per week. Contract Required.
Graduation with Leadership Distinction: GLD: Research

CHEM 498 - Undergraduate Research (3 Credits)
Introduction to the methods of chemical research. A written report on work accomplished is required at the end of each semester. Nine hours of library and laboratory per week. Contract Required.
Graduation with Leadership Distinction: GLD: Research

CHEM 499 - Undergraduate Research (3 Credits)
Introduction to the methods of chemical research. A written report on work accomplished is required at the end of each semester. Nine hours of library and laboratory per week. Contract Required.
Graduation with Leadership Distinction: GLD: Research

CHEM 511 - Inorganic Chemistry (3 Credits)
Consideration of atomic structure, valence, complex compounds, and systematic study of the periodic table.
Prerequisites: C or higher in CHEM 334, PHYS 212, and MATH 241.

CHEM 533 - Comprehensive Organic Chemistry III (3 Credits)
Selected organic reactions from synthetic and mechanistic viewpoints. For Undergraduate Credit Only.
Prerequisites: C or higher in CHEM 334.

CHEM 541 - Physical Chemistry (3 Credits)
Chemical thermodynamics and kinetics. For Undergraduate Credit Only.
Prerequisites: C or higher in CHEM 112 (or CHEM 142) and in MATH 241 or higher MATH.

Corequisite: PHYS 212; unless a grade of C or higher in PHYS 212 earned previously.

CHEM 541L - Physical Chemistry Laboratory (2 Credits)
Applications of physical chemical techniques. Five laboratory hours and one recitation hour per week.
Prerequisites: C or higher in CHEM 321L or in CHEM 322L or in CHEM 142.

Corequisite: CHEM 541 (unless grade of C or higher in CHEM 541 earned previously).

CHEM 542 - Physical Chemistry (3 Credits)
Spectroscopy, statistical mechanics, and chemical applications of quantum mechanics.
Prerequisites: C or higher in CHEM 112 or in CHEM 142, MATH 241 and PHYS 212.

CHEM 542L - Physical Chemistry Laboratory (2 Credits)
Applications of physical chemical techniques. Five laboratory hours and one recitation hour per week.
Prerequisites: C or higher in CHEM 321L or in CHEM 142.

Corequisite: CHEM 542 (unless grade of C or higher in CHEM 542 earned previously).

CHEM 545 - Physical Biochemistry (3 Credits)
A survey of physical methods essential for studies of biomacromolecules. Three lecture hours per week.
Prerequisites: C or higher in CHEM 541 and in CHEM 550 or CHEM 555.

CHEM 550 - Biochemistry (3 Credits)
Description of biological macromolecules and major metabolic pathways. Three lecture hours per week.
Prerequisites: C or higher in CHEM 334.

Cross-listed course: BIOL 541

CHEM 550L - Biochemistry Laboratory (1 Credit)
Experiments and demonstrations illustrating the principles of biochemistry. Three laboratory hours per week.
Prerequisite or Corequisite: C or higher in CHEM 550 or BIOL 541 or CHEM 555 or BIOL 545.

Cross-listed course: BIOL 541L

CHEM 555 - Biochemistry/Molecular Biology I (3 Credits)
Essentials of modern biochemistry. First semester of a two-semester course. Three lecture hours per week.
Prerequisites: C or higher in CHEM 334.

Cross-listed course: BIOL 545

CHEM 556 - Biochemistry/Molecular Biology II (3 Credits)
Essentials of modern biochemistry and molecular biology. Three lecture hours per week.
Prerequisites: C or higher in BIOL 302.

Cross-listed course: BIOL 546

CHEM 619 - Special Topics in Inorganic Chemistry (1-3 Credits)
Current developments in inorganic chemistry. Readings and research on selected topics. Course content varies by title and will be announced in the schedule of classes. May be repeated for credit.

CHEM 621 - Instrumental Analysis (3 Credits)
Chemical instrumentation including electronics, signal processing, statistical analysis, molecular/atomic spectroscopy, electrochemical methods, chromatography, and mass spectrometry. Three lecture hours per week.
Prerequisites: C or higher in CHEM 321 or CHEM 322.

CHEM 621L - Instrumental Analysis Lab (1 Credit)
Methods, principles and strategies for chemical instrumentation in analysis. Chemical instrumentation laboratory with environmental, forensic, and biotechnology applications. Three laboratory hours per week.
Corequisite: CHEM 621.

CHEM 622 - Forensic Analytical Chemistry (4 Credits)
Analytical chemical methods in forensic science, including gathering of evidence, toxicology, drug identification, analysis of trace evidence, arson analysis, and DNA/serology. Three lecture hours and three laboratory hours per week.
Prerequisites: C or higher in CHEM 321 and CHEM 321L or CHEM 322 and CHEM 322L; C or higher in CHEM 334; C or higher in CHEM 332L or CHEM 334L.

CHEM 623 - Introductory Environmental Chemistry (3 Credits)
Study of the chemical reactions and processes that affect the fate and transport of organic chemicals in the environment. Three lecture hours per week.
Prerequisites: C or higher in CHEM 321, in CHEM 333, and in MATH 142.

CHEM 624 - Aquatic Chemistry (3 Credits)
Study of the chemical reactions and processes affecting the distribution of chemical species in natural systems. Three lecture hours per week.
Prerequisite or Corequisite: CHEM 321, MATH 142.

Cross-listed course: MSCI 624

CHEM 629 - Special Topics in Analytical Chemistry (1-3 Credits)
Current developments in inorganic chemistry. Readings and research on selected topics. Course content varies by title and will be announced in the schedule of classes. May be repeated for credit.

CHEM 633 - Introduction to Polymer Synthesis (3 Credits)
Special emphasis on the modern synthesis of polymeric materials. Definitions, characterization, and applications of polymers will be briefly presented.
Prerequisites: C or higher in CHEM 334.

CHEM 639 - Special Topics in Organic Chemistry (3 Credits)
Current developments in organic chemistry. Readings and research on selected topics. May be repeated as content varies by title.

CHEM 643 - Computational Chemistry (3 Credits)
This course is designed to familiarize students with theory and use of modern electronic structure codes, as well as to develop critical thinking and problem-solving skills and to improve computer literacy.
Prerequisites: C or higher in CHEM 541 or CHEM 542.

CHEM 644 - Materials Chemistry (3 Credits)
Introduction to materials science; structural and electronic description of inorganic-based solids; experimental techniques in materials chemistry; interfacial energetics and optoelectronic processes at metal and semiconductor surfaces.
Corequisite: CHEM 542 (unless a grade of C or higher earned previously).

CHEM 649 - Special Topics in Physical Chemistry (1-3 Credits)
Current developments in physical chemistry. Readings and research on selected topics. Course content varies by title and will be announced in the schedule of classes. May be repeated for credit.

CHEM 655 - Metabolic Biochemistry of Human Disease (3 Credits)
Core concepts of biochemistry as applied to human health and disease.
Prerequisites: C or higher in CHEM 555/BIOL 545 or CHEM 550/BIOL 541.

Cross-listed course: BIOL 668

CHEM 659 - Special Topics in Biochemistry (3 Credits)
Selected topics in the field of biochemistry. May be repeated as content varies by title.
Prerequisites: C or higher in CHEM 555/BIOL 545 or CHEM 550/BIOL 541.