

CHEMISTRY (CHEM)

Subject-area course lists indicate courses currently active for offering at the University of Louisville. Not all courses are scheduled in any given academic term. For class offerings in a specific semester, refer to the Schedule of Classes (<http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm>).

500-level courses generally are included in both the undergraduate- and graduate-level course listings; however, specific course/section offerings may vary between semesters. Students are responsible for ensuring that they enroll in courses that are applicable to their particular academic programs.

Course Fees

Some courses may carry fees beyond the standard tuition costs to cover additional support or materials. Program-, subject- and course-specific fee information can be found on the Office of the Bursar website (<http://louisville.edu/bursar/tuitionfee/>).

CHEM 100. Elements of General Chemistry 3 Units

Prerequisite(s): Completion of general education requirement in mathematics recommended.

Description: The basic concepts of general and inorganic chemistry including an introduction to the periodic table, atomic and molecular structure, and chemical reactions and equilibria. This course is recommended as preparation for CHEM 201.

Note: May not be counted toward major in Chemistry.

For class offerings for a specific term, refer to the Schedule of Classes (<http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm>)

CHEM 101. Chemistry and Contemporary Society - S 3 Units

Term Typically Offered: Fall, Spring, Summer

Description: A one-semester introduction to inorganic, organic, and biochemistry for non-majors. The course is designed to provide a general background for an elementary understanding of chemistry and societal issues related to chemistry. May also be taken by the less-prepared student as preparation for CHEM 201.

Note: Not counted toward major in Chemistry.

For class offerings for a specific term, refer to the Schedule of Classes (<http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm>)

CHEM 103. Introductory Chemistry Laboratory - SL 1 Unit

Term Typically Offered: Fall, Spring

Prerequisite(s): Concurrent enrollment in or completion of CHEM 101 or CHEM 105.

Fee: An additional \$70.00 is charged for this course.

For class offerings for a specific term, refer to the Schedule of Classes (<http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm>)

CHEM 105. Chemistry for Health Professionals - S 4 Units

Term Typically Offered: Fall, Spring, Summer

Description: An introductory survey of both general and organic chemistry with an emphasis on the relationship of chemistry to life processes, health, and nutrition.

Note: Not counted toward major in chemistry.

Note: Does not fulfill general education lab requirement.

For class offerings for a specific term, refer to the Schedule of Classes (<http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm>)

CHEM 201. General Chemistry I - S 3 Units

Term Typically Offered: Fall, Spring, Summer

Prerequisite(s): 1) For students with 15 or fewer hours earned at UofL or another university: an Accuplacer AAF score of 250 or higher, a math ACT score of 26 (SAT Math of 610) or higher, or an ACT composite of 27 (SAT 1260) or higher; or 2) For students with 12 or more credit hours earned at UofL or another university: an overall GPA equivalent to a C+(2.30) or higher, and either a minimum grade of C (not C-) in MATH 180 or higher, or a minimum grade of C (not C-) in CHEM 101 or CHEM 105.

Description: An introduction to the basic concepts and principles of modern chemistry. Special emphasis on chemical periodicity, stoichiometry, equilibrium, thermodynamics, kinetics, atomic and molecular structure, and descriptive chemistry of the elements.

For class offerings for a specific term, refer to the Schedule of Classes (<http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm>)

CHEM 202. General Chemistry II - S 3 Units

Term Typically Offered: Fall, Spring, Summer

Prerequisite(s): CHEM 201.

Description: A continuation of the basic concepts and principles of modern chemistry. Topics include equilibria, thermodynamics, kinetics, electrochemistry, nuclear chemistry and/or descriptive chemistry of the elements.

For class offerings for a specific term, refer to the Schedule of Classes (<http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm>)

CHEM 207. Introduction to Chemical Analysis I - SL 1 Unit

Term Typically Offered: Fall, Spring, Summer

Prerequisite(s): 1) For students with 15 or fewer hours earned at UofL or another university: an Accuplacer AAF score of 250 or higher, a math ACT score of 26 (SAT Math of 610) or higher, or an ACT composite of 27 (SAT 1260) or higher; or 2) For students with 12 or more credit hours earned at UofL or another university: an overall GPA equivalent to a C+(2.30) or higher, and either a minimum grade of C (not C-) in MATH 180 or higher, or a minimum grade of C (not C-) in CHEM 101 or CHEM 105.

Fee: An additional \$45.00 is charged for this course.

Description: An introduction to the Chemistry laboratory with an emphasis on qualitative analysis. Students are expected to have completed or be enrolled in CHEM 201.

For class offerings for a specific term, refer to the Schedule of Classes (<http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm>)

CHEM 208. Introduction to Chemical Analysis II - SL 1 Unit Term Typically Offered: Fall, Spring, Summer Prerequisite(s): Completion of or concurrent enrollment in CHEM 201 and completion of CHEM 207. Fee: An additional \$45.00 is charged for this course. Description: CHEM 208 is a continuation of CHEM 207. For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)	CHEM 343. Organic Chemistry Laboratory I 2 Units Term Typically Offered: Fall, Spring, Summer Prerequisite(s): Completion of CHEM 209 and concurrent enrollment in or completion of CHEM 341. Fee: An additional \$80.00 is charged for this course. Description: Techniques of modern organic chemistry: syntheses, mechanistic studies, identification of unknowns by chemical and spectroscopic methods, special projects. For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)
CHEM 209. Introduction to Chemical Analysis III 1 Unit Term Typically Offered: Fall, Spring, Summer Prerequisite(s): CHEM 208 and successful completion of or concurrent registration in CHEM 202. Fee: An additional \$45.00 is charged for this course. Description: Continuation of CHEM 208. For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)	CHEM 344. Organic Chemistry Laboratory II 2 Units Term Typically Offered: Fall, Spring, Summer Prerequisite(s): Completion of CHEM 343 and concurrent enrollment in or completion of CHEM 342. Fee: An additional \$80.00 is charged for this course. Description: Techniques of modern organic chemistry: syntheses, mechanistic studies, identification of unknowns by chemical and spectroscopic methods, special projects. For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)
CHEM 210. Introduction to Chemical Analysis IV 1 Unit Term Typically Offered: Fall, Spring Prerequisite(s): Completion of or concurrent enrollment in CHEM 202 and completion of CHEM 209. Fee: An additional \$45.00 is charged for this course. Description: Continuation of CHEM 209; intended especially for Chemistry majors; introduction to instrumental methods of chemical analysis. For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)	CHEM 390. Undergraduate Research - WR, CUE 3 Units Term Typically Offered: Fall, Spring, Summer Prerequisite(s): CHEM 344, faculty consent and junior standing. Description: Each student is required to submit a written report (2400 words) to the research advisor near the end of the semester. The advisor will critique the report and return it to the student for revision and submission to the advisor and the department chair at the end of the semester. Note: Approved for the Arts and Sciences upper-level requirement in written communication (WR). Course Attribute(s): CUE - This course fulfills the Culminating Undergraduate Experience (CUE) requirement for certain degree programs. CUE courses are advanced-level courses intended for majors with at least 90 earned credits/senior-level status. For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)
CHEM 320. Chemical Information Resources 1 Unit Prerequisite(s): CHEM 341. Description: The use of printed material and computer based literature search techniques focused on finding specific information on a designated topic. For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)	CHEM 391. Undergraduate Research - CUE 1-3 Units Term Typically Offered: Fall, Spring, Summer Prerequisite(s): Faculty consent. Description: Each student is required to submit a written report to the research advisor and the Chemistry Department chair at the end of each research period. Course Attribute(s): CUE - This course fulfills the Culminating Undergraduate Experience (CUE) requirement for certain degree programs. CUE courses are advanced-level courses intended for majors with at least 90 earned credits/senior-level status. For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)
CHEM 341. Organic Chemistry I 3 Units Term Typically Offered: Fall, Spring, Summer Prerequisite(s): Completion of CHEM 202. Description: Basic principles of organic chemistry: structure and geometry of molecules and consequential physical, chemical, and spectroscopic properties; chemical reactions, mechanisms, and synthetic applications; industrial and biological examples. For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)	
CHEM 342. Organic Chemistry II 3 Units Term Typically Offered: Fall, Spring, Summer Prerequisite(s): Completion of CHEM 341. Description: Continuation of the basic principles of organic chemistry; structure and geometry of molecules and consequential physical, chemical, and spectroscopic properties; chemical reactions, mechanism, and synthetic applications; functional group chemistry and biomolecules. For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)	

CHEM 392. Undergraduate Research - CUE 1-3 Units**Term Typically Offered:** Fall, Spring, Summer**Prerequisite(s):** Faculty consent.**Description:** Each student is required to submit a written report to the research advisor and the Chemistry Department chair at the end of each research period.**Course Attribute(s):** CUE - This course fulfills the Culminating Undergraduate Experience (CUE) requirement for certain degree programs. CUE courses are advanced-level courses intended for majors with at least 90 earned credits/senior-level status.

For class offerings for a specific term, refer to the Schedule of Classes (<http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm>)

CHEM 420. Cooperative Internship in Chemistry - CUE, WR 1-3 Units**Term Typically Offered:** Fall, Spring, Summer**Prerequisite(s):** Chemistry through 344, department chair consent and junior standing.**Description:** An individually arranged course combining work experience with related academic work in chemistry. Each student is required to submit a written report along with an employer evaluation at the end of each co-op period. The report will be reviewed and graded by the co-op director.**Note:** Approved for the Arts and Sciences Upper-Level Requirement in Written Communication (WR).**Course Attribute(s):** CUE - This course fulfills the Culminating Undergraduate Experience (CUE) requirement for certain degree programs. CUE courses are advanced-level courses intended for majors with at least 90 earned credits/senior-level status., CBL - This course includes Community-Based Learning (CBL). Students will engage in a community experience or project with an external partner in order to enhance understanding and application of academic content.

For class offerings for a specific term, refer to the Schedule of Classes (<http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm>)

CHEM 425. Instrumental and Statistical Analysis 3 Units**Term Typically Offered:** Fall Only**Prerequisite(s):** CHEM 210 and CHEM 341.**Description:** Modern instrumental approaches to chemical analysis including atomic and molecular spectroscopy, chromatographic methods, electrochemistry, and statistical analysis of data.

For class offerings for a specific term, refer to the Schedule of Classes (<http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm>)

CHEM 426. Instrumental and Statistical Analysis Laboratory - WR 2 Units**Prerequisite(s):** CHEM 210.**Fee:** An additional \$70.00 is charged for this course.**Description:** Prerequisites or corequisites: CHEM 425. A laboratory course that covers modern instrumental approaches and advanced data analysis to chemical analysis.**Note:** Approved for the Arts and Sciences upper-level requirement in written communication (WR).

For class offerings for a specific term, refer to the Schedule of Classes (<http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm>)

CHEM 430. Practicum in Chemistry Education - CUE 1 Unit**Term Typically Offered:** Fall, Spring**Prerequisite(s):** CHEM 342 and CHEM 344; majors only; permission to enroll required; minimum 3.0 GPA in chemistry to be eligible.**Description:** A guided learning experience in inquiry-based instructional methods and best practices in STEM education. This course includes experimental learning as an undergraduate teaching assistant.**Note:** May be repeated for a maximum of 3 credit hours.**Course Attribute(s):** CUE - This course fulfills the Culminating Undergraduate Experience (CUE) requirement for certain degree programs. CUE courses are advanced-level courses intended for majors with at least 90 earned credits/senior-level status.

For class offerings for a specific term, refer to the Schedule of Classes (<http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm>)

CHEM 441. Elements of Physical Chemistry 3 Units**Term Typically Offered:** Fall Only**Prerequisite(s):** CHEM 202; PHYS 222 or PHYS 299; and MATH 205.**Description:** Survey of Physical Chemistry. Course content includes states of matter, laws of thermodynamics and their applications, chemical and biological kinetics, quantum chemistry, and spectroscopy.**Note:** Credit may not be earned for this course and CHEM 465 and CHEM 466.

For class offerings for a specific term, refer to the Schedule of Classes (<http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm>)

CHEM 445. Survey of Biochemistry 3 Units**Term Typically Offered:** Spring Only**Prerequisite(s):** CHEM 342.**Description:** A survey of chemical characteristics of the constituents of living matter; cellular metabolism of proteins, nucleic acids, carbohydrates and lipids.**Note:** This course will not count as credit for BS major with concentration in biochemistry.

For class offerings for a specific term, refer to the Schedule of Classes (<http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm>)

CHEM 450. Introduction to Computational Chemistry and Molecular Modeling 3 Units**Term Typically Offered:** Occasionally Offered**Prerequisite(s):** CHEM 342 and MATH 205; PHYS 299 or PHYS 222.**Description:** A discovery-based approach to common calculations in computational chemistry including how to optimize geometry, locate and characterize transition states, and calculate transition barriers and heats of reaction.

For class offerings for a specific term, refer to the Schedule of Classes (<http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm>)

CHEM 451. Senior Research Seminar 1 Unit**Prerequisite(s):** CHEM 591, or CHEM 392 and permission of the research director.**Description:** Preparation of the Senior Thesis and an oral presentation of it before a group of peers and faculty.

For class offerings for a specific term, refer to the Schedule of Classes (<http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm>)

CHEM 465. Physical Chemistry I Term Typically Offered: Fall Only Prerequisite(s): CHEM 202; PHYS 222 or PHYS 299; concurrent registration in MATH 301. Description: Introduction to the quantum theory of atoms, molecules and the chemical bond. The use of spectroscopy in the determination of molecular structure and chemical function. For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)	3 Units	CHEM 501. Independent Study Prerequisite(s): Minimum GPA of 3.0 overall; minimum GPA of 3.5 in department and at least 18 semester hours credit in the department. Description: Independent research conducted with the approval and supervision of a faculty member. Note: Credit may not be applied to an advanced degree in Chemistry. For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)	1-3 Units
CHEM 466. Physical Chemistry II Term Typically Offered: Spring Only Prerequisite(s): CHEM 465. Description: Thermodynamics, statistical thermodynamics, chemical equilibrium and reaction kinetics from a molecular point of view. For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)	3 Units	CHEM 503. Special Topics in Chemistry Prerequisite(s): As required by topic. Description: An examination of one or more specified areas of Chemistry. Details announced each semester. Note: Not applicable toward graduate degree in chemistry. For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)	1-3 Units
CHEM 470. Physical Chemistry Laboratory - WR Term Typically Offered: Spring Only Prerequisite(s): CHEM 210; CHEM 441 or CHEM 465. Fee: An additional \$60.00 is charged for this course. Description: Laboratory experiments and related lecture on properties of gases, thermochemistry, kinetics, electro-chemistry, laser techniques in chemical processes, spectroscopic methods including FTIR, EPR and X-ray crystallography. Note: Approved for the Arts and Sciences upper-level requirement in written communication (WR). Note: Fulfills one WR requirement. For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)	2 Units	CHEM 515. Inorganic Chemistry Term Typically Offered: Fall Only Prerequisite(s): CHEM 342; concurrent enrollment in CHEM 441 or CHEM 465. Description: Descriptive and theoretical chemistry of the elements. Note: Credit may not be applied to an advanced degree in Chemistry. For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)	3 Units
CHEM 491. Undergraduate Research - CUE Term Typically Offered: Fall, Summer Prerequisite(s): Faculty consent. Description: Each student is required to submit a written report to the research advisor and the Chemistry Department chair at the end of each research period. Course Attribute(s): CUE - This course fulfills the Culminating Undergraduate Experience (CUE) requirement for certain degree programs. CUE courses are advanced-level courses intended for majors with at least 90 earned credits/senior-level status. For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)	1-3 Units	CHEM 527. Spectroscopic Identification of Organic Compounds - WR Term Typically Offered: Fall Only Prerequisite(s): CHEM 342 and CHEM 344. Fee: An additional \$60.00 is charged for this course. Description: An introductory spectroscopy course designed to provide a realistic experience in organic structure determination using the principal methods of spectral characterization. Emphasis is placed on using mass spectrometry, ¹ H and ¹³ C nuclear magnetic resonance spectroscopy, and infrared spectroscopy to deduce the molecular structures of organic compounds. Note: Approved for the Arts and Sciences upper-level requirement in written communication (WR). For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)	3 Units
CHEM 492. Undergraduate Research Term Typically Offered: Fall, Spring, Summer Prerequisite(s): Faculty consent. Description: Each student is required to submit a written report to the research advisor and the Chemistry Department chair at the end of each research period. For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)	1-3 Units		

CHEM 528. Contemporary Methods of Organic Synthesis and Analysis - CUE 2 Units**Term Typically Offered:** Spring Only**Prerequisite(s):** CHEM 342, CHEM 344, and (CHEM 425 or CHEM 527).**Fee:** An additional \$60.00 is charged for this course.**Description:** A discovery-based approach to the solution of problems encountered in organic chemical synthesis and analysis.**Note:** Credit may not be applied to an advanced degree in Chemistry.**Course Attribute(s):** CUE - This course fulfills the Culminating Undergraduate Experience (CUE) requirement for certain degree programs. CUE courses are advanced-level courses intended for majors with at least 90 earned credits/senior-level status.

For class offerings for a specific term, refer to the Schedule of Classes (<http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm>)

CHEM 529. Contemporary Methods of Inorganic Synthesis and Analysis - WR 2 Units**Term Typically Offered:** Spring Only**Fee:** An additional \$60.00 is charged for this course.**Description:** Prerequisites or corequisites: CHEM 515. A discovery-based approach to the solution of problems encountered in inorganic chemical synthesis and analysis.**Note:** Credit may not be applied to an advanced degree in Chemistry.

For class offerings for a specific term, refer to the Schedule of Classes (<http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm>)

CHEM 532. Chemistry Education for Secondary Teachers 4 Units**Prerequisite(s):** CHEM 342 In-depth examination of chemistry content for secondary teachers as aligned with national and state standards.**Description:** Inquiry-based laboratory and diverse assessment of core concepts will be developed.**Note:** Does not count toward a degree in Chemistry except by departmental permission.

For class offerings for a specific term, refer to the Schedule of Classes (<http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm>)

CHEM 545. Biochemistry I 3 Units**Term Typically Offered:** Fall Only**Prerequisite(s):** CHEM 342.**Description:** Chemistry of amino acids, peptides, proteins, carbohydrates, nucleotides and nucleic acids; methods of analysis and laboratory synthesis; enzyme properties, kinetics, ligand binding.**Note:** Credit may not be earned in both CHEM 545 and CHEM 645, or in both CHEM 545 and CHEM 445.**Note:** Credit may not be applied toward an advanced degree in Chemistry.

For class offerings for a specific term, refer to the Schedule of Classes (<http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm>)

CHEM 546. Biochemistry Laboratory 2 Units**Term Typically Offered:** Occasionally Offered**Prerequisite(s):** CHEM 445 or concurrent enrollment in CHEM 545.**Fee:** An additional \$60.00 is charged for this course.**Description:** Application of contemporary laboratory methods of biochemistry including uv/vis spectrophotometry, liquid chromatography centrifugation, gel electrophoresis, mass spectrometry, FTIR, and recombinant DNA techniques.

For class offerings for a specific term, refer to the Schedule of Classes (<http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm>)

CHEM 547. Biochemistry II 3 Units**Term Typically Offered:** Occasionally Offered**Prerequisite(s):** CHEM 545.**Description:** Cellular metabolism of carbohydrates, lipids, amino acids and biomembrane phenomena; RNA, DNA, and protein synthesis.**Note:** Credit may not be earned in both CHEM 547 and CHEM 647, or in both CHEM 547 and CHEM 445.**Note:** Credit may not be applied to an advanced degree in chemistry.

For class offerings for a specific term, refer to the Schedule of Classes (<http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm>)

CHEM 550. Group Theory and its Chemical Applications 3 Units**Term Typically Offered:** Occasionally Offered**Prerequisite(s):** CHEM 441 or CHEM 465 Elementary group theory; the use of group theory to treat symmetry; application to atomic structure, molecular structure, spectroscopy, and reaction mechanisms.

For class offerings for a specific term, refer to the Schedule of Classes (<http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm>)

CHEM 555. Theory and Application of Computational Chemistry 3 Units**Prerequisite(s):** CHEM 441 or CHEM 465 or PHYS 300.**Description:** Theory and Application of Computational Chemistry will be a combined elective undergraduate and graduate level course. The purpose of the course is to provide students with the necessary knowledge such that they can examine chemical problems computationally and where required, use computational tools to benefit their own research. The course will emphasize practical applications of computers in chemistry, trends that define the appropriate methods for chemical studies, and elucidation of underlying theoretical methods. As the abstract nature of the field is frequently a learning barrier to many students, the course will incorporate a series of workshops to enable students to build their own computer programs and study chemical problems computationally.

For class offerings for a specific term, refer to the Schedule of Classes (<http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm>)

CHEM 557. Bio-Organic Phenomena 3 Units**Term Typically Offered:** Spring Only**Prerequisite(s):** CHEM 342 (or equivalent).**Description:** Completion of CHEM 445, CHEM 545, or equivalent is strongly recommended. Special topics in the biological chemistry area: e.g., chemical carcinogenesis; diet and cancer, food chemistry and polypeptides; proteins; carbohydrates; enzymes; hormone chemistry.

For class offerings for a specific term, refer to the Schedule of Classes (<http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm>)

CHEM 591. Chemistry for Teachers I **3 Units**

Prerequisite(s): For graduate education majors; must have experience in teaching chemistry principles in elementary, middle, or secondary schools.

Description: Teaching pre-college chemistry with emphasis on curriculum content, laboratory procedures, and process skills.

For class offerings for a specific term, refer to the Schedule of Classes (<http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm>)