

CHEMISTRY (CHM)

The department offers programs leading to the BA and BS degrees in chemistry. The BS degrees are certified by the American Chemical Society. A minimum GPA of 2.0 in the first two years of chemistry is required of students who elect to major in the department. Admission to any class is contingent upon satisfactory grades in prerequisite courses, and registration for advanced courses must be approved by the department. Candidates for either the BA or BS degree with a major in chemistry must have a minimum GPA of 2.0 in their chemistry courses numbered 200 or above. Unless otherwise stated, all chemistry courses are open to chemistry majors and minors on a letter-grade basis only (even those courses not required for the major or minor). Majors are required to complete on a letter-grade basis the required physics, biology, and mathematics courses. The BS programs are designed for those students who plan a career in chemistry at the bachelor or advanced degree level. The BA program is designed for those students who do not plan to do graduate work in the physical sciences but desire a stronger background in chemistry than is provided by the chemistry minor program.

The department will accept transfer courses completed at four-year colleges and universities but will not award transfer credit towards the chemistry major and minor except from schools offering a major in chemistry. These courses must be equivalent in content and level to courses offered at Wake Forest (as judged by the department). Transfer credit will not be awarded for online lab classes nor for online lecture courses that have co-requisite labs on our campus. Courses taken in summer school elsewhere, or in study abroad programs, must meet these same criteria and receive pre-approval. Advanced courses, 300-level and above, are typically not transferable. Students enrolled at Wake Forest may not take courses in chemistry at other institutions to satisfy divisional requirements.

The Health Professions Program at Wake Forest recommends that students take the following chemistry courses and their associated labs before the end of the third year.

Code	Title	Hours
CHM 111	College Chemistry I	3
CHM 122 or CHM 123	Organic Chemistry I Organic Chemistry I Honors	3
CHM 223	Organic Chemistry II	3
CHM 280	College Chemistry II	3

Students interested in this track should see the Health Professions Program adviser for more information.

Contact Information

Chemistry Department (<http://college.wfu.edu/chemistry/>)
Salem Hall, Box 7486
Phone 336-758-6139

Programs

Majors

- Chemistry, B.A. (<https://bulletin.wfu.edu/undergraduate/departments-programs/chemistry/ba-chemistry/>)

- Chemistry, B.S. (<https://bulletin.wfu.edu/undergraduate/departments-programs/chemistry/bs-chemistry/>)
- Chemistry with Concentration in Biochemistry, B.S. (<https://bulletin.wfu.edu/undergraduate/departments-programs/chemistry/bs-chemistry-concentration-biochemistry/>)
- Chemistry with Concentration in Materials Chemistry, B.S. (<https://bulletin.wfu.edu/undergraduate/departments-programs/chemistry/bs-chemistry-concentration-materials-chemistry/>)
- Chemistry with Concentration in Medicinal Chemistry and Drug Discovery, B.S. (<https://bulletin.wfu.edu/undergraduate/departments-programs/chemistry/bs-chemistry-concentration-medicinal-chemistry-drug-discovery/>)

Minor

- Chemistry, Minor (<https://bulletin.wfu.edu/undergraduate/departments-programs/chemistry/minor-chemistry/>)

Courses

Course listings specify prerequisites and corequisites, although admission by permission of instructor, POI, may be granted under special circumstances.

Chemistry (CHM)

CHM 108. Everyday Chemistry. (4 h)

Introduction to chemistry for non-science majors. Laboratory covers experimental aspects of topics discussed in lecture. Does not count towards the major or minor in chemistry. C-CHM 108L. (D, QR)

CHM 108L. Everyday Chemistry Lab. (0 h)

C-CHM 108.

CHM 111. College Chemistry I. (3 h)

Fundamental chemical principles. Also offered in Salamanca. C-CHM 111L. (D, QR) (Offered Fall Only)

CHM 111L. College Chemistry I Lab. (1 h)

Laboratory covers experimental aspects of basic concepts. C-CHM 111. (Offered Fall Only)

CHM 111S. Problem Solving in Chemistry. (1 h)

Explores and introduces problem-solving skills in chemistry through active and peer-to-peer learning. Pass/Fail only. P-POI. C-CHM111.

CHM 120. Physics and Chemistry of the Environment. (4 h)

Covers the basic physical and chemical processes in the earth's atmosphere, biosphere and the oceans. Also listed as PHY 120. (D, QR)

CHM 120L. Physics and Chemistry of the Environment Lab. (0 h)

C-CHM 120.

CHM 122. Organic Chemistry I. (3 h)

Principles and reactions of organic chemistry. Students may not receive credit for both CHM 122 and CHM 123. P-a grade of C or higher in CHM 111. C-CHM 122L. (D)

CHM 122L. Organic Chemistry I Lab. (1 h)

P-CHM 111. C-CHM 122. (Offered Spring Only)

CHM 123. Organic Chemistry I Honors. (3 h)

Principles and reactions of organic chemistry. Freshmen only, by invitation. P-CHM 111. C-CHM 123L. (D) (Offered Fall Only)

CHM 123L. Organic Chemistry I Honors Lab. (1 h)

P-CHM 111. C-CHM 123. (Offered Fall Only)

CHM 223. Organic Chemistry II. (3 h)

Principles and reactions of organic chemistry. P-a grade of C or higher in CHM 122 or 123.

CHM 223L. Organic Chemistry II Lab. (1 h)

P or C-CHM 223.

CHM 280. College Chemistry II. (3 h)

Advanced study of fundamental chemical principles. P-CHM 111. (D, QR) (Offered Spring Only)

CHM 280L. Theory and Methods of Quantitative Analysis Lab. (1 h)

Emphasizes technique development for accuracy and precision. P or C-CHM 280. (Offered Spring Only)

CHM 301. Elective Research. (0 h)

P-POI. Summers only.

CHM 302. Elective Research. (0 h)

P-POI. Summers only.

CHM 311. Current Topics. (1-4 h)

Course exploring current topics in chemistry. May be repeated for credit if course content differs. Does not count toward the major or minor in chemistry. P-POI.

CHM 321. Intermediate Organic Chemistry. (3 h)

Survey of advanced topics in organic chemistry including stereochemistry, conformational analysis, reaction mechanisms, organometallic chemistry and asymmetric synthesis. P-CHM 223, CHM 223L, and CHM 280.

CHM 324. Medicinal Chemistry I. (3 h)

An introduction to drug targets, mechanism, design, and synthesis. P-CHM 223, 370. (Offered Fall Only)

CHM 324L. Medicinal Chemistry Laboratory. (1.5 h)

A lab designed to introduce the concept of structure-activity relationships (SAR) using computation, synthetic chemical, physicochemical, and biological techniques. P-CHM 223L. P or C-CHM 324.

CHM 334. Chemical Analysis. (4 h)

Theoretical and practical applications of modern methods of chemical analysis. P-CHM 280L. C-CHM 334L. (Offered Fall Only)

CHM 334L. Chemical Analysis Lab. (0 h)

Lab only. No credit. C-CHM 334.

CHM 341. Physical Chemistry I. (3 h)

Fundamentals of thermodynamics and phenomenological kinetics, and introductory computational methods. Also offered in Salamanca. P-CHM 280, MTH 112. P or C-PHY 114 or 124. (Offered Fall Only)

CHM 341L. Physical Chemistry I Lab. (1 h)

P-CHM 280L. P or C-CHM 341, PHY 114 or 124.

CHM 342. Physical Chemistry II. (3 h)

Fundamentals of quantum mechanics, statistical thermodynamics, and introductory computational methods. P-CHM 341, MTH 112, and PHY 114 or 124. P or C-MTH 113. (Offered Spring Only)

CHM 342L. Physical Chemistry II Lab. (1 h)

P or C-CHM 342.

CHM 351. Special Topics in Chemistry. (3 h)

Courses in selected special topics in chemistry. May be repeated for credit if course content differs. P- POI.

CHM 361. Inorganic Chemistry. (3 h)

Principles and reactions of inorganic chemistry. P or C-CHM 280. C-CHM 361L. (Offered Spring only)

CHM 361L. Inorganic Chemistry Lab. (1 h)

P-CHM 280L. C-CHM 361.

CHM 362. Nanochemistry in Energy and Medicine. (3 h)

Advanced topics in nanomaterials science, photochemistry, energy conversion optoelectronics and biomedical photonics. P-CHM 280 and CHM 280L.

CHM 364. Materials Chemistry. (3 h)

A survey of inorganic-, organic-, bio-, and nano-materials, including hybrid materials and applications. P-CHM 280 (Offered every other spring).

CHM 364L. Materials Chemistry Lab. (1 h)

Synthesis of inorganic and organic based materials and their characterization. P-CHM 280L. P or C-CHM 364.

CHM 366. Chemistry and Physics of Solid State Materials. (3 h)

Design, synthesis, structure, chemical and physical properties, and the application of solid state materials. P- CHM 280.

CHM 370. Biochemistry I: Macromolecules and Metabolism. (3 h)

Introduces principles of biochemistry including structure, function, and biosynthesis of biological molecules, analysis of enzyme function and activity, bioenergetics, and regulation of metabolic pathways. Also listed as BIO 370 and BMB 370. P-any two of the following with associated labs: CHM 122 (or CHM 123), CHM 280, or BIO 265.

CHM 370L. Biochemistry Lab. (1 h)

Overview of biochemical approaches to study structure and function of macromolecules. Does not count towards the chemistry major with concentration in biochemistry. Also listed as BIO 370L. Credit allowed for CHM 370L/BIO 370L or CHM 371L/BIO 371L/BMB 371L, but not both. P or C-CHM 370/BIO 370/BMB 370.

CHM 371L. Advanced Biochemistry Lab. (1.5 h)

Emphasizes approaches for isolation and analysis of enzymes. Required for BMB major and the chemistry major with concentration in biochemistry. Recommended for research focused students. Also listed as BIO 371L and BMB 371L. Credit allowed for BIO 370L/CHM 370L, or BMB 371L/BIO 371L/CHM 371L, but not both. P or C-BMB 370/BIO 370/CHM 370.

CHM 373. Biochemistry II. (3 h)

Examines the structure, function, and synthesis of proteins and nucleic acids and includes advanced topics in biochemistry including catalytic mechanisms of enzymes and ribozymes, use of sequence and structure databases, and molecular basis of disease and drug action. Also listed as BMB 373. P-CHM 223 and BIO 370/BMB 370/CHM 370.

CHM 376. Biophysical Chemistry. (3 h)

Fundamentals of physical chemistry applied to biological molecules, including thermodynamics, kinetics, quantum mechanics, and spectroscopy. Emphasizes modern experimental approaches used to analyze biological systems. Also listed as BMB 376. P-CHM 280, BIO/BMB/CHM 370, PHY 114. P or C-MTH 112.

CHM 381. Chemistry Seminar and Literature. (0.5 h)

Discussions of contemporary research and introduction to the chemical literature and acquisitions of chemical information. Pass/Fail only. P-CHM 122 or 123. (Offered Fall Only)

CHM 390. Chemical Research Experience. (0, 1.5 h)

Research experience and written report. Requires pre-approval of research project conducted off the Reynolda campus, by prearrangement. Pass/Fail only. May be repeated for credit.

CHM 391. Undergraduate Research. (0.5-3 h)

Undergraduate research and written report. Lab-3-16 hours. May be repeated for credit. P-POI. (Offered Fall Only)

CHM 392. Undergraduate Research. (0.5-3 h)

Undergraduate research and written report. Lab-3-16 hours. May be repeated for credit. P-POI. (Offered Spring Only)

CHM 395. Senior Capstone. (0.5 h)

Discussions of contemporary research and integration of chemical information with scientific dissemination. Pass/fail only. P or C-CHM 361. (Offered Spring Only)

Faculty

Thurman D. Kitchin Professor of Chemistry and Chair S. Bruce King

John B. White Professor of Chemistry Willie L. Hinze

William L. Poteat Professor of Chemistry Mark E. Welker

Professors Rebecca W. Alexander, Ulrich Bierbach, Christa L. Colyer,

Patricia Dos Santos, Bradley T. Jones, Abdessadek Lachgar, Akbar Salam

Associate Professors Lindsay R. Comstock-Ferguson, Amanda C. Jones,

Paul B. Jones, John C. Lukesh

Assistant Professors Wendu Ding, Elham Ghadiri, Cedric Schaack, Troy A.

Stich

Teaching Professors Angela Glisan King

Associate Teaching Professor Scott Geyer, John Tomlinson

Associate Teaching Professor and Director of Chemistry Center David

Wren

Assistant Teaching Professor Jes Bolduc

Research Associate Professor George L. Donati

Visiting Associate Professor Carthene Bazemore-Walker