DEPARTMENT OF CHEMISTRY
COLLEGE OF ARTS AND SCIENCES

Faculty

Randy F. Johnston(1994). University Professor of Chemistry and Department Chair. B.S., University of Missouri, St. Louis; Ph.D., Texas Tech University.

Jimmy H. Davis(1978). Hammons Professor of Chemistry and Vice President for Institutional Research. B.S., Union University; Ph.D., University of Illinois; Additional study, University of Florida, Oak Ridge Associated Universities, Argonne National Laboratory, Harvard University, and Oxford University (England).

Michael Hayes(2009). Professor of Chemistry. B.S., Union University; Ph.D., University of Texas at Austin.

Sally A. Henrie (1998). Professor of Chemistry. B.S., University of Arizona; Ph.D., South Dakota State University.

Marlyn Newhouse (1992). Associate Professor of Chemistry. M.A. and B.S.Ed., Northern Arizona University; D.A., Middle Tennessee State University.

Brenda Peirson(2010). Professor of Chemistry. B.S., Bradley University; Ph.D., Miami University.

Michael R. Salazar(2001). Professor of Chemistry. B.S., New Mexico State University; Ph.D., University of Utah; Additional study, Los Alamos Laboratory.

Joshua R. Williams(2011). Associate Professor of Chemistry. B.A., Augustana College; Ph.D., University of Oregon.

David A. Wing (2008). Professor of Chemistry. B.S., Wheaton College; Ph.D., Northwestern University.

Staff

Kelly Farrar (2012). Academic Secretary—Biology and Chemistry. B.S.B.A., Union University.

Curriculum

The chemistry program at Union University seeks to serve effectively all students, recognizing different needs, interests, and career goals. The faculty seeks to help students understand the physical world, the methods by which it may be studied, and its relationship to other aspects of the human experience. It is the intention of the faculty to create an environment in which students are challenged to acquire skills in problem solving utilizing the modern methods of science and to study in-depth the chemical processes which characterize life systems while developing an inquiring attitude toward scientific exploration. The curriculum is intended to provide liberal arts students with a working knowledge of science and to meet the needs of students who wish to:

- continue study in chemistry at the graduate level,
- teach science at the elementary or secondary school level,
- prepare to enter a health science profession such as medicine, dentistry, medical technology, pharmacy, nursing, physical therapy, or other allied health fields, or
- become a professional/industrial chemist.

Students pursuing a major in Chemistry or Biochemistry must complete Math 211, 212; Physics 231, 232, and meet the following requirements:

I. Major in Chemistry—46 hours
   A. CHE 111, 112, 211, 221, 314, 315, 317, 318, 319, 324, 326, 327, 335, 498
   B. Research, 3 hours from: 424 or 425
   C. One of: 405, 430, 435

II. Major in Biochemistry—70 hours
   A. CHE 111, 112, 211, and 221—13 hours
   B. CHE 314, 315, 324, 326—10 hours
   C. CHE 317, 318, 319, 329, 327, 335—19 hours
   D. CHE 424/425—3 hours
   E. CHE 498—1 hour
   F. BIO 112, 211, 315, 325—16 hours
   G. BIO– one 200-level Elective—4 hours
   H. BIO– one 300-level Elective—4 hours
   I. No minor is required.

III. Major in Medical Technology—102–105 hours
   A. Chemistry 111, 112, 211-21, 314-15, 319, 324, 326
   B. Biology 112, 211, 221, 222, 315, 316, 320
   C. Physics 213-214 or 231-232
   D. Computer Science (3 hours) and MAT 111 or preferably MAT 211
   E. A minimum of 33 hours of Medical Technology at an affiliated hospital as the fourth year of study.

IV. Major in Chemical Physics—119 hours

Designed for those seeking a broad background in the physical sciences to pursue graduate work in chemistry or physics or secondary teacher licensure, the major permits students with previous experiences to shorten the time spent in formal education without reducing the quality of the degree obtained.

Students with an advanced preparation in secondary school or as college sophomores may be selected for

A.

317. Physical Chemistry I (3) F
Prerequisites: CHE 211, MAT 212, and PHY 232.
Application of physical techniques to chemical systems with emphasis on thermodynamics. The laws of thermodynamics will be derived and applied to phase and chemical equilibria, electrochemical cells, and surface phenomena.

318. Physical Chemistry II (3) S
Prerequisite: CHE 317.
A continuation of CHE 317 with emphasis on dynamics and quantum chemistry: kinetics, mechanisms, and photochemistry; atomic and molecular electronic structure and application to spectroscopy.

319. Biochemistry (4) F
Prerequisite: CHE 315, CHE 326, and BIO 112.
Introduction to the organic chemistry of living systems. Topics include the structure and function of proteins, enzymic control of chemical reactions, catabolism, anabolism, bioenergetics, biosynthesis, and molecular biology. Three lectures and one 3-hour lab/week.

324. Organic Chemistry Laboratory (2) F
Corequisite: CHE 314.
Introduction to the basic techniques for the physical characterization and isolation of organic compounds. Use of spectrometric methods as applied to the determination of structure is included, as are some synthetic methods. Two 3-hour labs/week.

326. Organic/Inorganic Synthesis Laboratory (2) S
Prerequisite: CHE 314 and CHE 324;
Corequisite: CHE 315.
Application of laboratory techniques in synthesis and characterization of organic and inorganic compounds. Two 3-hour labs/week.

327. Physical Chemistry Laboratory (2) S
Corequisite: CHE 318.
The application of physical methods in the study of chemical compounds. Two 3-hour labs/week.

329. Biochemistry II (4) S
Prerequisite: CHE 319.
A continuation of 319 with emphasis on bioenergetics and metabolism. Topics include the function and molecular control of catabolic pathways for proteins, lipids, and carbohydrates as well as anabolic pathways for biological synthesis of these molecules. Three lectures and one 3-hour lab/week.

335. Intermediate Inorganic Chemistry (3) S
Pre– or Corequisite: CHE 315.
Introduction to inorganic compounds with an emphasis on coordination, bioinorganic, nuclear, and organometallic chemistry. The relationships between structure, physical properties, and reactivity will be examined in detail.

405. Environmental Chemistry (4) W—Odd Years
Prerequisite: CHE 211 and 315.
Study of rapid changes in earth's atmosphere, water, and soil caused by the activities of humankind with attention to the ozone layer, air quality, and water cycles. The vectors, fate, and treatment/removal strategies for organic and heavy metal pollutants will be discussed. Three lectures and one 3-hour lab/week.

424-5. Introduction to Research (1-3) 424–F; 425–S
Prerequisite: 20 hours of chemistry and junior/senior standing.
The student's knowledge is integrated by application of a simple piece of original work. Each course will be three hours per week per credit hour.

430. Advanced Inorganic Chemistry (4) F—Even Years
Prerequisite: CHE 211. Pre-or Corequisite: CHE 318 and 335.
A theoretical treatment of fundamental inorganic topics such as chemical bonding, periodic relationships, stereochemistry of inorganic complexes, acids and bases, and physical properties of inorganic compounds. Three lectures and one 3-hour lab/week.

435. Advanced Organic Chemistry (4) F—Odd Years
Prerequisite: CHE 315.
Extensive treatment of topics including reaction mechanisms, stereochemistry, heterocyclic chemistry, and molecular rearrangements. Three lectures and one 3-hour lab/week.

498. Seminar (1-3) S
Prerequisite: 20 hours of chemistry and junior/senior standing.
Skills in scientific and technical presentations, written and oral, will be polished. To be used at the discretion of the department for majors and minors only.

Medical Technology Hospital-in-Residence Curriculum

411. Clinical Chemistry (6)
Chemical analysis of various body fluids and the study of their relationship to disease states.

412. Instrumentation (1)
The principles, use, and care of instruments found in up-to-date laboratories.

421. Hematology and Coagulation (7)
Application of theory to technical performance in hematological procedures which aid in classification of anemias, leukemias, and other blood cell abnormalities.

422. Advanced Microbiology (7)
A lecture and lab course covering the role of microorganisms as they cause disease in man. Methods employed in the identification of bacteria, fungi, viruses, and rickettsiae.

423. Serology (2)
A lecture and lab course in immunology, demonstrating reactions between antigens and antibodies are considered. Use of these reactions as a serodiagnostic tool is presented.

424. Immunohematology (5)
Includes selection, testing and bleeding of donors, identification of blood group antigens and antibodies, procedures employed in providing compatible blood for patients, and principles and procedures used in blood component therapy.

425. Parasitology (2)
A study of parasites of medical significance, both indigenous and foreign, with particular emphasis on life cycles and identification.

431. Urinalysis (2)
Gross, physical, microscopic, and chemical analysis of urine.

432. Clinical Correlations (1)
Basic understanding of altered physiology in disease; correlation between laboratory test results and anatomical/physiological changes.

440. Principles of Management and Ethics (0)
Preparation for the medical graduate for positions of leadership as supervisors and instructors.

179-279-379-479. External Domestic Study Programs (1-3) As Needed
All courses and their applications must be defined and approved prior to registering.

180-280-380-480. Study Abroad Programs (1-4)
All courses and their application must be defined and approved prior to travel.

195-6-7. Special Studies (1-4)
295-6-7. Special Studies (1-4)
Lower-level group studies which do not appear in the regular departmental offerings.

395-6-7. Special Studies (1-4)
Upperr