

DEPARTMENT OF CHEMISTRY

Contact Information

Chair: Christine Hahn

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Building Name: Nierman Science Hall

Room Number: 100

The aim of the Department of Chemistry is to provide

1. certain service courses for other departments whose subject matter is based, in part, on the fundamentals of chemistry;
2. a cultural background for those who are interested in science and who desire the Bachelor of Science (B.S.) or Bachelor of Arts (B.A.) degree but do not expect to become professional chemists; and
3. proper education for those who wish to become professional chemists.

The Department of Chemistry also offers a Master of Science (M.S.) degree in Chemistry through the Thesis, Project, or Course-work tracks; each track can be taken with a general chemistry, a biochemistry, or a pre-health emphasis.

Undergraduate students majoring in chemistry can pursue one of the following tracks: B.A. in Chemistry with Teaching Certification; American Chemical Society (ACS) Certified B.S. in Chemistry; ACS Certified B.S. in Chemistry with Biochemistry track; B.S. in Chemistry, Pre-Health Science track.

The Department of Chemistry offers an undergraduate-level certificate in Nano Materials Science and Engineering. Students will receive the certificate upon completing all courses (B or better) stated in course requirements. Consult the chair of the department for details.

Faculty

Department Faculty

Abrams, Jason Assistant Professor, Department of Chemistry; B.S., University of Florida; M.S., University of Minnesota; Ph.D., Florida State University.

Bhattacharya, Apurba Professor, Department of Chemistry; B.S., Calcutta University (India); M.S., Indian Institute of Technology (India); Ph.D., The University of Texas at Austin.

Castro, Mauro Professor, Department of Chemistry; Regents Professor; B.S., Texas A&I University; M.S., Texas A&I University; Ph.D., Texas A&M University.

Chi, Xiaoliu Professor, Department of Chemistry; B.S., East China University of Chemical Technology (China); M.S., East China University of Chemical Technology (China); M.S., Western Kentucky University; Ph.D., University of Kentucky.

Francis, Kevin Assistant Professor, Department of Chemistry; B.S., Georgia State University; M.S., Georgia State University; Ph.D., Georgia State University.

Galan, Jacob Assistant Professor, Department of Chemistry; B.S., Texas A&M University-Kingsville; M.S., Texas A&M University-Kingsville; Ph.D., Purdue University.

Gonzalez-Garcia, Maribel Professor, Department of Chemistry; B.S., Universidad de Alcala de Henares (Spain); Ph.D., Universidad Autonoma de Madrid (Spain).

Hahn, Christine Associate Professor, Department of Chemistry; Chair; Bachelors, Carl Schorlemmer College of Technology (Germany); M.S., Martin Luther University Halle-Wittenberg (Germany); Ph.D., Martin Luther University Halle-Wittenberg (Germany).

Liu, Jingbo L Professor, Department of Chemistry; B.S., Heilongjiang University (China); Ph.D., University of Science and Technology (China).

Liu, Sajid Professor, Department of Chemistry; B.S., University of Wales (United Kingdom); M.A., State University of New York at Buffalo; Ph.D., The University of Warwick (United Kingdom).

Sanchez, Elda E Associate Professor, Department of Chemistry; B.S., Texas A&M University-Kingsville; M.S., Texas A&M University-Kingsville; Ph.D., Central University of Venezuela (Venezuela).

Suntravat, Montamas Assistant Professor, Department of Chemistry; B.S., Chulalongkorn University (Thailand); Ph.D., Chulalongkorn University (Thailand).

Emeritus

Olivares, Alberto Professor of Chemistry, Department of Chemistry; B.S., Texas A&M University; Ph.D., Texas A&M University.

Courses

Chemistry (CHEM)

CHEM 1111 Gen Inorganic Chem Lab I **1 SCH (0-3-1)**

A laboratory experience that focuses on laboratory techniques, data collection and analysis. The experience reinforces and promotes an understanding of the principles of stoichiometry, gases, liquids, solutions and energy. One hour of recitation. Pre- or corequisite: CHEM 1311. Fee: \$5.00

CHEM 1112 Gen Inorganic Chem Lab II **1 SCH (0-3-1)**

A laboratory experience that focuses on laboratory techniques, data collection and analysis. The experience reinforces and promotes an understanding of the principles of stoichiometry, gases, liquids, solutions and energy. One hour of recitation. Prerequisite: CHEM 1311 and CHEM 1111; Pre- or corequisite: CHEM 1312. Fee: \$5.00

CHEM 1311 Gen Inorganic Chemistry I **3 SCH (3-0)**

The first course for students majoring in a field of science, engineering or agriculture. Principles of stoichiometry, thermochemistry, atomic and molecular structures, gases, liquids, solids and solutions and the chemistry of the elements and their compounds. Prerequisite: MATH 1314 and either one year of high school chemistry or CHEM 1481.

CHEM 1312 Gen Inorganic Chemistry II **3 SCH (3-0)**

The second course for students majoring in a field of science, engineering or agriculture. Principles of chemical kinetics, chemical equilibrium, thermodynamics, electrochemistry and the chemistry of the elements and their compounds. Prerequisites: CHEM 1111 and CHEM 1311.

CHEM 1376 Elementary Chemistry **3 SCH (3-2)**

A survey of fundamental concepts of chemistry. Topics include atomic structure, elements and the periodic table, nuclear chemistry, acids and bases and organic, inorganic and biochemical compounds. Prerequisite: PHYS 1375. Fee: \$5.00

CHEM 1405 General Introd to Chemistry **4 SCH (3-2)**

Elementary studies in chemistry for those students not majoring in science. Emphasizes body chemistry and physiological action of drugs, foods, nutrients, poisons, cancer-causing agents, etc. Includes environmental, social, political, historical and agricultural aspects of the science. Fee: \$5.00

CHEM 2401 Inorg Quantitative Analysis **4 SCH (3-4)**

Principles and methods of separation and analysis. Includes standard volumetric and gravimetric methods and an introduction to instrumental methods. Prerequisites: CHEM 1112 and CHEM 1312. Fee: \$5.00

CHEM 2421 Elem Organic Chemistry **4 SCH (3-3)**

Aliphatic and aromatic compounds with a special emphasis given to aliphatic compounds. Prerequisite: CHEM 1112 and CHEM 1312. Fee: \$5.00

CHEM 3123 Organic Chemistry Lab I **1 SCH (0-4)**

Introduction to laboratory practices and procedures in organic chemistry, with emphasis on hydrocarbon chemistry. Pre- or corequisite: CHEM 3323. Fee: \$5.00

CHEM 3125 Organic Chemistry Lab II **1 SCH (0-4)**

Introduction to laboratory practices and procedures in organic chemistry, with emphasis on hydrocarbon chemistry. Pre- or corequisite: CHEM 3325. Fee: \$5.00

CHEM 3181 Chemical Literature **1 SCH (1)**

Survey of chemical literature, electronic databases, and other internet sources to search for chemical information. Introduction to library sources, book loans, access to e-books and journals. Prerequisite: CHEM 3323

CHEM 3323 Organic Chemistry I **3 SCH (3-0)**

Introduction to the important concepts and principles in the bonding and reactions of organic molecules, with intensive study of the chemistry of non-aromatic hydrocarbons. Prerequisites: CHEM 1312, CHEM 1112. To count for a major or minor in Chemistry, CHEM 3123 must also be taken.

CHEM 3325 Organic Chemistry II **3 SCH (3-0)**

Continuation of CHEM 3323. An intensive study of the reactions and mechanisms of aromatic hydrocarbons and the main non-hydrocarbon functional groups. Prerequisites: CHEM 3323, CHEM 3123. To count for a major or minor in Chemistry, CHEM 3125 must also be taken.

CHEM 3331 Physical Chemistry I **3 SCH (3-0)**

Study of physical and chemical phenomena. Thermodynamics, including thermodynamics laws, thermal chemistry, phase transitions, electrochemistry and chemical equilibrium. Prerequisites: CHEM 3325 and one semester each of physics and calculus.

CHEM 3332 Physical Chemistry II 3 SCH (3-0)

Study of physical and chemical phenomena. Chemical kinetics, quantum mechanics, spectroscopy, statistical thermodynamics and molecules in motion. Prerequisites: CHEM 3331 and two semesters each of physics and calculus.

CHEM 3385 Undergraduate Research (WI) 1-3 SCH (1-3)

Supervised individual journal-quality research involving advanced chemical concepts and a variety of experimental techniques and instruments. May be taken for a maximum of 6 semester hours. Prerequisites: At least one semester of chemistry and prior approval of research project director.

CHEM 3451 Environmental Chemistry 4 SCH (3-3)

Sources and causes of land, water and air pollution; the methods of measurement and abatement. May not be counted as part of the minimum requirements for a major in chemistry. Prerequisites: CHEM 1112, CHEM 1312 and two additional 3- or 4-credit hour courses in either biology or geology or more advanced chemistry.

Fee: \$5.00

CHEM 4111 Adv Inorganic Chemistry Lab 1 SCH (0-4)

Developing laboratory skills in synthesis and characterization of main group and transition metal compounds. Applying concepts of acid and bases, redox reactions, bonding and structure, and coordination chemistry in laboratory work. Compounds are characterized using chemical and instrumental methods (UV, IR, and NMR spectroscopy). Prerequisite: CHEM 2401; Pre- or corequisite: CHEM 4311.

CHEM 4131 Physical Chem Measurements I 1 SCH (0-4)

A laboratory course on the techniques and apparatus used in the measurement of properties of chemical systems. Attention is also given to the limits of accuracy and the sources of error in a given technique. Required of chemistry majors. Prerequisite or corequisite: CHEM 3331.

Fee: \$5.00

CHEM 4132 Physical Chem Measurements II 1 SCH (0-4)

A laboratory course on the techniques and apparatus used in the measurement of properties of chemical systems. Attention is also given to the limits of accuracy and the sources of error in a given technique. Required of chemistry majors. Prerequisite or corequisite: CHEM 3332.

Fee: \$5.00

CHEM 4181 Chemical Seminar 1 SCH (1-0)

Presentation of a topic in chemistry including design of slides, presentation of chemical content (reaction equations, chemical drawings and schemes), speech and structure of presentation, citation of content, interaction with audience, answers and questions. Prerequisite: CHEM 3181.

CHEM 4311 Advance Inorganic Chemistry 3 SCH (3-0)

Review of atomic structure, structure and bonding, acid-base and redox concepts, and reaction principles. Detailed discussion of solid state structures, periodic trends of elements and their compounds, industrial processes for the recovery of elements from natural sources, and production of generic inorganic compounds. Application of chemical elements and their compounds. Prerequisite: CHEM 2401.

CHEM 4341 Biochemistry I 3 SCH (3-0)

Introduction to the important concepts, nomenclature and compounds of biochemistry with special emphasis on the chemical interpretation of the structures and functions of biological macromolecules. Prerequisite: CHEM 3325.

CHEM 4342 Biochemistry II 3 SCH (3-0)

An introduction to the major biochemical cycles and pathways in living organisms, including reaction steps, regulation and mechanisms. Prerequisite: CHEM 4341.

CHEM 4345 Principles of Biochemistry 3 SCH (3-0)

A one-semester presentation of the major areas of biochemistry, emphasizing the structure and function of biomolecules and major metabolic activities of living organisms, including humans. Prerequisites: CHEM 2421 or CHEM 3325.

CHEM 4381 Selected Topics in Chemistry 1-3 SCH (1-3)

Literature and research in areas of chemistry not otherwise treated in depth in available courses. May be repeated when topic changes for a maximum of 6 semester hours of credit.

CHEM 4385 Senior Research (WI) 1-3 SCH (1-3)

Supervised individual journal-quality research involving advanced chemical concepts and a variety of experimental techniques and instruments. May be taken for a maximum of 6 semester hours. Prerequisites: CHEM 3331 and CHEM 3332, senior standing and prior approval of the research project director.

CHEM 4401 Mod Meth of Instrumental Anal 4 SCH (3-4)

Introduction to the theory and practice of optical, separation, and electro-analytical methods of analysis, including UV/Visible spectroscopy, mass spectroscopy, NMR, gas chromatography, and HPLC. Prerequisites: CHEM 2401 or CHEM 2371; and CHEM 3331.

Fee: \$5.00

CHEM 4421 Advanced Chemical Synthesis 4 SCH (2-6)

Introduction to advanced and sophisticated synthesis of organic, biochemical and inorganic compounds. Laboratory includes multi-step syntheses, stereochemical problems, literature-searching techniques, etc. Prerequisites: CHEM 3323/3123, CHEM 3325/3125.

Fee: \$5.00

Degree Requirements

Majors

- Chemistry - Biochemistry, B.S. - Certified by the American Chemical Society - Minor in Biology (<https://catalog.tamuk.edu/undergraduate/arts-sciences/chemistry/chemistry-biochemistry-bs-certified-american-chemical-society-minor-biology/>)
- Chemistry - Pre-Health, B.S. - Minor in Biology (<https://catalog.tamuk.edu/undergraduate/arts-sciences/chemistry/chemistry-pre-health-bs-minor-biology/>)
- Chemistry, B.A. with Teaching Certification (<https://catalog.tamuk.edu/undergraduate/arts-sciences/chemistry/chemistry-ba-teaching-certification/>)
- Chemistry, B.S. - Certified by the American Chemical Society (<https://catalog.tamuk.edu/undergraduate/arts-sciences/chemistry/chemistry-bs-certified-american-chemical-society/>)

Minors

- Chemistry, Minor (<https://catalog.tamuk.edu/undergraduate/arts-sciences/minors/chemistry-minor/>)
- Environmental Science, Minor (<https://catalog.tamuk.edu/undergraduate/arts-sciences/minors/environmental-science-minor/>)