Department of Chemistry

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Ruthanne D. Thomas, Chair

Graduate Faculty: Acree, Borden, Braterman, Chyan, Cundari, Golden, Jones, Kelber, J. Marshall, P. Marshall, Mason, Omary, Richmond, Schwartz, Selby, Theriot, Thomas, Wilson.

Student stipends, including teaching assistantships and research fellowships, are available from a variety of sources. Stipends may range up to $20,000 per year depending upon demonstrated academic and research competence. Further information may be obtained from the chair of the Graduate Affairs Committee.

Research

A variety of research programs are in progress involving analytical, computational, inorganic, organic and physical chemistry, as well as chemistry education. Specific areas of study include synthesis, properties and kinetic investigations of transition metal carbonyls; syntheses and properties of nitrogen heterocycles; NMR applications to organometallic chemistry; gas phase kinetics; spectroelectochemistry; morphology of inorganic precipitates; thermodynamics; Raman scattering; materials analysis and development; properties of surface adsorbed molecules; crystallography; polymer liquid crystals; interfacial processes; organosilicon synthesis and kinetics; polycyclic cage compounds; ferroelectric thin films; basis set development; computer-aided catalyst design; computational organic chemistry; chemical vapor deposition; and reactivities of metal and oxide surfaces.

The department possesses more than $2.7 million of capital equipment, including 200 MHz, 90 MHz multinuclear and 300 MHz multinuclear FT-NMR with CP/MAS solids capability, ESR, Auger/ESCA, ICP, FT-IR, Raman, mass spectrometers, stopped-flow kinetic analyzer, pulsed-laser flash photolysis, laser-induced fluorescence spectrometers and state-of-the-art high-performance computing.

Studies are conducted with the assistance of graduate and undergraduate students, research technicians and post-doctoral fellows. Other technical personnel include full-time instrument technicians and a glassblower.

Financial support for research is provided by the Robert A. Welch Foundation, the National Science Foundation, the Air Force Office of Scientific Research, the Army Research Office, the Office of Naval Research and the Department of Energy.

Additional sources of research funding include the Texas Advanced Research and Technology Program, Texas Instruments, Electrical Power Research Institute, Sun Exploration, the UNT Faculty Research Fund and several industrial fellowships.

Admission Requirements

Departmental forms for applying for teaching and research support may be obtained from the chair of the Graduate Affairs Committee of the Department of Chemistry or from the World Wide Web. Complete college transcripts, two letters of recommendation and an acceptable GRE score are required for conditional admission. Contact the department or the Toulouse School of Graduate Studies for information concerning acceptable admission test scores.

New students should contact the chemistry Graduate Affairs Committee immediately upon arriving on campus for information on departmental requirements. A departmental policy bulletin that delineates these requirements is available to students.

Students must take placement examinations covering undergraduate analytical, inorganic, organic and physical chemistry. These examinations are given during registration week of each long term/semester. The results of these examinations are used for counseling purposes. The chemistry department employs a core course systems that requires its students to take graduate courses in specified areas.

Advisory Program

The chemistry Graduate Affairs Committee serves as adviser to the beginning student. When a field of specialization and a major professor have been selected, a committee is then appointed to serve in an advisory capacity. The minimum number of committee members is two for the master's and four for the doctoral advisory committee. The student meets yearly with this committee for research progress reports and consultation. PhD committees will also choose an individual from outside the university who is knowledgeable in the student's area of research to serve in an advisory capacity to the committee.

Degree Programs

The department offers graduate programs leading to the following degrees:

- Master of Science with a major in chemistry; and
- Doctor of Philosophy with a major in chemistry.

Concentrations are available at the master's level in analytical, industrial, inorganic, organic or physical chemistry or chemistry education.

Concentrations at the doctoral level are available in analytical, inorganic, organic or physical chemistry.

Below is an abbreviated description of each of the degrees offered. Complete descriptions of degree requirements are contained in the *Department of Chemistry Graduate Policy Bulletin*. A copy can be obtained from the chair of the Graduate Affairs Committee.

Master of Science

Analytical, Inorganic, Organic or Physical Chemistry

The applicant seeking a master's degree in one of these areas will plan a program with the assistance of the advisory professor and the advisory committee. A graduate major must present credit for at least 30 semester hours. The student must maintain a B average in all formal chemistry course work. The student must write a thesis describing his or her research and must defend the thesis at an oral examination administered by the advisory committee.

The Department of Chemistry requires completion of three of the four core courses (one of which must be in the student's area of research) with an average grade of B or above. A thesis is required.

Industrial Chemistry

This degree is designed for students with specific interests in selected areas of applied chemistry. The degree requirements are determined by consultation with the graduate affairs committee. The program leads to a non-thesis degree requiring 36 semester hours of formal course work, at least one-half of which (18 hours) must be in chemistry. Supplemental non-chemistry courses must include at least 12 hours and must be approved by the student's committee. In addition to the formal courses, either 3 or 6 hours of the total 36 hours must comprise on the job research training in an industrial position (or equivalent on the job training).

Chemistry Education

This program is designed primarily for students who do not possess a degree in chemistry (e.g., secondary education majors) but who may desire to enter a graduate program. With the aid of the chemistry adviser, the student may choose a 30-semester-hour program, including thesis, or a 36-semester-hour program without thesis. A minimum of 12 hours in formal course work in chemistry is required. In order to qualify for this degree, a student must have received teaching certification prior to admission or must obtain this certification prior to receiving the degree.

Doctor of Philosophy

The course requirements for the PhD degree require that a student complete core courses in three of the four areas of chemistry (including the student's area of research). Students must complete three additional advanced courses (of which at least two must be in the Department of Chemistry). The student must maintain a B average or better in these six courses. This research must culminate in the writing of a dissertation of demonstrable scientific merit. It is normally required that at least one paper be accepted in a refereed journal by the time of the oral defense.

After completion of the formal course work, foreign language or computer science requirement, and CHEM 6010, the student will apply to the dean of the Toulouse School of Graduate Studies for admission to candidacy for the Doctor of Philosophy degree. This should be done at least one year before graduation.

Courses of Instruction

All Courses of Instruction are located in one section at the back of this catalog.

Course and Subject Guide

The "Course and Subject Guide," found in the Courses of Instruction section of this book, serves as a table of contents and provides quick access to subject areas and prefixes.