Department of Chemistry

The Master of Science (M.S.) in Chemistry and the Doctor of Philosophy (Ph.D.) in Chemistry programs offer opportunities for advanced study and research designed to prepare students for roles in industry, government, research institutes, or educational institutions. For the M.S. program, the thesis option is recommended for students who are planning a career in research or who contemplate pursuing a doctorate in their program of study. A non-thesis option is available for students with other goals. The Ph.D. program is broad-based and will prepare students for a variety of options in chemistry and related fields upon graduation.

Chemistry includes graduate programs of study in analytical chemistry, bioorganic chemistry, biophysical chemistry, biochemistry, bioinorganic chemistry, environmental chemistry, inorganic chemistry, organic chemistry, and physical chemistry.

Faculty expertise in each of the interest areas offers the opportunity for direct student-faculty interaction for thesis or dissertation development through coursework and research. Additional cooperative projects and programs are available with other area research institutions.

A limited number of teaching and/or research assistantships and fellowships are available to qualified students. Financial assistance is awarded on a competitive basis.

- M.S. in Chemistry (p. 1)
- Ph.D. in Chemistry (p. 2)

Master of Science Degree in Chemistry

The purpose of the Master of Science (M.S.) degree program in Chemistry is to offer students the opportunity to acquire a sound preparation of the fundamentals in several areas of chemistry, to introduce students to recent advances in chemical theory and methods, and to encourage research in a specific area of study.

Qualified students are encouraged to apply for teaching and/or research assistantships and fellowships. Requests should be sent to the Graduate Advisor of Record for chemistry when application is made for admission to UTSA.

The complete set of requirements for the M.S. degree in Chemistry is described in the Chemistry M.S. Program Handbook which can be accessed at http://utsa.edu/chem/graduates.html.

Admission Requirements

In addition to satisfying the University-wide graduate admission requirements, applicants must have earned a Bachelor of Arts or a Bachelor of Science degree from an accredited university with a minimum grade point average of 3.0 (on a 4.0 scale) in upper-division work, preferably in chemistry. All undergraduate chemistry courses must be completed with a minimum grade point average of 3.0.

Applicants must submit scores from the Graduate Record Examination (GRE). When GRE scores are used to determine admission, applicants will be compared to applicants with similar socioeconomic backgrounds. A minimum of two letters of recommendation from persons familiar with the applicant’s undergraduate scholastic record must be sent to the Graduate School at the same time application is made for admission to UTSA. Background or remedial courses in chemistry may be required to remove deficiencies.

Applicants whose native language is not English must submit scores from the Test of English as a Foreign Language (TOEFL). The English Language Assessment Procedure is a mandatory assessment for incoming international students whose TOEFL scores are between 550 and 600 (paper version) or 79 and 100 (Internet version). See Chapter 1, Admission, of this catalog for details.

Thesis Option in Chemistry

Degree Requirements

The Master of Science in Chemistry program requires the successful completion of a minimum of 33 semester credit hours. The student must have a grade point average of 3.0 or greater (on a 4.0 scale) in the core lecture courses and elective courses combined.

Candidates must complete the following:

A. Required courses (27 semester credit hours):

- CHE 5263 Advanced Analytical Chemistry
- CHE 5313 Advanced Biochemistry
- CHE 5453 Advanced Inorganic Chemistry
- CHE 5643 Advanced Organic Chemistry
- CHE 5843 Advanced Physical Chemistry

Graduate Seminar in Chemistry (3 semester credit hours):

- CHE 5981 Graduate Seminar in Chemistry (repeated for a total of 3 hours)

B. A minimum of 6 semester credit hours of electives in chemistry, as approved by the M.S. Research Advisor and the Graduate Advisor of Record, is required.

C. Students must pass a final oral comprehensive examination, scheduled during the student’s last semester of work, for completion of the degree program.

D. Students must successfully defend their thesis research results before their Graduate Committee prior to the submission of the thesis to the Dean of the Graduate School for approval.

Total Credit Hours 33

1 Registration for CHE 5981 Graduate Seminar in Chemistry is required for each semester of residence, although no more than 3 semester credit hours may be applied to the Master’s degree.

Nonthesis Option in Chemistry

Degree Requirements

This program requires the successful completion of a minimum of 33 semester credit hours. The student must have a grade point average of
3.0 or greater (on a 4.0 scale) in the core lecture courses and elective courses combined.

Candidates for the degree must complete the following:

A. Required courses (27 semester credit hours):

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<tr>
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<tr>
<td>CHE 5843</td>
<td>Advanced Physical Chemistry</td>
</tr>
<tr>
<td>CHE 5981</td>
<td>Graduate Seminar in Chemistry (repeated for a total of 3 hours) ¹</td>
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</table>

B. Directed Research (repeated for a total of 9 semester credit hours):

<table>
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<tr>
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<tbody>
<tr>
<td>CHE 6991</td>
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<td>CHE 6995</td>
<td>Directed Research</td>
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<tr>
<td>CHE 6996</td>
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</tbody>
</table>

Registration for CHE 5922 Research and Teaching Practice and Ethics is required for all students who are Teaching Assistants.

B. 6 semester credit hours of elective organized coursework. These courses must be approved by the M.S. Research Advisor and the Graduate Advisor of Record

C. Students must submit an acceptable final written report and pass an oral presentation, scheduled during the student’s last semester of work, for completion of the degree program.

Total Credit Hours 33

¹ Registration for CHE 5981 Graduate Seminar in Chemistry is required for each semester of residence, although no more than 3 semester credit hours may be applied to the Master’s degree. The laboratory work in chemistry should be taken as Directed Research.

Doctor of Philosophy Degree in Chemistry

The Department of Chemistry offers opportunities for advanced study and research leading to the Doctor of Philosophy (Ph.D.) degree in Chemistry. The Ph.D. degree in Chemistry is awarded to candidates who have displayed an in-depth understanding of the subject matter and demonstrated the ability to make an original contribution to knowledge in their field of specialty.

The complete set of requirements for the Ph.D. in Chemistry is described in the Chemistry Ph.D. Program Handbook (http://utsa.edu/chem/graduates.html). The regulations for this degree comply with the general University regulations (refer to Chapter 2, General Academic Regulations, and Chapter 5, Doctoral Degree Regulations, in this catalog).

Admission Requirements

In addition to satisfying the University-wide graduate admission requirements, applicants must have earned a Bachelor of Arts or a Bachelor of Science degree from an accredited university and a minimum grade point average of 3.0 (on a 4.0 scale) in upper-division and graduate work, preferably in chemistry. Applicants must submit scores from the Graduate Record Examination (GRE) with their application. When GRE scores are used to determine admission, applicants will be compared to applicants with similar socioeconomic backgrounds. At least two letters of recommendation from persons familiar with the applicant’s undergraduate (and graduate, where applicable) scholastic record must be sent to the Graduate School at the same time application is made for admission to UTSA. Background or remedial courses in chemistry may be required to remove deficiencies.

Applicants whose native language is not English must submit scores from the Test of English as a Foreign Language (TOEFL). The English Language Assessment Procedure is a mandatory assessment for incoming international students whose TOEFL scores are between 550 and 600 (paper version) or 79 and 100 (Internet version). See Chapter 1, Admission, of this catalog for details.

Degree Requirements

The Ph.D. degree requires a minimum of 86 semester credit hours beyond the baccalaureate degree. The curriculum consists of 18 semester credit hours of formal coursework, required teaching, research, and completion of the dissertation following advancement to candidacy. Enrollment in the Chemistry Research Colloquium and/or Graduate Seminar in Chemistry is required each semester of enrollment and may be taken for a maximum combined total of 12 semester credit hours. A minimum of 56 semester credit hours in doctoral research, including 12 semester credit hours of doctoral dissertation, must be completed. The student must have a grade point average of 3.0 or greater (on a 4.0 scale) in the core courses and elective courses combined. Each student must be a teaching assistant for a minimum of one academic year. Other requirements include (but are not limited to) submission of a satisfactory research proposal in an area outside the dissertation research, the written dissertation, and the final oral examination. The final oral examination consists of a public presentation of the dissertation and a closed oral defense which are evaluated by the student’s Doctoral Studies Committee. Students matriculating with a Master’s degree may use up to 30 semester credit hours toward the degree, provided the courses are comparable to core and elective courses.

Program of Study

A. Core curriculum. (9 semester credit hours selected from the following):

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<td>CHE 5843</td>
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</tbody>
</table>

B. Colloquia and seminars (maximum 12 semester credit hours required):

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<thead>
<tr>
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<tbody>
<tr>
<td>CHE 5981</td>
<td>Graduate Seminar in Chemistry</td>
</tr>
<tr>
<td>CHE 7911</td>
<td>Chemistry Research Colloquium</td>
</tr>
</tbody>
</table>

C. Doctoral research (minimum 56 semester credit hours required): 56

<table>
<thead>
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<tbody>
<tr>
<td>CHE 5922</td>
<td>Research and Teaching Practice and Ethics</td>
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</tbody>
</table>

Directed Research (Select a minimum of 19 semester credit hours of the following):

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<td>CHE 6994</td>
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<tr>
<td>CHE 6995</td>
<td>Directed Research</td>
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</table>
CHE 6996 Directed Research
CHE 6997 Directed Research

Doctoral Research (Select a minimum of 23 hours of the following):
CHE 7921 Doctoral Research
CHE 7922 Doctoral Research
CHE 7923 Doctoral Research
CHE 7926 Doctoral Research
CHE 7927 Doctoral Research
CHE 7928 Doctoral Research

Doctoral Dissertation (Select a minimum of 12 hours of the following):
CHE 7931 Doctoral Dissertation
CHE 7932 Doctoral Dissertation
CHE 7933 Doctoral Dissertation
CHE 7936 Doctoral Dissertation
CHE 7937 Doctoral Dissertation
CHE 7938 Doctoral Dissertation

D. Electives (minimum 9 semester credit hours required; chosen with consent of advisor):
CHE 5483 Inorganic Solid State Materials
CHE 5833 Computational Chemistry
CHE 6263 Recent Advances in Bioanalytical Chemistry
CHE 6403 Bioinorganic Chemistry
CHE 6433 Organometallic Chemistry
CHE 6443 Green Chemistry and Catalysis
CHE 6623 Advanced Organic Synthesis
CHE 6633 Bioorganic Chemistry
CHE 6643 Chemistry of Heterocyclic Compounds (Chemistry of Heterocyclic Compounds)
CHE 6683 Topics in the Chemistry of Natural Products
CHE 6813 Molecular Thermodynamics
CHE 6823 Chemical Kinetics and Dynamics
CHE 6833 Quantum Chemistry
CHE 6853 Biophysical Chemistry
CHE 6883 Mass Spectrometry
CHE 7633 Advanced Catalysis in Organic Synthesis
CHE 7973 Special Problems

Total Credit Hours 86

The entire program of study must be approved by the student's Doctoral Research Advisor, Doctoral Studies Committee, and Graduate Program Committee and must be submitted to the Dean of the Graduate School for final approval.

Advancement to Candidacy

All students seeking a doctoral degree at UTSA must be admitted to candidacy. One of the requirements for admission to candidacy is passing the Qualifying Examination. The Qualifying Examination is divided into written and oral portions. A Dissertation Research Proposal (DRP) constitutes the written portion, and defense of the DRP constitutes the oral portion. The oral portion must be presented no later than one month following submission of the written portion. The student's performance on both the written and oral portions is evaluated by the student's Doctoral Studies Committee.