

Chemistry and Biochemistry - Graduate Programs

OBJECTIVE: MASTER OF SCIENCE

The objectives of the Chemistry and Biochemistry Department's program leading to the Master of Science degree include:

- a. developing the individual's ability to do independent research,
- b. preparing students for more advanced study in chemistry and
- c. providing advanced training to professional chemists and those employed in technical and business areas in which chemistry at this level is necessary for efficient performance.

Research areas include analytical chemistry, biochemistry, bioinorganic chemistry, colloid and surface chemistry, electrochemistry, inorganic chemistry, medicinal chemistry, organic chemistry, physical chemistry, polymer chemistry, and theoretical chemistry.

OBJECTIVE: PH.D. IN CHEMISTRY

The program leading to the Doctor of Philosophy degree in Chemistry is designed primarily to prepare doctoral-level chemists for industrial research careers. The student must:

- a. demonstrate the ability to carry out independent research and
- b. acquire the practical knowledge of the type of research conducted in industry and of the constraints (both practical and philosophical) under which such research is conducted.

The areas of research include analytical chemistry, biochemistry, bioinorganic chemistry, colloid and surface chemistry, electrochemistry, inorganic chemistry, medicinal chemistry, organic chemistry, organometallic chemistry, physical chemistry, polymer chemistry, and theoretical chemistry.

ADMISSION CRITERIA

In evaluating candidates for admission to its graduate degree programs, the Department of Chemistry and Biochemistry emphasizes the preparedness of the student as evidenced by quality and quantity of coursework and the student's previous research experience. Recommendations from our own faculty, based on firsthand knowledge of the applicant or a faculty member at the applicant's institution, are also very important.

UNCONDITIONAL ADMISSION

Unconditional admission may be granted under any one of the following options. The minimum undergraduate GPA requirement for all options is 3.0, as calculated by Graduate Admissions.

OPTION 1

A satisfactory completion of a Bachelor's degree or equivalent, official transcripts, and GRE scores, and three letters of recommendation.

OPTION 2

A satisfactory completion of a Bachelor's degree or equivalent, official transcripts, and a letter of recommendation from a faculty member at the applicant's undergraduate institution, *plus a recommendation from a UT Arlington Chemistry and Biochemistry faculty member.*

OPTION 3

A satisfactory completion of a bachelor's degree or equivalent, official transcripts, and a letter of recommendation from a faculty member at the undergraduate institution, *plus a recommendation from a UT Arlington Chemistry and Biochemistry faculty member based on a face-to-face interview.*

LANGUAGE REQUIREMENTS

An applicant whose native language is not English must submit a TOEFL score of at least 550 or a score of at least 213 on the computer-based test. A TSE-A score of 45 or higher can be substituted for the TOEFL. Those who have completed their undergraduate education in English *may be eligible for a TOEFL waiver* based on the recommendation letters.

PROVISIONAL ADMISSION

An applicant unable to supply all required documentation prior to the admission deadline but who otherwise appears to meet admission requirements may be granted provisional admission.

A deferred decision may be granted when a file is incomplete or when a denied decision is not appropriate.

PROBATIONARY ADMISSION

In rare cases, probationary admission may be granted as the result of a substandard performance on one or more of the admission criteria. In this case, the Graduate Advisor will set additional conditions for admission including, but not limited to, additional undergraduate coursework and/or achieving a B or better in the first 9 hours of graduate coursework.

DENIAL OF ADMISSION

A candidate may be denied admission if they have less than satisfactory performance on a majority of the admission criteria described above.

ELIGIBILITY FOR SCHOLARSHIPS/FELLOWSHIPS

Students that have no provisional admission conditions to meet will be eligible for available scholarship and/or fellowship support. Award of scholarships or fellowships will be based on the same criteria utilized in admission decisions. To be eligible, candidates must be new students coming to UT Arlington in the Fall semester, must have a GPA of 3.0 in their last 60 undergraduate credit hours plus any graduate credit hours as calculated by Graduate Admissions, and must be enrolled in a minimum of 6 hours of coursework in both long semesters to retain their fellowships. (Students with graduate teaching or research assistantships, however, must be enrolled in a minimum of 9 hours of coursework in both long semesters and 6 hours of coursework in the summer sessions.)

Master's Degree Requirements

A candidate for graduate study must satisfy the general admission requirements of the program.

MASTER'S DEGREE WITH THESIS

This degree requires a minimum of 24 credit hours in course work plus a 6 credit hour thesis class. A minimum of 18 hours in chemistry from courses listed in the Graduate Catalog will be required. Twelve of these hours will be taken from at least four (4) of the chemistry disciplines (Analytical, Biochemistry, Inorganic, Organic, Physical); suggested classes include:

CHEM 5331	ADVANCED BIOCHEMISTRY I	3
or CHEM 5336	STRUCTURE & FUNCTION OF PROTEINS, MEMBRANES & CARBOHYDRATES AND FAST KINETICS	
CHEM 5341	INORGANIC CHEMISTRY	3
CHEM 5351	ORGANIC CHEMISTRY I	3
CHEM 5361	INTRODUCTION TO GRADUATE PHYSICAL CHEMISTRY	3
CHEM 5324	ANALYTICAL MASS SPECTROMETRY AND SPECTROSCOPY	3
CHEM 5325	SEPARATION SCIENCE	3

Electives (6 hours) shall be graduate division courses in a science or engineering subject selected by the candidate; any elective requires the approval of the graduate advisor.

The 6 credit hour thesis class (CHEM 5698) is a completion course and must be taken in the final semester.

MASTER'S DEGREE WITH THESIS SUBSTITUTE

This degree is available for students with at least five years of professional experience in an industrial, government, or other chemistry laboratory at the time the degree is awarded. Admission to the program requires specific approval of the Graduate Studies Committee.

The degree plan requires a minimum of 30 credit hours, of which at least 24 must be in coursework and at least 3 in a suitable research project (CHEM 5392). A minimum of 18 hours in chemistry from courses listed in the Graduate Catalog will be required. Twelve of these hours will be taken from at least four (4) of the chemistry disciplines (Analytical, Biochemistry, Inorganic, Organic, Physical); suggested classes include:

CHEM 5331	ADVANCED BIOCHEMISTRY I	3
or CHEM 5336	STRUCTURE & FUNCTION OF PROTEINS, MEMBRANES & CARBOHYDRATES AND FAST KINETICS	
CHEM 5341	INORGANIC CHEMISTRY	3
CHEM 5351	ORGANIC CHEMISTRY I	3
CHEM 5361	INTRODUCTION TO GRADUATE PHYSICAL CHEMISTRY	3
CHEM 5324	ANALYTICAL MASS SPECTROMETRY AND SPECTROSCOPY	3
CHEM 5325	SEPARATION SCIENCE	3

Additional electives II be graduate division courses in a science or engineering subject selected by the candidate; any elective requires the approval of the graduate advisor.

MASTER'S DEGREE NON-THESIS

This option requires a minimum of 30 hours of coursework of which at least 24 hours must be in chemistry. Courses in chemistry will be taken from at least four (4) of the chemistry disciplines (Analytical, Biochemistry, Inorganic, Organic, Physical). Suggested classes include:

CHEM 5331	ADVANCED BIOCHEMISTRY I	3
or CHEM 5336	STRUCTURE & FUNCTION OF PROTEINS, MEMBRANES & CARBOHYDRATES AND FAST KINETICS	
CHEM 5341	INORGANIC CHEMISTRY	3
CHEM 5351	ORGANIC CHEMISTRY I	3
CHEM 5361	INTRODUCTION TO GRADUATE PHYSICAL CHEMISTRY	3
CHEM 5324	ANALYTICAL MASS SPECTROMETRY AND SPECTROSCOPY	3
or CHEM 5325	SEPARATION SCIENCE	

Elective courses (6 hours) shall be graduate division courses selected by the candidate. All courses taken for this degree plan including electives must be approved by the graduate advisor.

ADMISSION CRITERIA

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DENIAL OF ADMISSION

A candidate may be denied admission if they have less than satisfactory performance on a majority of the admission criteria described above.

ELIGIBILITY FOR SCHOLARSHIPS/FELLOWSHIPS

Students that have no provisional admission conditions to meet will be eligible for available scholarship and/or fellowship support. Award of scholarships or fellowships will be based on the same criteria utilized in admission decisions. To be eligible, candidates must be new students coming to UT Arlington in the Fall semester, must have a GPA of 3.0 in their last 60 undergraduate credit hours plus any graduate credit hours as calculated by

Graduate Admissions, and must be enrolled in a minimum of 6 hours of coursework in both long semesters to retain their fellowships. (Students with graduate teaching or research assistantships, however, must be enrolled in a minimum of 9 hours of coursework in both long semesters and 6 hours of coursework in the summer sessions.)

Ph.D. Degree Requirements

To be admitted to the Ph.D. program, an applicant must satisfy the general admission requirements of the program and his or her academic record must show preparation for advanced work in chemistry.

Each candidate must complete the following program requirements:

1. Courses for students emphasizing analytical chemistry

Select three of the following:		9
CHEM 5324	ANALYTICAL MASS SPECTROMETRY AND SPECTROSCOPY	3
CHEM 5325	SEPARATION SCIENCE	3
CHEM 5327	ANALYTICAL ELECTROCHEMISTRY	3
CHEM 5326	ANALYTICAL CHEMISTRY - CONCEPTS AND IMPLEMENTATION	3
Plus two (2) courses from two divisions outside of analytical chemistry (biochemistry, inorganic, organic, or physical). Suggestions include: ¹		
CHEM 5331	ADVANCED BIOCHEMISTRY I	3
CHEM 5341	INORGANIC CHEMISTRY	3
CHEM 5351	ORGANIC CHEMISTRY I	3
CHEM 5361	INTRODUCTION TO GRADUATE PHYSICAL CHEMISTRY	3

Plus courses as indicated in items 7-11.

2. Courses for students emphasizing biochemistry:

CHEM 5331	ADVANCED BIOCHEMISTRY I	3
CHEM 5334	MECHANISMS OF ENZYME ACTIONS	3
CHEM 5335	GENES, GENOMES, AND NUCLEIC ACIDS	3
Plus two (2) courses from two divisions outside of analytical chemistry (biochemistry, inorganic, organic, or physical). Suggestions include:		6
CHEM 5262 & CHEM 5168	COMPUTATIONAL CHEMISTRY and QUANTUM CHEMISTRY LABORATORY	3
CHEM 5336	STRUCTURE & FUNCTION OF PROTEINS, MEMBRANES & CARBOHYDRATES AND FAST KINETICS	3
CHEM 5351	ORGANIC CHEMISTRY I	3
CHEM 5341	INORGANIC CHEMISTRY	3
CHEM 5358	DETERMINATION OF MOLECULAR STRUCTURE BY PHYSICAL METHODS	3
CHEM 5324	ANALYTICAL MASS SPECTROMETRY AND SPECTROSCOPY	3

Plus courses as indicated in items 7-11.

3. Courses for students emphasizing inorganic chemistry:

CHEM 5341	INORGANIC CHEMISTRY	3
CHEM 5358	DETERMINATION OF MOLECULAR STRUCTURE BY PHYSICAL METHODS	3
CHEM 5342	SOLID STATE CHEMISTRY	3
or CHEM 5336	STRUCTURE & FUNCTION OF PROTEINS, MEMBRANES & CARBOHYDRATES AND FAST KINETICS	
Plus two (2) courses from two divisions outside of analytical chemistry (biochemistry, inorganic, organic, or physical). Suggestions include: ¹		6
CHEM 5262 & CHEM 5168	COMPUTATIONAL CHEMISTRY and QUANTUM CHEMISTRY LABORATORY	3
CHEM 5351	ORGANIC CHEMISTRY I	3
CHEM 5324	ANALYTICAL MASS SPECTROMETRY AND SPECTROSCOPY	3
CHEM 5331	ADVANCED BIOCHEMISTRY I	3

Plus courses as indicated in items 7-11.

4. Courses for students emphasizing organic chemistry:

CHEM 5358	DETERMINATION OF MOLECULAR STRUCTURE BY PHYSICAL METHODS	3
CHEM 5351	ORGANIC CHEMISTRY I	3
CHEM 5354	ORGANIC CHEMISTRY II	3
CHEM 5355	ADVANCED ORGANIC SYNTHESIS	3
Plus two (2) courses from two divisions outside of analytical chemistry (biochemistry, inorganic, organic, or physical). Suggestions include: ¹		6
CHEM 5324	ANALYTICAL MASS SPECTROMETRY AND SPECTROSCOPY	3

CHEM 5331	ADVANCED BIOCHEMISTRY I	3
CHEM 5341	INORGANIC CHEMISTRY	3
CHEM 5262 & CHEM 5168	COMPUTATIONAL CHEMISTRY and QUANTUM CHEMISTRY LABORATORY	3

Plus courses as indicated in items 7-11.

5. Courses for students emphasizing physical chemistry:

CHEM 5361	INTRODUCTION TO GRADUATE PHYSICAL CHEMISTRY	3
CHEM 5364	ADVANCED GRADUATE PHYSICAL CHEMISTRY	3
CHEM 5300	SELECTED TOPICS IN ADVANCED CHEMISTRY	3

Plus two (2) courses from two divisions outside of analytical chemistry (biochemistry, inorganic, organic, or physical). Suggestions include: ¹

CHEM 5324	ANALYTICAL MASS SPECTROMETRY AND SPECTROSCOPY	3
or CHEM 5326	ANALYTICAL CHEMISTRY - CONCEPTS AND IMPLEMENTATION	

CHEM 5331	ADVANCED BIOCHEMISTRY I	3
CHEM 5341	INORGANIC CHEMISTRY	3
CHEM 5351	ORGANIC CHEMISTRY I	3

Plus courses as indicated in items 7-11.

6. Courses for students emphasizing polymer chemistry:

All required courses for any of the other emphasis areas 1-5 plus:

CHEM 5356	ADVANCED POLYMER CHEMISTRY	3
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Plus courses as indicated in items 7-11.

7. All PhD-bound students must complete a Career Development Course - Select one of the following: ²

CHEM 6104	CHEMISTRY CAREER DEVELOPMENT	
CHEM 6304	CHEMISTRY CAREER DEVELOPMENT	
CHEM 6904	CHEMISTRY CAREER DEVELOPMENT	

8. All PhD-bound students must take the following courses

CHEM 5011	SEMINAR IN CHEMISTRY	0
CHEM 6011	TOPICS IN GRADUATE RESEARCH	0
CHEM 6012	ISSUES IN MODERN CHEMICAL RESEARCH	0

9. All PhD-bound students will enroll in the lecture courses Advanced Laboratory Techniques in their respective 2nd (CHEM 5381), 3rd (CHEM 5382) and 4th (CHEM 5383) long semesters.

10. For successful completion of the doctoral degree program, every student must have taken at least 9 SCH dissertation courses.

11. Additional research and elective courses chosen according to the student's dissertation topic and area of specialization under the guidance of the supervising committee

¹ CHEM 5358 cannot be used to fulfill this requirement. Students who do not have a good instrumentation background should consider taking CHEM 5421.

² For guidance and options of "Career Development" (possible "Internship"), students will consult with their research supervisor and with the Graduate Advisor.

A course grade may be used to satisfy degree requirements for no more than seven years after the course has been completed.

After admission to the doctoral program, the student must successfully complete the appropriate examination(s) required by the faculty of the student's discipline.

A supplementary set of guidelines, published by the Department of Chemistry and Biochemistry, should be consulted.