



Department of Chemistry

M.S. Program Handbook

Fall 2010

Chemistry M.S. Program Handbook

Fall 2010

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Program Overview

The M.S. degree in Chemistry is offered by the Department of Chemistry (<http://www.utsa.edu/chem>) at the University of Texas at San Antonio (UTSA) as either a Thesis or Non-Thesis option. The primary objective of the M.S. degree is to introduce students to recent advances in the chemistry sub-disciplines, complete a research project in one or two specialized areas, and prepare graduates to participate in and contribute to the chemistry profession in all of its various forms. 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. The Non-Thesis option is available for students with other goals.

The curriculum is designed to provide a foundation in advanced contemporary chemistry through the Core and Elective courses. All students are required to take courses in Analytical Chemistry, Biochemistry, Inorganic Chemistry, Organic Chemistry, and Physical Chemistry. Additional required elective courses are normally taken in fields close to the student's area of specialization. The curriculum also includes participation in research seminars and colloquia, teaching opportunities, and interactions with faculty. Students will normally conduct research in the Biotechnology, Sciences and Engineering Building (BSE) located on the 1604 campus (Main Campus).

Disclaimer

The information contained in this Handbook does not constitute a contract, expressed or implied, between any applicant, student or faculty member and the M.S. program in Chemistry, the Graduate School at The University of Texas at San Antonio or The University of Texas System.

Revisions

The Department of Chemistry reserves the right to alter and/or clarify the requirements and procedures set forth in this handbook at any time. Any changes become effective upon approval by the Graduate Programs Committee and, if necessary, by faculty vote and University approval. The changes apply to prospective students and may apply to those already enrolled in the M.S.

Program. **Suggestions from students and faculty for improving the contents of this handbook are encouraged.** Please forward your suggestions to the Department of Chemistry's Graduate Advisor of Record, Department of Chemistry, The University of Texas at San Antonio, One UTSA Circle, San Antonio, Texas 78249-0698

Application

All applications for admission to the M.S. program must be made directly to the Graduate School and not to the Department of Chemistry. The Department of Chemistry encourages potential applicants to contact the Graduate Advisor of Record or other members of Faculty before submitting applications.

Deadlines for Admission

Domestic Applicants

Fall Term – July 1

Spring Term – November 1

International Applicants

Fall Term – April 1

Spring Term – September 1

Please note that the Department does not normally admit students during the summer.

Minimum requirements for admission

- A Bachelor of Arts or a Bachelor of Science degree obtained at an accredited university
- Minimum grade point average (GPA) of 3.0 in upper-division work, preferably in chemistry {should include two semesters each of organic and physical chemistry with appropriate laboratories}
- Combined general GRE score >1000
- At least two strong letters of recommendation
- Meaningful statement of research interests and career goals (250-500 words)
- Payment of application fee

and, when applicable:

- TOEFL score: >550 paper

More details about the GRE and TOEFL may be found at

<http://www.utsa.edu/graduate/FutureStudentsAcademicPrograms/testInformation.html>

Upon official admission by UTSA, the student will receive an official letter of admission from the Graduate School and a letter from the Department of Chemistry.

The Department of Chemistry does not offer financial support to M.S. students. However, Teaching Assistantships (TAs) are normally available, and students are encouraged to apply for these positions as soon as they are admitted to the program (see **MS#1**).

Orientation

The Departmental orientation for new M.S. students takes place in the middle of January or August. (Exact dates vary from year to year and will be provided by the Graduate Advisor of Record). Attendance is mandatory. Topics typically include a general description of the graduate program, courses taught in the respective semester, and a questions and answer session. Studies for the M.S. may begin in either the spring or fall semester each year.

Typical Timeline for the M.S. Degree

The procedures and requirements leading to the M.S. degree in chemistry are listed below.

The following is a recommended time-line for new M.S. students. This time-line will vary depending on the attendance status of the M.S. student (full- or part-time) and whether the student opts for a Thesis or Non-Thesis option.

Year 1, First semester

- Begin coursework
- Assume Teaching Assistant duties (if applicable)
- Meet faculty and learn about their research interests
- Select research advisor (Supervising Professor) by the end of the semester
- Select Thesis Committee (two additional faculty members, of whom at least one must be from the Department of Chemistry) by the end of the semester

- Attend departmental seminars
- Remove any conditions on admittance to program (if applicable)

Year 1, Second semester

- Continue coursework
- Continue Teaching Assistant duties (if applicable)
- Commence research (if applicable)
- Attend departmental seminars
- Remove any conditions on admittance to program (if applicable)

Year 1, summer semester

- Continue coursework (if applicable)
- Continue Teaching Assistant duties (if applicable – limited TA positions are open to M.S. students during summer)
- Commence/continue research

Year 2, First semester

- Continue coursework (if applicable)
- Continue Teaching Assistant duties (if applicable)
- Continue research
- Attend departmental seminars

Year 2, Second/third/summer semesters

- Complete coursework
- Continue Teaching Assistant duties (if applicable)
- Defend research (written and oral formats)
- Attend departmental seminars

Program Administration

The Dean of the Graduate School at The University of Texas at San Antonio has overall responsibility for the M.S. Program in Chemistry. All M.S. work is subject to approval by the Graduate School and by the Deans. The graduate faculty in the Department of Chemistry, along with the Graduate Programs Committee, and Graduate Advisor of Record, are responsible for curriculum development and on-going review.

The M.S. Program is supervised by the Graduate Programs Committee of the Department of Chemistry which is composed of members of the faculty, including the Graduate Advisor of Record. The Graduate Programs Committee is responsible for establishing admission requirements, recommending admission of applicants, overseeing academic curricula, monitoring students' academic progress, and verifying to the Graduate School that the student has fulfilled all requirements for the awarding of the degree.

The day-to-day administration of the M.S. program is the responsibility of the Graduate Advisor of Record (GAR). The GAR advises all M.S. graduate students, maintains records, and represents the program. Questions about degree requirements and academic policies should be directed to the GAR, who may consult with the Graduate Programs Committee.

Requirements and Regulations

Students enrolled in the Department of Chemistry's M.S. Program are subject to all established requirements and regulations of the Graduate School of The University of Texas at San Antonio. Refer to the Program Overview section of this Handbook for advice on determining which regulations may apply to your particular circumstances.

Students are strongly encouraged to refer to the current UTSA Graduate Catalog for guidance. This catalog is available in the Department of Chemistry's office and also on-line at <http://www.utsa.edu/gcat/>.

Time Limits

Students have six years from the term of original registration to complete their M.S. degree program under the catalog in effect at the time of their initial registration. Students are strongly encouraged to complete their M.S. requirements within two and a half years. Longer times may be required if coursework needs to be repeated. These time limits may be extended for a maximum of three years for students participating in military service.

Credit Hour Requirements

Students in the Department of Chemistry's M.S. program must complete all of the required courses outlined in the section of this Handbook entitled "Coursework Requirements". Students must complete a Program of Study that includes a minimum of 33 semester credit hours of graduate coursework. The student must achieve a grade point average (GPA) of 3.0 or greater (on a 4.0 scale) in organized lecture courses and achieve an overall grade point average of at least 3.0. Note that Graduate Seminar is not an organized lecture course.

Transfer of Credit

With the approval of the Graduate School, graduate credit hours (with grades of B or higher) from other Universities may be accepted *in lieu* of required courses. In some cases, graduate courses may be transferred for credit as a chemistry graduate elective course. Students are responsible for requesting course transfer credit. This process involves the submission by the

student to the GAR, a brief letter of petition, course description and a copy of the relevant syllabus for each course for which credit transfer is sought. Upon approval by the Graduate Programs Committee, a formal petition to Associate Dean for Graduate Affairs in the College of Sciences will be prepared for final ratification by the Dean of the Graduate School. Credit transfer courses are not included in the computation of a student's GPA.

English Language Requirements

Students are required to possess a competent command of written and spoken English. For international students this requirement is met by obtaining or exceeding TOEFL scores listed below.

The UTSA Graduate Catalog (2009-2011) states: The English Language Assessment Procedure (ELAP) is a mandatory UTSA assessment for incoming international students whose Test of English as a Foreign Language (TOEFL) scores are between 500 and 600 (paper version) or 61 and 100 (Internet version). ELAP tests academic language skills in the areas of reading, writing, listening, and speaking. The test is administered during orientation week at no charge to the student. A registration hold is placed on students until the test is successfully completed.

Students who are required to take English for International Students (EIS) classes and do not register for them or drop them before they are successfully completed will be withdrawn from the University and will jeopardize their visa status. Once students successfully complete the EIS classes, the registration hold is removed from their record.

Registration

The Office of the Registrar schedules and announces the timing of the registration process to all students, Departments, Departmental Chairpersons, and their assistants prior to the start of each Semester. Information regarding registration can be found in the ASAP section <https://asap.utsa.edu/> of the UTSA website <http://www.utsa.edu/>. For individual registration concerns, students should consult the Department of Chemistry's GAR. A student must register each Semester and Summer Terms that s/he is enrolled in the M.S. program. This includes courses in Research, Thesis, and Graduate Seminars.

Semester Credit Hours

One Semester hour of credit is earned through:

1. Lecture clock hours: 15 to 18 (normally 16)
2. Laboratory clock hours: 45 to 60

A course, for example, has a credit value of three semester credit hours if the class meets for three lecture hours per week during fall or spring Semesters.

Full-Time Status

The minimum full-time course load for a Semester is nine Semester credit hours and for the Summer Term, three credit hours. The maximum load is individually determined by the student's Faculty advisor and the Graduate Programs Committee. If a student is employed as a Teaching Assistant or Research Assistant, the course load may be reduced accordingly. In order to qualify for a Teaching Assistant position, students must register for at least 6 credit hours.

Grading System

The following grading system is used for all coursework:

Grade Symbol	Grade Points	Meaning of Grade Symbol
A	4	Outstanding
B	3	Above average
C	2	Average (below average graduate work)
D	1	Below average (failing graduate work)
F	0	Failure (failing graduate work)
CR	0	Credit – indicates successful credit by examination or through Faculty evaluation of class tests, assignments, <i>etc.</i>
NC	0	No Credit – indicates unsatisfactory progress

Credit hours are awarded only for the grades of A, B, C and CR. All A to F grades are included in the calculation of the GPA. CR/NC grades and their associated course credits do not contribute in any way to the GPA calculation. A grade of F in a course will automatically result

in dismissal from the M.S. program. Note that in the calculation of GPA, only UTSA courses are included. Students must maintain a GPA of 3.0 or above throughout candidacy.

Other grades may be given that do not contribute to the calculation of the GPA. A grade of W means Withdrawal and indicates that the student was passing at the time of the withdrawal or drop. A grade of IN means Incomplete and can be assigned according to university guidelines. A grade of NR means No Report and can only be assigned by the Registrar. A grade of RP means Research in Progress and is applicable to master's Thesis/Directed Research courses. When the Thesis/Non-Thesis studies are complete, the RP grades will be changed to letter grades up to the maximum number of semester credit hours approved for the specific degree.

Academic Standing

A student's academic standing is defined as good standing, academic probation, or academic dismissal.

Academic probation describes the standing of a student in one of the following categories:

1. A student who fails to achieve a GPA of 3.0 or higher in any term at UTSA, irrespective of level of courses taken.
2. A student who received a grade of "D" in any course in a term.
3. A student who does not meet all requirements for unconditional or regular admission and who, by special action, is admitted on academic probation.
4. A student who has been reinstated following academic dismissal.

Academic probation is cleared only when none of the above criteria apply and when the student achieves an overall GPA of 3.0 as a graduate student at UTSA. In order to graduate, all graduate students must have a grade point average of at least a 3.0 (on a 4.0 scale). Students on academic probation are encouraged to discuss their status with their academic advisors and the GAR.

Academic dismissal occurs when a student at the graduate level:

1. Earns a grade point average of less than 2.0 in any term.
2. Earns a grade of “F” in any course.
3. Currently on academic probation and would again be placed on academic probation under the provisions set forth above. If, however, the student’s UTSA grade point average for the term is at least 3.0, he or she will continue on academic probation.

Withdrawal

Permission for withdrawal from the M.S. program and the Graduate School may be granted by the Dean of the Graduate School. A student who wishes to withdraw should complete and sign a Withdrawal form available from the Enrollment Services Center. Students who withdraw during a regular “drop period” will receive a grade of “W” in all classes. Students who withdraw after the regular drop date with a passing grade will receive a “W”, while those who are failing will receive an “F”. Students will then be subject to UTSA’s academic standing probation and dismissal regulations. Students who withdraw should refer to the regulations on refunds of tuition and fees, readmission policies, and requirements for maintaining registration.

Transfer between Graduate Programs

Any student who wishes to change the course of study from one graduate program to another must make written application to that program. Such an application will be subject to the same requirements, procedures, and acceptance considerations that apply to first-time applicants. Students who wish to apply for such a transfer must have an interview with the Dean of the Graduate School.

Graduation

The degree of Master of Science is awarded by the Board of Regents upon the satisfactory completion of a prescribed Program of Study as documented by the Graduate Programs Committee, recommendation of the Graduate School, and certification of the candidate by the Dean of the Graduate School and President to the Board of Regents.

Applying for the Degree

It is the student's responsibility to apply officially for his or her degree and submit an application for graduation online through the Automated Student Access Program (ASAP). See *UTSA Information*, Chapter 5, General Academic Regulations, for application instructions and deadlines. The application of any student applying for graduation after the established deadlines for that semester will be processed for graduation for the following semester. A student who completed all degree requirements but failed to apply for the degree may obtain a Letter of Completion from the Graduation Coordination Office after the close of the semester in which all degree requirements are met.

Students who apply for the degree in a given semester but do not fulfill all requirements must file a new degree application on or before the appropriate deadline for the next semester in which they intend to graduate.

Graduation Dates

Degrees are awarded at the end of each spring, summer and fall Semester. Commencement ceremonies are held in May and December, at the end of the spring and fall Semesters. Students who graduate at the end of the Summer Semester may participate in either the May or December ceremony. Information on the procedures to be followed is available in the Office of the Registrar or online at www.utsa.edu/registrar.

Misconduct

Students are responsible for knowing and observing the University's "Procedures and Regulations Governing Student Conduct and Discipline" and the "Rules and Regulations of the Board of Regents of The University of Texas system". This and additional information can be found in the UTSA catalogs (<http://www.utsa.edu/gcat>) which are available on-line.

Degree Requirements – Overview

The M.S. in Chemistry is awarded as a Thesis or Non-Thesis option. University-wide regulations for M.S. degrees are found at

<http://www.utsa.edu/gcat/Chapter4/MastersDegReg.html>.

Thesis Option

Degree Requirements. The Master of Science program requires the successful completion of a minimum of 33 semester credit hours. Candidates must complete the following:

A. Required courses (27 semester credit hours):

[CHE 5263](#) Advanced Analytical Chemistry 3 hours

[CHE 5313](#) Advanced Biochemistry 3 hours

[CHE 5453](#) Advanced Inorganic Chemistry 3 hours

[CHE 5643](#) Advanced Organic Chemistry 3 hours

[CHE 5843](#) Advanced Physical Chemistry 3 hours

[CHE 5981](#) Graduate Seminar in Chemistry 3 hours

[CHE 6951-3](#) Independent Study 3 hours

[CHE 6983](#) Master's Thesis, including an oral defense of the written thesis 6 hours

Note: Registration for [CHE 5981](#) is required for each semester of residence, although no more than 3 semester credit hours can be applied to the Master's degree.

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. Please note the following "students must be enrolled in CHE 6961 Comprehensive Examination in the semester the comprehensive exam is taken, if registered for no other courses that semester."

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.

Non-Thesis Option

Degree Requirements. This program requires the successful completion of a minimum of 33 semester credit hours. Candidates for the degree must complete the following:

A. Required courses (27 semester credit hours):

[CHE 5263](#) Advanced Analytical Chemistry 3 hours

[CHE 5313](#) Advanced Biochemistry 3 hours

[CHE 5453](#) Advanced Inorganic Chemistry 3 hours

[CHE 5643](#) Advanced Organic Chemistry 3 hours

[CHE 5843](#) Advanced Physical Chemistry 3 hours

[CHE 5981](#) Graduate Seminar in Chemistry 3 hours

[CHE 6951-3](#) Independent Study 3 hours

[CHE 6991-6](#) Directed Research 6 hours

Note: Registration for [CHE 5981](#) is required for each semester of residence, although no more than 3 semester credit hours can be applied to the degree. The laboratory work in is taken as Independent Study and Directed Research, with Independent Study preceding Directed Research.

B. Six 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. Please note the following "students must be enrolled in CHE 6961 Comprehensive Examination in the semester the comprehensive exam is taken, if registered for no other courses that semester."

The course numbers serve as links to course descriptions in the Graduate Catalog web site. Descriptions of these courses as well as Elective course descriptions are also listed elsewhere in this Handbook (see **Course Descriptions – Core and Electives**)

The following requirements apply to both degree options except where explicitly stated otherwise.

Choose Supervising Professor/Generate Preliminary Results

By the end of the first semester of Year 1, the student should choose a Supervising Professor, who must be a member of the Department of Chemistry and the graduate faculty, and start to develop knowledge of the supervising professor's research for descriptions of faculty research interests. During the first semester as a graduate student, all students are required to register for the one hour Research Colloquium course, CHE , where they will learn about the research interests of the Chemistry faculty members. See <http://www.utsa.edu/chem/faculty.html>.

For the Thesis Option, starting the second semester and/or first summer session of Year 1, the student should begin research in the supervising professor's laboratory. It is critical that the student develops sufficient laboratory skills to generate preliminary results so as to complete the degree requirements in a timely fashion. The preliminary results should be of sufficient rigor and merit to justify continued investigation, and serve as the basis for the proposed project.

Thesis/Supervising Committee

The Thesis Committee (Thesis option) or Supervising Committee (Non-thesis Option) should be chosen no later than the end of the first semester of study. The Supervising Professor chairs the Committee. Additional members of the Thesis/Supervising Committee are chosen by the supervising professor in consultation with the student. The Thesis/Supervising Committee must consist of at least three members, including the Supervising Professor. The supervising professor and at least one of the Committee members must be members of the Department of Chemistry. If justified, one or more members of the Thesis/Supervising Committee can be external to the Department of Chemistry; the GAR should be consulted in this case, because a special application must be made to the Graduate School. See form MS#5 for requesting approval of the

Thesis/Supervising Committee. This task must be completed before the end of the first semester of registration.

Program of Study

The Program of Study (POS) consists of the courses taken towards the degree (See **Course Requirements**) and must be approved by the student's Supervising Professor, Thesis Committee, and the Graduate Programs Committee.

The student's performance on both the oral and written portions of their research shall be evaluated by the Thesis/Supervising Committee, which shall recommend either passage or changes in order to remedy deficiencies in the oral and/or written portions. Deficiencies must be remedied within two months of the Thesis/Supervising Committee's recommended changes via another oral presentation before the Thesis Committee and/or presenting hard copies of a suitably amended thesis (Thesis option) or research report (non-Thesis option) to the Thesis/Supervising Committee.

Written Thesis (Applies to Thesis Option only)

The student shall write a draft of the Thesis and submit it for review to the Supervising Professor. After appropriate editing, hard copies of the draft shall be submitted to all members of the Thesis Committee for further review. Requirements for the format and style of the written thesis are available at <http://www.utsa.edu/gcat/Chapter4/MastersDegReg.html>. Scientific terminology is determined by the supervising professor in consultation with the student, but should be clear, concise and consistent throughout. Following the final oral examination, the Thesis Committee makes recommendations for changes to and must approve the final version of the written thesis.

Final Oral Examination (Applies to Thesis Option only)

The final oral examination shall be held no sooner than one week and no later than one month following submission of the written draft to the Thesis Committee. The final oral examination consists of a public oral presentation of the written thesis and a closed oral defense. The defense

is administered and evaluated by the student's Thesis Committee and covers the thesis as well as the general field encompassing the thesis.

Written Report (Applies to Non-Thesis Option only)

The Written Report should present a relatively limited (compared to a thesis) set of original experimental data with some brief background and analysis of the data. Within these guidelines the Supervising Committee in consultation with the student shall agree on the level and extent of the research and the evaluation criteria for the Written Report. This agreement shall be provided to the student in writing either during the first year of study or upon transfer from the Thesis to the Non-Thesis option.

The Written Report must be typed double-spaced and consist at minimum of the following sections: Introduction, Experimental Procedures, Results and Discussion (including figures and tables) and References (numerically listed in order of citation in the text). Scientific terminology is determined by the Supervising Professor in consultation with the student, but should be clear and consistent throughout. The student shall write a draft of the Report and submit it for review to the Supervising Professor. After appropriate editing, hard copies of the draft shall be submitted to all members of the Supervising Committee. Following the final oral examination, the Supervising Committee shall make recommendations for changes to and must approve the final version of the Written Report.

Final Oral Examination (Applies to Non-Thesis Option only)

The final oral comprehensive examination shall be held no sooner than one week and no later than one month following submission of the draft of the Written Report to the Supervising Committee. The examination consists of a public oral Power Point presentation of the Written Report and a closed oral defense. The defense is administered and evaluated by the student's Supervising Committee and covers the Written Report as well as the general field encompassing the Report.

Course Descriptions – Core

5263 Advanced Analytical Chemistry

(3-0) 3 hours credit. Prerequisite: [CHE 3213](#) and CHE 4213, or an equivalent.

The physical and chemical principles of modern analytical chemistry with emphasis on error analysis, signals and noise, electrochemical techniques, analytical separations, and selected spectroscopic methods based on absorption and emission. (Formerly CHE 5163. Credit cannot be earned for both CHE 5263 and CHE 5163.)

5313 Advanced Biochemistry

(3-0) 3 hours credit. Prerequisite: Undergraduate biochemistry.

Advanced topics in modern biochemistry, including cell signaling, apoptosis, trafficking and processing of proteins, DNA array technology, and various aspects of bioinformatics. Ligand interactions and the thermodynamics and mechanisms underlying how these important macromolecules interact with each other. Spectroscopic determination of nucleic acid and protein structures, and reactions using techniques such as nuclear magnetic resonance spectroscopy, mass spectrometry and x-ray diffraction.

5453 Advanced Inorganic Chemistry

(3-0) 3 hours credit. Prerequisite: [CHE 4463](#) or equivalent.

Modern theories of chemical bonding, structure of inorganic compounds, reaction mechanisms, cluster compounds, organometallic chemistry, and bioinorganic chemistry. (Formerly CHE 5133. Credit cannot be earned for both CHE 5453 and CHE 5133.)

5643 Advanced Organic Chemistry

(3-0) 3 hours credit. Prerequisites: 8 semester credit hours each of undergraduate organic chemistry and physical chemistry or graduate standing in chemistry.

An advanced study of topics in organic chemistry such as stereochemistry, conformational analysis, nonbenzenoid, aromaticity, molecular orbital theory, and organic reaction mechanisms. Applications of these concepts to the structure and reactivity of biomolecules such as peptides and proteins, nucleic acids, and carbohydrates. (Formerly CHE 5113. Credit cannot be earned for both CHE 5643 and CHE 5113.)

5843 Advanced Physical Chemistry

(3-0) 3 hours credit. Prerequisites: [CHE 3824](#) and [CHE 3831](#), or equivalents.

An advanced study of group theory, and its application to molecular orbital theory, electronic/vibrational/rotational spectroscopy, and chemical reactivity.

5981 Graduate Seminar in Chemistry

(0-3) 1 hour credit. Prerequisite: Graduate standing in Chemistry or consent of the Graduate Advisor of Record. Current research and literature seminars presented by faculty, visiting lecturers, and doctoral candidates. Students must register every semester while in residence, but only 3 hours will apply toward the M.S. degree.

6951-3 Independent Study

1 to 3 hours credit. Prerequisites: Graduate standing and permission in writing (form available) of the instructor and the student's Graduate Advisor of Record.

Independent reading, research, discussion, and/or writing under the direction of a faculty member. May be repeated for credit, but not more than 6 hours, regardless of discipline, will apply to the Master's degree.

6983 Master's Thesis

3 hours credit. Prerequisites: Permission of the Graduate Advisor of Record and thesis director. Thesis research and preparation. May be repeated for credit, but not more than 6 hours will apply to the Master's degree. Credit will be awarded upon completion of the thesis. Enrollment is required each term in which the thesis is in progress.

6991-6 Directed Research

1 to 6 hours credit. Prerequisites: Graduate standing and permission in writing (form available) of the instructor and the student's Graduate Advisor of Record.

The directed research course may involve either a laboratory or a theoretical problem. Normally a written report is required. May be repeated for credit, but not more than 6 hours or 18 hours, regardless of discipline, will apply to the Master's degree or Doctoral degree, respectively. (Formerly CHE 5973.)

6961 Comprehensive Examination

1 hour credit. Prerequisite: Approval of the appropriate Graduate Program Committee.

Independent study course for the purpose of taking the Comprehensive Examination. May be

repeated as many times as approved by the Graduate Program Committee. Enrollment is required each term in which the Comprehensive Examination is taken if no other courses are being taken that term. The grade report for the course is either “CR” (satisfactory performance on the Comprehensive Examination) or “NC” (unsatisfactory performance on the Comprehensive Examination).

Course Descriptions – Electives in Chemistry

5833 Computational Chemistry

(3-0) 3 hours credit. Prerequisites: [CHE 3824](#) and [CHE 3831](#), or equivalents.

The application of molecular mechanical, molecular orbital, and density functional methods to problems of molecular structure, property, reactivity, and spectroscopy. (Formerly CHE 7843. Credit cannot be earned for both CHE 5833 and CHE 7843.)

6603 Introduction to Polymer Chemistry

(3-0) 3 hours credit. Prerequisite: Consent of graduate student advisor.

Fundamental concepts of polymer chemistry, including mechanisms for synthesis, kinetics, and copolymerization; molecular weight, stereoisomerism, morphology, solubility, and thermal transitions; visco- and rubber elasticity; and the molecular basis for physical properties.

6863 NMR Spectroscopy

(3-0) 3 hours credit. Prerequisite: Consent of instructor.

A lecture course with demonstrations dealing with the basic theory and applications of one- and two-dimensional nuclear magnetic resonance spectroscopy, including the interpretation of spectra. The parameters and the pulse sequences for various types of NMR experiments and explanations of how molecular structural information can be obtained will be presented.

6883 Mass Spectrometry

(2-3) 3 hours credit. Prerequisite: Consent of instructor.

The basic principles of interpreting mass spectra and how they are produced. The effect the method of ion production has on the observed mass spectra, and the theory and operation of various types of mass spectrometers will be covered. The basic theory of ion-molecule reactions and other advanced topics will be presented.

6903 Progress in Chemistry - Master's

(3-0) 3 hours credit. Prerequisite: Consent of instructor.

An organized course offering the opportunity for a specialized study of current aspects of chemistry not normally available as part of the regular course offerings. The course may be repeated for credit, but not more than 6 hours may be applied to the Master's degree.

6973 Special Problems

(3-0) 3 hours credit. Prerequisite: Consent of instructor.

An organized course offering the opportunity for specialized study not normally or not often available as part of the regular course offerings. Special Problems courses may be repeated for credit when the topics vary, but not more than 6 hours, regardless of discipline, will apply to the Master's degree.

7263 Recent Advances in Bioanalytical Chemistry

(3-0) 3 hours credit. Prerequisites: Consent of instructor and Graduate Advisor of Record.

A survey of modern analytical techniques used in studies of biological interest from both theoretical and practical perspectives.

7403 Bioinorganic Chemistry

(3-0) 3 hours credit. Prerequisite: [CHE 4303](#) or [CHE 4463](#), or equivalent.

Study of the functions, reaction sites, mechanisms, molecular architecture, and medicinal aspects of metal ions in biological systems including bioorganometallic compounds. A discussion of the experimental techniques will be included.

7433 Organometallic Chemistry

(3-0) 3 hours credit. Prerequisite: [CHE 4463](#) or equivalent.

Preparation, bonding and reactivity of organometallic compounds, both main group and transition metals.

7603 Bioorganic Chemistry

(3-0) 3 hours credit. Prerequisite: CHE [2623](#) or consent of instructor.

Chemical transformations of biologically important organic compounds; examination of enzyme active sites. Discussion of theories of catalysis, stereochemistry, electron-transfer, and molecular structure in the context of biological systems. (Formerly CHE 5503. Credit cannot be earned for both CHE 7603 and CHE 5503.)

7623 Methods of Organic Synthesis

(3-0) 3 hours credit. Prerequisite: CHE [2623](#) or consent of instructor.

A study of modern methods of organic functional group transformation, simple carbon skeleton construction, asymmetric synthesis, introduction to the synthon concept and to retrosynthetic analytical methodology for designing rational synthetic approaches to complex organic molecules of biological interest. (Formerly CHE 6123. Credit cannot be earned for both CHE 7623 and CHE 6123.)

7673 Advanced Topics in Medicinal Chemistry

(3-0) 3 hours credit. Prerequisites: Consent of instructor and Graduate Advisor of Record.

Approaches to drug design and development; a rational target-oriented approach and a combinatorial approach. Mechanisms of drug action on enzymes, receptors, and nucleic acids. Strategies for the preparation of series of analogs for the structure-activity investigations.

7683 Topics in the Chemistry of Natural Products

(3-0) 3 hours credit. Prerequisites: CHE 5643 and CHE 7623.

Selected topics in the chemistry and biochemistry of natural products and related compounds of biological and medicinal interest. Course may be repeated for credit when topics vary, but not more than 6 hours may apply to the Doctoral degree. (Formerly CHE 6183. Credit cannot be earned for both CHE 7683 and CHE 6183.)

7813 Molecular Thermodynamics

(3-0) 3 hours credit. Prerequisite: CHE 5843.

A molecular approach to the study of the physiochemical properties of gases, liquids, and solids. (Formerly CHE 5213. Credit cannot be earned for both CHE 7813 and CHE 5213.)

7823 Chemical Kinetics and Dynamics

(3-0) 3 hours credit. Prerequisite: CHE 5843.

An advanced study of topics in chemical kinetics and dynamics. (Formerly CHE 5223. Credit cannot be earned for both CHE 7823 and CHE 5223.)

7833 Quantum Chemistry

(3-0) 3 hours credit. Prerequisite: CHE 5843.

The application of quantum mechanical methods to many-body chemical systems. (Formerly CHE 5243. Credit cannot be earned for both CHE 7833 and CHE 5243.)

7853 Biophysical Chemistry

(3-0) 3 hours credit. Prerequisite: CHE 5843.

The study of the structure/function relations of proteins, nucleic acids, membranes, and other macromolecular biomolecules using spectroscopic methods. (Formerly CHE 5513. Credit cannot be earned for both CHE 7853 and CHE 5513.)

Forms

In order to maintain accurate records and to track student progress, a number of forms require completion. Descriptions and examples of these forms are listed below in approximate chronological order.

**PLEASE DOWNLOAD THE LATEST VERSION OF THE FOLLOWING FORMS
FROM THE DEPARTMENT OF CHEMISTRY'S WEBSITE.**

Form # Title

MS#1 Application for Teaching Assistantship (TA)

After receiving and Acceptance Letter from the Department of Chemistry, a student must apply for a Teaching Assistant (TA) position. TA positions are typically not available for M.S. students during the summer because they are expected to dedicate all of their time towards research.

In order to be considered for a TA position, you must be registered for at least six credit hours in a longer semester.

MS#2 Transfer of Credit

A student may petition to have previous applicable course work credited towards his/her M.S. Program of Study. The student must initiate this process by writing a short letter to the GAR listing the non-UTSA course(s) being requested for substitution of UTSA course(s) along with copies of the non-UTSA course description(s) (from the University's graduate catalog), a course syllabus (of the type typically distributed by the instructing Professor at the first class meeting), and an official academic transcript reporting the non-UTSA course grades. The GAR will seek approval for the credit transfer from the Graduate Programs Committee, then the College of Sciences.

MS#3 Request to Approve M.S. Research Advisor

This form needs to be completed by the end of your first semester of registration. Your research advisor (supervising professor) must be a member of the Tenured/Tenure Track Faculty.

MS#4 Request to Approve Thesis/Supervisory Committee

This form is used to request up to three members of your Thesis Committee (in addition to your supervising professor). These members should be drawn from the Tenured/Tenure Track Faculty.

MS#5 Removal of Conditions Petition

Sometimes students are admitted to the M.S. program without satisfying all of the conditions for entry, for example, a student has yet to complete the GRE. If other parts of the student's application package are strong, the Department can recommend admittance to the student, "with condition". For example, in the above case, the student would be obliged to submit his/her GRE before the completion of his/her first semester of study in the Department.

MS#6 Formal appointment of Research Advisor and Supervisory Committee

This form will be submitted to the Dean, College of Sciences for approval.

MS#7 Program of Study – Thesis option

The Program of Study form lists student's intended coursework. It will be developed under the direction of the research advisor in consultation with the GAR.

MS#8 Program of Study – Non-Thesis option

The Program of Study form lists student's intended coursework. It will be developed under the direction of the research advisor in consultation with the GAR.

MS#9 Directed Research (Non-Thesis option)

This form must be completed and approved by members of the Department – your research advisor, the GAR and Chairman – in order to allow you to conduct research towards your M.S. Non-Thesis degree. Directed Research should be taken after Independent Study.

MS#10 College of Sciences Completion Form

This form is submitted by the GAR to certify that the student is clear for graduation.

MS#11 College of Sciences Completion of Oral Exam

This form is submitted by the GAR to certify that the student is clear for graduation.

MS#12 UTSA Report on Comprehensive Examination

This form is submitted by the GAR to certify that the student is clear for graduation.

MS#13 Substitute Courses Form

This form is submitted should there be approved variations to the student's Program of Study.



The University of Texas at San Antonio
Department of Chemistry

Application for Teaching Assistantship

Name _____
(Last) (First) (Middle)

Social Security Number _____

Place of Birth _____

Date Available _____ Request: Half-Time Appointment •
Quarter-Time Appointment •

Available for 9 month appointment • yes • no

Rate following labs in order of your top two preferences for teaching:

- General Chemistry I Lab
- General Chemistry II Lab
- Organic Chemistry I Lab
- Organic Chemistry II Lab
- Instrumental Analysis

Home Address _____ Residence Telephone _____
City _____ State _____ Zip _____

Are you a citizen of the United States? _____ Yes _____ No If not, do you intend to apply?

If not a US citizen, TOEFL score _____

Are you related by blood or marriage to any member of the Board of Regents, or faculty or staff of The University of Texas System?

• yes • no If yes, give name and relationship: _____

Have you ever been employed by The University of Texas System? • yes • no When? _____

Where? _____ In what capacity? _____

ACADEMIC BACKGROUND

Overall GPA _____ Chemistry GPA _____

GRE Scores: _____ Verbal _____ Quantitative _____ Analytical

Grades for specific classes: General Chem I ____ General Chem II ____ Org Chem I ____ Org Chem II ____

Degrees Earned	Date	Institute Conferring	Major	Minor

RESEARCH/TEACHING EXPERIENCE

Name of Institution	Type of Institution	Position or Rank	No. of Years

OTHER TYPES OF EMPLOYMENT IN ASCENDING ORDER:

Place	Type of Business	Position	No. of Years

PUBLICATIONS: (List title of books, pamphlets, articles, research projects, and publication dates).

PRESENTATIONS AND ABSTRACTS: (Where presented and when)

MEMBERSHIPS:

Professional: _____

Non-Professional: _____

REFERENCES SUPPLYING LETTERS OF RECOMMENDATION – APPLICANT IS RESPONSIBLE FOR INSURING LETTERS ARE SENT: (unless indicated, UT San Antonio will assume that contact can be made to the references listed).

NAME	ADDRESS	TELEPHONE	POSITION
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NOTE: UT San Antonio is an equal opportunity employer.

In order for the application to be considered, the student must be admitted to one of the Masters Programs in the College of Sciences as a degree-seeking student. The student must have two or more letters of recommendation submitted.

I certify that the statements made by me in this application are true, complete, and correct to the best of my knowledge and belief and are made in good faith. I understand that any false statements made herein will void this application and any actions based on it. I understand that any offer of employment tendered me is contingent upon my agreement to abide by the Rules and Regulations of the Board of Regents of The University of Texas System.

Date _____

Signature _____

**The University of Texas at San Antonio
College of Sciences**

**PETITION FOR COURSES TAKEN AT ANOTHER INSTITUTION
TO BE COUNTED IN UTSA M.S. DEGREE PROGRAM**

College of Sciences

Student's Name _____ Student ID Number @ _____

Degree _____ Major _____ Concentration _____

Courses to be transferred from other components of The University of Texas System:

Number	Title	Hours	Institution	Grade	Date

Courses to be transferred from institutions outside The University of Texas System:

Number	Title	Hours	Institution	Grade	Date

The courses listed above must have a grade of B or better; are from an accredited university and have not been used in another degree program.

- 1) Please attach transcript/s
- 2) Syllabus or course description required
- 3) Evidence that the university where the courses were taken is accredited

Application of the starred (*) courses listed above to the Program of Study for this student is hereby approved.

Approve

Disapprove

Graduate Program Committee Chairman

Date

Department Chair

Date

Associate Dean, College of Sciences

Date

Memorandum

Date: _____

To: **Graduate Advisor of Record**

From: _____
Student

Proposed Advisor

RE: Request to Approve M.S. Advisor

I wish to inform the Graduate Advisor of Record that I have chosen _____ for my supervising Professor with his/her consent.

Signature _____
M.S. Student

Approved by:
Graduate Advisor of Record, Department of Chemistry

Approved by:
Dr. W Gorski, Chair, Department of Chemistry

Date: _____

To: **Graduate Advisor of Record**

Supervising Professor

M.S. Student

RE: Proposed members of M.S. Thesis/Supervising Committee

We are requesting approval for the following members to be assigned to

_____ Thesis/Supervising committee.

Chairman/Member:

Name and signature

Member:

Name and signature

Member:

Name and signature

___ Approved

___ Denied

Approved by:

Graduate Advisor of Record

Approved by:

Dr. W Gorski, Chair, Department of Chemistry

REMOVAL OF ADMISSION CONDITIONS

TO: Dr. George Perry
Dean, College of Sciences

FROM: Chemistry Dr. Waldemar Gorski
Department **Department Chair**

DATE: _____

_____ @00 _____
Student **Banner #**

was granted admission under the following conditions:

Must

_____ This student has satisfied these conditions and her admission status should now be changed to that of "regular degree-seeking student."

_____ The Graduate Studies Committee has reviewed this student's credentials and has recommended removal of the conditions: supporting documentation is attached. The student's status should now be changed to that of "regular degree-seeking student."

_____ This student has been dropped from the program shown below because the admission conditions have not been met.

Major (and Concentration, if applicable) Chemistry

Recommended by: _____
Program Advisor **Date**

_____ **Graduate Advisor of Record** **Date**

APPROVED: _____
Dean **Date**

TO: Registrar/Director of Admissions
Please change the admission status of this student as indicated above.

**RECOMMENDATION FOR APPOINTMENT OF SUPERVISORY
COMMITTEE FOR MASTER'S DEGREE CANDIDATE**

Appointment of the faculty members listed below as the supervisory committee for the master's degree program, thesis, and final comprehensive examination are recommended.

<u>X</u>	<u>@00</u>
Student Name	Banner ID

EXAMINATION COMMITTEE:

<u>Dr.</u> Committee Chair	Initials	Date
<u>Dr.</u> Member	Initials	Date
<u>Dr.</u> Member	Initials	Date

RECOMMENDED:

<hr style="width: 20%; margin-left: 0;"/> Graduate Advisor of Record	Initials	Date
<u>Dr. Waldemar Gorski,</u> Chair, Department of Chemistry	Initials	Date

APPROVED:

<u>Dr. George Perry</u> Dean, College of Sciences	Initials	Date
--	----------	------

cc: Graduate Advisor
Student File
Committee Members

Program of Study – Thesis option**THE UNIVERSITY OF TEXAS AT SAN ANTONIO
PROGRAM OF STUDY FOR THE MASTER'S DEGREE**

Please Type

STUDENT'S NAME _____ **STUDENT'S BANNER ID** _____

Last First Middle

PROGRAM OF STUDY FOR THE DEGREE _____ **CATALOG** 2009-2011**MAJOR** _____ **CONCENTRATION** _____

The following courses are required for the degree indicated above:

Discipline and Number	Course Title	Semester Hrs Credit	Grade	When & Where Completed, if not UTSA
CHE 5263	Advanced Analytical Chemistry	3		
CHE 5313	Advanced Biochemistry	3		
CHE 5453	Advanced Inorganic Chemistry	3		
CHE 5643	Advanced Organic Chemistry	3		
CHE 5843	Advanced Physical Chemistry	3		
CHE 5981	Graduate Seminar in Chemistry	1		
CHE 5981	Graduate Seminar in Chemistry	1		
CHE 5981	Graduate Seminar in Chemistry	1		
CHE 6951-3	Independent Study	3		
CHE 6983	Master's Thesis, incl. Oral Defense	6		
CHE xxxx	(elective – to be approved by GAR)	3		
CHE xxxx	(elective – to be approved by GAR)	3		
		TOTAL 33		

Upon completion of the above requirements, in addition to meeting the University-wide requirements for all Master's degrees, the above-named student will have satisfied all requirements for the Master's degree.

GRADUATE ADVISOR'S SIGNATURE _____ **DATE** _____**DEPARTMENT CHAIR'S SIGNATURE** _____ **DATE** _____**DEAN'S SIGNATURE** _____ **DATE** _____**-THE ORIGINAL COPY OF THIS FORM MUST BE FILED WITH THE REGISTRAR-****DO NOT WRITE BELOW THIS LINE**

Applied for degree _____	Time Limit (6 yrs) _____	Hours of A _____ x 4 = _____
Advanced to Candidacy _____	Catalog _____	B _____ x 3 = _____
Admission Cleared _____	Indep. Study Max. (6) _____	C _____ x 2 = _____
Total Transfer Hrs. (6) _____	Spec. Prob. Max. (6) _____	Total _____; GPA (3.0) _____
UT System Transfer _____	Comprehensive Exam _____	
Non-UT Transfer _____	Thesis Filed _____	

NOTES:

Program of Study – Non-Thesis option**THE UNIVERSITY OF TEXAS AT SAN ANTONIO
PROGRAM OF STUDY FOR THE MASTER'S DEGREE**

Please Type

STUDENT'S NAME _____ **STUDENT'S BANNER ID** _____

Last First Middle

PROGRAM OF STUDY FOR THE DEGREE _____ **Master of Science** _____ **CATALOG** 2009-2011**MAJOR** _____ **Chemistry** _____ **CONCENTRATION** _____

The following courses are required for the degree indicated above:

Discipline and Number	Course Title	Semester Hrs Credit	Grade	When & Where Completed, if not UTSA
CHE 5263	Advanced Analytical Chemistry	3		
CHE 5313	Advanced Biochemistry	3		
CHE 5453	Advanced Inorganic Chemistry	3		
CHE 5643	Advanced Organic Chemistry	3		
CHE 5843	Advanced Physical Chemistry	3		
CHE 5981	Graduate Seminar in Chemistry	1		
CHE 5981	Graduate Seminar in Chemistry	1		
CHE 5981	Graduate Seminar in Chemistry	1		
CHE 6951-3	Independent Study	3		
CHE 6991-3	Directed Research	6		
CHE xxxx	(elective – to be approved by GAR)	3		
CHE xxxx	(elective – to be approved by GAR)	3		
		TOTAL 33		

Upon completion of the above requirements, in addition to meeting the University-wide requirements for all Master's degrees, the above-named student will have satisfied all requirements for the Master's degree.

GRADUATE ADVISOR'S SIGNATURE _____ **DATE** _____**DEPARTMENT CHAIR'S SIGNATURE** _____ **DATE** _____**DEAN'S SIGNATURE** _____ **DATE** _____**-THE ORIGINAL COPY OF THIS FORM MUST BE FILED WITH THE REGISTRAR-
DO NOT WRITE BELOW THIS LINE**

Applied for degree _____	Time Limit (6 yrs) _____	Hours of A _____ x 4 = _____
Advanced to Candidacy _____	Catalog _____	B _____ x 3 = _____
Admission Cleared _____	Indep. Study Max. (6) _____	C _____ x 2 = _____
Total Transfer Hrs. (6) _____	Spec. Prob. Max. (6) _____	Total _____ ; GPA (3.0) _____
UT System Transfer _____	Comprehensive Exam _____	
Non-UT Transfer _____	Thesis Filed _____	

NOTES:

THE UNIVERSITY OF TEXAS AT SAN ANTONIO

COLLEGE OF SCIENCES

Department of Chemistry

DIRECTED RESEARCH

CHE 6991- 6

Directed Research is an important part of the graduate program. The Department of Chemistry in the College of Sciences has a requirement that a minimum of six semester credit hours credit hours in Directed Research be counted towards your M.S. (Non-Thesis) degree. The student should have a solid background in order to be able to function well in Directed Research which may involve laboratory research or a theoretical problem. Prerequisites include graduate standing and permission in writing (this form) from the instructor, the Graduate Advisor of Record, and the Department Chair in which the course is offered.

Name _____ Banner ID _____

Degree Sought M.S. Major Chemistry

Status (circle one): Graduate-no conditions Graduate-conditional Special Graduate

Post-baccalaureate Grade Point Average at UTSA: _____

Number of hours of Directed Research to be taken _____

Courses taken previously which form a basis for this Directed Research:

Discipline & Number	Course Title
1. _____	_____
2. _____	_____
3. _____	_____
4. _____	_____
5. _____	_____
6. _____	_____
7. _____	_____

Post-baccalaureate hours of Independent Study and/or Directed Research enrolled previously:

Semester in which you wish to enroll in Directed Research: _____

Name of instructor supervising this Directed Research: _____

Description of Topic to be studied:

Description of work to be required of the student and the basis upon which credit and a grade will be assigned:

Will you be required to use any of the computer resources (mainframe, microcomputer, *etc.*) of the University or College as part of this Directed Research? Attach Computer Utilization form. (If you have any questions about this, consult your instructor).

Yes No

Student

Date

Instructor

Date

Graduate Advisor of Record

Date

Department Chair

Date

*****NOTE:** If you are seeking approval of a Directed Research course outside the department of your major, the Directed Research form must be signed by both:

The Department Chair of your major AND

The Department Chair of the discipline in which the Directed Research course is offered.

MS#10 College of Sciences Completion Form

See PDF – this is to be completed by administrative staff, not students

College of Sciences Completion of Oral Exam

DATE:

MEMORANDUM

TO: Dr. George Perry,
Dean, College of Sciences

FROM: Dr.(*insert name*),
Graduate Advisor of Record, Department of Chemistry

SUBJECT: Completion of Oral Examination

Student's Name_____
Banner ID

The above student has successfully completed the Oral Examination for the Master of Science Degree in Chemistry.

Committee Chairman_____
Committee Member_____
Committee Member

THE UNIVERSITY OF TEXAS AT SAN ANTONIO**REPORT OF COMPREHENSIVE EXAMINATIONS FOR THE MASTER'S DEGREE**

To: University Registrar

Student's Name _____
(Last) (First) (Middle)

Student's Number

Degree Master of Science Major Area Chemistry

Concentration _____

This is to certify that the comprehensive examinations required for the master's degree indicated above have been satisfactorily completed according to the regulations of The University and to the policies and procedures of the this College.

Dean's Signature _____ Date _____

Dean, College of Sciences

Substitute Courses Form

To: Registrar's Office

Student's Name: Name Student's ID Number: @ _____CRN: 00000 Discipline/Number/Section: CHE 0000.001 Term: 200000 Grade: A

This is to certify that the courses listed above have been approved for use in this student's Program of Study and should be listed on her graduate transcript.

Justification: These courses are of benefit to the student with regard to her research project.

Graduate Advisor of Record_____
Date_____
Department Chair_____
Date_____
Dean, College of Sciences
College of Sciences_____
Date