

**Middle Tennessee State University  
Department of Chemistry Master's Program  
Graduate Student Handbook**

Welcome to the graduate program in chemistry at Middle Tennessee State University. We hope your stay here will be a productive one. This handbook has been prepared to inform you of some of the procedures and deadlines required to successfully complete the M.S. program. However, while this handbook covers many of the items you will need to know as a graduate student, it is not exhaustive. If you have any questions do not hesitate to ask the M.S. program coordinator. Good luck.

### **Admissions**

In addition to the general admission requirements of the Graduate School, (bachelor's degree with a minimum 2.75 GPA) applicants to the M.S. program in Chemistry must:

1. have an undergraduate minor in chemistry or its equivalent at the time of admission.

NOTE: Although there are no specific course requirements for admission, all chemistry students must take or have taken Quantitative Analysis before graduation. For those students who have not taken Quantitative Analysis as an undergraduate, they must take CHEM 2230 as a prerequisite for CHEM 6230 Intermediate Analytical Chemistry.

2. achieve a satisfactory score on the Graduate Record Examination.

### **Graduation Requirements**

To receive the M.S. in Chemistry from MTSU, the candidate must:

1. Complete a minimum of 30 semester hours with no more than 30 percent of the total degree hours dually listed as undergraduate/graduate hours.

2. Complete the following core curriculum:

CHEM 6100	Intermediate Organic Chemistry	(3 hours)
CHEM 6400	Intermediate Inorganic Chemistry	(3 hours)
CHEM 6230	Intermediate Analytical Chemistry	(4 hours)
CHEM 6300	Intermediate Physical Chemistry	(3 hours)

Exceptionally well-prepared students may take a proficiency exam to qualify to take a more advanced course in place of the core course.

3. Complete and present an original thesis approved by the student's advisory committee:

CHEM 6870	Chemistry Research	(3 hours)
CHEM 6800	Chemistry Seminar	(1 hour)
CHEM 6640	Thesis Research	(variable)

4. Complete a minimum of 5 credit hours of additional approved chemistry graduate courses, or approved cognate courses in biology, mathematics, computer science, or physics.

5. File a Candidacy Form with the Graduate Office prior to the completion of 24 credit hours and annually work out a plan of study for the next twelve months with the academic advisor.

6. Successfully complete five of six written comprehensive examinations in the following areas of chemistry: analytical/instrumental, biochemistry, general, inorganic, organic, and physical chemistry.

### **Graduate Assistantships**

Students in the graduate program in Chemistry are generally offered a graduate teaching assistantship. The initial appointment usually requires a 3.0 undergraduate GPA. Those students not meeting this requirement may ask the Graduate School to grant an exception. The assistantship pays a small monthly stipend, along with tuition and most of the general access fee. In return, graduate teaching assistants are required to work 8 **contact** hours in the Chemistry Department. In general this will entail acting as a teaching assistant in chemistry or physical science laboratories. Most chemistry laboratories are 3 contact hours (CHEM 1030 is an exception), while physical science laboratories are 2 contact hours. Therefore most teaching assistants will be required to oversee two chemistry laboratory sections or three physical science laboratory sections per week. The remaining contact hours will be assigned depending upon the needs of the chemistry department and may entail working in the Chemistry Department office, the stockroom, additional chemistry laboratories, or other duties.

Graduate teaching assistants responsible for a laboratory section are required to answer student questions about lab procedures, enforce safety regulations, grade lab reports, submit grades to the lab instructor, and may be required to prepare a weekly briefing for the students in the laboratory. The faculty member in charge of your particular laboratory will determine your actual duties. The graduate teaching assistant will generally not be responsible for setting up the laboratory although this may vary with the individual laboratory. Because of the amount of time required to teach laboratories, if you hold a full-time job, you should consider not accepting an assistantship.

Dr. Gary White holds a training session at the beginning of the semester. Attendance at this meeting is mandatory and you will be notified of the date of this meeting. This session will include information on safety and emergency procedures.

To retain your assistantship, you must be a full-time graduate student (registered for 6 graduate hours) and maintain a "B" average (3.00 GPA). In addition graduate assistants are evaluated at the end of every semester and you must maintain a satisfactory rating to be retained. Assistantships are generally renewable for four (4) semesters, not including summer semesters, upon satisfactory discharge of your duties.

There is considerable paperwork that is associated with the granting of your assistantship. This includes the completion of a W-4 form in the chemistry office. This form must be completed before the start of your first semester. For international students there are even more forms to fill out. You should consult with the chemistry office in advance of the start of the semester to ensure that your paperwork is complete so that you will receive your paychecks on time.

### **Coursework**

Every graduate student is required to accumulate thirty hours of credit to graduate with an M.S. degree in chemistry. The thirty hours include a minimum of six lecture classes, plus chemistry seminar, chemistry research, and thesis research.

Of the six lecture classes, four are required in the core areas of analytical/instrumental, inorganic, organic, and physical chemistry. All graduate students must therefore take and pass the following core courses:

CHEM 6230	Intermediate Analytical Chemistry
CHEM 6400	Intermediate Inorganic Chemistry
CHEM 6100	Intermediate Organic Chemistry
CHEM 6300	Intermediate Physical Chemistry

The core courses are broad-based and provide some review of undergraduate material and some graduate level material. The core courses are good preparation for the comprehensive examinations, which all graduate students must pass. Of the four core courses three are lecture only, while the analytical/instrumental core course has a laboratory component and is worth four credit hours. In addition Intermediate Analytical Chemistry (CHEM 6230) has a prerequisite of Quantitative Analysis (CHEM 2230) while the other three core courses do not have prerequisites. However it is expected that all students will have taken two semesters of organic chemistry as part of their undergraduate curriculum. Generally two core courses are offered each semester. In the fall semester Intermediate Organic Chemistry (CHEM 6100)

and Intermediate Analytical/Instrumental Chemistry (CHEM 6230) are offered, while in the spring semester, Intermediate Inorganic Chemistry (CHEM 6400) and Intermediate Physical Chemistry (CHEM 6300) are offered. The courses also rotate between day and night offerings.

In addition to the core courses described above, there is a core course in biochemistry (CHEM 6500 Intermediate Biochemistry) that is taught every other year. It is not required of M.S. students, but counts as one of the two elective courses. If you have not had a previous course in biochemistry it is strongly urged that you take this course or another biochemistry course as preparation for the comprehensive exam.

In addition to the four core courses required of all students, two electives are required. These electives may be in any area of chemistry or may be in related areas such as biology or math. Permission of the M.S. coordinator is required to take courses outside the area of chemistry. You should be aware that not all elective courses are offered every year and should plan your course of study accordingly.

The remaining hours consist of research-related courses. Chemistry Research (CHEM 6870) is generally taken in your last semester in residence. Thesis Research (CHEM 6640) is a variable credit pass/fail course that may be taken multiple times (A maximum of 8 hours will count toward the 30 hours to graduate.) Chemistry Seminar (CHEM 6800) is also required of all students.

### **Registration for courses**

You must register for courses each semester. At the beginning of the registration period, an M.S. Course Request Form will be placed in your mailbox. If you have a research advisor, consult with him or her and then bring the form to the M.S. coordinator. If you have not yet chosen a research advisor, bring the form directly to the M.S. coordinator for consultation. If you are registering for Chemistry Research or Thesis Research, it will be necessary to create these sections before you can register. Therefore, once you have obtained the signature of the M.S. program coordinator on the course request form, you must visit the Chemistry Office and have the departmental secretary create the sections. Once the sections have been created it is necessary to register using the PIPELINE system. It is imperative that you register as soon as possible in the semester. Failure to do so may endanger your graduate assistantship, delay your paycheck, create additional work for the departmental secretaries and M.S. coordinator and cost you a late registration fee of \$100.

### **Departmental Mailboxes**

Each graduate student is assigned a departmental mailbox located just outside the Chemistry Department office along with a university mailbox located

in the Keathley University Center. You should check your departmental mailbox once a day for announcements and messages from the department and the faculty.

### **Keys**

Once you begin work in the M.S. program, you will be given keys to allow you access to the building and certain labs outside of normal business hours. Keys are issued by the departmental secretaries and become your responsibility once issued. When you have completed your M.S. degree, it is your responsibility to return the keys to the departmental secretaries. Failure to do so may result in a charge and the withholding of your degree. In addition, you should not lend your keys to another student.

### **Comprehensive Exams**

As part of the graduation requirements, all graduate students are required to pass a series of comprehensive exams. Comprehensive exams are given in six areas of chemistry including analytical/instrumental, biochemistry, general, inorganic, organic, and physical chemistry. **You are required to pass five of the six exams in two attempts.** The format of the comprehensive exams is multiple-choice and the subject matter is that found in an undergraduate course along with the material taught in the core courses. The exams are given over two days with the general, organic, and physical chemistry exams given the first day and the quantitative/instrumental, inorganic, and biochemistry exams on a different day. Once all of the exams have been given, they will be graded and you will be informed in writing of the results. You have the right to view the exams once they have been graded although you may not make copies of the exams or your answer sheet.

The comprehensive exams are given three times per year. Students must attempt the exams as soon as the core courses have been completed. Exams are given the week after final exams of the fall and spring semesters, and during the month of July.

### **Admission to Candidacy Forms**

Each student is required to file an Admission to Candidacy Form with the Graduate Office before completing 24 graduate credit hours. The usual time to file this form is the end of your second semester in residence. The Admission to Candidacy Form is a list of the courses you have taken and plan to take to earn the M.S. in Chemistry. A copy of the form is located in the back of this handout. Once you have completed the form, it should be taken to the M.S. coordinator for his or her signature and then to the Graduate Office for approval. Once the Candidacy Form has been approved, the Graduate Office will return a copy to

the M.S. coordinator to be kept on file. Any change in this form requires permission from the Graduate Office in writing.

### **Selection of Research Advisor**

The selection of a research advisor is one of the most important decisions you will make in graduate school. The research advisor not only affects the particular project you will work on, but your research advisor will have a profound effect on your development as a scientist. The research advisor will shape your attitudes toward research and science in general. Therefore it is necessary that you carefully consider your choice of research advisor. You will begin your selection by considering the area of chemistry in which you are interested. This process generally starts in the beginning of your first semester in graduate school. A good place to start the selection process is the departmental web page. This contains a short summary of the research interests of each of the faculty member in the department. By the middle of the first semester you should begin interviewing faculty members about their interests. Most faculty members are more than happy to discuss their research with you, so do not hesitate to approach them. You are required to interview at least three faculty members and fill out the form found in the back of this handout. You should complete your interviews by the middle of your second semester at MTSU. Once you have decided on your choice of research advisor you must formally request permission to work with a particular faculty member and obtain their signature on the form naming them as your research advisor. Be aware that some faculty members may not be able to accept you as a research student. Do not be discouraged, and do not take the decision of a research advisor to not allow you to work in their laboratory personally. Most likely the decision is a reflection of several factors, including the number of students they already have working for them, the amount of time they are able to spend in the laboratory, the amount of space they have available in the laboratory, and the resources such as equipment and funding they have available. Once you have secured the necessary signatures, the form should be returned to the M.S. program coordinator. The deadline for the submission of this form is the end of your second semester at MTSU.

### **Research Project**

After you have chosen a research advisor you must decide on a research project. This is done in consultation with your advisor. Your advisor will lay out a project that is consistent with his or her interests, with your interests, and which can be done within a reasonable amount of time with the equipment and resources available at MTSU. You are strongly urged to prepare a short description of the research program, including an introduction to the project, the goals to be accomplished, and if possible, the methodology that will be used to accomplish those goals. This research plan may avoid any misunderstandings that might arise between yourself and your research advisor as your research nears its ends.

### Formation of Research Committee

Once you have agreed upon a project with your research advisor, a committee of readers must be chosen. Three members of your research committee consist of your research advisor, the Department Chairperson, and Dr. Linda Wilson. Again in consultation with your research advisor, you should approach one additional faculty member and request that he/she serve as a reader on your research committee. This faculty member should possess some expertise in an area that is integral to your thesis. By the end of your third semester in residence you must submit to the M.S. Graduate Coordinator the form naming your committee members.

### Seminar

The Department of Chemistry holds weekly seminars from 11:20 –12:45 every Thursday in DSB 100. Seminar speakers include invited outside guest lecturers, faculty members, and graduate students completing their research. Dr. Martin Stewart, the seminar director, will distribute the schedule of speakers at the beginning of each semester. **All M.S. students are required to present a seminar concerning their research during their course of study at MTSU.** Upon registering for Chemistry Seminar (CHEM 6800), contact Dr. Stewart as soon as possible to schedule your seminar. You will be required to supply Dr. Stewart with a title of your seminar at the beginning of the semester and a completed seminar announcement approximately 10 days in advance of your seminar. The seminar announcement must be no longer than two letter-size pages (i.e. both sides of a single page) and consists of a standard heading, an abstract of typically 200 – 300 words in length, and your most important literature references. References and other conventions should follow the format of *The ACS Style Guide*. Dr. Stewart will provide you with samples of previous seminar announcements that illustrate specific details of format and style.

Your seminar is scheduled when your completed thesis has received approval from your research committee. The format of the seminar consists of a presentation approximately 45 minutes in length followed by a question and answer period. During the presentation, the student is expected to present a clear statement of the problem or project, the significance of the problem, a short but comprehensive review of the relevant literature, the experimental techniques used to study the problem and the conclusions drawn based upon your experimental work. It is expected that the bulk of the presentation will concentrate on your work and its analysis. Describe the methods and procedures used and the data collected in sufficient detail to justify your conclusions. At the end of the presentation, audience members will be given a chance to ask questions based upon the presentation. Your grade will be based

upon the effectiveness of the presentation and your ability to answer the audience's questions.

**For those semesters in which you are not registered for CHEM 6800, you are expected to attend seminar.** Attendance at seminar serves a number of purposes. It exposes you to the current chemical literature, both published and unpublished, and also introduces you to areas in chemistry that you may not normally encounter. In addition, as you are required to present a seminar, it is imperative that you be aware of what constitutes a good seminar as well as shortcomings and errors that produce a poor one. Seminar is considered an essential part of the graduate program.

### **Thesis**

The bulk of your time in the M.S. program will be spent carrying out your research and writing the results in a thesis. It is generally accepted that to make adequate progress on your thesis, you must spend 40 – 50 hours per week on research to complete the thesis in time. This is in addition to the amount of time you are required to spend teaching laboratories.

The Graduate Office has prepared a handout covering some of the style requirements of the thesis. You should obtain a copy of this handout before you begin writing your thesis and become familiar with its requirements. Dr. Linda Wilson has also prepared a handout covering additional areas of style. You should also have access and be familiar with the latest edition of the *ACS Style Guide* for reference. A copy of this reference is available at Phillip's Bookstore. You should be aware of the deadline for submitting a thesis to the Graduate Office as they change every semester. The deadline for submitting a thesis to the Graduate Office is fairly early in the semester and the Graduate Office has made it clear it will not extend the deadline. In addition you should provide your committee members a copy of your complete thesis at least two weeks in advance of any deadlines. Faculty members have many other duties and cannot drop every thing else because you have a thesis to be read. The copy of your thesis that is given to the Department Chairperson, Dr. Linda Wilson, and the other two readers should first go through several drafts in consultation with your research advisor. A thesis that contains numerous misspellings, grammatical errors, and typos reflects badly on both you and your research advisor. The copy that goes to the Graduate Office should be carefully reviewed for errors. The Graduate Office has returned theses to the department disapproved solely because it contained too many misspellings and typos.

Usually, the final corrected version of the thesis must be submitted to the Graduate Office by the 10th week of the fall and spring semesters. (The deadline is even earlier in the summer semester.) This means the thesis should be submitted to your committee by the 8th week of the semester in which you intend to graduate. In addition you should realize that it will take most students

two to three months of solid work to prepare their thesis for submission to their committee.

### **Intent to Graduate Form**

You are required to submit an Intent to Graduate Form in the semester you plan to graduate. This form is available in the Graduate Office. You must be aware of the deadline for filing this form as it changes from semester to semester. If for some reason you do **NOT** graduate in the semester you have indicated, you must file a new Intent to Graduate Form the next semester although you will not be charged another graduation fee.

### **Final Cleanup**

Your final duty after completing your thesis and your chemistry seminar will be to cleanup your research area. You should consult with your research advisor as to the disposal and retention of chemicals and products generated during your research. You must also present your notebooks and other research related materials to your research advisor before leaving school. Also all keys must be returned to the Departmental office.

This booklet has been written in an attempt to inform you of some of the major policies, procedures, and deadlines that you will encounter during your matriculation as an M.S. student in the Department of Chemistry. However no booklet can answer every question, and it is your responsibility to be aware of any material not covered in this booklet. If you have questions, consult your thesis advisor or the M.S. advisor.

### **Forms**

- Admission to Candidacy Forms
- Selection of Research Advisor
- Selection of Committee Members
- Admission to Candidacy Form

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## Timeline

The following timeline is the typical path a graduate student will follow from entering the M.S. program in Chemistry to graduation.

### **Semester 1 (Fall)**

Register for a minimum of two core courses.

Intermediate Organic Chemistry

Intermediate Analytical Chemistry

Well-prepared students should seriously consider registering for a third course.

Begin interviews of prospective research advisors.

### **Semester 2 (Spring)**

Register for the remaining two core courses.

Intermediate Physical Chemistry

Intermediate Inorganic Chemistry

Well-prepared students should register for a third course, completing his/her course requirements for the M.S. degree.

By the middle of the semester submit choice of research advisor to the graduate coordinator.

Sign-up for first attempt at comprehensive exams upon completion of core courses.

These exams will be held the week after finals.

File Admission to Candidacy form.

### **First Summer Semester**

Begin research.

Students who have not taken all of their required courses should consider registering for at least one course.

Sign up to take any comprehensive exams not passed on the first attempt.

### **Semester 3 (Fall)**

Continue/complete research.

Begin writing thesis.

Complete course requirements if not already done.

**Semester 4 (Spring)**

Register for Chemistry Seminar (CHEM 6800).

Register for Chemistry Research (CHEM 6870).

File Intent to Graduate Form.

Submit thesis to committee.

Submit completed and signed thesis to Graduate Office.

Present seminar.

**Second Summer Semester (if needed)**

File Intent to Graduate form.

Complete thesis.

Present seminar.

Submit completed and signed thesis to Graduate Office.

**Middle Tennessee State University  
Department of Chemistry  
Graduate Research Advisor  
Selection Form**

**Student Section:**

I have interviewed the following three faculty members and have decided to work with \_\_\_\_\_.

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_

\_\_\_\_\_  
Student

\_\_\_\_\_  
Date

**Advisor Section:**

I agree to serve as Research Advisor to the student named above and in so doing certify that I have adequate time, space, and facilities available for the student to successfully complete his/her degree project.

\_\_\_\_\_  
Advisor

\_\_\_\_\_  
Date

**Committee Approval:**

\_\_\_\_\_  
Graduate Coordinator

\_\_\_\_\_  
Date

