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, Dr. Paul Kline. Good luck.

Admissions
In addition to the general admission requirements of the College of Graduate Studies, (for example, bachelor’s degree with a minimum 2.75 GPA for unconditional admission) 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 that 30 percent of the total degree hours dually listed as undergraduate/graduate hours (5000-level classes).

2. Complete the following core curriculum:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 6100</td>
<td>Intermediate Organic Chemistry</td>
<td>3 hours</td>
</tr>
<tr>
<td>CHEM 6400</td>
<td>Intermediate Inorganic Chemistry</td>
<td>3 hours</td>
</tr>
<tr>
<td>CHEM 6230</td>
<td>Intermediate Analytical Chemistry</td>
<td>4 hours</td>
</tr>
<tr>
<td>CHEM 6300</td>
<td>Intermediate Physical Chemistry</td>
<td>3 hours</td>
</tr>
</tbody>
</table>

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

4. Complete and present an original thesis approved by the student’s research committee:
CHEM 6870  Chemistry Research  (3 hours)
CHEM 6800  Chemistry Seminar  (1 hour)
CHEM 6640  Thesis Research  (variable)

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 a CHEM 6800 seminar and a defense of thesis.

Students have six years after the date they matriculate to complete the requirements for the master's degree. This causes no difficulties for fulltime students, but can cause difficulties for students who are working outside the department fulltime if they take semesters off. (Exceptions to the time limit can be granted by the Dean for good cause.)

**Graduate Assistantships**

Students in the graduate program in Chemistry are generally offered a graduate teaching assistantship. The initial appointment requires full admission and a 3.0 GPA in undergraduate work and/or the latest graduate degree work attempted. 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 remain 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. If you quit the program during a semester, you are required to pay back the cash value of the assistantship for the entire semester!

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.

The duties for the summer session may differ from those for fall and spring semesters. For example, if you have selected a research adviser and he/she is available to work with you during the summer, you may be assigned duties of assisting your advisor for 20 hours a week in their research. Some professors are not available during summers for advising research. If your research professor is unavailable during the summer, or you have not yet selected a research advisor, you may expect to be assigned other duties in the department during the summer.

Assistantships are generally renewable for six (6) semesters, including summer semesters, upon satisfactory discharge of your duties. An extension for a seventh semester of support may be given depending on extenuating circumstances. If you need a seventh semester of support, talk to your thesis advisor.

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. 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 specific prerequisites, although CHEM 6100 assumes a two-semester background in undergraduate organic chemistry. Generally all core courses are offered once a year. Intermediate Organic Chemistry (CHEM 6100) and Intermediate Inorganic Chemistry (CHEM 6400) are normally offered in the fall semester, while Intermediate Analytical/Instrumental Chemistry (CHEM 6230) and Intermediate Physical Chemistry (CHEM 6300) are normally offered in the spring semester.

In addition to the four core courses required of all students, five (5) hours of 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. It may be wise to select your last elective after you have selected your research area, since a particular elective may help you in your research project. However, you should be aware that not all elective courses can be 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 the fall semester of your second year; in it you write the introductory chapter of your thesis. 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, and should be taken in your last semester in the program (including summers).

Registration for courses
You must register for courses each semester. If you are registering for Thesis Research (CHEM 6640), it will be necessary to create the section before you can register. Visit the Chemistry Office and have the departmental secretary create the sections. Your thesis advisor must also sign the form creating the section. Once the sections have been created it is necessary to register using the PIPELINE system. It is imperative that you register during the preregistration period (mid-November for Spring semester; early April for summer and fall semesters). Advanced courses that have insufficient numbers of students preregistered may otherwise be cancelled before the semester begins. Failure to preregister in advance of the semester may endanger your graduate assistantship, delay your paycheck, create additional work for the departmental secretaries, and cost you a late registration fee of $100.

Departmental Mailboxes
Each student supported by a GTA is assigned a departmental mailbox located in SCI 3044B 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.

Swipe Card Access
Many of the laboratories in the Science Building are equipped with swipe card locks. Your ID card will provide you access to your research lab outside of regular business hours. If you require access to the building outside of regular business hours or additional research areas such as the GC lab, computer lab or stockroom, ask your research advisor

Write-Up Spaces
Scattered throughout the third floor are write-up spaces with desks for graduate students. Because of their grading responsibilities, students supported on a GTA are given first priority for assignment to a desk. Students not supported by a GTA should ask their research advisor to petition the M.S. coordinator for a desk. These desks will be assigned based on their availability. Students assigned a desk will be given a key to the write-up space which must be returned when their research is complete.

Degree Plan
Each student is required to file a Degree Plan with the College of Graduate Studies before completing 24 graduate credit hours. The usual time to file this form is the end of your second semester in residence. The Degree Plan 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 online on the College of Graduate Studies website (http://www.mtsu.edu/graduate/pdf/DegPlan_Chem.pdf). Once you have completed the form, it should be taken to the M.S. coordinator for his or her signature and then to College of Graduate Studies for approval. Once the Degree Plan has been approved, the College of Graduate Studies will return a copy to the M.S. coordinator to be kept on file. Any change in this plan requires permission from the College of Graduate Studies in writing (http://www.mtsu.edu/graduate/pdf/DegreePlanReviseALL.pdf).
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: they may already have two or more graduate students, they may not have time to work with students in the laboratory, they may not have enough space or enough equipment and funding. Do not be discouraged, and do not take the decision of a research advisor to not allow you to work in their laboratory personally. 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 beginning 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 design 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 Thesis/Research Committee

Once you have agreed upon a project with your research advisor, a committee of readers must be chosen. The Department Chair is considered an *ex officio* member of all research committees. Again in consultation with your research advisor, you should approach two additional faculty members 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. The topic of each seminar will be announced in advance. Seminar speakers include invited outside guest lecturers, faculty members, and graduate students completing their research. Dr. Charles Chusuei, the seminar director, will distribute announcements of seminars. **All M.S. students are required to present**
a seminar describing their research. This is the defense of thesis. Normally this will be done during the semester in which you plan to graduate (summers included). A notice with the title of your seminar and an abstract must be completed 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.

For those semesters in which you are not registered for CHEM 6800, you are still 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.

Failure to attend seminars will lead to students holding GTA positions to lose their position. For students not holding GTA positions, failure to attend may results in a grade of “I” for research that semester. Occasional, excused absences will be allowed, and other scientific seminars may be used in place of missed Chemistry seminars.

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 from the College of Graduate Studies (http://mtsu.edu/graduate/intent.php). 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.

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 and grading laboratories.

The College of Graduate Studies has prepared a handout covering some of the style requirements of the thesis (http://www.mtsu.edu/graduate/pdf/ThesisDissertationManual201480rev.pdf). You should obtain a copy of this handout before you begin writing your thesis and become familiar with its requirements. You should also have access and be familiar with the latest edition of the ACS Style Guide for reference. 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 College of Graduate Studies is fairly early in the semester and the College of Graduate Studies 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 everything else because you have a thesis to be read. The copy of your thesis that is given to the other committee members 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 College of Graduate Studies should
be carefully reviewed for errors. The College of Graduate Studies 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 College of Graduate Studies 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. See the Timetable below for suggested dates for completing the various stages of writing the thesis, assuming graduation in the summer of the second year.

Thesis Committee
The department has approved a policy that requires that MS students meet with their thesis committee each semester to review their progress. A form will be placed in your mail boxes each semester (not including summers) that must be filled out and completed by the end of the semester. Failure to complete this form can lead to loss of your GTA position.

Defense of Thesis
Your thesis defense/seminar must be announced to the entire department at least one week before it is held. See Dr. Charles Chusei for the required format. The format of the seminar consists of a public 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. Once the questions are over, the candidate and committee will meet in a closed session to administer the oral examination. The oral exam will include questions that assess the candidate's ability to integrate scholarly information gained through coursework and its relationship to the student's major and related fields. Note that any faculty member may submit questions to the committee that they feel should be asked. If the student's committee judges that the student failed to demonstrate the required level of understanding, a second attempt will be administered that addresses the specific shortcomings. The second attempt may be another oral or a written exam as determined by the student's M.S. research committee. Your grade will be based upon the effectiveness of your thesis defense as judged by your M.S. research committee.

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.

Student Complaint Policy
In cases where there is a conflict between a graduate student and his/her faculty research advisor or GTA supervisor and this conflict cannot be resolved between the involved
parties, the next step is to bring the conflict to the chair of the MS committee who, either alone or with members of the MS committee, will attempt to mediate the situation and create plan of resolution. Should this fail, the situation will be brought to the department chair, who will handle the situation, including potentially transferring the student to a different mentor/supervisor.

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 policies change from time to time. Ultimately 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. program coordinator.
Proposed Timeline

Although each student's pathway to graduation is unique, the following timeline is the typical path a graduate student will follow to graduation.

Semester 1 (Fall)
- Register for two core courses:
  - Intermediate Organic Chemistry
  - Intermediate Inorganic Chemistry
- Graduate assistants need to be registered for two graduate courses; well-prepared students should seriously consider registering for a third (elective) course.
- Begin interviews of prospective research advisors; if possible select advisor.

Semester 2 (Spring)
- Register for two core courses:
  - Intermediate Physical Chemistry
  - Intermediate Analytical Chemistry
- Well-prepared students should begin research or select an elective.
- By the middle of the semester submit choice of research advisor to the graduate coordinator.
- File Admission to Candidacy form.

First Summer Semester
- Begin or continue research.
- Students who have not taken all of their required courses may consider registering for at least one course.

Semester 3 (Fall)
- Continue/complete research.
- Register for Chemistry Research (CHEM 6870), and begin writing thesis.
- Complete course requirements if not already done.

Semester 4 (Spring)
- Register for Chemistry Seminar (CHEM 6800), and present seminar.
- Complete research.
  - Submit first draft of thesis to major professor: about Feb. 23.
  - Submit second draft of thesis to major professor: about Apr. 4.
  - Submit third draft of thesis to major professor: about Apr. 18.
  - Submit corrected thesis to second reader: about May 2.

Second Summer Semester
- File Intent to Graduate form.
- Defend thesis.
  - Submit fully corrected and signed thesis to Graduate office: about June 9 (see Graduate Catalog for exact date)

PCK 8/3/04; revised GPW 8/15/06; revised STH 9/15/09; revised PCK 12/10/15
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
NAME: ________________________________________________
(Last) (First) (Middle)

ADDRESS: ________________________________________________
(Street)
______________________________________________
(City) (State) (Zip)

I agree to serve as a member of the research committee to the student named above.

NAME OF COMMITTEE MEMBERS:

____________________________________  ______________________
(Major Professor) (Date)

____________________________________  ______________________
(Committee Member) (Date)

____________________________________  ______________________
(Committee Member) (Date)

Dr. Greg Van Patten, *ex officio* member as Department Chair

The committee members for the above named student are approved.

____________________________________  ______________________
(MS Program Coordinator) (Date)