

# **Masters Program Handbook**

## **Policies, Rules & Guidelines**

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*QUESTIONS? COMMENTS? CONCERNS?*

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## PROGRAM OVERVIEW AND REQUIREMENTS

### **Admissions requirements**

To be successful in the Chemistry and Biochemistry graduate program, candidates should have a minimum of an undergraduate degree (BA, BS, or equivalent) with 18 non-duplicating units in chemistry and/or biochemistry; two semesters (or equivalent) of calculus; two semesters (or equivalent) of physics (preferably calculus-based). At least one semester of undergraduate physical chemistry is strongly recommended.

### **Degree emphases**

Students may complete the MS degree with one of four emphases: General Chemistry, Environmental Chemistry, Bioorganic and Biomedical Chemistry, or Carcinogenesis and Cancer Chemotherapy. You should determine the best emphasis for your education and career plans with your advisor.

### **Degree requirements**

The MS degree for all emphases in chemistry requires completion of 32 hours, as follows:

- 16-19 graded graduate coursework units, including
  - a minimum of 4 units of CHM 698 (Graduate Seminar), as described below
  - 12-15 units of graduate level courses (500- or 600-level). The specific courses required for each emphasis are listed in the [Academic Catalog](#).
- 13-16 (non-graded) research units, including
  - 9-12 units of CHM 685 for the research of an approved thesis
  - 4-6 units of CHM 699 for the writing and oral defense of an approved thesis\*

\*Please be aware that you may end up taking more than the 4-6 units you can count toward your degree because you must enroll for CHM 699 each term while you work on your thesis.

In addition, all students must:

- pass [proficiency exams](#) in three of the five subdisciplines of chemistry, as described in detail below, and
- successfully complete a research thesis.

## WORKING TOWARDS YOUR DEGREE

### **Faculty**

#### *Research advisor*

Your advisor has been determined in the admissions process. This is the faculty member with whom you will be conducting research, which comprises 50% or more of your degree. Your advisor will also assist you in selecting your thesis committee, choosing an appropriate course plan, and completing requirements such as proficiency exams and seminars.

#### Advisor responsibilities

Oversee research project and progress  
Provide facilities and equipment required for project  
Provide guidance in choosing coursework, proficiency exams, seminar topics, etc.  
Assist in staying current with required forms, etc.  
Provide guidance in preparation of thesis and thesis defense

#### Student responsibilities

Make progress on research project  
Inform advisor of research issues and needs  
Perform adequately in coursework, proficiency exams, seminars, etc.  
Complete required forms, etc. ahead of deadlines  
Complete thesis and defense ahead of deadlines

#### *Thesis committee members*

The thesis committee will be the main entity to evaluate the research portion of your degree through participation in grading your seminar presentations, research credits, and final thesis and defense. Your committee members should have some knowledge of the area of research you are pursuing and should be chosen with the assistance of your research advisor.

The thesis committee consists of a minimum of three faculty; one of these three may be from a department other than Chemistry and Biochemistry. Your committee is selected at the beginning of your first semester (Sept. 1 or Jan. 15).

#### Committee responsibilities

Attend all scheduled committee meetings  
Attend literature and research seminars  
Read and provide feedback on thesis at the thesis defense  
Attend defense and participate in oral examination process

#### Student responsibilities

Scheduled committee meetings when members are available  
Schedule literature and research seminars when members can attend  
Provide ample time for faculty to examine thesis prior to defense  
Ensure members are available for scheduled thesis defense

#### *Graduate Coordinator*

The Graduate Coordinator serves as an informal advisor and monitors your progress towards your degree.

## Proficiency Exams (Policy effective for incoming graduate students in Fall 2014)

Students earning a M.S. degree in chemistry should have a broad, fundamental knowledge of chemistry. To this end, they must demonstrate proficiency in three areas of chemistry at the advanced undergraduate level.

Proficiency will be evidenced by satisfactory performance on exams.

Exams are given in six areas: Organic, Inorganic, Analytical, Biochemistry, Physical Chemistry (thermodynamics and kinetics), and Physical Chemistry (quantum). Students must pass three exams as follows:

- one in their emphasis area (selected in collaboration with advisor)
- two in a non-emphasis area from the list above (selected in collaboration with advisor)

Passing an exam requires the following:

- in an emphasis area, a score that corresponds to the 50<sup>th</sup> percentile or better
- in the other two areas, a score that corresponds to the 40<sup>th</sup> percentile or better
- for non-ACS exams, a score based on norms set by the department

A student must pass **two** proficiency exams *before* beginning their third semester or they will be dismissed from the program. **All three exams** must be passed before a student is allowed to defend their thesis.

Each exam may be taken only three times. If a student fails an exam three times, they will be dismissed from the program.

Incoming students must take three exams before beginning the program and are expected to pass at least two. (Contact your advisor to discuss which exams you should take.) Students should plan to spend at least 2 to 3 months preparing for these exams, before they arrive on campus. *Failure to pass at least two exams will require remedial coursework (see below). This will slow down completion of the M.S. degree by at least one semester.*

- 0 exams passed: Student must enroll in at least two remedial undergraduate courses (CHM 238, 320, 341, 350, or 360) and may not be allowed to enroll in graduate course(s) in the corresponding subject area(s). Students must pass both courses with a C or better AND pass at least one proficiency exam at the end of that semester. **Failure to meet both criteria will result in dismissal from the program.**

1 exam passed: Student must enroll in at least one remedial undergraduate course (CHM 238, 320, 341, 350, or 360) and may not be allowed to enroll in a graduate course in the corresponding subject area. Students must pass this course with a C or better AND pass the proficiency exam in that course at the end of that semester. **Failure to meet both criteria will result in dismissal from the program.**

2 exams passed: No remedial courses are required but a course may be recommended by your advisor.

Proficiency exams are offered four times a year:

- (1) August (before the start of fall semester)
- (2) November or December (at or near the end of fall semester)
- (3) January (before the start of spring semester)
- (4) April or May (at or near the end of spring semester)

## Graduate Research (CHM 685)

The research you conduct will immediately contribute to your master's thesis and counts for 50% or more of the credit you earn towards this degree. The guidance provided by your advisor and thesis committee will help ensure successful completion of this degree requirement.

Important steps along the way:

- Select your Thesis Committee of 3 faculty (Advisor + 2) and complete the [Committee Selection Form](#) at the start of your first semester.
- Submit a [research plan](#) to your Thesis Committee within your first semester.
- Submit the [Progress Report](#) to your Thesis Committee at the start of your third semester.
- Hold your [progress meeting](#) with Thesis Committee during your third semester.

More detail on each of these items is provided in the term-by-term checklist and elsewhere in this document.

The culminating event for your MS degree will be the preparation of your Masters Thesis and oral defense of your thesis. Copious information (checklists, examples, etc.) to assist you in completing your thesis can be found on the [Graduate College website](#).

- Theses range in length from 3-5 chapters, 50-200 pages. Theses of former students are available for check-out from the Chemistry Department office.
- Expect your thesis preparation to require a month per chapter – it is advisable to start writing your thesis before the start of your final semester.
- Work closely with your advisor to determine the appropriate length, organization and style for your thesis.
- The Graduate College will assist you with proper [thesis format](#) (fonts, margins, spacing, etc.).
- The [term-by-term checklist](#) will give you an idea of the forms and steps required to complete your thesis and defense. These steps are numerous, and the deadlines are often inflexible. Plan ahead and be on time! Consult the current [Graduate College schedule](#) for specific dates and deadlines for your final semester.
- Your thesis defense is an oral examination given by your thesis committee that focuses on your research. However, topics from your coursework and proficiency exams may also be incorporated into your oral exam. At the time of your defense, your thesis must be completed and reviewed by your committee, and typically the thesis will be discussed at the oral exam. Your committee will likely have suggestions for corrections to your thesis following your defense.
- While every student's defense is a unique experience, they always commence with a formal, oral presentation by the student over their research. Work with your advisor to determine the appropriate length and content for your presentation.
- Your advisor can also provide you with guidance on areas that may be part of the oral examination that you should prepare for.

## Graduate Seminar (CHM 698)

All graduate students must complete at least 4 units of CHM 698. To minimize redundancy within these units, at least one unit in each of the following areas must be earned:

Seminar course: Students may take CHM 698-1 in their first semester of enrollment in the graduate program. This option may not be repeated.

Literature seminar: Students will give a 30-minute formal, public\* presentation on a topic from the literature during the regularly scheduled department seminar time. This is usually completed in the second semester of graduate studies. Students complete the [Literature Seminar Form](#) when carrying out this option and register for CHM 698 with their advisor. This option may be repeated for up to 2 credits.

- ▮ Submit title and abstract to Committee at least one month prior to seminar for approval.
- ▮ Give title to Chemistry Office one week prior to presentation date for flyers.
- ▮ Thesis Advisor signs [Literature Seminar Form](#) after presentation verifying completion of assignment.

Research seminar: Students will give a 45-minute formal, public\* presentation on their graduate research during the regularly scheduled department seminar time. This is usually completed in the fourth or final semester of graduate studies. Students complete the [Research Seminar Form](#) when carrying out this option and register for CHM 698 with their advisor. This option may not be repeated.

- ▮ Submit [Research Seminar Form](#) with title and abstract to Committee at least one month prior to seminar for approval.
- ▮ Give title to Chemistry Office one week prior to presentation date for flyers.
- ▮ Thesis Advisor signs Research Seminar Form after presentation verifying completion of assignment.

Seminar option: Students will give a formal class lecture, poster presentation at a regional or national meeting (presenting author), or oral presentation at a regional or national meeting. This can be completed at any point during the program. Students complete the [Seminar Option Form](#) when carrying out this option and register for CHM 698 with their advisor. This option may be repeated for up to 2 credits.

- ▮ Committee signs off on title and abstract before presentation.
- ▮ Thesis Advisor signs [Seminar Option Form](#) after presentation verifying completion of assignment.

\* The presentation is publicized, given during the regular academic year, and scheduled during normal University hours (preferably during the regular departmental seminar hour). Exceptions to these scheduling expectations must be approved via the [Exception to Seminar Scheduling Form](#).

## Financial aid

Many students in the Chemistry MS program receive financial aid in the form of assistantships and/or tuition waivers. In this department, graduate assistantships come in two varieties:

### *Teaching assistantships*

Work as a full-time Teaching Assistant (TA) requires 20 hours per week of work. The majority of that workload will be in the form of laboratory teaching contact hours. Laboratory teaching assignments are designated by John Nauman, and he is the formal supervisor for most TAs. For CHM 238 and higher numbered labs, the laboratory instructor is the TA supervisor. Your teaching load must be balanced along with your coursework and research load; successful students manage their time and effort so that none of the three areas are neglected.

Suggestions:

- Work with your supervisor to understand exactly what your obligations and responsibilities are as a TA.
- Stay in clear communication with your supervisor, particularly if you are sick or otherwise unable to fulfill your TA duties.
- Work with your research advisor as well as your TA supervisor to establish reasonable expectations for a balanced workload.
- Ask questions!
- “I don’t know,” is an acceptable answer, especially if followed by, “but I will find out.”
- Be respectful towards others and they will return that courtesy.
- Know how to say no – to extra work, to spending excessive time with students, etc.

### *Research assistantships*

Some students may be supported as Research Assistants (RAs) for part of their graduate work. Usually RA funding is provided by an external grant via the faculty advisor, but some RA positions are through university or federal programs. All RAs will be supervised by their research advisor unless the funding agency stipulates differently.

Students with RAships often have few obligations other than completing their research and coursework. If you are on RA, check with your supervisor to see what other responsibilities you might have. The workload balance for RAs should also be discussed with the research advisor and RA supervisor, if applicable.

*Additional information can be found in the [Graduate Assistant Handbook](#).*

### **IMPORTANT RULES AND POLICIES**



The following are some of the most important rules and policies for the Chemistry Department and the Graduate College. Additional information may be found within the Academic Catalog and on the Graduate College website.

*Required hours for graduate students* Although there is no minimum number of credit hours required, 9 hours constitute a full-time schedule, and 12 hours are the maximum allowed for graduate assistants. For students not on GA, 16 is the maximum number of hours allowed. If it is necessary to take more than the maximum number of credit hours, complete the [Unit Load Override Approval form](#).

*Continuous Enrollment Policy* Students will be automatically withdrawn if not enrolled for 3 consecutive semesters.

*Academic standing* Students must stay in good academic standing or risk being dismissed from the program. Good academic standing includes but is not limited to:

- maintaining a minimum GPA of 3.0 or higher
- fulfilling the obligations of financial aid arrangements (TA, RA, etc.)
- making consistent progress towards the degree
- completing forms, seminars, proficiency exams, etc. in a timely manner
- adhering to safe laboratory practice standards

*Undergraduate courses* cannot count towards the 32 required hours for this degree.

*MS degree time limit* You must complete your MS degree within six years from when you take the first course that counts towards your degree.

*Changes to the Thesis Committee* Following selection of the Thesis Committee in semester 1, any changes to the committee must be made via the Change of Committee form.

*Appeals / Grievances* Grade appeals are handled according to [the NAU Student Handbook](#). For appeals other than grade appeals, the [Graduate College policy](#) will be followed. In these appeals, the academic unit administrator is the Graduate Coordinator; the Department Chair may serve in this role if the Graduate Coordinator presents a conflict of interest in the appeal.

## TERM-BY-TERM CHECKLIST

### **Prior to semester one**

- ▮ Meet with Advisor to draft degree plan, including the [Coursework Plan](#) and [Proficiency Exam Plan](#)
- ▮ Students should take one or more proficiency exams prior to the start of their first semester.

### **Semester One**

- ▮ Enroll in graduate classes, including CHM 595, CHM 685, and CHM 698, as appropriate.
- ▮ Sign up for proficiency exams as appropriate.
- ▮ Choose/arrange for a Thesis Committee of 3 faculty (Advisor + 2) by September 1 (January 15). Complete [Committee Selection Form](#) with signatures from all faculty.
- ▮ Submit 2-year [course plan](#) and [proficiency exam plan](#) to Committee by September 1 (January 15). Include written justification for all non-chemistry courses. Committee signs off on course plan by November 1 (April 15).
- ▮ *CHM 685 requirement:* Submit a 1-3 page [research plan](#) to Thesis Committee by October 1 (February 15). Committee signs off on research plan within 30 days of receipt. *Grade for CHM 685 will be IP until semester three.*

### **Semester Two**

- ▮ Enroll in graduate classes, including CHM 595, CHM 685, and CHM 698, as appropriate. *Grade for CHM 685 will be IP until semester three.*
- ▮ Sign up for proficiency exams as appropriate.
- ▮ *CHM 698 requirement:* Register for CHM 698 under Advisor's name. Schedule departmental [literature seminar](#) as described above. *Grade for CHM 698 determined by thesis committee.*

### **Semester Three or Penultimate Semester**

- ▮ Enroll in graduate classes, including CHM 685 and CHM 698, as appropriate. *Grade for CHM 685 determined by advisor at end of term.*
- ▮ Sign up for proficiency exams as appropriate.
- ▮ *CHM 685 requirement:* Each student must meet with their Committee no later than October 15 (February 28). The meeting will consist of (1) discussion of the prior student submission to the committee of a 5-10 page [Progress Report](#), (2) a formal presentation by the student of their progress to date and proposed plan to complete their degree, and (3) preparation of a degree [Completion Plan](#). Committee grades Progress Report. Committee signs [Cover Page](#) following finalization of Progress Report and Completion Plan. *Grade for CHM 685 for semesters one and two is the average committee grade for this report.*

*(continued next page)*

### **Semester Three or Penultimate Semester (continued)**

- ▮ *CHM 698 requirement:* Register for CHM 698 under Advisor's name. Submit [CHM 698 Seminar Option Form](#) to Committee before start of semester for approval. *Grade for CHM 698 determined by Advisor.*
- ▮ Submit the [Application for Graduation Form](#) along with the Program of Study form to the department for approval. These forms and the processing fee must reach the Graduate College by the published deadline.

### **Semester Four or Final Semester**

*NOTE: see the current Important Dates for Graduate Students (Graduate College, Current Students webpage) for dates for the many important deadlines for the items below*

- ▮ Enroll in graduate classes, including CHM 685 and CHM 698, as appropriate. *Grade for CHM 685 determined by advisor at end of term.*
- ▮ Register for CHM 699 (Thesis) (2 hours minimum).
- ▮ Sign up for proficiency exams as appropriate.
- ▮ *CHM 698 requirement:* Register for CHM 698 under Advisor's name. Schedule departmental [research seminar](#) as described above. *Grade for CHM 698 determined by thesis committee.*
- ▮ Submit rough draft of Thesis to Graduate College for format check by deadline.
- ▮ Schedule Oral Defense with Committee.
- ▮ Submit Thesis to Committee two weeks in advance of Oral Defense only after at least one revision through Advisor. A copy must also be made available to the Chemistry faculty.
- ▮ Submit [Oral Defense Form](#) to Graduate College within 48 hours of defense. Committee must match Committee Selection form and subsequent [Change of Committee](#) forms.
- ▮ Submit at least 5 copies of Final Thesis to Graduate Office by deadline (one for each; Graduate College, Library, Chemistry Office, Advisor, and Student).\*\*

\*\* Starting in Fall 2011, an electronic thesis will be required for all students. Details will follow in a separate document.

## FORMS

Click on the form title to link to the PDF version of the form.

<u>Suggested</u>	
<u>Semester:</u>	<u>Forms to Complete:</u>
┌	1 <a href="#">Committee Selection Form</a>
┌	1 <a href="#">Course Plan Form</a>
┌	1 <a href="#">Proficiency Exam Plan Form</a>
┌	1 <a href="#">Proposed Research Form</a>
┌	2 <a href="#">CHM 698 Literature Seminar Form</a>
┌	3 <a href="#">Application for Graduation Form</a>
┌	3 <a href="#">CHM 698 Seminar Option Form</a>
┌	3 <a href="#">Progress Report Cover Page</a>
┌	3 Program of Study Form
┌	3 <a href="#">Degree Completion Form</a>
┌	4 <a href="#">CHM 698 Research Seminar Form</a>
┌	4 <a href="#">Oral Defense Form</a>

### Exception Forms:

[Exception to Seminar Scheduling Form](#)

[Change of Committee Form](#)

## PROJECTED COURSE OFFERING SCHEDULE

The following terms are when we plan to offer Chemistry graduate courses. *This schedule is subject to change.*

Every semester

CHM 685	Graduate Research
CHM 698	Graduate Seminar
CHM 699	Thesis

*Note: Except for section 1 of CHM 698, register for these courses under your advisor's section. Summer offerings of these courses are listed under the Department Chair.*

Fall 2011, Fall 2013

CHM 560	Topics in Biochemistry
CHM 595	Lab Safety and Supervision
CHM 599	Special Graduate Course (TBA)

Spring 2012, Spring 2014

CHM 540	Theoretical Chemistry (Quantum and Spectroscopy)
CHM 565	Chemical Toxicology
CHM 620	Advanced Analytical Chemistry

Fall 2012, Fall 2014

CHM 560	Topics in Biochemistry
CHM 595	Lab Safety and Supervision
CHM 650	Advanced Inorganic Chemistry

Spring 2013, Spring 2015

CHM 540	Theoretical Chemistry (Quantum and Spectroscopy) (?)
CHM 566	Chemical and Molecular Biology of Cancer
CHM 610	Scientific Writing: Research-Related Writing Skills in Chemistry

## IMPORTANT UNIVERSITY DATES 2014-2015

<b>August 2014</b>	
8/15/2014	Financial Aid Disburses
8/18/2014	Begin Financial Aid Refunds
8/18/2014	Payment deadline for students enrolled between 3/24-8/17
8/25/2014	First day of Term
8/25/2014	\$50 late enrollment fee in effect
<b>September 2014</b>	
9/1/2014	Labor Day – University Closed
9/4/2014	Last day to Add a class (without having to file a petition and pay a \$25 late add fee)
9/4/2014	Last day to Drop/Delete a class (without class appearing on students’ transcripts)
9/4/2014	Last day to change Audit to Credit or Credit to Audit
9/5/2014	Last day to submit residency reclassification petition
9/5/2014	Drop with a “W” in effect (class will appear on students’ transcripts with a “W”)
9/5/2014	Petition to Add a class and \$25 late add fee in effect
9/15/2014	Administrative Drop deadline and 21 <sup>st</sup> day enrollment count
9/15/2014	Open enrollment begins for Winter 2014
9/16/2014	Census \$100 Add fee for M16 session classes in effect
9/26/2014	Last day to file for A-Pass/Fail

<b>October 2014</b>	
10/3/2014	Last day to submit residency reclassification appeal
10/6-10/24	Submission of mid-term grades
10/24/2014	Course withdrawal deadline
10/25/2014	Petition required to withdraw from an individual course and \$25 late processing fee in effect
10/27/2014	Early Enrollment for Spring 2015 begins (continuing students only)
<b>November 2014</b>	
11/1 – 11/30	Early Enrollment for Spring 2015 continues (continuing students only)
11/11/2014	Veteran’s Day – University Closed
11/17/2014	First day to submit residency petition for Spring 2015
11/24/2014	Open enrollment begins for Spring 2015
11/27 - 11/28	Thanksgiving – University Closed
11/28/2014	Last day to officially withdraw from all M16 classes in the Fall 2014 term

<b>December 2014</b>	
12/1/2014	Last day to submit Spring 2015 Graduation Application to be included in Commencement Booklet
12/1– 12/5	End of Term Week (Reading Week)
12/5/2014	Instruction ends
12/8-12/11	Finals
12/12/2014	Last day to submit Fall 2014 Graduation Application
12/12/2014	Commencement
12/12/2014	Degree Conferral Date

12/15 - 1/9/15	Winter Term: See <a href="http://www.nau.edu/winter">www.nau.edu/winter</a> for important dates and class schedule.
12/25-1/1/15	WINTER BREAK (University Closed)

GRADUATE COLLEGE SPECIFIC DATES

**Fall Term 2014**

May 1	Applications for December Graduation Due in the Graduate College*
Aug 18	Academic Year Graduate Assistant Appointment Start Date
Aug 19	Orientation for New Graduate Students and Graduate Assistants
Aug 25	Classes Begin
Sept 1	Labor Day Holiday
Sept 5	Deadline to Submit AZ Residency Petition for Fall 2014
Sept 11	Applications for Doctoral Candidacy Due for December Graduation
Oct 3	Deadline to File Residency Reclassification Appeal
Nov 11	Veteran's Day Holiday
Nov 12	Last Date to Submit Dissertation Defense Scheduling Form for December Graduation
Nov 14	Last Day to Submit Electronic Theses and Dissertations for Format Check: <b>Email attachment only.</b>
Nov 26	Last Day to Hold Dissertation Defense for Fall Semester
Nov 27-28	Thanksgiving Holiday
Dec 1	Applications for May and Summer Graduation Due in the Graduate College*
Dec 1-5	End of Term Week (Reading Week)
Dec 9	Final Approved Electronic Copies of Theses and Dissertations Due
Dec 8-11	Finals
Dec 12	Fall-only Graduate Assistant Appointment End Date
Dec 12	Commencement
Dec 15	Winter Classes Begin

*\*Graduation application must include all signatures and attachments to be considered complete.*



