

**Master of Science Degree Program  
in  
Chemistry**

**Policies and Procedures**

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**School of Chemistry and Materials Science  
College of Science  
Rochester Institute of Technology  
Rochester, New York 14623**

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## **1.0 Introduction to the Department of Chemistry and RIT**

The RIT Department of Chemistry is a student-oriented department with a strong research focus offering degrees at the undergraduate and graduate level in chemistry and biochemistry. The department is characterized by its large variety of chemistry courses with a low student-to-faculty ratio, American Chemical Society (ACS) certified degrees, and its large collection of state-of-the-art research instrumentation for student use. The degree programs provide students with an excellent preparation for graduate school or careers in industry.

The Department of Chemistry is one of five academic departments in the College of Science at RIT. The Department occupies 27,600 square feet of space in the Thomas Gosnell Hall (8) and the Chester F. Carlson Center for Imaging Science (76). This space is divided between teaching laboratories (13.5k ft<sup>2</sup>), research laboratories (8.3k ft<sup>2</sup>), support facilities (3.7k ft<sup>2</sup>), and offices (2.1k ft<sup>2</sup>). The scientific instruments available for chemistry student use include nuclear magnetic resonance, ultraviolet, visible, Fourier transform infrared, atomic absorption, and gas chromatography mass, and liquid chromatography mass spectrometers; differential scanning calorimeters; dynamic mechanical and thermo gravimetric analyzers; capillary electrophoresis and high pressure liquid chromatography systems. Most of these instruments are computer networked for easy data transfer.

Rochester Institute of Technology, founded in 1829, is a privately endowed, coeducational, non-sectarian, fully accredited institution. RIT focuses on offering specialized courses of study in professional scientific and technical areas. It is comprised of nine colleges: Applied Science & Technology, Business, Computing & Information Sciences, Engineering, Health Sciences & Technology, Imaging Arts & Sciences, Liberal Arts, Science, and Sustainability. In addition it is the site for the National Technical Institute for the Deaf. Many departments at RIT, including the Department of Chemistry, have a cooperative education program that enables undergraduate and graduate students to alternate semesters of industrial work experience with academic course work. Of the 17,500 students who attend RIT, approximately 3,000 are enrolled in graduate programs. RIT's students come from all 50 states and from more than twenty foreign countries.

RIT is located in the town of Henrietta, NY on a 1,300-acre campus five miles from downtown Rochester. Rochester is a recognized center of technology and science, with a high proportion of scientists, technologists, and skilled workers in the population. Well known employers in Rochester include the University of Rochester, Wegmans, Eastman Kodak, Xerox, Bausch and Lomb, Delphi Automotive, Harris Communication, Rochester Products, CellTech Pharmaceuticals, and Getinge. Rochester is also a noted cultural center where support of music, art, theater, libraries, and museums is a matter of pride. The Eastman School of Music, the International Jazz Festival, the Clothesline Art Festival, and the Lilac Festival are a few examples of the cultural attractions.

## **2.0 MS Degree Program in Chemistry**

The Department offers a Master of Science (MS) graduate degree in Chemistry. The MS degree in Chemistry was first introduced in 1965 and as such is one of RIT's oldest graduate degree

programs. The MS degree program offers options designed to fill the needs of the full-time graduate student as well as enabling practicing chemists in the greater Rochester industrial community to pursue an advanced degree on a part-time basis. This program combines traditional course work with research to increase the breadth and depth of the student's knowledge.

The Department of Chemistry, Rochester Institute of Technology, offers two 30-credit hour program options leading to the degree, Master of Science in Chemistry. The Thesis Option is designed for those students seeking the traditional research-intensive master's degree. The Non-Thesis Option is designed to offer students a flexible program that can be tailored to their career interests.

The Thesis Option is a focused study within a specific field of chemistry, culminating with the submission and defense of a written thesis. The student will register for 10 credit hours of research, public seminars, and an oral defense. Depth in the program is provided by five chemistry focus area courses, while breadth is provided by four seminar courses. The thesis work may be conducted at an industrial site, provided that it culminates in a written public thesis. The thesis option is recommended for students planning to further their education in a doctoral program after leaving RIT.

The Non-Thesis Option is for students desiring breadth and flexibility in their academic program. Students can fulfill the degree requirements through course work and a capstone project. The capstone project cannot exceed a total of 4-credit hours and must culminate in a presentation of the project results. Students electing this option take a total of seven graduate level courses. Students may also use industrial projects, or cooperative education experience to complete their M.S. degree requirements within the context of this option. This option is ideal for part-time students, or students wishing to complete a multi-disciplinary M.S. degree.

This manual describes departmental policies and the requirements for an M.S. degree in either the thesis or non-thesis option. Inquiries concerning the RIT M.S. degree programs in Chemistry are invited, and should be directed to the Director, Chemistry Graduate Program, Department of Chemistry, Rochester Institute of Technology, Rochester, New York 14623.

### **3.0 Admission and Academic Status**

#### **3.1 Admissions**

The application for graduate study can be obtained by downloading and filling out an application found at <http://www.rit.edu/grad>, or writing to Rochester Institute of Technology Office of Part-time & Graduate Enrollment, Bausch & Lomb Center - A130, 58 Lomb Memorial Drive, Rochester, NY 14623-5604, phone: 585-475-2229, email: [gradinfo@rit.edu](mailto:gradinfo@rit.edu).

The application will be reviewed once all of the required application elements are provided to Graduate Admissions. In addition to those elements required by Graduate Admissions, a complete application will include three letters of recommendation, and Graduate Record

Examination (GRE) scores. Submission of scores from the GRE Chemistry Subject Examination is highly recommended. This is not required, but these scores are often used to determine financial support. International applicants who do not have a degree granted from a US institution, or for whom English is not the primary language, must submit Test of English as a Foreign Language (TOEFL) scores, or approved comparable exams, along with their GRE scores. The applicant is encouraged to visit the Department to supplement the application process.

The following criteria must be met to receive acceptance to the program:

- a. Baccalaureate degree from an accredited college or university, or an equivalent acceptable to the Chemistry Graduate Committee.
- b. Demonstrated ability to maintain at least a GPA of 3.0 out of 4.0, or its equivalent.
- c. Experience in chemistry such as general, analytical, organic, bio, and physical chemistry. In addition, applicants must have completed courses in physics and calculus.
- d. An acceptable TOEFL score (or approved comparable exams), or a demonstrated proficiency in English via the Michigan Test administered at RIT, and an acceptable GRE verbal score are required. Current minimum scores and a listing of approved comparable English proficiency examinations, may be found at <http://www.rit.edu/emcs/admissions/international>.
- e. Approval for admission by the Institute and the Chemistry Graduate Committee.

The status of an application may be viewed on-line at <http://www.rit.edu/grad>, or by contact with Graduate Admissions using the information provided. An application, once completed, may take one to two months to be evaluated by the Chemistry Graduate Committee. The admission decision is made by the Chemistry Graduate Committee, and the status of that process may be viewed using the on-line application system.

### **3.2 Contingent Admission for International Students**

Under certain circumstances, it is possible to obtain a contingent admission to the program. A contingent admission typically results from an arrangement with foreign cultural ministry to give students, whose chemistry studies were not in English, an opportunity to obtain admission into the MS program. Typical contingencies on admission are as follows.

Upon arrival at RIT, the student must take the English tests given by RIT's English Language Center. If the student's score is below the requirement, the student must follow the recommendations of the English Language Center for additional coursework. This will require additional time and financial resources to complete the MS degree.

Upon arrival at RIT, the student must take the Placement Exams in Organic, Inorganic, Physical, Analytical, and Bio Chemistry given in RIT's MS Chemistry Program. The student must pass

three of the five exams for acceptance into the program. If the student's best scores on any three is below the requirement, the student must follow the recommendations of the Chemistry MS Program Director for additional undergraduate coursework and receive a grade of B or better in these courses. This will require additional time and financial resources to complete the MS degree.

A student may not take any graduate level courses for credit until all contingencies have been removed.

### **3.3 Non-Matriculated Status**

Applicants are permitted to take graduate courses as non-matriculated students if they have a baccalaureate degree from an accredited college or university, and if they possess the necessary background for the specific course in which they wish to enroll. The courses taken for credit can usually be applied toward the Master's degree at the time the student is formally admitted to the graduate program. However, there is a limit of 6 semester credits (two courses), earned as a non-matriculated student, which can be transferred into the student's graduate record.

It is suggested that any applicant who wishes to enroll in a graduate course as a non-matriculated student should obtain permission from the Chemistry Graduate Program Director.

### **3.4 Readmission**

If a student has become inactive (has not completed a course in three consecutive semesters) or has withdrawn from RIT, Institute Policy requires the student to reapply for admission. Readmission applications are handled according to the following procedure:

- a. Students who left the program with a GPA of 3.0 or better (were in good academic standing) and will return to the program within two years of the time their last course was completed, will be readmitted to the program upon submitting a readmission application.
- b. Students who left the program with a GPA of 3.0 or better and return to the program later than two years since the last course was completed, must meet the current admission standards for readmission. The program of study shall be subject to review and may need to be revised. Previous waiver and/or transfer credit may be lost, and program deficiencies may need to be remedied.
- c. Students who left the program with a GPA below 3.0 must meet current admissions standards for readmission. The decision to reaccept the student to the program will be based on all information, including previous graduate level work. Previous waiver and/or transfer credit may be lost and program deficiencies may not be remedied. In addition, the Department will decide which previous courses, if any, will be applicable toward the degree.

- d. The Seven-Year Rule. In all cases, students must complete the program within seven years of the date the earliest course counted toward their degree program. A student who has not completed their degree requirements within this seven-year period, must petition the Chemistry Graduate Program Director for re-admission via a written letter that outlines why the petitioner was not able to complete the degree in the required time. Documented evidence supporting the petitioner's claim may be requested at that time. The final decision to pursue a petition for re-admission to Graduate Studies at RIT is solely at the discretion of the Chemistry Graduate Program Director. If a petition is to be forwarded to RIT Office of Graduate Studies for review, the dean of graduate studies will decide whether to re-admit the candidate. In no case, is the decision automatic, and the petitioner may have their petition denied for any reason.

### **3.5 Academic Probation and Suspension Policy**

Matriculated graduate, full-time or part-time, degree students will be placed on academic probation, or will be suspended from the Institute according to the criteria enumerated below. Students risk the loss of a teaching assistantship and tuition remission as a consequence of academic probation.

- a. Violation of RIT's Academic Honesty and Honor Code, which can be found at [http://www.rit.edu/studentaffairs/studentconduct/rr\\_academicdishonesty.php](http://www.rit.edu/studentaffairs/studentconduct/rr_academicdishonesty.php) or in the RIT Student Handbook that is provided on-line.
- b. Any matriculated graduate student whose Program Cumulative GPA falls below a 3.00 will be placed on academic probation and counseled by the Graduate Director concerning continuation in the graduate program. Students may lose their teaching or research assistantship and stipend while on academic probation. For purposes of the GPA calculation relevant to academic probation, a grade of incomplete (I) in a graduate course may, depending on the circumstances, temporarily be counted as an F.
- c. Those students placed on probation must raise their Program Cumulative GPA to 3.00 or better within one semester, or be suspended from the graduate program.
- d. Should it be necessary to suspend a graduate student for academic reasons, the student may petition for readmission with the Chemistry Graduate Program Director, who will consult with the Department Head and the Dean of Graduate Studies.
- e. A student who has completed all course credits but has not finished the thesis must register for Continuation of Research in all subsequent quarters until the degree is complete. Failure to do so may result in a requirement to reapply for entrance into the program.
- f. A student may apply for a Leave of Absence by writing a letter to the Chemistry Graduate Program Director, and the Dean of Graduate Studies. The time during a Leave of Absence counts toward the seven years policy.

## 4.0 Assistantships and Scholarships

Students who are matriculated in the M.S. Chemistry program are eligible for financial awards, to help defray the expense of their graduate education. These awards may consist of tuition remission and/or a stipend, depending on whether the award is: (1) a teaching assistantship (TA), (2) a graduate student adjunct (GSA), (3) a graduate scholarship, or (4) a research assistantship (RA). A description of these awards follows, along with the responsibilities associated with them.

### 4.1 Awards Application

Application materials for financial awards are included in the admissions application packet sent out by the Department of Chemistry. Although the application for admission to the program gets sent to the RIT Admissions Office, include a copy of the application sent to the RIT Admissions Office with the financial award application. This will help the Chemistry Graduate Committee in the application review process. Students desiring a TA or GSA should arrange for a live interview, either by phone or in person, with the Chair of the Chemistry Graduate Committee. Any matriculated student who wishes to be considered for a financial award should submit an application to the Director of the Chemistry Graduate Program.

The financial awards decision is made by the Chemistry Graduate Committee, in consultation with the Department Head. Award decisions are made by the middle of the academic quarter prior to when the awards go into effect. TA decisions for the Fall academic quarter are awarded by April 15th of the previous academic year. Students receiving a financial award will be notified, in writing, by the Chemistry Department Head. No financial award can be given to a non-matriculated student.

### 4.2 Teaching Assistantships

Teaching assistantships entitle the recipient to full tuition remission and a monthly stipend. In return for the award, teaching assistants (TAs) will be expected to carry out the following duties:

- a. teach undergraduate laboratories for a maximum of 10 contact hours per week;
- b. assist faculty members in the grading of undergraduate examinations, homework and laboratory reports;
- c. arrange and observe office hours for students who desire help in courses for which the TA is responsible; and
- d. be knowledgeable about the course materials for which the TA is responsible.

It is estimated that these duties would require approximately 20 hours per week. As a consequence of this TA load in addition to coursework, TAs should treat this combination as a full time job requiring 100% of their effort. Teaching assistants are given 1-year contracts, which are renewed for a second year, provided they are in good academic standing, and have adequately performed their TA duties. The TA

### **4.3 Graduate Student Adjunct**

A graduate student adjunct (GSA) receives quarterly contracts to teach specific courses. The adjunct position entitles students to a stipend for the courses they teach. Tuition remission is not directly connected to this award, although many students receive tuition remission through other sources. The GSA is responsible for the same duties as the TA, and is subject to the same review process. Since graduate student adjuncts are hired per course, the time spent per week teaching, grading and advising is commensurate with the number of courses for which they are responsible.

### **4.4 Graduate Scholarships**

Graduate scholarships entitle the awardee to receive partial or full tuition remission. Graduate scholarships may be renewed provided the recipient is in good academic standing. The amount of tuition a scholarship awardee receives depends on several factors, including: (1) the student's academic record; (2) the student's progress toward their degree, and (3) the quality of the applicant pool.

### **4.5 Research Assistantships**

A Graduate Research Assistantship (RA) is a funded research position associated with a specific research laboratory or Research Advisor. It is similar to a TA except the student is performing full time research. As a consequence of this RA load and coursework, RAs should treat this combination as a full time job requiring 100% of their effort. RAs generally receive a stipend and tuition remission. The term of an RA appointment is one semester and may be renewable, depending on their Research Advisor's research support.

TAs who have made good academic progress toward their degree by the first summer of residence in the program may apply for summer research support as an RA. Students who have been awarded a summer research assistantship will receive a stipend and four semester credits of tuition remission for Chemistry Graduate Research in return for spending the summer working in their Research Advisor's research lab. Students seeking RA positions during other academic quarters can inquire through their advisor. The availability of these RAs will depend on the advisor's grant funding. Students switching from TA to RA, or RA to TA, do so at Semester stops and starts.

### **4.6 Evaluation and Review**

All financial awards come with the student's responsibility of staying in good academic standing (GPA of 3.0 or greater) and making steady progress toward their degree. If these criteria are not met, the award will not be renewed, and may be revoked. In addition, TAs and GSAs are subject to teaching evaluations from both their students and from their faculty coordinators. Specific guidelines and expectations will be provided by the faculty coordinator prior to and during that quarter in which the TA or GSA is teaching. TA/GSA evaluations will be taken into consideration when renewing teaching contracts. This process of review and evaluation is to

ensure that financial award recipients fulfill their primary goal in the program, obtaining their degree.

## **5.0 Chemistry MS Degree Program Guidelines**

The chemistry graduate program is a 30-credit hour program leading to the Master of Science degree in chemistry. The program requires, nominally, 2 years to complete when taken as a full-time student. All students must complete the program in a seven-year time period. Students can choose from a Thesis and a Non-Thesis option to fulfill the degree requirements. These options will be described separately. However, there are some general guidelines, common to both options, which will be presented first.

All chemistry graduate students, regardless of their chosen option, must demonstrate proficiency in three out of the five sub-disciplines of chemistry (analytical, physical, organic, inorganic and bio chemistry) and mastery in one area. Demonstration of proficiency is determined by performance on placement exams (PEs) and/or graduate level coursework. Mastery is demonstrated by the successful completion of a thesis and dissertation for students selecting the thesis option, or a capstone project for students selecting the non-thesis option.

### **5.1 Orientation**

All newly matriculated graduate students must arrive a week in advance of their first academic quarter. This should be sufficient time to find a residence, get acclimated to the campus, and go through the graduate student orientation. Orientation is run in formal group activities prior to the fall quarter. Students who enter the program during the other academic quarters will receive a one-on-one orientation by a member of the Chemistry Graduate Committee.

During orientation new graduate students will: (1) be introduced to the faculty, (2) be introduced to their classmates, (3) review the Chemistry M.S. program guidelines, (4) be advised on course registration, (5) receive an RIT computer account, (6) receive keys and desk assignments, (7) schedule placement examinations; (8) be introduced to chemistry stockroom procedures; (9) take placement examinations in the five chemistry subject areas, and (10) take an OSHA certified laboratory safety course. The latter must be taken once a year while the student is enrolled in the program. Additionally, TAs and GSAs will be trained in teaching and communication techniques during the orientation week.

### **5.2 Graduate Advisor**

During the first semester of attendance for a new graduate student, the Director of Graduate Program and Graduate Committee will act as the student's Academic Advisor. Graduate students will be counseled by a permanent Project Advisor (Project Option) or Thesis Advisor (Thesis Option) starting with the completion and approval of FORM 2.

### **5.3 Placement Examinations (PEs)**

All new graduate students in the Department of Chemistry must arrive at least one week prior to registration during which time they will take the placement exams in the sub-disciplines of analytical, organic, bio, inorganic, and physical chemistry. The PEs are standardized examinations, published by the American Chemical Society to be used by graduate chemistry programs throughout the USA. All chemistry graduate students may demonstrate proficiency in three of the five areas by passing three of the five PEs. The pass/fail decision is based on the national statistics for a given exam. A passing score on a PE is a score above the 50<sup>th</sup> percentile on the exam.

Students failing to pass three PEs must demonstrate proficiency in three sub-disciplines of chemistry through graduate coursework. A student must formally take and pass with a grade of B or higher in the sub-discipline courses until he or she has demonstrated proficiency in at least three areas of chemistry by either a passing score in PE's or coursework. Progress on the placement exams is reported in FORM 1.

## 5.4 Courses

Whether graduate students choose the Thesis Option or the Project Option, the program is designed to give some breadth and depth to a student's knowledge of chemistry. The series of four seminar courses are designed to give breadth, while the lecture courses are designed to give depth. The specific graduate lecture courses taken are determined by the student's area of focus, his or her Graduate Advisor, and the outcome of the PEs. To maximize a student's depth in a focus area, passing all three PEs is important. The only courses which will count for the MS degree in chemistry are those numbered at a level of 600 or higher. Graduate courses from outside the department may count towards the degree if they are approved by the student's Academic Advisor.

Any course in which a **C-**, **D**, or **F** is obtained will not apply toward the courses required to graduate. Courses in which grades of **C+**, **C**, **C-**, **D**, or **F** are received may be repeated with permission from the Graduate Advisor and the Graduate Director, but will incur a financial burden for the student. Grade point averages will include the original course's and the repeated course's grade. **F** grades most often occur if an incomplete in a course, an **I** grade, has not been remedied within one academic semester of the official end of the course.

### 5.4.1 Focus Area Courses

A student will take five or seven courses, depending on if they are on the thesis or project option, pertinent to a chosen focus area in their graduate career at RIT. These courses are designed to give students depth of knowledge in specific chemistry areas relevant to a student's chosen thesis or capstone project area. Many factors determine the specific focus area courses a student will take. Availability, PE performance, and research focus are a few. In general, a student's Graduate Advisor will have the final say as to which courses may be taken for the MS Chemistry Degree. Courses may be Chemistry Department offerings or courses offered external to the department.

### 5.4.2 Seminar Requirement

An important part of the degree requirement is Chemistry Seminar. Chemistry Seminar is a series of four courses designed to introduce some breadth to a student's chemistry knowledge. Internal and external speakers present seminars on research topics of current interest. All students are enrolled in Chemistry Seminar and receive credit for: i) presentation as an internal speaker, ii) audience review/critique of internal and external speakers, and iii) external speaker invitation responsibilities. Presentation credit is gained by presenting two public seminars during their two years at RIT; one in Semester 1 of Year 1, and the final in Semester 2 of Year 2. Seminar one is a literature seminar on their selected research topic. Seminar two is either their thesis defense or capstone presentation, depending on which track they are on. Audience review credit is gained when students not presenting write a synopsis for each seminar scheduled. In Semester 1 of Year 2, graduate students will invite, host, and introduce external seminar speakers to the seminar series for credit.

Graduate student seminars must be formally added to the seminar calendar prior to the semester in which they are given, by submitting a general seminar topic to the faculty member coordinating Chemistry Seminar and by arranging an agreed upon seminar date. In the week prior to their seminar presentation, students should submit a written abstract of their seminar to the Department Secretary to be included with their seminar announcement. The grade for the seminar presentation will be determined from the grades submitted by the faculty members attending the seminar (FORM 5 & FORM 10).

#### 5.4.3 Graduate Chemistry Writing

An important part of being a professional chemist is to be able to effectively communicate information about your research results, laboratory, and personal qualities to others through written and verbal delivery. This course develops these skills. Students will learn how to write a curriculum vitae, resumé, laboratory overview, short and long research abstracts, and scientific research articles using the various formats and styles used by chemists. Integral parts of writing a research article are the initial formulation of the research hypothesis and design of experiments to test the hypothesis. This course will also review and stress the importance of these components.

#### 5.4.4 Research

Chemistry graduate students in the thesis option degree track take ten credit hours of research under the supervision of a member of the Chemistry Graduate Faculty, or an RIT faculty member approved by the Chemistry Graduate Committee. This research should be original research which can lead to a refereed publication in a scientific journal and presentation at a scientific meeting, and will lead to a graduate thesis.

#### 5.4.5 Project

Chemistry graduate students in the project option degree track take four credit hours of project under the supervision of a Research Advisor who is either a member of the Chemistry Graduate Faculty, or an scientist approved by the Chemistry Graduate Committee. In the case where the student is working for industry, the student may petition the Chemistry Graduate committee to use a work related project as the capstone project. In this situation, the student's work supervisor

typically serves as the Research Advisor and a member of the Graduate Faculty serves as the Academic Advisor.

All industrial project work must be started after the student becomes matriculated in the graduate program to receive graduate credit. Project work can be proprietary, provided one or more RIT Graduate Faculty serve on the Project Committee and appropriate non disclosure agreement (NDA) paperwork is signed by all committee members and the student.

## **6.0 Thesis Option**

The Thesis Option is a focused study within a specific field of chemistry, culminating with the submission and defense of a written thesis. The student will register for 10 credit hours of research, give three oral exams, and two public seminars. The two public seminars typically coincide with two of the oral exams. The thesis work may be conducted at an industrial site, provided that it culminates in a written public thesis. This option is recommended for students planning to further their education in a doctoral program after leaving RIT. This option is required for students receiving tuition remission in connection with TA or RA appointments.

### **6.1 Advisor**

Prior to the completion of one semester of full-time work, or 6 credit hours for the part-time student, students in the thesis option must choose a faculty member who will serve as their research advisor. Any member of the Graduate Chemistry Faculty can serve as a Graduate Advisor. (See Appendix B for a list of graduate faculty.) In some cases, other RIT faculty may serve in this capacity. In both cases, the selection must be approved by the potential advisor and the Graduate Director. Each student must interview a minimum of four faculty members as potential Research Advisors. To validate the process the student submits FORM 2 to the Graduate Director.

### **6.2 Schedule**

As soon as a Research Advisor has been approved, the student and the Research Advisor will outline the entire pathway to be pursued through the program. The study plan (FORM 4) is used to list all courses to be used toward the student's degree. It is then submitted by the Graduate Advisor to the Graduate Director for approval. The student's program must meet the minimum course requirements given below.

A minimum of 30 semester credit hours beyond the baccalaureate degree is required to obtain the M.S. degree in Chemistry. Courses for credit in chemistry are chosen from the 600 and 700 numbered courses of the Department. Courses below the 600 level can not be chosen to fulfill the graduate chemistry course requirement. Graduate level courses from outside the department may under certain circumstances be chosen if approved by the candidate's thesis committee and Chemistry Graduate Committee. Table 6.1 presents an overview of the course requirements for the thesis option.

**Table 6.1 Course Grid for MS Chemistry Thesis Option**

	Year 1				Year 2		
	Fall	Intersession	Spring	Summer	Fall	Intersession	Spring
<b>Focus Area Courses</b>	Course 1 (3)		Course 3 (3)		Course 5 (3)		
	Course 2 (3)		Course 4 (3)				
<b>Core Courses</b>	Seminar 1 (1)		Seminar 2 (1)		Seminar 3 (1)		Seminar 4 (1)
	Writing (1)						
<b>Research</b>		Research (1)	Research (1)	Research (3)	Research (2)	Research (1)	Research (2)

Numbers in parentheses indicate semester credit hours.

**Table 6.2 Minimum Course Requirements (Thesis Option)**

Category	Credits
Chemistry Graduate Courses	15
Thesis Research	10
Seminar Courses	4
Writing Course	1
<b>Total</b>	<b>30</b>

Table 6.3 TA thesis option timeline.

Year	Semester	Load			Activity	FORM	Week
		Focus Area Courses	Research	TA/RA			
1	Fall	2	Yes	TA	Placement Exams	1	-1
					Interview Advisors	2	1-4
					Select Thesis Advisor	2	5
					Request Thesis Committee	2	5
					Thesis Committee Appointed	2	6
					Reserve date for proposal talk (Public and Closed Door)	3	6
					Study Plan	4	10
					Proposal Talk (Seminar 1 & Oral Exam 1)	5 & 6	11-15
	Intersession	0	Yes		Focus 100% on Research		
	Spring	2	Yes	TA	Thesis Advisor and student submits request for summer RA to GC	7	8
					GC notifies student and Thesis Advisor on summer funding	7	10
					Placement exams	1	16
	Summer	0	Yes	RA	Focus 100% on Research		
Thesis Advisor evaluates students candidacy for completion of thesis track					8	7	
GC Awards second 10 month contract for thesis track students						8	
2	Fall	0 or 1	Yes	TA	Placement exams	1	-1
					Interim Oral (Oral Exam 2)	9	6-10
	Intersession	0	Yes		Focus 100% on Research		
	Spring	0 or 1	Yes	TA	Thesis Defense (Seminar 2 & Oral Exam 3)	10 & 11	14+
					Lab Checkout	12	
Summer	No	No		Certification of Degree	14		

### 6.3 Seminars

As part of the core course requirements, thesis-option students must present at least two public departmental seminars. These are typically followed by closed-door sessions in order to count as two of the oral exams (See 6.4). The first seminar is a one-hour presentation based on literature (helpful background for the student's thesis research), with an additional proposal component. Guidance on the selection of a seminar topic may be provided by the student's Thesis Advisor.

The seminar should be scheduled to precede the first oral examination (FORM 3). The evaluation of the first seminar by the faculty audience is reported on FORM 5.

The second seminar is given in conjunction with the third oral exam, which together constitutes the thesis defense. This seminar is based on the thesis research and is followed by a question and answer period conducted by the seminar audience and the Oral Committee (the latter being, specifically, a closed session). A worked-up thesis draft must be provided to the Oral Committee at least two weeks before this event. The evaluation of the second seminar by the faculty audience is reported on FORM 10.

## **6.4 Oral Examinations**

Graduate students who have chosen the thesis option must pass a series of two oral comprehensive exams and an oral thesis defense. The purpose of the Oral Examination is to evaluate and advise students on their research progress and their general knowledge of chemistry. The role of evaluator and advisor is performed by the Oral Committee. Members of the committee can make specific recommendations for remediation to assist the student in areas of weakness.

The Oral Committee is formed during the graduate student's first semester of attendance and prior to the student's first oral exam. The Oral Committee is appointed by the Director of the Chemistry Graduate program at the request and suggestion of the student and the Thesis Advisor (FORM 2). The student's oral committee must be formed in time to enable the student to complete the first oral exam by the end of the first semester of attendance.

Every oral exam is to be culminated by a discussion (in the student's absence) of the student's performance and progress. The Oral Committee's pass/fail decision is recorded on FORM 6 (First Oral Exam), FORM 9 (Interim Oral) and FORM 11 (Thesis Defense). The Oral Committee's decision and recommendations will be shared with the examinee. The Oral Committee should also review the student's complete academic record. Each graduate student must maintain a cumulative grade point average 3.0 or higher. (See Academic Probation and Suspension Policy.)

### **6.4.1 Oral Examination 1**

The first oral examination for thesis-option candidates will be held before the end of the first semester of the student's first year in the program. The subject of the oral is usually a general discussion of the proposed research. A short (ca. 3 page) description of the project and a thorough list of pertinent literature citations should be distributed to Oral Committee members at least one week prior to the scheduled oral examination date. The purpose of this oral examination is also to review the student's PE and course grades, review the student's program of study (FORM 6), review TA performance and evaluations, if applicable, and to determine general chemical competency. The Oral Committee may also offer suggestions to help define and refine the research ideas presented. It is each committee member's responsibility, including the Thesis Advisor, to evaluate the first oral examination.

In the event of an unfavorable evaluation, the Oral Committee should immediately decide upon specific action to be taken. One or more recommendations could be made, which may include the following:

- Additional oral presentations
- Special written assignments
- Special seminar or other oral assignments
- Specific undergraduate or graduate course assignments
- Dismissal from the MS degree program

#### 6.4.2 Oral Examination 2

The second oral examination for thesis-option students will be held in the semester following the student's first summer of attendance in the program; for most students, this will be their third full semester. The purpose of the oral is to review the student's research activities to date, especially summer work, and to continue discussions on appropriate topics resulting from the first oral examination. The results of Oral Exam 2 are reported on FORM 9. To assist the Oral Committee in the evaluation of the examinee's research activities, each student must submit a research summary to the members of the Oral Committee at least one week before the scheduled exam date. This report should be reviewed by the Thesis Advisor before going to the Committee, and should contain a statement of research goals, results to date, and a projection of future experiments to be performed in order to complete the thesis. Remedies for unacceptable work include those listed above under 6.4.1 Oral Examination 1. If a student has accumulated fewer than 5 research credits at the time of the second oral, a switch to the non-thesis option may be recommended.

#### 6.4.3 Oral Examination 3

The final oral examination for thesis-option candidates is the thesis defense, and is to be culminated by completing FORM 11. This examination is to be taken at least two weeks before convocation for students completing their MS degrees in the spring semester. The seminar is followed by a question and answer period, which is conducted, successively, by the seminar audience and then the Oral Committee. The written thesis is to be made available to each committee member, in a form acceptable to the Thesis Advisor, at least two weeks before the final oral exam. The draft should be of a good quality and near final form. The pass/fail decision for the thesis and the final oral is to be recorded on FORM 11. The second seminar grade is also to be recommended on FORM 10. Remedies for unacceptable work include more experimentation and repeating the final oral.

All experimental work must be finished and lab space cleaned up before vacating RIT. All lab equipment and all keys must be returned to the College of Science Stockroom. If the student is a TA, all grades must be submitted and all assignments returned. FORM 12 must be submitted to assure these are completed.

### 6.5 Thesis

A thesis is the capstone experience for the Thesis Option degree. The thesis is a report of the student's research progress and will be on display in the library for generations to come. The quality of the thesis is what the student will be remembered by. The thesis must be approved by the student's Oral Committee and the Director of the Chemistry Graduate Program, and accepted by the library. An approved thesis that has been accepted by the library constitutes a publication. This process should not preclude additional publications in the refereed scientific literature.

The key to good thesis writing is organization and planning. Students are encouraged to read the following guidelines carefully. An excellent guide for writing style is *The ACS Style Guide, A manual for Authors and Editors*, (J.S. Dodd, Editor, ACS, Washington, DC, 2nd Ed, 1997).

In keeping with the spirit of the scientific method, the thesis should contain the following pages and sections. Sections indicated as optional are not required.

1	Title Page	8	Experimental or Methods
2	Abstract	9	Results
3	List of Figures (optional)	10	Discussion
4	List of Tables (optional)	11	Conclusions
5	Acknowledgments (optional)	12	References
6	Table of Contents	13	Appendices (optional)
7	Introduction		

More specific details and examples can be found in Appendix C.

## 6.6 Certification

Students in the Thesis Option program will be certified for their M.S. degrees when the following materials are presented to the Department Head:

- a. Proof of matriculated student status,
- b. Proof of completion of focus area and core courses with a GPA of 3.00 or above,
- c. Updated FORM 4 along with a current academic advising report,
- d. Completed FORM 11 with the thesis submitted to the RIT library  
(Print receipt from library indicating proof of print submission along with email from library, via ProQuest, indicating acceptance of electronic copy to the ProQuest Dissertations and Thesis database.),
- e. FORM 14, initiated by the Thesis Advisor, and
- f. FORM 12, initiated by student.

## 7.0 Project Option

The Project Option is for students desiring more course study in their academic program. Students fulfill the degree requirements through course work and completion of a capstone project. The capstone project accounts for four semester credit hours and must culminate in a capstone presentation and report of the project results. Students may use industrial projects to complete their M.S. degree requirements within the context of this option. This option is ideal for part-time students, or students wishing to complete a multi-disciplinary MS degree.

### 7.1 Advisor

Prior to the completion of one semester of full-time work, or 6 credit hours for the part-time student, students in the project option must choose a faculty member who will serve as their Graduate Advisor and one or more individuals who will help guide the student's studies. These individuals are chosen using FORM 2, and approved by the Graduate Director. This group will constitute the candidate's project committee. It is possible for the candidate's committee to be composed of members from outside of the Chemistry Graduate Faculty and RIT.

### 7.2 Schedule

The Project Option offers the student more flexibility in completing their degree. It is possible for a full time, devoted student to complete the MS Chemistry degree in as little as one full year. Alternatively, a student may spread studies out over no more than seven years.

As soon as an Graduate Advisor has been approved, the student and the advisor will outline the entire pathway to be pursued through the program. A study plan (FORM 4) is used to list all courses to be used toward the student's degree. It is then submitted by the Graduate Advisor to the Graduate Director for approval. The student's program must meet the minimum course requirements given below.

A minimum of 30 semester credit hours beyond the baccalaureate degree is required to obtain the MS degree in Chemistry. Courses for credit in chemistry are chosen from the 600 and 700 numbered courses of the Department. Courses below the 600 level can not be chosen to fulfill the graduate chemistry course requirement. Graduate level courses from outside the department may under certain circumstances be chosen if approved by the candidate's thesis committee and Chemistry Graduate Committee. The following tables present an overview of the course requirements for the project option. The tables assume that the student will finish in two years. Shorter or longer periods are possible, but the MS degree must be completed within 7 years of matriculation into the program. Consult the graduate director for more information.

**Table 7.1 Course Grid for MS Chemistry Project Option (1-year completion option)**

	Year 1		
	Fall	Intersession	Spring
<b>Focus Area Courses</b>	Course 1 (3)		Course 5 (3)
	Course 2 (3)		Course 6 (3)
	Course 3 (3)		Course 7 (3)
	Course 4 (3)		Course 8 (3)
<b>Core Courses</b>	Seminar 1 (1)	Seminar 2 (1)	Seminar 3 (1)
	Writing (1)	Seminar 4 (1)	
<b>Project</b>			Project (1)

Numbers in parentheses indicate semester credit hours.

**Table 7.2 Course Grid for MS Chemistry Project Option (2-year completion option)**

	Year 1				Year 2		
	Fall	Intersession	Spring	Summer	Fall	Intersession	Spring
<b>Focus Area Courses</b>	Course 1 (3)		Course 3 (3)		Course 5 (3)		Course 7 (3)
	Course 2 (3)		Course 4 (3)		Course 6 (3)		Course 8 (3)
<b>Core Courses</b>	Seminar 1 (1)		Seminar 2 (1)		Seminar 3 (1)		Seminar 4 (1)
	Writing (1)						
<b>Project</b>							Project (1)

Numbers in parentheses indicate semester credit hours.

**Table 7.3 Course Grid for MS Chemistry Project Option (7-year completion option)\***

Year	1	2	3	4	5	6	7
<b>Focus Area Courses</b>	Course 1 (3)	Course 2 (3)	Course 3 (3)	Course 4 (3)	Course 5 (3)	Course 7 (3)	Course 8 (3)
					Course 6 (3)		
<b>Core Courses</b>	Seminar 1 (1)	Seminar 2 (1)	Seminar 3 (1)	Seminar 4 (1)			
	Writing (1)						
<b>Project</b>							Project (1)

Numbers in parentheses indicate semester credit hours.

\* Time between matriculation and certification must be less than seven years.

**Table 7.4 Minimum Course Requirements (Project Option)**

Category	Credits
Chemistry Courses	24
Capstone Project	1
Seminar	4
Writing	1
Total	30

Students choosing the project option take one semester credit of a capstone project. Students may perform their project at an industrial site. External industrial research can be proprietary within the context of the project option, but all of the student's committee must have access to the project. A non-disclosure agreement (NDA) may be required in the case of proprietary work. The student must still satisfy their seminar requirements by presenting their work to audiences either internal or external to RIT that the committee attends. The Tables 7.1 - 7.5 should be useful in planning the degree program.

**Table 7.5 Project Option Timeline. (1-year completion example)**

Year	Semester	Load		Activity	FORM	Week
		Focus Area + (Core) Courses	Capstone Project			
1	Fall	4 + (2)		Placement Exams	1	-1
				Interview Project Advisors	2	1-4
				Select Project Advisor	2	5
				Request Project Committee	2	5
				Project Committee Appointed	2	6
				Reserve date for Literature Seminar	3	6
				Study Plan	4	10
				Literature Seminar	5	11-15
	Interession	0 + (2)				
	Spring	4 + (1)	1	Report or Public Presentation of Project	9	14
Lab Checkout (if applicable)				10	15	
Summer			Certification of Degree	14	-1	

**Table 7.6 Project Option Timeline. (2-year completion example)**

Year	Semester	Load		Activity	FORM	Week
		Focus Area Courses	Capstone Project			
1	Fall	2		Placement Exams	1	-1
				Interview Graduate Advisors	2	1-4
				Select Project Advisor	2	5
				Request Project Committee	2	5
				Project Committee Appointed	2	6
				Reserve date for Literature Seminar	3	6
				Study Plan	4	10
	Literature Seminar	5	11-15			
Intersession	0					
Spring	2		Placement Exams	1	16	
Summer	0					
2	Fall	2		Placement Exams	1	-1
					8	6-10
	Intersession	0				
	Spring	2	1	Public Presentation of Project	10	14+
				Lab Checkout (if applicable)	12	
Summer			Certification of Degree	14	-1	

### 7.3 Seminars

As part of the core course requirements, project-option students must present at least one public departmental seminar and a public, oral or written presentation of their final project, referred to as the capstone experience in Section 7.4. Part time students working on an industrial project may present their seminar to an audience at their place of employment.

The first seminar is a one-hour presentation based on literature that is helpful background for the student's project research. Guidance on the selection of a seminar topic may be provided by the student's Project Advisor. FORM 3 is used to reserve a date for the seminar. The evaluation of the first seminar by the faculty audience is reported on FORM 5.

### 7.4 Capstone Experience

The master's degree implies a period of intense study in a specific area. In the Project Option, mastery of the subject area is demonstrated by a capstone experience project. This culminating work must be presented in either written or oral form to an audience of scientists. The presentation of the final project may take the form of a departmental seminar, an external to the department presentation, a journal publication, patent, or a poster presentation at a conference. The nature of this work will be agreed to by the student, the Graduate Advisor, the student's

Graduate Committee, and the Director of the Chemistry Graduate Program. Evaluation of the public presentation performed by the student's graduate committee using FORM 10.

### **7.5 Certification**

Students in the Non-Thesis Option program will be certified for their M.S. degrees when the following materials are presented to the Department Head:

- a. Proof of matriculated student status
- b. Proof of completion of core and elective courses with a GPA of 3.00 or above
- c. Updated FORM 4 along with a current academic advising report
- d. Proof of successful completion of the capstone experience (FORM 10)
- e. FORM 14, initiated by the academic advisor
- f. FORM 12, initiated by student

## Appendix A. Glossary of Terms\*

Academic Advisor	(P,T) A member of the SCMS graduate faculty who oversees the academic progress of a student. This person is typically the Graduate Committee or their appointee before the approval of FORM 2. After FORM 2 has been approved, the student's Academic Advisor becomes their Thesis Advisor or Project Advisor.
Credit Hour	(P,T) A unit of measure associated with a course at RIT.
FORM	(P,T) A document used by the Chemistry MS Degree Program to keep track of degree progress.
Graduate Advisor	(P,T) A member of the graduate faculty who serves as the advisor to a MS student. In general, there are two types of graduate advisors: Thesis Advisor and Project Advisor. The term Advisor is also used to indicate the individual who guides a student's selection of academic courses and monitors their progress before a Thesis or Project Advisor is chosen.
Graduate Committee	(P,T) A group of four graduate faculty members and the graduate director who oversee the operation of the MS Chemistry degree program.
Graduate Director	(P,T) The individual appointed by the SCMS to serve as the point person for the MS degree and head of the graduate committee, and sign off on all MS degrees.
Graduate Faculty	(P,T) A member of the SCMS who is willing to and eligible to a graduate advisor and graduate committee member.
NDA	See Non-Disclosure Agreement
Non-Disclosure Agreement	(P) A document signed by members of the Graduate Faculty and a Project Option student's employer governing the disclosure of proprietary information.
Oral Exam	(T) A presentation to a student's oral committee. This presentation is only open to the thesis candidate and members of the student's oral committee.
PE	(P,T) See Placement Exam
Placement Exams	(P,T) A set of five standardized exams given in the graduate program. These exams are used to advise the student on coursework and in some cases test competency in a subject area. Students take exams in Analytical, Bio, Inorganic, Organic, and Physical Chemistry and must demonstrate proficiency in three of the five.

Project (P)	(T) The culminating experience for the RIT MS Chemistry accepted by New York State. The project work is presented by the student and can take the form of a publication, report, oral presentation, or poster presentation.
Project Advisor	(P) A graduate advisor who supervises an MS student on a project track.
Project Committee	(P) A group of graduate faculty, or individuals appointed by the graduate director, and the project Advisor who oversee the progress of a project track student.
Project Option	(P,T) One of two MS chemistry degree options offered by the SCMS. The project option requires the completion of an research project and presentation of the results.
Public Presentation	(P) One of many forms of presentation of a body of work which is open to the public. These may include a peer-reviewed publication, poster presentation, conference presentation, or a seminar.
Research Advisor	(P,T) An individual who advises a student on research. This term is synonymous with thesis advisor for a student in the thesis option. In the project option, the term is used to describe an individual from outside the Graduate Faculty who guides the student's Project Research.
Research Laboratory	(P,T) The space in which a research project is carried out.
SCMS	School of Chemistry and materials Science
Seminar	(P,T) A formal public presentation of a topic.
Thesis	(T) The culminating experience for the RIT MS Chemistry accepted by New York State. The Thesis is a written document presented and defended by the student. The thesis work is an original body of work undertaken by the student under the supervision of the Thesis Advisor.
Thesis Advisor	(T) A graduate advisor who supervises an MS student on a thesis track.
Thesis Committee	(T) A group of graduate faculty, or individuals appointed by the graduate director, and the thesis Advisor who oversee the progress of a thesis track student.
Thesis Option	(P,T) One of two MS chemistry degree options offered by the SCMS. The thesis option requires the completion of an original research project and the writing and defense of a thesis.

\* Applicability Notes: P=Project Option, T=Thesis Option

## Appendix B. Graduate Chemistry Faculty

### Graduate Chemistry Faculty School of Chemistry and Materials Science Rochester Institute of Technology

**Cody, Jeremy A.**, Assistant Professor  
BS, Indiana University of Pennsylvania; PhD, University of Rochester.  
Organic Chemistry. Natural Product Synthesis.

**Collison, Christina G.**, Associate Professor  
BA, Colby College; PhD, University of Rochester.  
Organic Chemistry, Natural Product Synthesis

**Collison, Christopher J.**, Associate Professor  
BSc and PhD, Imperial College of Science Technology and Medicine, University of London.  
Physical Chemistry, Materials, and Organic Photovoltaic Devices.

**Craig, Paul A.** Professor  
BS, Oral Roberts University; PhD, University of Michigan.  
Analytical Chemistry, Biochemistry.

**Eddingsaas, Nathan C.**, Assistant Professor.  
BS University of Wisconsin - Stevens Point; PhD University of Illinois at Urbana-Champaign.  
Atmospheric chemistry, Analytical Chemistry, Spectroscopy, Chemical Kinetics.

**Hornak, Joseph P.**, Professor.  
BS, Utica College; MS, Purdue University; PhD, University of Notre Dame.  
Physical Chemistry. Magnetic Resonance Spectroscopy and Imaging.

**Michel, Lea V.**, Assistant Professor  
BA, Colgate University; PhD, University of Rochester.  
Biochemistry, Biophysics and Structural Biology, Protein NMR Spectroscopy.

**Miri, Massoud J.**, Assistant Professor.  
BS, MS, PhD, University of Hamburg, Germany.  
Polymer Chemistry.

**Rocha, John-David R.**, Assistant Professor.  
BS, University of North Texas; MS, University of North Texas; PhD, Rice University.  
Physical Chemistry

**Santhanam, K.S.V.** Professor.  
BSc, MA, PhD, S.V. University (India).  
Material Science, Electrochemistry carbon nanotubes & sensors. Conducting polymers.

**Smith, Thomas W.**, Professor  
BS, John Carroll University; PhD, University of Michigan.  
Organic Chemistry. Polymer Chemistry.

**Takacs, Gerald A.**, Professor  
BSc, University of Alberta (Edmonton); PhD, University of Wisconsin (Madison).  
Physical chemistry, chemical kinetics, photochemistry, atmospheric chemistry, plasma chemistry.

**Williams, Scott A.**, Associate Professor  
Purdue University (Biochemistry), Montana State University (Physical Chemistry), St. Jude Children's Research Hospital (Pharmacology)  
Physical and Inorganic Chemistry

## **Appendix C. Thesis format information and example pages.**

For additional information, see the RIT Library's web page  
<http://infoguides.rit.edu/thesis-services/>.

# Irreversible First Order Chemical Reactions

Susan Queue

B.S. Chemistry, Perdue University, West Laughalot, IN, 2003  
A.S. Science, Elkhart Community College, Elkhart, IN 2001

A thesis submitted in partial fulfillment of the  
requirements for the degree of Master of Science in Chemistry in the  
School of Chemistry and Materials Science,  
College of Science  
Rochester Institute of Technology

August 2014

Signature of the Author \_\_\_\_\_

Accepted by \_\_\_\_\_  
Director, M.S. Degree Program                      Date

SCHOOL OF CHEMISTRY AND MATERIALS SCIENCE  
COLLEGE OF SCIENCE  
ROCHESTER INSTITUTE OF TECHNOLOGY  
ROCHESTER, NEW YORK

CERTIFICATE OF APPROVAL

---

M.S. DEGREE THESIS

---

The M.S. Degree Thesis of Susan Queue has  
been examined and approved by the thesis  
committee as satisfactory for the thesis required for  
the M.S. degree in Chemistry.

---

Dr. James Grateful, *Thesis Advisor*

---

Dr. Charles Rivers

---

Dr. Linda Little

---

Dr. Theodore Smith

---

Date

## Format

- Page Size:** 8.5 by 11 inch 100% rag, low acid, bond paper should be used for the original copy of the thesis. This paper deteriorates less over time than wood pulp paper.
- Margins:** Left Edge: 1.5 inches  
Right Edge: 1.0 inches  
Top Edge: 1.0 inches  
Bottom Edge: 1.0 inches
- Spacing:** Double spaced for the general text of the manuscript, but single space for long tables, quotations, footnotes, and captions.
- Font:** A font which gives 26 lines of text per page should be chosen. In many cases this will be a 10, 11, or 12 point font.
- Figures:** All figures should be legible and of *journal quality*. Please refer to a chemistry journal or *The ACS Style Guide* for examples. Do not paste original line drawings or spectra on pages. In some cases a high quality photocopy will be acceptable, but in most cases a line drawing or laser printed plot will be necessary. White out is not permitted. All figures should conform to the margin restrictions listed above. All figures should contain a caption and labeled axes. Photocopies of copyrighted materials are a violation of U.S. copyright laws.
- Equations:** Equations should be numbered consecutively at the right hand margin.
- Page Numbers:** Pages are numbered on the bottom center of the page without preceding or trailing characters such as parentheses or dashes. The pages before the introduction are given lower case Roman numerals. The title page is page *i* (but no page number is appears on it), the copyright release form is page *ii*, the abstract *iii*, etc. The first page of the introduction will start the Arabic numbering and should be page 1. The pages of Appendix A should be numbered A1, A2, A3, ..., and Appendix B B1, B2, B3, ... .
- Reproduction:** Good, clear laser printed copies of the thesis are essential. Photocopies of the original may be used for the remaining copies. Please use color when necessary.
- Copies:** You will need at least three final copies of your thesis. The original copy is for the library, one is for your advisor, and the remaining one is yours. Additional final copies may be needed for your committee, colleagues, and family members. The library copy must be bound and the library pays for binding that copy. It is customary that you bind your advisor's copy. See the "thesis services" link on the library web site for additional information on binding and cost for additional copies. <http://infoguides.rit.edu/thesis-services>

References: References are a list of scientific literature cited in the thesis. These should follow one of two formats: listing by number or listing by author's name and date. For example:

Both algorithms set equal to zero any data point with a value less than an arbitrary noise figure as defined previously.<sup>13</sup>

Both algorithms set equal to zero any data point with a value less than an arbitrary noise figure as defined previously (13).

Both algorithms set equal to zero any data point with a value less than an arbitrary noise figure as defined previously (Fletcher, *et al.* 1993).

Collate all references at the end of the manuscript in numerical order of citation if listed by number and in alphabetical order if cited by author.

The exact format of the reference may vary slightly between the focus areas in chemistry. You should use the format acceptable in focus area. References to journal articles should contain authors, title of article, journal name in italics, volume (bold), pages, and year as presented in the following examples. Refer to The ACS Style Guide or CASSI for abbreviations of journals.

13. Fletcher, L.M.; Barsotti, J.B.; Hornak, J.P., "A Multispectral Analysis of Brain Tissues", *Magn. Reson. Med.* 1993, 29, 623-630.

An alternative format for some disciplines of chemistry is:

13. Fletcher, L.M.; Barsotti, J.B.; Hornak, J.P.; "A Multispectral Analysis of Brain Tissues." *Magn. Reson. Med.* 29:623-630 (1993).

References to books should contain the author(s), title in italics, publisher, city, and year. You may also wish to include the ISBN number.

3. D.A. Skoog, J.J. Leary, *Principles of Instrumental Analysis*; Saunders: NY 1992.

References to book chapters in an edited book should contain authors, title of chapter, title of book in italics, editor, publisher, city, year, page or chapter.

25. J.P. Hornak, L.M. Fletcher; "Multispectral Image Segmentation in Magnetic Resonance Imaging" in *Digital Image Processing Method*; E.R. Dougherty, Ed.; Marcel Dekker: NY, 1994; chapter 3.

Additional formats can be found in *The ACS Style Guide*.

**Abstract:** The abstract is a brief summary of your thesis. See any abstract in the scientific literature as an example. The length should be approximately 100 to 200 words.

**Appendices:** Appendices should, if necessary, have their own table of contents. The individual pages of an appendix should be numbered with the letter of the appendix and ascending page numbers (i.e., A1, A2, A3....).

## **Appendix D. Chemistry MS Program Forms.**

**FORM 1**  
**Chemistry MS Program**  
**RIT**

**Placement Exam Report**

Students Name \_\_\_\_\_

<b>Attempt 1</b>	<b>Placement Exam</b>				
	<b>Analytical</b>	<b>Biochemistry</b>	<b>Inorganic</b>	<b>Organic</b>	<b>Physical</b>
Score					
%					
Pass/Fail					
Course					
Grade					
Requirement Satisfied					

<b>Attempt 2</b>	<b>Placement Exam</b>				
	<b>Analytical</b>	<b>Biochemistry</b>	<b>Inorganic</b>	<b>Organic</b>	<b>Physical</b>
Score					
%					
Pass/Fail					
Course					
Grade					
Requirement Satisfied					

<b>Attempt 3</b>	<b>Placement Exam</b>				
	<b>Analytical</b>	<b>Biochemistry</b>	<b>Inorganic</b>	<b>Organic</b>	<b>Physical</b>
Score					
%					
Pass/Fail					
Course					
Grade					
Requirement Satisfied					

cc: School Office  
 Graduate Advisor  
 Graduate Director  
 Student (Mail Folder)

Form initiated by: Graduate Director  
 Applicability: Thesis & Project

**FORM 2**  
**Chemistry MS Program**  
**RIT**

**Interviews with Potential Thesis / Project Advisors**

In order to encourage interaction between new graduate students and faculty, you are required to interview at least four faculty as potential advisors. Please have each interviewee sign the list below. These signatures indicate that you have conversed with the given faculty member on research topics in their areas of interest. When you have chosen your research advisor, return this completed form to the Director of the Chemistry Graduate Program.

_____	_____	_____	_____
Faculty Signature	Date	Faculty Signature	Date
_____	_____	_____	_____
Faculty Signature	Date	Faculty Signature	Date
_____	_____	_____	_____
Faculty Signature	Date	Faculty Signature	Date

\_\_\_\_\_  
Student's Name

\_\_\_\_\_  
ID Number

I select the following thesis / project advisor

\_\_\_\_\_  
(Please Print)

I have agreed to serve as thesis / project advisor.

\_\_\_\_\_  
Graduate Advisor's Signature

I request that a committee be appointed for me and suggest the following members. I have talked to the faculty listed below and they have agreed to serve on my committee.

_____	_____
_____	_____

Committee approved by:

\_\_\_\_\_  
Director Chemistry Graduate Program

\_\_\_\_\_  
Date

cc: School Office  
Graduate Advisor  
Graduate Director  
Student (Mail Folder)

Form initiated by: Graduate Student  
Applicability: Thesis & Project

**FORM 3**  
**Chemistry MS Program**  
**RIT**

**Proposal Talk Reservation Request**

**To: Seminar Coordinator**

I request that the following seminar date and time be reserved for my public and closed-door parts of my research/literature proposal talk.

\_\_\_\_\_

Date

\_\_\_\_\_

Time

\_\_\_\_\_

Room

\_\_\_\_\_

Title

\_\_\_\_\_

Candidate

\_\_\_\_\_

Student Number

\_\_\_\_\_

Today's Date

\_\_\_\_\_

Student's Graduate Advisor

cc: School Office  
Graduate Advisor  
Graduate Director  
Student (Mail Folder)

Form initiated by: Graduate Student  
Applicability: Thesis & Project

**FORM 4**  
**Chemistry MS Program**  
**RIT**

**Study Plan**

\_\_\_\_\_  
Student Name

\_\_\_\_\_  
Student Number

In order to complete the requirements for the degree Master of Science, the Candidate named above must obtain a satisfactory grade in the following courses:

<u>COURSE NUMBER</u>	<u>COURSE TITLE</u>	<u>CREDIT HOURS</u>
CHEM-771	Chemistry Seminar I	1
CHEM-772	Chemistry Seminar II	1
CHEM-773	Chemistry Seminar III	1
CHEM-774	Chemistry Seminar IV	1
CHEM-670	Chemistry Writing	1

_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

Thesis Option       Project Option

Working Title: \_\_\_\_\_

Advisor: \_\_\_\_\_

Director Graduate Program \_\_\_\_\_

\_\_\_\_\_  
Date

cc: School Office  
Graduate Advisor  
Graduate Director  
Student (Mail Folder)

Form initiated by: Graduate Advisor  
Applicability: Thesis & Project

**FORM 5**  
**Chemistry MS Program**  
**RIT**

**Grading Sheet: Graduate Student Seminar 1**

The purpose of the first graduate student seminar is to summarize the literature and present a research proposal on a topic. Please assist in evaluating the seminar by \_\_\_\_\_'s  
Graduate Advisor

student \_\_\_\_\_ on \_\_\_\_\_ entitled  
Student's Name Date

\_\_\_\_\_  
Seminar Title

Please assess the	Unable to assess	Low			High	
student's presentation of the material	①	①	②	③	④	⑤
student's knowledge of the vocabulary	①	①	②	③	④	⑤
student's knowledge of the literature	①	①	②	③	④	⑤
quality of the visual aids	①	①	②	③	④	⑤
organization of the seminar	①	①	②	③	④	⑤
overall presentation quality	①	①	②	③	④	⑤

Was there missing literature that should have been presented?       Yes       No

Please elaborate on your above ratings.

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\_\_\_\_\_  
Your Name

cc: School Office  
Graduate Advisor  
Graduate Director  
Student (Mail Folder)

Form initiated by: Seminar Coordinator  
Applicability: Thesis & Project

**FORM 6**  
**Chemistry MS Program**  
**RIT**

**Evaluation Sheet: Oral Examination 1**

The purpose of the first oral exam is to test the student's preparedness to proceed with the proposed research summarize in the first seminar.

The undersigned states that \_\_\_\_\_ ,  
Student's Name Student Number

a student in the Master of Science degree program in Chemistry has taken Oral Examination 1.

Evaluation of student by Oral Committee:

Specific Recommendations:

The results were as follows:

\_\_\_\_\_  
Pass/Fail

\_\_\_\_\_  
Oral Committee Member

\_\_\_\_\_  
Pass/Fail

\_\_\_\_\_  
Oral Committee Member

\_\_\_\_\_  
Pass/Fail

\_\_\_\_\_  
Oral Committee Member

\_\_\_\_\_  
Pass/Fail

\_\_\_\_\_  
Oral Committee Member (Optional)

\_\_\_\_\_  
Pass/Fail

\_\_\_\_\_  
Thesis Advisor

\_\_\_\_\_  
Date

NOTE: No more than one negative vote is allowed for successful completion.

cc: School Office  
Graduate Advisor  
Graduate Director  
Student (Mail Folder)

Form initiated by: Thesis Advisor  
Applicability: Thesis

**FORM 7**  
**Chemistry MS Program**  
**RIT**

**Summer Assistantship Request**

I request that a summer research assistantship be awarded my MS student

\_\_\_\_\_ MS Student

\_\_\_\_\_ Student Number

who is making satisfactory progress in the Chemistry MS Program.

I confirm the following:

\_\_\_\_\_ Graduate GPA

- Oral committee Appointed (Form 2)
- Approved Study Plan (Form 4)
- Presented and Passed Proposal Talk (Form 6)

The following summarizes my student's research progress to date.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

\_\_\_\_\_  
Thesis Advisor

\_\_\_\_\_  
Date

Approved: \_\_\_\_\_

Graduate Director

\_\_\_\_\_  
Date

cc: School Office  
Graduate Advisor  
Graduate Director  
Student (Mail Folder)

Form initiated by: Thesis Advisor  
Applicability: Thesis

**FORM 8**  
**Chemistry MS Program**  
**RIT**

**Mid-Project Evaluation of MS Thesis Research**

(This form will be shared with the student.)

\_\_\_\_\_  
MS Student

\_\_\_\_\_  
Student Number

Please summarize your student's research progress to date.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Is the student on track to finish their research by May      Yes       No       Maybe

Will the student be able to write a thesis on their research?      Yes       No       Maybe

I request that the student be renewed for a thesis-based MS.      Yes       No   
Please explain.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

\_\_\_\_\_  
Graduate Advisor

\_\_\_\_\_  
Date

Approved: \_\_\_\_\_  
Director Graduate Program

\_\_\_\_\_  
Date

cc: School Office  
Graduate Advisor  
Graduate Director  
Student (Mail Folder)  
Committee Members (4)

Form initiated by: Thesis Advisor  
Applicability: Thesis

**FORM 9**  
**Chemistry MS Program**  
**RIT**

**Evaluation Sheet: Oral Examination 2**

The purpose of the second oral exam is to assess the student's research and academic progress.

The undersigned states that \_\_\_\_\_ ,  
Student's Name Student Number

a student in the Master of Science degree program in Chemistry has taken Oral Examination 2.

Evaluation of student by Oral Committee:

Specific Recommendations:

The results were as follows:

\_\_\_\_\_  
Pass/Fail

\_\_\_\_\_  
Oral Committee Member

\_\_\_\_\_  
Pass/Fail

\_\_\_\_\_  
Oral Committee Member

\_\_\_\_\_  
Pass/Fail

\_\_\_\_\_  
Oral Committee Member

\_\_\_\_\_  
Pass/Fail

\_\_\_\_\_  
Oral Committee Member (Optional)

\_\_\_\_\_  
Pass/Fail

\_\_\_\_\_  
Graduate Advisor

\_\_\_\_\_  
Date

**NOTE: No more than one negative vote is allowed for successful completion.**

cc: School Office  
Graduate Advisor  
Graduate Director  
Student (Mail Folder)

Form initiated by: Graduate Advisor  
Applicability: Thesis

**FORM 10**  
**Chemistry MS Program**  
**RIT**

**Grading Sheet: Graduate Student Seminar/Presentation 2**

The purpose of the final graduate student seminar is to present a summary of their graduate MS thesis research and to defend their thesis. Please assist in assigning the seminar by \_\_\_\_\_'s  
Graduate Advisor

student \_\_\_\_\_ on \_\_\_\_\_ entitled  
Student's Name Date

\_\_\_\_\_  
Seminar Title

Please assess the	Unable to assess	Low				High
student's depth of knowledge of the field	①	①	②	③	④	⑤
student's breadth of knowledge of the field	①	①	②	③	④	⑤
quality of the student's results	①	①	②	③	④	⑤
significance of the student's results	①	①	②	③	④	⑤
student's presentation of the material	①	①	②	③	④	⑤
quality of the visual aids	①	①	②	③	④	⑤
organization of the seminar	①	①	②	③	④	⑤
overall presentation quality	①	①	②	③	④	⑤
appropriately referenced materials	①	①	②	③	④	⑤

Please elaborate on your above ratings.

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\_\_\_\_\_  
Your Name

cc: School Office  
Graduate Advisor  
Graduate Director  
Student (Mail Folder)

Form initiated by: Graduate Advisor  
Applicability: Thesis

**FORM 11**  
**Chemistry MS Program**  
**RIT**

**Evaluation Sheet: Oral Examination 3**

The undersigned state that \_\_\_\_\_  
Candidate Student Number

a candidate for the Master of Science degree in Chemistry has presented a thesis and has taken a thesis defense examination.

Instructions for committee: Write in pass or fail for thesis and final oral. The thesis pass/fail decisions may be deferred.\*

Thesis	Final Oral	Signature	
_____ Pass/Fail	_____ Pass/Fail	_____ Oral Committee Member	
_____ Pass/Fail	_____ Pass/Fail	_____ Oral Committee Member	
_____ Pass/Fail	_____ Pass/Fail	_____ Oral Committee Member	
_____ Pass/Fail	_____ Pass/Fail	_____ Oral Committee Member (Optional)	
_____ Pass/Fail	_____ Pass/Fail	_____ Graduate Advisor	_____ Date

\*Deadline set by Oral Committee for resubmission of thesis: \_\_\_\_\_

NOTE: No more than one negative vote on each required phase (thesis and thesis defense) is allowed for successful completion. If oral examination is not passed, the candidate will be allowed one more chance to achieve this goal. Seminar coordinator should use recommended seminar grades above (by Oral Committee members) as an aid in arriving at the seminar grade.

cc: School Office  
Graduate Advisor  
Graduate Director  
Student (Mail Folder)

Form initiated by: Graduate Advisor  
Applicability: Thesis

**FORM 12**  
**Chemistry MS Program**  
**RIT**

**MS Student Laboratory Checkout Form**

**Returned all borrowed equipment.**

\_\_\_\_\_ (COS Stockroom)

**Returned all building 8 RIT keys.**

\_\_\_\_\_ (COS Stockroom)

**Returned all other RIT keys.**

\_\_\_\_\_ (Building manager, or NA if not applicable)

**Submitted all Grades (TA only)**

\_\_\_\_\_ (Teaching Lab Coordinator)

**Cleaned research lab space.**

\_\_\_\_\_ (Graduate Advisor)

**Employer**

\_\_\_\_\_

**Contact Information**

\_\_\_\_\_ Address

\_\_\_\_\_

\_\_\_\_\_ City

\_\_\_\_\_ State

\_\_\_\_\_ Zip Code

\_\_\_\_\_ e-mail

\_\_\_\_\_ Phone

cc: School Office  
Graduate Advisor  
Graduate Director  
Student (Mail Folder)

Form initiated by: Graduate Student  
Applicability: Thesis & Project

**FORM 13**  
**Chemistry MS Program**  
**RIT**

**Teaching Assistant Evaluation Form**

\_\_\_\_\_  
Teaching Assistant

\_\_\_\_\_  
Date

\_\_\_\_\_  
Laboratory Coordinator

\_\_\_\_\_  
Course Name

\_\_\_\_\_  
Course Number

\_\_\_\_\_  
Semester course was taught

<u>Check List</u>	<u>Excellent</u>	<u>Good</u>	<u>Fair</u>	<u>Poor</u>	<u>No Information</u>
Fairness and Promptness in Grading	_____	_____	_____	_____	_____
Stimulation of Student Interest	_____	_____	_____	_____	_____
Handling of Hazardous Situations	_____	_____	_____	_____	_____
Knowledge of Subject Matter	_____	_____	_____	_____	_____
Reliability in Keeping Office Hours and Appointments	_____	_____	_____	_____	_____
Cooperation with Co-workers	_____	_____	_____	_____	_____

In the space below additional comments can be added. It may be especially important to hear about the relationship of the TA with the students, the TA's general effectiveness, and any particular areas in which the TA could improve. Also, do you have any recommendations or reservations as to future teaching assignments for this person? (A letter may be added to substitute for or supplement this form).

\_\_\_\_\_  
Signature, Laboratory Coordinator

\_\_\_\_\_  
Date

cc: School Office  
Graduate Advisor  
Graduate Director  
Student (Mail Folder)

Form initiated by: Laboratory Coordinator

**FORM 14**  
**Chemistry MS Program**  
**RIT**

**MS Chemistry Degree Certification**

This is to certify that \_\_\_\_\_, \_\_\_\_\_  
Graduate Student Candidate Student Number

has satisfactorily completed all the requirements for the degree of Master of Science in Chemistry,

Thesis Option.

Project Option.

Successful completion of a thesis entitled:

Successful completion of a project entitled:

\_\_\_\_\_  
\_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

If a thesis, please attach a copy of the second e-mail from ProQuest indicating that they have looked at it and approved it for inclusion in the ProQuest database.

\_\_\_\_\_  
Date

\_\_\_\_\_  
Graduate Advisor

\_\_\_\_\_  
Director, Chemistry Graduate Program

\_\_\_\_\_  
Head, School of Chemistry and Materials Science

cc: School Office  
Graduate Advisor  
Graduate Director  
Student (Mail Folder)  
Committee Members (4)

Form initiated by: Graduate Advisor  
Applicability: Thesis & Project