

Virginia Commonwealth University  
Department of Chemistry



**VCU**

**VIRGINIA COMMONWEALTH UNIVERSITY**

2022-2023  
Graduate Studies Handbook

DEPARTMENT OF CHEMISTRY  
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Dear Graduate Students:

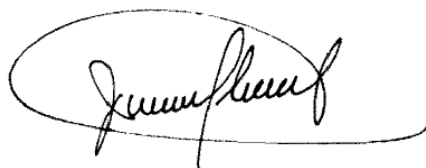
Welcome to the graduate program of the Chemistry Department at Virginia Commonwealth University. I am confident you will discover that the education you will obtain at VCU will prepare you for your professional career. I am also positive you will find the Department an enjoyable place to work and study.

This handbook is intended to serve as a general resource for policies, requirements, and procedures of the graduate programs offered by the Department. Graduate Students should also refer to the Graduate School Bulletin, which documents the official rules and regulations for graduate education at the university (<http://bulletin.vcu.edu/academic-regs/grad/>). The handbook also contains information regarding the structure of the Department, its personnel, and their job responsibilities.

I hope you find this information useful as you prepare to enter the program or while you are a student in the Department. If you have any questions, please feel free to contact me.

Once again, welcome to the Department of Chemistry and VCU.

Sincerely yours,

A handwritten signature in black ink, appearing to read 'Julio Alvarez', enclosed within a large, loopy oval shape.

Julio C. Alvarez  
Graduate Program Director

## Chemistry Directory

**Chair:** Maryanne M. Collinson

**Associate Chair:** Suzanne Ruder

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## **Graduate Program**

This handbook is a guideline of Department's policies, procedures and graduate rules under the umbrella of the College of Humanities and Sciences and the Graduate School at VCU. If you have any questions, please check with the Graduate Director.

### **1. General Information**

The Chemistry Department has compiled this handbook to aid applicants and graduate students in understanding the policy for M.S. and Ph.D. degrees. This document is located at <https://chemistry.vcu.edu/graduates/graduate-handbook/>. Students are responsible for reviewing academic regulations described in the Graduate Bulletin at <http://bulletin.vcu.edu/academic-regs/grad/>. Questions should be addressed to the Chair and/or Graduate Director, Department of Chemistry, P.O. Box 842006, Virginia Commonwealth University, Richmond, Virginia 23284-2006, (804) 828-1298.

#### A. Degrees, Programs and Concentrations

Virginia Commonwealth University offers programs leading to the Doctor of Philosophy (PhD) and Master of Science (MS) degrees in Chemistry (CHEM), as well as PhD in Chemical Biology (CHEB) and Nanoscience (NANO). In cooperation with the Physics Department, VCU also offers a Ph.D. degree in Chemical Physics (CHEM PHYS). The degree of MS is offered in thesis and non-thesis tracks, while the part time option for PhD in Chemistry is also available if the applicant receives endorsement from a research advisor within the department. Students interested in these options are encouraged to contact potential research advisors prior to enrollment and secure funding as VCU does not offer financial aid for MS or part-time PhD students. Requirements and general policy Information for each graduate degree offered including concentrations can be found at: <http://bulletin.vcu.edu/graduate/college-humanities-sciences/chemistry/>

#### B. Financial Assistance

Students on the PhD track are eligible for financial assistance from VCU through graduate teaching or research assistantships (GTA or GRA), however funding from self or fellowships outside VCU is also acceptable. To qualify for financial support, students may not hold employment outside VCU and must maintain a graduate GPA  $\geq 3$  (B, without rounding up) making timely progress while registering 9-15 graduate credits per semester. GRAs are allowed to register 1 credit of dissertation credits per semester but only upon becoming PhD candidates in the 4<sup>th</sup> semester and with approval from research advisor. **Financial aid ceases when a PhD Student transfers to MS.** (Graduate Bulletin <http://bulletin.vcu.edu/academic-regs/grad/>) Students supported on GTA are required to teach in recitation and laboratory sections as directed by the Associate Chair. These teaching assignments are carried out under the supervision of faculty in charge of the corresponding courses. GRAs perform research for advisor faculty members who are Principal Investigators (PIs) pursuing funded research programs. Typically, GTAs become GRAs after attaining PhD candidacy (in the 4<sup>th</sup> semester) at discretion of the PI and the availability of research grants. The Department also offers a number of fellowships, which are awarded on a yearly basis and are listed in the departmental webpage including application requirements at: (<https://chemistry.vcu.edu/undergraduates/departamental-scholarships/>).

Financial assistance is awarded on a 9-month or 4.5-month basis, with assistantship contracts (GTA or GRA) starting on August 10<sup>th</sup> or January 10<sup>th</sup>, respectively. Official Academic calendars including important landmarks for every academic semester can be found at: <https://academiccalendars.vcu.edu/>

Summer support may be available through GRA (from advisor's grant) or GTA when teaching during summer. This latter entails a reduced teaching load with a correspondingly lower stipend than a regular semester GTA.

The rules for awarding financial support in the form of TA, providing good standing and progress in the program, are as follows:

- A student who enters the PhD program with a bachelor's degree may anticipate support up to **FIVE CALENDAR YEARS**.
- A student who enters the PhD program with a master's degree may anticipate support up to **FOUR CALENDAR YEARS**.

#### C. Health Insurance for PhD Students

Created in response to student demand, the student health insurance program offers a comprehensive health insurance package for VCU students through United Health Care. All full-time PhD Students (registered for 9-15 graduate credits) must enroll in the program unless proof of other insurance is provided. The coverage period typically runs from August 15 to August 14 of the following year. The university subsidizes 70% of premium cost while the student is responsible for the other 30 %. Once enrolled in, students are covered through the entire coverage period regardless of graduation halfway. There is no reimbursement if a student decides to cancel enrollment during mid-coverage period. Information about the program, plan benefits, enrollment/opting out, and frequently asked question can be found in the student health insurance program webpage:

<https://provost.vcu.edu/insurance/>

#### D. Tuition, University Fees, and Types of GTA-GRA Contracts

The financial aid package for PhD students includes a tuition waiver that covers tuition costs throughout the program duration but not more than 10 semesters and counting on timely progress with GPA  $\geq 3$  (B) (without rounding up). When students are supported as GTAs, the tuition waiver is paid by the College of Humanities and Sciences and students must register 9-15 graduate credits per semester during pre-candidacy (first 4 semesters). After passing the Oral Candidacy Exam in the 4<sup>th</sup> semester and having applied for candidacy with the dean's office, GTAs are required to register 9 credits HUMS 701 (full-time) and enroll in the health insurance program (see above). When students are supported as GRAs during post-candidacy (after the 4<sup>th</sup> semester), the tuition waiver is paid by Advisor's grant and students have two options for registration: one is 9-credits of HUMS 701 requiring enrollment in the health insurance program, and the other is 1 credit of CHEM 697 **without access to health insurance** but reduced fees (see below). During post-candidacy, GTAs must always register HUMS 701 because enrollment in any other course will generate a bill sent to the student. Likewise, GRAs in post-candidacy must register HUMS 701 or 1 credit of CHEM 697 (nothing else), to prevent charges billed to the student.

University fees are charged to students on a semester basis, but their price reduces ~90% when switching registration of 9-15 credits (full-time) to 1 credit. Therefore, PhD candidates (after the 4<sup>th</sup> semester) who are also GRAs (not GTAs) and wish to minimize costs in university fees are allowed to register 1 credit of CHEM 697. However, these GRAs are responsible for their own health insurance, and this option must be approved by student's advisor and communicated promptly to the financial manager in the department. To prevent payroll delays students and advisors are encouraged to plan ahead and inform the financial manager of the GRA contract they desire. The department offers three types of contracts for PhD students on tuition waiver: full-time (9-15 credits) for GTAs in pre-candidacy, full-time (9 credits HUMS 701) for GTAs and GRAs in post-candidacy, and non-full-time (1 credit CHEM 697) GRAs in post-candidacy. These contracts are different because the tuition costs and fees for each one, may be also different.

International students in GRA who choose 1 credit during post-candidacy, are required to request a "full-time equivalent" (FTE) form at <https://global.vcu.edu/students/immigration/f1studentcourses/> from the VCU Global Education Office. Both student and advisor must fill out and sign the form adding a letter of advisor support to the request (instructions on what to write in the letter are described in the form). The form must be emailed to the Global Education Office allowing a week for processing. Once the request is approved, the student can register CHEM 697. Students on visa who are on GRA contract must do this procedure every semester they choose to register 1 credit of CHEM 697. Domestic GRAs choosing 1 credit of CHEM 697 in post-candidacy are not required to do the FTE-step but they are responsible for their own health insurance.

#### E. Proficiency Examinations for CHEM and CHEM PHYS Students

Students entering the CHEM graduate program shall take proficiency examinations to gauge undergraduate knowledge in the four traditional areas of chemistry: analytical, inorganic, organic and physical. These standardized tests by the American Chemical Society take place during orientation week and the results are provided to students before registration but have no bearing on students' transcripts.

Students entering the PhD CHEM PHYS program must pass proficiency examinations in two areas of chemistry and two areas of physics (mechanics; electricity and magnetism). Students entering with a bachelor's or master's degree in chemistry who have not taken the physics courses previously can satisfy the physics requirement with "A"s or "B"s in PHYS 301, 302 (classical mechanics), and 376 (electromagnetism). Students entering with a bachelor's or master's degree in physics who have not taken chemistry courses previously may satisfy the chemistry requirement with "A"s or "B"s in two of four courses, CHEM 301-302 (organic chemistry; the two-semester sequence counts as one course only), CHEM 320 (inorganic chemistry), CHEM 409 (instrumental analysis) or CHEM 510 (atomic and molecular structure).

**Students entering the PhD programs in CHEB and NANO are not required to take proficiency exams.**

#### F. Limits on Course Load and Continuous Enrollment

To be eligible for assistantship students must be full time and register at least 9 graduate credits per semester (but not more than 15) during pre-candidacy. **Once students apply to PhD candidacy and is approved by the dean's office in the 4<sup>th</sup> semester, students must register one of two dissertation courses: HUMS 701 (9 credits, requires enrollment in the VCU health insurance) or 1 credit of CHEM 697 (no access to VCU health insurance program). Registration of HUMS 701 is mandatory for GTAs and PhD candidates supported on Altria fellowships. During post-candidacy, students supported on GRA (advisor's grant) or self, also have the option of registering 1 credit of CHEM 697 instead of HUMS 701 to further reduce costs in university fees (see above). VCU allows a maximum of 8 years to complete a PhD degree and 5 years for a MS degree. Even after the 10<sup>th</sup> semester when no GTA support is available, a student who continues in the program must register at least 1 credit per semester (CHEM 697) to maintain continuous enrollment unless a leave of absence is requested.**

<http://bulletin.vcu.edu/academic-regs/grad/registration-policies/>

<http://bulletin.vcu.edu/graduate/study/financing-graduate-school/satisfactory-academic-progress-financial-aid-purposes/>

<http://bulletin.vcu.edu/academic-regs/grad/time-limit/>



#### G. Satisfactory Graduate GPA and Course Grades Allowed

Students on assistantship support whose graduate GPA falls below B (3.0) are given one semester to bring it back to B. If recovery does not occur within this time, the assistantship will be rescinded, and **the student will be dismissed from the program. Regardless of the financial source, VCU will not approve graduation in a graduate degree with a GPA below 3 (without rounding up) or a graduate course graded D or F. Likewise, students who receive 2 unsatisfactory grades "U" in a dissertation course (CHEM 697 or HUMS 701) will be automatically dismissed.**

<http://bulletin.vcu.edu/academic-regs/grad/satisfactory-academic-progress/>

<http://bulletin.vcu.edu/academic-regs/grad/theses-dissertations/>

#### H. Satisfactory Working Hours

Once selecting research advisor by October 31<sup>st</sup> (entering in Fall) or March 31<sup>st</sup> (entering Spring), PhD students are expected to start going to their research labs to get acquainted with their project techniques, associated literature, and initiate training with senior members. Upon completing core and elective courses (1<sup>st</sup> year), and despite being GTA, PhD students are expected to increase the hours devoted to research. **All in all, students are expected to treat their teaching/research responsibilities as a full-time job requiring at least 40 h/week, excluding lunch. Individual advisors may have their own expectations, therefore students are urged to communicate with their advisors at all times during graduate studies.**

#### I. Causes for Dismissal from the Graduate Program

- A GPA below 3 (B) without recovery after one semester. Getting a D-F grade in a graduate course.
- An F from an incomplete "I" grade not addressed by student for not contacting course professor after one semester
- Two U-grades (unsatisfactory) in CHEM 697 or HUMS 701.
- Not passing the cumulative exams (2 out of 3) by the 2<sup>nd</sup> semester for PhD CHEM.
- Not passing the Oral Candidacy Exam by the end of the 4<sup>th</sup> semester for PhD CHEM.
- Unethical conduct in research or teaching (GTA-absence, negligent/uncompliant behavior).

#### J. Seminar Program

This is a forum in which graduate students are exposed to visiting and local speakers from different disciplines in chemical sciences, including departmental faculty and students. The program is managed by the Graduate Administrative Assistant and the professor in charge of the seminar courses CHEM 690/692. The schedule is posted on CANVAS and is maintained by the Graduate Administrative Assistant. The program also includes special seminar series that are scheduled annually in honor of past departmental professors, like the Mary Kapp Lecture (Spring) and John Fenn Lecture (Fall). Seminars are scheduled twice a week on Tuesdays and Thursdays from 4:00 to 5:00 pm in Oliver Hall 1024 or via Zoom. Tuesdays are reserved for student research seminars while invited speakers are scheduled on Thursdays. Students are encouraged to interact with invited speakers when asked to volunteer in networking meetings with them and are expected to attend at a minimum all outside speaker seminars, or as instructed by faculty seminar coordinator. To see the schedule enroll in CANVAS using the link: <https://viriniacommonwealth.instructure.com/enroll/83TRAB>, Login in CANVAS and click on the Chem. Grad. Program course.

#### K. Program Withdrawal and Leave of Absence Requests

Students withdrawing from any graduate program (CHEM, CHEB or NANO) should notify with an email statement to the corresponding Graduate Director so that the College and the Graduate School can be informed promptly. Those students are also expected to follow the checkout procedure with the Graduate Administrative Assistant and the Building Manager.

Requests of leave of absence (LOA) from a program must be made by pdf letter to the program director indicating withdrawal and resumption dates along with a brief justification of the request. If the LOA is medical, description of private health details is discouraged, but a general doctor's note is still required. The graduate director then submits a Special Action Form (SAF) to the dean's office on student's behalf. All justified requests are typically approved by the dean's office, but the **department will only submit petitions made no later than the last day for add/drop and late registration of the LOA semester.** This corresponds to the first week of classes and can be found in the online VCU academic calendar. LOAs are granted only by semester, so requests for more than one semester are required to be submitted every semester. Likewise, students must announce the return to classes after a LOA with a pdf letter emailed to the graduate director and before the semester classes start.

## **2. Graduate Committees and Personnel**

#### A. Graduate Recruiting and Admissions Committee (GRAC)

This committee is made up of 4 to 6 rotating professors from different areas in the Department and is led by an appointed committee chair. The committee primary responsibilities include, recruiting, screening and selecting new graduate students every cycle. This committee also coordinates recruitment brochures and presentations.



#### B. Graduate Evaluation and Advising Committee (GEAC)

This body is made up of 5 professors, one from each of the four chemistry areas, in addition to the Graduate Director who acts as committee chair. At discretion of the Department Chair, membership to this committee rotates yearly among departmental PIs. The primary role of GEAC is handling academic issues regarding student performance, transfers, dismissals and appeals. It also oversees compliance with graduate rules, program assessment.

#### C. Graduate Program Director (GPD)

The GPD is appointed on a rotational basis by the Department Chair. General responsibilities comprise overseeing compliance in academic policy and facilitating the operation of the Graduate Program in coordination with other parties in the department (GEAC, GRAC, etc.) and university (College and Graduate School). Every year, the Graduate Director coordinates orientation week for new graduate students, the execution and grading of proficiency exams and the schedule of cumulative exams. The GDP also coordinates the annual program assessment in collaboration with GEAC and the Graduate Administrative Assistant.

#### D. Graduate Administrative Assistant

The Graduate Administrative Assistant provides an essential support to the function of the graduate program. Responsibilities include oral defense planning, procedural requests to the college and graduate school, seminar scheduling, orientation week preparation, poster session logistics, building access, check in and check out procedures for graduate students, scheduling of visiting speakers and graduate students.

#### E. Financial Manager

The Financial Manager handles and oversees financial matters pertaining grants, graduate student payroll for GTA and GRA appointments as well as travel reimbursements.

#### F. Building Manager

The Building Manager coordinates training and compliance to safety for all departmental personnel as well as students in teaching and research labs. Building security and Stockroom operation are also under the purview of the Building Manager. Students graduating or withdrawing from the program must sign off during checkout with the Building Manager.

#### G. TA Coordinator

Every semester, the distribution of TA assignments among graduate students is handled by the Associate Chair, who also coordinates the dissemination of teaching practices and standards in accord with VCU's mission. Students are encouraged to comply with these guidelines to prevent withdrawal of GTA-support.

### **3. Requirements for PhD in CHEM**

#### A. Student Learning Outcomes and Overview of Requirements

The attainment of any graduate degree conferred by the Department, relies on the completion of various requirements that are integrated in several learning outcomes:

- Demonstrate expertise in chemistry.
- Demonstrate effective oral and writing communication skills.
- Demonstrate ability to analyze data critically in chemistry.
- Demonstrate ability to conduct independent research correctly while abiding to safety and ethical standards.

In addition to these cognitive skills in preparation for diverse careers in chemistry, publication of 3 articles (one per thesis chapter) in peer-review outlets is an adequate expectation for the PhD degree. Research articles and presentations at conferences and other forums, significantly enhance job prospects.

Table 1 illustrates the major PhD requirements during pre- and post-candidacy for a student entering in Fall and Spring with a timeline of 10 semesters. Students however can finish in less than 5 years, if requirements are fulfilled early. Ideally, going from GTA to GRA is expected during post-candidacy if research funding is available. **In any case, no GTA support is provided beyond the 10<sup>th</sup> semester, therefore students are encouraged to follow the registration timeline outlined in Table 1.** This includes completing the pre-candidacy requirements of courses, cumulative exams, literature seminar and oral candidacy exam, in a timely manner. The tuition waiver for GTAs or GRAs during post-candidacy only allows registration of dissertation credits from HUMS 701 or CHEM 697 (or else extra charges will be billed to the student). Therefore, any non-dissertation course must be taken during pre-candidacy when the permitted load is between 9 to 15 credits per semester. To be eligible for GTA, PhD students must maintain full-time status by registering at least 9 credits of graduate courses, adding CHEM 697 as needed to maintain full-time status. An exception to this rule is given to GRAs in post-candidacy, who can choose between registering 9 credits of HUMS 701 or 1 credit of CHEM 697 (special GRA contract, see above).

**Table 1.** Example of 10-semester timeline for PhD in Chemistry

| PRE-CANDIDACY 9 to15 CREDITS/SEMESTER ENTERING IN FALL   |  |  |  |  |  |
|--|--|--|--|--|--|
| Semester 1   |  | Semester 2   |  | Semester 3   |  |
| Core: CHEM 504, 510, 520 (9)<br>CHEM 690 (1)<br>CHEM 693 (1)<br>CHEM 697 (4)<br><br>Advisor selection by Oct 31 <sup>a</sup><br><br>15 credits |  | Elective courses (9)<br>CHEM 690 (1)<br>CHEM 697 (4)<br>CHEM 698 (1)<br>CUMULATIVE EXAMS<br>Committee selection by Feb 1 <sup>b</sup><br><br>15 credits          |  | CHEM 692 (1)<br>CHEM 697 (11)<br>CHEM 699 (3)<br>LITERATURE SEMINAR<br><br><br>15 credits                              |  |
|  |  |  |  | CHEM 690 (1)<br>CHEM 697 (9)<br><br>CANDIDACY EXAM <sup>c</sup><br>Candidacy Application<br><br>10 credits             |  |
| PRE-CANDIDACY 9 to15 CREDITS/SEMESTER ENTERING IN SPRING   |  |  |  |  |  |
| Semester 1   |  | Semester 2   |  | Semester 3   |  |
| Elective courses (9)<br>CHEM 690 (1)<br>CHEM 697 (4)<br>CHEM 698 (1)<br><br>Advisor selection by March 31 <sup>a</sup><br><br>15 credits       |  | Core: CHEM 504, 510, 520 (9)<br>CHEM 690 (1)<br>CHEM 693 (1)<br>CHEM 697 (4)<br>CUMULATIVE EXAMS<br>Committee selection by Sept 1 <sup>b</sup><br><br>15 credits |  | CHEM 692 (1)<br>CHEM 697 (14)<br><br>LITERATURE SEMINAR<br><br><br>15 credits  |  |
|  |  |  |  | CHEM 690 (1)<br>CHEM 697 (6)<br>CHEM 699 (3)<br>CANDIDACY EXAM <sup>c</sup><br>Candidacy Application<br><br>10 credits |  |
| POST-CANDIDACY 9 CREDITS/SEMESTER  |  |  |  |  |  |
| Semester 5   |  | Semester 6   | Semester 7                             | Semester 8   | Semester 9   |
| HUMS 701 <sup>d</sup><br><br>9 credits   |  | HUMS 701 <sup>d</sup><br><br>9 credits   | HUMS 701 <sup>d</sup><br><br>9 credits | HUMS 701 <sup>d</sup><br><br>9 credits   | HUMS 701 <sup>d</sup><br><br>9 credits                                       |
|  |  |  |  |  | HUMS 701 <sup>d</sup><br>THESIS DEFENSE<br>RESEARCH SEMINAR<br><br>9 credits |

<sup>a</sup>Obtain Chair's approval and <sup>b</sup>notify Graduate Director and Administrative Assistant. <sup>c</sup>Dismissal or transfer to MS will ensue if not completed by the end of the 4<sup>th</sup> semester. <sup>d</sup>It requires approved candidacy status and can be replaced by 1 credit CHEM 697 but only for GRAs.

## B. Course Requirements

Students must take a minimum of 18 credits of graduate didactic courses, including 9 credits in three core areas and 9 credits of approved electives (Tables 2 and 3). Ideally, this course load should be completed during the first year or at least by the end of the third semester. **Students are urged to confirm their progress using DegreeWorks, which is VCU online system that automatically tracks coursework.** Courses like CHEM 693 (Chemistry Perspectives and Ethics) and CHEM 698 (Investigation in Chemical Literature) must be taken during the first year and before presenting the Literature Seminar (CHEM 692).

**Table 2.** Summary of Requirements for PhD in CHEM (60 total credits minimum)

| Course   |                                    | Credits     | Semester Offered (when to complete it)                                 |
|--|------------------------------------|-------------|--|
| CHEM 504 Advanced Organic  | Area<br>core<br>courses            | 3           | Fall (1 <sup>st</sup> year)  |
| CHEM 510 Atomic and Molecular Structure                            |                                    | 3           |  |
| CHEM 520 Advanced Inorganic  |                                    | 3           |  |
| CHEM 693 Chemistry Perspectives and Ethics                         |                                    | 1           |  |
| Electives from Table 3   |                                    | 9           | Some in Fall, some in Spring (1 <sup>st</sup> year)                    |
| CHEM 690 Research Seminar  |                                    | 1 (3 times) | Fall and Spring (only in pre-candidacy)                                |
| CHEM 698 Investigation in Current Chemistry Literature             |                                    | 1           | Fall and Spring (prior to literature seminar)                          |
| CHEM 692 Literature Seminar Presentation to committee <sup>a</sup> |                                    | 1 (1 time)  | Fall and Spring (only in pre-candidacy)                                |
| CHEM 699 Scientific Writing in Chemistry                           |                                    | 3           | Fall (1 <sup>st</sup> or 2 <sup>nd</sup> year prior to candidacy exam) |
| Dissertation   | CHEM 697 Directed Research         | 32          | Fall and Spring (pre- and post-candidacy)                              |
| Courses  | HUMS 701 Post-candidacy Doct. Res. |             | Fall and Spring (only in post-candidacy)                               |
| Other Requirements   |                                    |             |  |
| Cumulative Exams (2 to 3)  |                                    |             | Fall and Spring (2 <sup>nd</sup> semester)                             |
| Oral Candidacy Exam  |                                    |             | Fall, Spring or Summer (4 <sup>th</sup> semester)                      |
| Application to Candidacy   |                                    |             | 4 <sup>th</sup> semester (immediately passing candidacy exam)          |
| Research Seminar to the department                                 |                                    |             | Graduation semester  |
| Thesis manuscript (3-5 chapters) and final defense                 |                                    |             | Graduation semester  |
| Electronic Thesis upload and Application Graduation                |                                    |             | Graduation semester upon final defense                                 |

<sup>a</sup>Students must register CHEM 692 instead of CHEM 690 during the semester presenting the Literature Seminar.

Both CHEM 697 and HUMS 701 are dissertation courses, but the latter was created to provide full-time status at a reduced tuition rate for PhD candidates regardless of their VA-residence status (pre-candidacy tuition costs double for VA non-residents). Therefore, HUMS 701 is a 9-credit course that both GTAs and GRAs are allowed to register but only after being approved PhD candidates by the dean's office and the graduate school. For this reason, it is imperative that upon passing the oral candidacy exam, students must immediately apply for PhD candidacy. Students who wish to lower the cost of their university fees are allowed to register 1 credit of CHEM 697 instead of HUMS 701. However, this option does not allow access

to the VCU health insurance program and is only available for GRAs who have become PhD candidates (see section on tuition and contracts above). The grade for either course is S (satisfactory) or U (unsatisfactory) and is provided by advisor. Sections of CHEM 697 with variable number of credits are offered every semester to facilitate reaching the number of credits needed. Candidates on supported on GTA or Altria must register HUMS 701 without exception.

**Table 3.** List of Core (C) and Elective (E) Courses Offered\*

|                      | AREA OR TOPIC                 | COURSE              | NAME  | CREDITS | SEMESTER      |
|----------------------|-------------------------------|---------------------|---|---------|---------------|
| DIDACTIC             | ANALYTICAL                    | CHEM 630 (E)        | Electroanalytical Chemistry                       | 1.5     | Spring        |
|                      |                               | CHEM 631 (E)        | Separation Science                                | 1.5     | Fall          |
|                      |                               | CHEM 633 (E)        | Mass Spectrometry                                 | 1.5     | Fall          |
|                      |                               | CHEM 635 (E)        | Spectrochemical Analysis                          | 1.5     | Fall          |
|                      |                               | CHEM 636 (E)        | Biosensors  | 1.5     | Spring        |
|                      |                               | CHEM 637 (E)        | Electrochemistry Applications                     | 1.5     | Spring        |
|                      | INORGANIC                     | <b>CHEM 520 (C)</b> | Advanced Inorganic                                | 3       | Fall          |
|                      |                               | CHEM 622 (E)        | Solid State & Materials                           | 1.5     | Spring        |
|                      | ORGANIC                       | <b>CHEM 504 (C)</b> | Advanced Organic I                                | 3       | Fall          |
|                      |                               | CHEM 604 (E)        | Advanced Organic II                               | 3       | Spring        |
|                      |                               | CHEM 506 (E)        | Introduction to Spectroscopic Methods             | 1.5     | Spring        |
|                      |                               | CHEM 606 (E)        | Advanced Spectroscopic Methods                    | 1.5     | Spring        |
|                      |                               | CHEB 601 (E)        | Chemical Biology I                                | 3       | Fall          |
|                      |                               | CHEB 602 (E)        | Chemical Biology II                               | 3       | Spring        |
|                      | PHYSICAL                      | <b>CHEM 510 (C)</b> | Atomic and Molecular Structure                    | 3       | Fall          |
|                      |                               | CHEM 511 (E)        | Chemical Thermodynamics and Kinetics              | 3       | Spring        |
|                      |                               | CHEM 512 (E)        | Applied Molecular Modeling                        | 3       | Spring        |
|                      |                               | CHEM 691 (E)        | Nanomaterials Energy & Environ Applications       | 3       | Spring        |
|                      | EDUCATION RESEARCH            | CHEM 591 (E)        | Introduction to Chemical Education Research       | 1.5     | Spring        |
|                      | LITERATURE ANALYSIS & WRITING | CHEM 698            | Investigations in Current Chemistry Literature    | 1       | Spring        |
|                      |                               | CHEM 699            | Scientific Writing in Chemistry                   | 3       | Fall          |
|                      | NON-DIDACTIC                  | CHEM 690            | Research Seminar                                  | 1       | Fall & Spring |
|                      |                               | CHEM 692            | Seminar Presentation                              | 1       | Fall & Spring |
|                      |                               | CHEM 693            | Chemistry Perspectives and Ethics                 | 1       | Fall          |
|                      |                               | CHEM 696            | Professional Skill Development (MS students only) | 3       | Fall          |
| DISSERTATION COURSES |                               | CHEM 697            | Directed Research                                 | 1 to 11 | Fall & Spring |
|                      |                               | HUMS 701            | Post-Candidacy Doctoral Research                  | 9       | Fall & Spring |

\*Students should corroborate actual course offering in the Schedule of Classes link on VCU website.

Students in the CHEM PHYS program, are required to complete CHEM 510 or PHYS 580 plus CHEM 511, CHEM 612, PHYS 576, and PHYS 641 in addition to three courses from the following list: CHEM 512, 550, 591, 610, 611, 615, 616, 620, 634, 635, 691; PHYS 550, 571, 573, 591, 661, 691; MATH 517, 518; NANO 650, 651. A minimum of four graduate courses must be in chemistry. These students may also substitute 15 credits of PHYS 697 for 15 credits of CHEM 697.

#### C. Course Transfers, Waivers and Optional Undergraduate Courses

Students can request transfers in the form of **Waivers** (up to 6 credits maximum) for courses taken at previous institutions or VCU by emailing the Graduate Director attaching the syllabus of the course taken previously and the course at VCU to be waived. Once content is verified to be equivalent, the Graduate Director files a waiver request to the College, which typically takes 3 weeks for approval. **This process waives the content of the course but not the credits, therefore students must replace the credits of the course waived with dissertation credits.** The course to be waived should be graded B or higher and appear on the official transcript of the previous institution.

For students interested in refreshing basic knowledge in a core area, optional registration of undergraduate courses concurrent with the graduate courses is possible and without impact on graduate GPA. **However, students having no coursework experience in undergraduate Instrumental Analysis are required to take CHEM 409.**

#### D. Cumulative Exams

These are take-home exams aimed at expanding knowledge and enhancing critical analysis of selected topics of chemistry. The tests are written jointly by the faculty in each division (analytical, organic, inorganic, and physical) and offered simultaneously in the 4 areas, three times a semester on the second Saturday of the month. Evaluation is also performed jointly using a pass/fail criterion determined by each division and the grades are communicated to the students before the following exam. On the designated Saturday morning, students receive the exam by email at 9:00 am and return the answers no later than 3 hours later at 12:00 pm. Cumulative exams must be taken during the 2<sup>nd</sup> semester of PhD and to complete this requirement, students need to pass two exams, one on the area of concentration, and another outside the area. **Students not passing one of the two exams are required to take a third one, but should this be unsuccessful, transfer to MS will ensue.**

Topics are announced at 2:00 pm on Friday a week prior to the exam and students must declare the exam area they will take by the following Tuesday using a google form. Use this link: <https://viriniacommonwealth.instructure.com/enroll/83TRAB> to enroll in CANVAS and see the exam schedule. Login in CANVAS and click on the Chem. Grad. Program course.

#### E. Seminar Attendance (CHEM 690) and Literature Seminar Presentation to Committee (CHEM 692)

During the four semesters of pre-candidacy, PhD-students are required to register one of two seminar courses: CHEM 690 when merely attending the seminar (3 semesters) and CHEM 692 when presenting the Literature Seminar (1 semester). Regardless of registration to CHEM 690/692, graduate students are expected to attend seminar, which runs twice a week on Tuesdays and Thursdays from 4:00 to 5:00 pm in Oliver Hall 1024 or via Zoom. Tuesdays are reserved for student research seminars while invited speakers are scheduled on Thursdays. **Once approved to PhD candidacy, students must not register CHEM 690 or 692, to prevent a tuition charge billed to the student. However, all PhD students must present a research seminar to the department in their semester of graduation despite not registering CHEM 692 or obtaining an official grade. If graduation is expected in the summer semester, the departmental research seminar should be scheduled on the Spring semester prior to graduation. In any case, students are responsible for reserving a date from the CANVAS schedule and emailing title and abstract to the Graduate Administrative Assistant. Students are expected to attend all seminars by outside speakers or as directed by the seminar coordinator.** Use this link: <https://viriniacommonwealth.instructure.com/enroll/83TRAB> to enroll in CANVAS and see the seminar schedule. Login in CANVAS and click on the Chem. Grad. Program course.

Attendance to the seminar is expected throughout the PhD but is only tracked during pre-candidacy with the grade for CHEM 690 (S or U). All PhD students must present a Literature Seminar during the second year (3<sup>rd</sup> or 4<sup>th</sup> semester) in a topic from the latest chemistry literature to their thesis committee. In the semester presenting the seminar, students are also required to register CHEM 692 instead of CHEM 690. This seminar is graded using the letter scale A to F. The objective of the seminar presentation is to broaden expertise, build up communication skills and sharpen critical analysis. **Once a topic is approved using the Literature Seminar Approval Form (see appendix below), students must email the signed form (pdf) to the Graduate Administrative Assistant, the professor for CHEM 692 and their thesis committee.** Students must also email the seminar abstract to committee two weeks before the seminar date and ensure to practice at least once in front of advisor and other students. The title and date of the seminar should be notified to the Graduate Administrative Assistant to secure room reservation and guarantee that the committee will have the rubric to grade the seminar. For guidelines on abstract preparation and seminar policy, students should consult the syllabus for CHEM 692/690 or ask the professor in charge of those courses.

After the Q&A session, each committee member evaluates the performance using the rubric in Table 4. In this score system, 100 to 85 is equivalent to A, 84 to 65 is B, and anything below 64 is C. Following deliberation led by the committee chair, individual faculty scores are combined to produce a single graded rubric that goes on file with all signatures. Before adjourning the meeting, the committee chair communicates the unified grade and recommendations to student. The committee chair should return the signed form to the Graduate Administrative Assistant so that an official grade can be submitted to the registrar by the professor in charge of CHEM 692. Students getting a C are allowed to repeat the seminar at committee's discretion and after requesting the professor in charge of CHEM 692 to file an incomplete grade "I". This requires a retroactive change of grade the following semester when the grade of the redo becomes available. If the committee and student agree on a C without repeat, the student must get an A in another course to prevent the GPA going below B.

**Topic selection for the literature seminar must be conducted following these guidelines:**

- No direct overlap with student's research.
- It cannot include published work by student's advisor, collaborators or competitors.
- The student should be unfamiliar enough with the topic so that it constitutes an achievable challenge. Research articles must be from the last three years.

#### F. Oral Candidacy Exam (Proposal Defense)

##### ***Schedule and Candidacy Application.***

The Oral Candidacy Examination or Proposal Defense must be completed no later than the end of the 4<sup>th</sup> semester, regarded as the last day of Final Exams in the Monroe Park Campus for that semester on the VCU calendar. **Failure to meet this deadline will result in automatic dismissal or transfer to MS depending on the case.**

Once a defense date is agreed upon with the committee, the student must communicate this information along with the Title of the Proposal to the Graduate Administrative Assistant. This will ensure that a Defense Package with records and the grading rubric will be emailed to the committee for signing after the defense. Students are responsible for room reservation and informing/reminding the committee about the defense. Upon passing the candidacy exam, students must apply immediately for candidacy using a DocuSign online form available on the graduate school webpage <https://graduate.vcu.edu/forms/> or <https://graduate.vcu.edu/current-students/degree-candidacy/>. It is crucial that students

follow the instructions described in the form carefully, including all members of the committee, entering the correct email address ([CHSGRADDEAN@VCU.EDU](mailto:CHSGRADDEAN@VCU.EDU)) and name of the associate dean, all of which are listed on the graduate school webpage for degree candidacy forms above.

**Table 4.** Seminar Evaluation

|   |       | Does not<br>Meet            | Meet<br>s | Exceed<br>s |
|---|-------|-----------------------------|-----------|-------------|
|   | Score | 0 to 5                      | 6 to 8    | 9 to 10     |
| <b>Organization</b>   |       |                             |           |             |
| 1. Ability to clearly explain a topic in the appropriate depth  |       |                             |           |             |
| 2. Ability to use slides and visual aids effectively  |       |                             |           |             |
| 3. Ability to communicate scientific information to an audience in a clear and understandable fashion |       |                             |           |             |
| 4. Demonstrate breadth of knowledge in chemistry  |       |                             |           |             |
| <b>Delivery</b>   |       |                             |           |             |
| 5. Ability to hold the audience's attention   |       |                             |           |             |
| 6. Ability to stay within the required time (40-50 mins excluding questions)                          |       |                             |           |             |
| <b>Questions</b>  |       |                             |           |             |
| 7. Ability to grasp material presented  |       |                             |           |             |
| 8. Depth of understanding of the topic and relevant background material                               |       |                             |           |             |
| <b>Other</b>  |       |                             |           |             |
| 9. Ability to write an abstract that properly conveys the content of a seminar                        |       |                             |           |             |
| 10. Overall professionalism of the talk (e.g. punctuality, attire, etc)                               |       |                             |           |             |
| <b>TOTAL/100 PTS</b>  |       | Combined score by committee |           |             |

#### **Manuscript Sections.**

Students must write an original manuscript describing their current research results along with a section of proposed future work. This manuscript must be sent to each member of the thesis committee a week prior to the scheduled defense. Regardless of format, NIH or NSF proposal, it is highly recommended to include the following sections:

- A section of **preliminary results** describing relevant experimental outcomes obtained since student started the research.
- A section describing the **gap in knowledge (unknown), research problem or statement of critical need** to be addressed by the proposed project. This section should also include a background on known facts about the problem/gap-in-knowledge/critical need.
- A section proposing a **solution to the problem** encompassing the pursuit new knowledge (*i.e.* long-and short-term goals, along with ~3 specific aims to attain those goals).
- A section explaining the **significance** and **payback** for addressing the problem.
- A section describing the **specific aims** to be pursued as logical steps of the long and short-term goals.
- A **proposed approach or research plan** to carry out each specific aim, discussing expected outcomes and data analysis.
- A section of bibliographic **references**.

#### **Manuscript Format.**

- Between 13 to 15 pages, numbered and in single space, or 27-30 pages in double space without including references.
- Font size 11 (Arial, Helvetica or palatino linotype) with 1-inch margin all sides.
- Bibliographic references should be in the style of *The Journal of The American Chemical Society* (JACS) including **article titles and inclusive pages**. A minimum of 25 references must be cited with no more than 30% citations from the student's research group.
- The research plan section must be *at least* 5-4 pages in single space or 10-9 pages in double space.
- Figures, schemes and equations must be numbered and embedded in the section of text where they are described.
- The writing style must be clear and simple suited for general readership in chemistry.

Manuscripts that do not comply with these guidelines may be returned by the committee without revision. Students are encouraged to take the writing course CHEM 699 (offered only in Fall) before completing the candidacy exam.



## Evaluation.

**Table 5.** Grading of Student Learning Outcomes

|  |                             | Score            | Does not Meet<br>1 to 5 | Meets<br>6 to 8 | Exceeds<br>9 to 10 |
|--|-----------------------------|------------------|-------------------------|-----------------|--------------------|
| <b>SLO</b>   |                             |                  |                         |                 |                    |
| 1. Demonstrate breadth and depth in chemistry  |                             |                  |                         |                 |                    |
| 2. Demonstrate effective oral and writing communication skills in chemistry                                    | Oral presentation           |                  |                         |                 |                    |
|  | Candidacy/Thesis manuscript |                  |                         |                 |                    |
| 3. Demonstrate ability to analyze data critically  |                             |                  |                         |                 |                    |
| 4. Demonstrate ability to conduct independent research correctly while abiding to ethical and safety standards |                             | Project progress |                         |                 |                    |
|  |                             | <b>TOTAL</b>     |                         |                 |                    |

On the day of the defense, the examination begins with the student giving a 20-minute presentation summarizing the major points of the manuscript followed by rounds of Q&A from the committee. Each committee member evaluates performance using a rubric that assigns scores to various student learning outcomes (SLO) as shown in Table 5.

Despite passing the candidacy exam, a score  $\leq 5$  in a SLO may require improvement and timely follow up at committee's discretion (*i.e.* progress update, written report, or other assignment). Additionally, for assessing **project progress** (SLO 4) the committee may rely on advisor's perspective as well as the research products (*i.e.* peer-review publications, posters, presentations, etc.) generated by the student (see full Defense Evaluation Form in appendix). During deliberation led by the committee chair, scores from individual members are combined to come up with a unified quantitative evaluation that will go on record with signatures. The committee is expected to take a holistic approach so that depending on the case, a second opportunity may be granted when the overall performance is deemed unsatisfactory (*i.e.* total score  $\leq 25$ ). **The second attempt must occur within 4 weeks of the date of the original exam date and should the result persist, the student will be transferred to MS with TA-support ending in the 6<sup>th</sup> semester. Rubric(s) from every attempt, scored and signed, must be kept on record.**

### G. Final Dissertation Defense

Every student is expected to complete an original research project under the guidance of an advisor and its results must be reported in a dissertation manuscript describing the research significance in relation to existing knowledge. Guidelines for preparation of the thesis can be found in the Graduate Dissertation Manual:

<https://graduate.vcu.edu/media/graduate-school/docs/pdf/ThesisandDissertationmanual8.27.2018.pdf>

When advisor and student determine that sufficient research has been completed to write a **dissertation of 3 to 5 chapters (~ 3 to 5 research articles)**, the student should schedule the defense with the committee. The student should also notify the Graduate Administrative Assistant of the thesis title so that a venue can be reserved for the intended date. Copies of the dissertation should be made available to the committee one week prior to the defense.

**Given that the PhD is awarded for addressing an original problem in research, evidence of publication (at least one manuscript draft submitted) in a peer-review journal should be presented to the committee at the time of the defense.**

Nevertheless, to maximize job prospects and expand career opportunities, students are urged to produce as many publications as possible.

The evaluation of the thesis defense follows the format of the Oral Candidacy Exam using the same Defense Evaluation form to assess the same SLOs. Upon successful defense, the student must correct the manuscript following directions by the committee. The final version must be submitted online following the instructions described in the Electronic Thesis and Dissertation (ETD) webpage: <http://www.graduate.vcu.edu/student/thesis.html> before the deadline listed on the VCU calendar.

### H. Research Seminar Presentation to the Department

In the semester of graduation, every student must present a seminar about the research performed at VCU. The objective of this presentation is to describe the investigation results in front of the departmental audience. To facilitate public announcement, students must email the seminar abstract to the Graduate Administrative Assistant two weeks in advance. Therefore, presenters are urged to schedule the seminar during regular schedule (Tuesdays or Thursdays 4:00 to 5:00 pm) or get permission from the professor in charge of seminar program when presenting at a different time. In the latter case, students must secure room reservation with the Graduate Administrative Assistant. The performance is still assessed with the

evaluation form used for Literature Seminar (Section 3E) but the grade will not appear in transcript, therefore **PhD students must not register CHEM 692 for this seminar.**

#### I. Application to Graduation

During the first week of the semester of graduation, students must declare intent to graduate on e-services. Concurrently, they also need to schedule their thesis defense and research seminar (section 3H) while informing the Graduate Administrative Assistant of dates and thesis title. Because VCU requires registration of at least 1 credit during the final semester, graduating in summer will generate additional tuition and fee charges that will apply to the student or advisor's grant. Upon passing the final defense, the committee chair submits the thesis evaluation form (Appendix, same form used for oral candidacy exam) to the Graduate Administrative Assistant. Once the final and approved version of the thesis is uploaded on the corresponding VCU website, students must apply for graduation using the DocuSign form available on the graduate school webpage <https://graduate.vcu.edu/forms/>. This will start the automated signing by the committee members, graduate director, and corresponding associate dean. In order to participate in the hooding ceremony at commencement, students must have completed all PhD requirements, including electronic thesis submission. The Graduate School contacts students directly to let them know they have been approved for attending the hooding ceremony.

#### 4. **Requirements for PhD in CHEM with Chemical Education Focus**

Students may select a chemical education focus for their PhD. These students will include chemical education research and work on an "atoms and molecules" project encompassing a traditional area of chemistry (physical, analytical, organic, inorganic, or chemical physics). Consequently, students are encouraged to publish in both areas. Likewise, the Department offers a course in Chemical Education Research, CHEM 591, as well as cumulative exams in research education topics. All other requirements are identical to those for the PhD in CHEM.

#### 5. **Requirements for MS in CHEM with Thesis and Non-Thesis Options**

Table 6 summarizes the MS requirements also outlined in the graduate bulletin at:

<http://bulletin.vcu.edu/graduate/college-humanities-sciences/chemistry/chemistry-ms/#degree requirement text>

**Table 6.** Summary of Requirements for MS in CHEM (30 total credits minimum)

| Course Requirement                                      |                   | Credits |            | Semester offered (when to take it)     |
|---|-------------------|---------|------------|--|
|   |                   | Thesis  | Non-Thesis |  |
| CHEM 504 Advanced Organic                               | Area core courses | 3       | 3          | Fall (1 <sup>st</sup> year)            |
| CHEM 510 Atomic and Molecular Structure                 |                   | 3       | 3          |  |
| CHEM 520 Advanced Inorganic                             |                   | 3       | 3          |  |
| CHEM 693 Chemistry Perspectives and Ethics              |                   | 1       | 1          |  |
| Electives from Table 3                                  |                   | 6       | 9          | Fall and Spring (1 <sup>st</sup> year) |
| CHEM 696 Professional Skill Development                 |                   | 3       | 3          | Fall (1 <sup>st</sup> year)            |
| CHEM 698 Investigation in Current Chemistry Literature  |                   | 1       | 1          | Fall and Spring (1 <sup>st</sup> year) |
| CHEM 692 Seminar Presentation to committee <sup>a</sup> |                   | 1       | 1          | Graduation semester                    |
| CHEM 697 Directed Research                              |                   | 9       | 6          | Throughout the degree                  |
| <b>Other Requirements</b>                               |                   |         |            |  |
| Application to Candidacy                                |                   | yes     | yes        | After defense/report to committee      |
| Thesis (1-2 chapters) with defense to committee         |                   | yes     | no         | Graduation semester                    |
| Project Report (5 pages) with Q&A to committee          |                   | no      | yes        | Graduation semester                    |
| Application for Graduation                              |                   | yes     | yes        | After passing defense                  |

<sup>a</sup>This presentation comprises the research described in the thesis or the written project report for the non-thesis option

#### A. Student Learning Outcomes and Overview of Requirements

The learning outcomes for MS in chemistry are the same as in PhD (Section 3A), with the difference being the dept and amount of research performed (see above). Students must complete core and elective courses (Table 6) adding up to a total of 30 credits. There is no financial assistance, therefore students are allowed to follow their own pace, however, the maximum time allowed to complete a MS degree is 5 years. MS students must also take the proficiency exams in the four chemistry areas during orientation week and the results should guide the selections of elective courses to alleviate weaknesses disclosed in the exams. **PhD students can transfer to MS** after emailing a formal request to graduate director and selecting the MS-track most compatible with their progress attained during PhD. MS students wanting to transfer to PhD must apply following the process described on the departmental webpage, but the admission committee will only consider applications from students who have completed all requirements for the MS program even without graduating. All core and elective courses from the MS at VCU can be transferred to the PhD if the transfer is done without time gaps.

The MS with thesis requires working on an original research project under the supervision of an advisor in the department. A thesis manuscript about the project is to be presented to the thesis committee in a seminar (CHEM 692) scheduled during



the graduation semester. Students must also complete a thesis defense to the committee and upload the final version of the thesis manuscript on the Electronic Thesis and Dissertation (ETD) webpage before deadline listed on the VCU calendar.

The non-thesis option also requires an advisor in the department, but coadvisors in other departments, industrial or government labs are also allowed. A research project of experimental or theoretical nature is to be completed by the student and presented to the committee in a written report that is also presented as a seminar (CHEM 692) during the semester of graduation. The project can consist of learning a technique, investigating a chemical problem, or performing data analysis from a chemical inquiry, but it does not need to be an original research project. This work can be done while the student is fully employed or in internship at the site of employment or in a PI's lab at VCU.

Tables 7 and 8 illustrate timelines for MS both in the thesis and non-thesis tracks.

**Table 7.** Example of 4-semester timeline for **MS CHEM Thesis Option** (30 total credits minimum)

| Semester 1   | Semester 2   | Semester 3   | Semester 4   |
|--|--|--------------|--|
| Core: CHEM 504, 510, 520 (9)<br>CHEM 693 (1)   | Elective courses (6)<br>CHEM 698 (1)<br>CHEM 696 (3) | CHEM 697 (5) | CHEM 692 (1)<br>CHEM 697 (4)<br><br>RESEARCH SEMINAR<br>DEFENSE TO COMMITTEE |
| Advisor selection by Oct 31 (Fall start) or March 31 (Spring start) <sup>a</sup><br>Committee selection in 2 <sup>nd</sup> semester by Feb 1 or Sep 1 <sup>b</sup> |  |              |  |
| 10 credits   | 10 credits   | 5 credits    | 5 credits  |

**Table 8.** Example of 4-semester timeline for **MS CHEM Non-Thesis Option** (30 total credits minimum)

| Semester 1   | Semester 2   | Semester 3   | Semester 4   |
|--|--|--------------|--|
| Core: CHEM 504, 510, 520 (9)<br>CHEM 693 (1)   | Elective courses (9)<br>CHEM 698 (1)<br>CHEM 696 (3) | CHEM 697 (3) | CHEM 692 (1)<br>CHEM 697 (3)<br><br>RESEARCH SEMINAR<br>Q&A TO COMMITTEE |
| Advisor selection by Oct 31 (Fall start) or May 31 (Spring start) <sup>a</sup><br>Committee selection in 2 <sup>nd</sup> semester by Feb 1 or Sep 1 <sup>b</sup> |  |              |  |
| 10 credits   | 13 credits   | 3 credits    | 4 credits  |

<sup>a</sup>Students commencing in Fall or Spring must get approved by Department Chair's approval and <sup>b</sup>notify Graduate Director and Administrative Assistant.

#### B. Research Seminar Presentation to Committee (CHEM 692)

In the semester of graduation, MS students in the thesis and non-thesis tracks, must register CHEM 692 to be graded with a seminar presentation of their lab work to their committee. These seminars are graded with the same rubric used for PhD literature seminars (see above) and the grade from the committee must be communicated to the Graduate Administrative Assistant and the Professor in charge of CHEM 692 by the committee chair. This presentation is graded using the letter scale A to F and a seminar abstract must be emailed to the committee a week before the seminar date. Students should practice at least once in front of advisor and other students. The title and date of the seminar should be emailed to the Graduate Administrative Assistant to reserve a room and have the grading rubric sent to the committee. For guidelines on abstract preparation and seminar policy, students should consult the syllabus for CHEM 692 or ask the professor in charge of the course. After the Q&A session, each committee member evaluates the performance using the rubric in Table 4. In this score system, 100 to 85 is equivalent to A, 84 to 65 is B, and anything below 64 is C. Following deliberation led by the committee chair, individual faculty scores are combined to produce a single rubric grade that goes on file with all signatures. Before adjourning the meeting, the committee chair communicates the unified grade and recommendations to student. The committee chair then returns the signed form to the Graduate Administrative Assistant so that an official grade can be submitted to the registrar by the professor in charge of CHEM 692. Students getting a C are allowed to repeat the seminar at committee's discretion and after requesting the professor in charge of CHEM 692 to file an incomplete grade "I". This requires a retroactive change of grade the following semester when the grade of the redo becomes available. If committee and student agree on a C without repeat, the student must have an A in another course to prevent the GPA going below B.

#### C. MS Candidacy Application

Both MS-thesis and non-thesis students are required to apply for degree candidacy with the college and the graduate school. This process can be done after completing core and elective courses or during the semester of graduation. Students should initiate the application via DocuSign on the graduate school website at <https://graduate.vcu.edu/forms/> including all committee members, graduate director, and corresponding associate dean. Instructions are provided on the website.

#### D. Final Defense and Application to Graduation for MS-Thesis Track

During the first week of classes in the graduation semester, students must declare intent to graduate in e-services and plan for a defense to the committee about their research. This defense should be done during the Q&A session after the research seminar and should be evaluated with the rubric in Table 5 aside from the seminar grade for CHEM 692 (see section 5B). Therefore, students must email thesis title and date to the Graduate Administrative Assistant so that the defense evaluation form is provided to the committee for signing. Once the committee chair returns the signed form to the Graduate Administrative Assistant and the final version of the thesis is approved, students must apply for graduation using a DocuSign link given in the graduate school website for graduation application: <https://graduate.vcu.edu/forms/>. Students must include the name and email addresses of all committee members, graduate director, and corresponding associate dean. This automated signing must be initiated only after uploading the final approved version of the thesis on the VCU webpage for thesis upload <http://www.graduate.vcu.edu/student/thesis.html> and before the deadline stated in the VCU calendar.

#### E. Final Written Report and Application to Graduation for MS-Non-Thesis Track

Students on the MS-Non-Thesis track are expected to write a final report of 7 to 10 pages (including figures and references but excluding the title page) at single space in font size 11 (Arial, Helvetica or palatino linotype) and 1-inch margin all sides. This manuscript is about experimental or theoretical work conducted by the student on learning a technique, investigating a chemical problem, or doing data analysis under the guidance of advisor. The report is expected to contain the following sections:

- Title of the project
- Introduction: explaining the goal and scope of the project detailing some background on the state of the art of the issue with perceived weaknesses and strengths and how they will be addressed.
- Materials and Methods: describing experimental or theoretical approaches to the project.
- Results and Discussion: describing data and analysis.
- Conclusions: summarizing results and corollary statements.
- References (no more than one page) in the style of *The Journal of The American Chemical Society* (JACS) including **article titles and inclusive pages**. No more than 30% of citations should be from the student's group.

Students must email the report to the committee one week prior to the seminar presentation. Likewise, the title, date and location should be communicated to the Graduate Administrative Assistant, so that a seminar rubric is provided to the committee on the day of the seminar. The seminar is followed by a Q&A with the committee about the presentation and final report. Once the seminar is graded and the committee shares the feedback with the student, the committee chair must email the grade and the filled-out form to the Graduate Administrative Assistant to communicate the grade to the professor in charge of CHEM 692. If the seminar grade is C, the student must have an A-grade on another course to be approved for graduation, otherwise the seminar would have to be repeated in the same or a following semester at committee's discretion. The latter option will require the student to request an incomplete grade "I" in CHEM 692, and then file a retroactive change of grade once the new grade is available.

After the final version of the manuscript is approved by the committee and a satisfactory grade is communicated to the CHEM 692- professor, the student must initiate a DocuSign chain including committee members, graduate director, and the corresponding associate dean. The form and instructions for initiating this process are found in the graduate school website for graduations and degree candidacy forms: <https://graduate.vcu.edu/forms/>.

#### **6. Course Registration**

To register online, go to [www.vcu.edu](http://www.vcu.edu) and click on "Register for Classes" on the top menu, then select "Register for Classes Using e-services". You will need the course registration number (CRN) which can be found by clicking on "Schedule of Classes" on the same webpage. After picking the current semester, selection of CHEM, CHEM BIO, or NANO, will display the courses offered in those subjects. When clicking in a particular course, you can determine its CRN, instructor, sits available, course capacity, time and location. The system does not allow registration of courses with conflicting schedules. However, should your TA assignment overlap with CHEM 690, you can still register the course but the professor in charge of CHEM 690/692 needs to be informed that your attendance to seminar will be limited because of GTA. In case of getting a no-allowed to register message because of lacking a pre-requisite, email the Graduate Director to authorize an override.

Typically, students devote the first semester to satisfy the core courses while registering electives in the second semester (Table 2) or vice versa if entering in Spring. In any case, the primary goal is to complete the 18-credit minimum of didactic courses by the end of the first year or at least by the 3<sup>rd</sup> semester. The same goal applies to MS students and their core/elective courses. Students must never register summer credits unless graduating on a summer period, in which case they must register 1 credit of CHEM 697. However, charges will apply to the student or advisor's grant.

#### **7. Incomplete Grades**

In some cases, professors submit an incomplete grade "I" to the registrar when a student does not complete assignments or exams in a course. In such circumstances, students must contact the professor and address the source of the "I" grade

**immediately because those grades are converted automatically to F by VCU at the end of the following semester** (see VCU calendar). Getting an F-grade in any course will trigger automatic dismissal from a graduate program.

#### **8. Research Advisor Selection and TA/RA Ratio per PI**

In a session during orientation week, departmental PIs present summaries of their research to the entering graduate class. Students are urged to meet individually with as many PIs as possible to discuss potential projects. Attendance of the Graduate Poster Session in October, when graduate students present their individual projects, is mandatory. **Students are urged to have at least three choices for advisor and are expected to obtain selection approval from the Department Chair no later than October 31 (entering in Fall) or March 31 (entering in Spring). A "U" grade in CHEM 697 will be assigned if this deadline is not met. Once advisor selection is approved, students must notify the Graduate Administrative Assistant for record keeping.**

Students and advisors who meet to ponder a decision of working together, are strongly encouraged to consider the following guidelines:

- Tenured faculty members (Associate and Full professors) with no extramural funding are allowed a maximum of two students on GTA (supported by VCU).
- Tenured PIs with extramural funding are expected to maintain at least 1 student on RA funding per every 2 GTAs.

This policy is justified by the finite number of GTA appointments available and the imperative need to transition students from GTA to GRA at candidacy (5<sup>th</sup> semester) when they complete the required coursework and can dedicate full-time to research. Furthermore, every released GTA position translates into a new student entering the program each year, thus enhancing funding impact and improving chances of research productivity. **While we do our best to ensure students are placed with their first-choice advisor, sometimes it is not possible for reasons related to extramural funding and the number of GTAs currently in that group. Therefore, it is vital that you discuss your interests with possible research advisors ahead of time and make sure you have alternatives (2<sup>nd</sup>, 3<sup>rd</sup> choice) in mind if this worse-case scenario comes true.**

#### **9. Thesis Committee Selection**

In consultation with advisor, students should select a thesis committee made of at least 4 members including advisor and an out-of-department member. Ideally this committee should also have one member from the student's concentration area and another from out-of-area. This guideline should be followed in so far as the number of "free" faculty allows it. In the end students and advisors must select committee members from the list of available faculty members compiled every semester by the Graduate Administrative Assistant. This list is updated every semester based on the limit of thesis committee memberships per PI. **Students must notify the Graduate Administrative Assistant by February 1 (entering in Fall) or September 1 (entering in Spring) of their committee so that the corresponding paperwork can be initiated with the College and the Graduate School.**

#### **10. Graduate Poster Session**

All graduate students past their first summer of research are required to present a poster on their research progress at the Graduate Poster Session scheduled every fall semester. Students must e-mail the poster file (pdf) to their thesis committee and let them know of presentation times so that members can stop by the poster. Students must follow Graduate Administrative Assistant instructions for printing posters and presentation scheduling. Students graduating in the fall should consult with their advisor to determine if they have to present poster.

#### **11. Support for Graduate Student Travel**

Students can apply for travel departmental support (\$400) once during their PhD or MS if they maintain full time status. To qualify for this financial aid, the applicant must be the first author of the presentation at the intended conference. Students must fill out the application travel application form (Appendix) and have it electronically signed by the Graduate Director and Chair of the Department. Subsequently, students must email the signed form to [chemtravel@vcu.edu](mailto:chemtravel@vcu.edu) for processing. All travel guidelines required by the University must be followed. <https://procurement.vcu.edu/i-want-to/travel/>. Graduate students are also encouraged to seek travel support from the graduate student association and their research advisor via their grant funding.

#### **12. Career Plans**

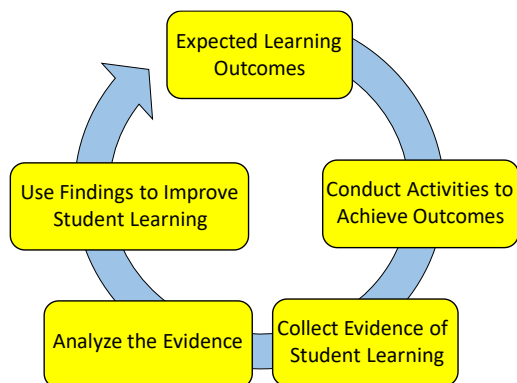
Beyond acquiring specialized knowledge in chemistry, benefits of doctoral education comprise a set of transferable skills that include **complex problem-solving, critical reasoning and thinking in-depth from different perspectives**. These skills, which are represented in the SLOs described in section 3.A, are advantageous in any professional environment but particularly in non-academic settings where a more diversified workforce is expected and doctorate holders can distinguish themselves from colleagues. In addition to the goal of cultivating these skills and producing publications as part of the graduate degree, students are encouraged to begin mapping out career paths as early as they can. There are internet sites like

<https://www.acs.org/content/acs/en/careers.html> (from the American Chemical Society, ACS), which has a “career navigator app” that provides resources and information pertaining different professions in chemical sciences. The site <https://cheekyscientist.com/> specializes in helping science PhD holders find their career niche. Likewise, VCU offers courses like GRAD 615 Careers in Biomedical Sciences and GRAD 610 Career Planning for Graduate Students, which also provide career advice and resources.

### 13. Assessment of Student Learning Outcomes

In order to maintain curriculum integrity and monitor its alignment with SLOs, the department performs an annual evaluation using the assessment management software TaskStream in compliance with the VCU-Provost office:

<https://provost.vcu.edu/academics/assessment/>



This initiative is aimed at attaining the following goals:

- Maintain an evidence-based repository of student’s learning on an annual basis.
- Provide students with the opportunities they need to achieve the expected learning by making judicious curriculum modifications based on the learning data collected.
- Maximize student’s success not only in the program but after graduation when transferable skills derived from SLOs become the bedrock of work performance.

The Curriculum Map for the CHEM-Graduate Program (Appendix) shows every requirement and graduate course tabulated in line with the SLOs listed in section 3.A. The assessment is conducted annually whereby data collected is

presented to the department and analyzed during the Faculty Retreat every August. Faculty and thesis committees directly collect most of the data but the Graduate Director, GEAC and the Graduate Administrative Assistant help in putting together tables and summaries that are presented for analysis and discussion. Grades from courses and quantitative evaluations obtained with rubrics for different requirements make the core of the data collected but research products like conference attendance, presentations and publications are also considered.

# APPENDIX

## *Important Forms and Rubrics*



# VCU

VIRGINIA COMMONWEALTH UNIVERSITY

**Make it real.**

## Approval Form for Literature or Research Seminar

Date: \_\_\_\_\_

Student name: \_\_\_\_\_

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

**Important:** Once the seminar date has been assigned, the student may not cancel or delay the seminar without permission from his/her committee. Abstracts are due to the CHEM 690/692 professor two weeks prior to the seminar date.

**Proposed Title:**

**Description of topic (for literature seminar):**

**List of pertinent references including titles (at least 3 recently published – for literature seminar):**

**Seminar Date and time:** \_\_\_\_\_

**Location:** \_\_\_\_\_

**Approved: Sign and Date**

Research Advisor \_\_\_\_\_

**Below area is for literature seminar only**

Committee member \_\_\_\_\_

Committee member \_\_\_\_\_

Committee member \_\_\_\_\_

Committee member \_\_\_\_\_

Committee member \_\_\_\_\_

## Literature or Research Seminar Rubric

Student's name \_\_\_\_\_ Semester student entered graduate school \_\_\_\_\_

Area of Concentration \_\_\_\_\_ Today's date \_\_\_\_\_

### To Research advisor:

Date(s) and time of practice for literature seminar with student (must be at least 1):

List names of students present at practice for literature seminar (must be at least 4):

### Comments:

**To Committee Chair:** please give each committee member a copy of this rubric at the beginning of the exam. The copy that goes on record will have the signatures and the **average score** per graded item.

### Seminar Evaluation

|   |        | Does not Meet | Meets  | Exceeds |
|---|--------|---------------|--------|---------|
|   | *Score | 0 to 5        | 6 to 8 | 9 to 10 |
| <b>Organization</b>   |        |               |        |         |
| 1. Ability to clearly explain a topic in the appropriate depth  |        |               |        |         |
| 2. Ability to use slides and visual aids effectively  |        |               |        |         |
| 3. Ability to communicate scientific information to an audience in a clear and understandable fashion |        |               |        |         |
| 4. Demonstrate breadth of knowledge in chemistry  |        |               |        |         |
| <b>Delivery</b>   |        |               |        |         |
| 5. Ability to hold the audience's attention   |        |               |        |         |
| 6. Ability to stay within the required time (40-50 mins excluding questions)                          |        |               |        |         |
| <b>Questions</b>  |        |               |        |         |
| 7. Ability to grasp material presented  |        |               |        |         |
| 8. Depth of understanding of the topic and relevant background material                               |        |               |        |         |
| <b>Other</b>  |        |               |        |         |
| 9. Ability to write an abstract that properly conveys the content of a seminar                        |        |               |        |         |
| 10. Overall professionalism of the talk (e.g. punctuality, attire, etc)                               |        |               |        |         |
| <b>*TOTAL/100 PTS</b>   |        |               |        |         |

\*A = 100-85; B = 84-65; C ≤ 64. Students graded C are allowed to repeat the seminar at committee's discretion.

Recommended grade: \_\_\_\_\_

### Comments/Justification:

**Below area is for literature seminar only**

Is a second seminar required: Yes/No; if yes, when? \_\_\_\_\_

### NAMES AND SIGNATURES OF COMMITTEE MEMBERS INCLUDING DATE

Chair: \_\_\_\_\_ Department of \_\_\_\_\_

Advisor: \_\_\_\_\_ Department of \_\_\_\_\_

Member: \_\_\_\_\_ Department of \_\_\_\_\_

Member: \_\_\_\_\_ Department of \_\_\_\_\_

Member: \_\_\_\_\_ Department of \_\_\_\_\_



COLLEGE OF HUMANITIES AND SCIENCES  
DEPARTMENT OF CHEMISTRY

### Defense Evaluation Form

**TYPE OF EXAM**

☐ PhD Committee Update

☐ PhD Oral Candidacy 1<sup>st</sup> Try

☐ PhD Thesis Defense

☐ PhD Oral Candidacy 2<sup>nd</sup> Try

☐ Master Thesis Defense

Student's name \_\_\_\_\_ Started in: ☐ FALL ☐ SPRING OF \_\_\_\_\_

Area of Concentration \_\_\_\_\_ Today's date \_\_\_\_\_

**To Committee Chair:** please give each committee member a copy of this rubric at the beginning of the exam. The copy that goes on record must have all signatures and the average score per Student Learning Outcome (SLO). Despite passing the exam, a second meeting may be required by the committee to drive improvement on a SLO. Second attempts in the Oral Candidacy Exam must be within 4 weeks of today's date and should an unsatisfactory result persist at that point, transfer to MS will ensue. In that case, TA support will only be available until the 6<sup>th</sup> semester.

**I. SLO EVALUATION**

|  |                                   | *Score | Does not Meet<br>1 to 5 | Meets<br>6 to 8 | Exceeds<br>9 to 10 |
|--|-----------------------------------|--------|-------------------------|-----------------|--------------------|
| <b>SLO</b>   |                                   |        |                         |                 |                    |
| 1. Demonstrate breadth and depth in chemistry  |                                   |        |                         |                 |                    |
| 2. Demonstrate effective oral and writing communication skills in chemistry                                    | Oral presentation                 |        |                         |                 |                    |
|  | Candidacy/Thesis manuscript       |        |                         |                 |                    |
| 3. Demonstrate ability to analyze data critically  |                                   |        |                         |                 |                    |
| 4. Demonstrate ability to conduct independent research correctly while abiding to ethical and safety standards | Project progress (see section II) |        |                         |                 |                    |
| <b>**TOTAL</b>   |                                   |        |                         |                 |                    |

\*Despite passing the exam, a score  $\leq 5$  in any SLO may require improvement and timely follow up at discretion of the committee.

\*\*A total score  $\leq 25$  is deemed unsatisfactory and would prompt transfer to MS.

**II. LIST OF PRODUCTS FROM THIS PROJECT BY STUDENT (SLO 4)**

In presentations outside VCU: Oral \_\_\_\_\_ Poster \_\_\_\_\_

Or as primary (1<sup>st</sup>) or secondary (2<sup>nd</sup>) co-author in peer-reviewed journals: Published \_\_\_\_ (\_\_\_\_) Submitted \_\_\_\_ (\_\_\_\_)

If this project in the hands of this student has no publication yet, what is the likelihood from 1 (low) to 10 (high) that this student gets primary co-authorship in a published article before the end of the 10<sup>th</sup> semester? \_\_\_\_\_

**III. THE RESULTS OF THE EXAM WERE**

**SATISFACTORY**

**(PASS)**

☐

**UNSATISFACTORY (NO PASS)**

☐

Is a second meeting necessary? NO / YES When? \_\_\_\_\_ Reason: UPDATE SLO # \_\_\_\_\_ 2<sup>nd</sup> TRY

**IV. COMMENTS/JUSTIFICATION** \_\_\_\_\_

**NAMES AND SIGNATURES OF COMMITTEE MEMBERS INCLUDING DATE**

Committee Chair: \_\_\_\_\_ Department of \_\_\_\_\_

Advisor: \_\_\_\_\_ Department of \_\_\_\_\_

Member: \_\_\_\_\_ Department of \_\_\_\_\_

Member: \_\_\_\_\_ Department of \_\_\_\_\_

Member: \_\_\_\_\_ Department of \_\_\_\_\_

Signature of Program Director \_\_\_\_\_ DATE \_\_\_\_\_

## CURRICULUM MAP GRADUATE PROGRAM CHEMISTRY

|                                   |            |         |           | Goal 1<br>Establish expertise and communication skills in chemistry | Goal 2<br>Demonstrate independent critical thinking in chemistry |   |  |   |
|-----------------------------------|------------|---------|-----------|---|--|---|--|---|
|                                   |            |         |           | Student Learning Outcomes   |  |   |  |   |
|                                   |            | CREDITS | CATEGORY  | COURSE/<br>REQUIREMENT  | 1.1 Demonstrate breadth and depth in chemistry                   | 1.2 Demonstrate effective oral and written communication skills | 2.1 Demonstrate ability to analyze data critically | 2.2 Demonstrate ability to conduct independent research correctly while abiding to ethical and safety standards |
| AREA                              | Analytical | 1.5     | E         | CHEM 630  |  |   |  |   |
|                                   |            |         |           | CHEM 631  |  |   |  |   |
|                                   |            |         |           | CHEM 633  |  |   |  |   |
|                                   |            |         |           | CHEM 635  |  |   |  |   |
|                                   |            |         |           | CHEM 636  |  |   |  |   |
|                                   |            |         |           | CHEM 637  |  |   |  |   |
|                                   | Physical   | 3.0     | C         | CHEM 510  |  |   |  |   |
|                                   |            |         |           | CHEM 511  |  |   |  |   |
|                                   |            |         | E         | CHEM 512  |  |   |  |   |
|                                   |            |         |           | CHEM 691  |  |   |  |   |
|                                   | Organic    | 3.0     | C         | CHEM 504  |  |   |  |   |
|                                   |            |         |           | CHEM 604  |  |   |  |   |
|                                   |            |         |           | CHEB 601  |  |   |  |   |
|                                   |            | 1.5     | E         | CHEB 602  |  |   |  |   |
|                                   |            |         |           | CHEM 506  |  |   |  |   |
|                                   |            |         |           | CHEM 606  |  |   |  |   |
|                                   | Inorganic  | 3.0     | C         | CHEM 520  |  |   |  |   |
|                                   |            | 1.5     | E         | CHEM 622  |  |   |  |   |
| Seminar & Writing                 | 1.0        |         | CHEM 690  |   |  |   |  |   |
|                                   |            |         | CHEM 692  |   |  |   |  |   |
|                                   |            |         | CHEM 698  |   |  |   |  |   |
|                                   | 3.0        |         | CHEM 699  |   |  |   |  |   |
| Ethics & Professional development | 1.0        |         | CHEM 693  |   |  |   |  |   |
|                                   | 3.0        |         | CHEM 696  |   |  |   |  |   |
| *Dissertation                     | 1.0-10     |         | CHEM 697  |   |  |   |  |   |
|                                   | 9.0        |         | †HUMS 701 |   |  |   |  |   |
| ‡CUMULATIVE EXAMS                 |            |         |           |   |  |   |  |   |
| ‡ORAL CANDIDACY EXAM              |            |         |           |   |  |   |  |   |
| THESIS DEFENSE                    |            |         |           |   |  |   |  |   |

C = Core, E = Elective; †Only for PhD candidates; \*Only for PhD students

\*Minimum dissertation credits for PhD = 32 of CHEM 697, or 32 of CHEM 697 + HUMS 701

\*Minimum credits of CHEM 697 for MS-thesis = 9; for MS-non-thesis = 6

PhD = 9 C + 9 E = 18 didactic courses minimum

MS-thesis = 9 C + 6 E = 15 didactic courses minimum; MS-non-thesis = 9 C + 9 E = 18 didactic courses minimum

**Request For Travel Funds  
From Graduate Student Travel Program**

Name\_\_\_\_\_ Date\_\_\_\_\_

Meeting\_\_\_\_\_

Dates of Meeting\_\_\_\_\_

Location of Meeting\_\_\_\_\_

Title of Paper\_\_\_\_\_

\_\_\_\_\_

Authors\_\_\_\_\_

\_\_\_\_\_

Type of Presentation (oral, poster, etc.)\_\_\_\_\_

\_\_\_\_\_

Amount Requested (\$400 maximum during student's career)\_\_\_\_\_

**APPROVAL**

Research Advisor\_\_\_\_\_ Date\_\_\_\_\_

Signature

Graduate Director\_\_\_\_\_ Date\_\_\_\_\_

Signature

**\*This form must be submitted to the Graduate Director 4-6 weeks in advance of the meeting date**

**VCU****College of Humanities and Sciences**

## How to Dispose of Hazardous Waste

If you are using Hazardous Products or Materials, (flammable, corrosive, toxic, reactive) you are more than likely creating hazardous waste that needs to be disposed of properly.



Products with these labels are typically hazardous waste when disposed.

Waste containers need to be compatible with what is being stored inside, especially the LID! A waste container is no good to anyone if the lid is corroded away by the hazardous waste inside

### Storing Hazardous Waste

All waste containers need to be stored in some form of secondary containment (bucket, tray) in case of breakage)

While in Secondary Containment, each waste container needs to be labeled with the label below (labels available in Chemistry Stockroom)

**Hazardous Waste**  
 Satellite Accumulation Area

Contents \_\_\_\_\_  

**Handle with Care !**

☐ Flammable
 ☐ Corrosive pH \_\_\_\_
 ☐ Reactive
 ☐ Toxic

This does not have to be a complete and de-tailed list of what is inside the waste bottle, just a generic description, (Acidic, Basic, Organic Solvents) just so someone coming in the lab has an idea what is inside if they need to.

Waste bottles and the Secondary Containers need to be kept in a clean, neat, and segregated part of

the hood. They need to be closed when not in use, no funnels left inside the bottles.

### Final Labeling of Hazardous Waste,

Make sure the waste is labeled with the final label as seen below (labels available at link below VCU SRM under the forms heading)

<https://srm.vcu.edu/i-want-to-know-about/waste-management/>

HAZARDOUS WASTE

Generator's Name & Department Rodney Lab Ram - Chemistry

Bldg./Floor/Room # Temple/ 1<sup>st</sup>/ 1022 Date Filled 01/01/2016

| Chemical Name(s)         | Percent or Volume, pH |
|--------------------------|-----------------------|
| <u>Xylene</u>            | <u>98%</u>            |
| <u>Hydrochloric Acid</u> | <u>1%</u>             |
| <u>Giemsa stain</u>      | <u>1% pH 7.0</u>      |

Make Sure the label is filled out with the Name of the Generator

Department

Building/Floor/Room Number

Date it was filled

Chemical Contents (NO ABBREVIATIONS)

### Scheduling a Waste Pickup

Once all this filled out and taped securely on-to the waste bottle, visit the website below and follow the prompts for scheduling a pickup through VCU SRM

<https://redcap.vcu.edu/surveys/?s=CNF7FWH4LE>

All this information applies for both solid and liquid hazardous waste



## RESEARCH ADVISOR SELECTION FORM

If you did not attend the annual poster presentations by graduate students please have 75% of the faculty and your proposed advisor sign this sheet. When complete, scan and email it to the Department Chair by October 31 (students commencing studies in the fall semester) or March 31 (students commencing studies in the spring semester) for official approval. The graduate director and administrative assistant should be copied on this email.

\_\_\_\_\_  
Dr. Xuewei Wang                      Date

\_\_\_\_\_  
Dr. Katharine Tibbetts                      Date

\_\_\_\_\_  
Dr. Soma Dhakal                      Date

\_\_\_\_\_  
Dr. Ka Un Lao                      Date

\_\_\_\_\_  
Dr. Maryanne Collinson                      Date

\_\_\_\_\_  
Dr. Dusan Bratko                      Date

\_\_\_\_\_  
Dr. Julio Alvarez                      Date

\_\_\_\_\_  
Dr. Katherine Belecki                      Date

\_\_\_\_\_  
Dr. Indika Arachchige                      Date

\_\_\_\_\_  
Dr. Ashton Cropp                      Date

\_\_\_\_\_  
Dr. Hani EL Kaderi                      Date

\_\_\_\_\_  
Dr. Mathew Hartman                      Date

\_\_\_\_\_  
Dr. Nicholas Farrell                      Date

\_\_\_\_\_  
Dr. Vladimir Sidorov                      Date

\_\_\_\_\_  
Dr. Everett Carpenter                      Date

\_\_\_\_\_  
Dr. Frank Gupton                      Date

\_\_\_\_\_  
Dr. Heather Lucas                      Date

\_\_\_\_\_  
Dr. Suzanne Ruder                      Date

\_\_\_\_\_  
Dr. Samy El Shall                      Date

\_\_\_\_\_  
Dr. Joshua Sieber                      Date

### Research Advisor of Choice

\_\_\_\_\_

\_\_\_\_\_  
Advisor signature

Select program:

\_\_\_\_\_  
Student's signature                      MS-Thesis\_\_\_MS-Non-Thesis\_\_\_PhD-CHEM\_\_\_PhD-CHEB\_\_\_PhD-NANO\_\_\_

Dr. \_\_\_\_\_ is approved as advisor for \_\_\_\_\_  
Student's name print (legible)

\_\_\_\_\_  
Signature of Chair                      Date