

**Virginia Commonwealth University**

**Nanoscience and Nanotechnology  
Doctoral Program**

**GRADUATE STUDENT HANDBOOK**

Dear Entering Graduate Student:

Welcome to the graduate program in Nanoscience and Nanotechnology at Virginia Commonwealth University. I am confident that you will find that the education you obtain at VCU will benefit you throughout your professional career and that you will find the Department an enjoyable place to work and study. This handbook is designed to answer any questions you may have regarding the graduate program.

I hope you will find this information useful in preparing to enter the graduate program. If you have any questions, please feel free to contact me. Once again, welcome to VCU.

Sincerely yours,

Everett Carpenter  
Program Director

**INFORMATION FOR ENTERING  
GRADUATE STUDENTS**

**Everett Carpenter, Program Director**

**Scott Gronert, Department Chair Chemistry**

**Robert Gowdy, Department Chair Physics**

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# **1. GENERAL PROGRAM INFORMATION**

This information is to supplement the Graduate Rules and to clarify the Program's policies and procedures. If you have any questions about a particular rule or a problem you have encountered which are not answered in this booklet, check with Dr. Carpenter.

1. **Location**

The Department of Chemistry is located in Oliver Hall, 1001 West Main Street, and The Department of Physics is located at 701 W. Grace street.

2. **Major Program Committees Involving Graduate Students**

Graduate Admissions Committee (GAC) - Responsible for: recruiting new graduate students; reviewing applications for admission to the graduate program in nanoscience and nanotechnology and making recommendations on these applications to the Graduate Director for action; preparing recruiting posters and brochures; arranging for visits of potential graduate students; evaluating transfer credit for courses taken at other universities and making recommendations to the Graduate Director and GEAC regarding such credit.

Program Director- Responsible for: coordinating efforts of GA, and other departmental committees involving the Nanoscience and Nanotechnology program; reviewing and approving thesis and dissertation committees; scheduling thesis, oral candidacy, and dissertation defenses; assigning, in consultation with the GAC, Graduate Research Awards; reviewing graduate student teaching and research evaluations and reporting problems to the faculty; writing letters of warning for academic problems to the graduate students; acting as liaison between the graduate students and Departmental and University committees and administration.

3. **Academic Performance**

Acceptable grades in graduate courses are A or B. Grades below B will cause a review of progress by the Program Director and a letter of warning from the Program Director. Multiple grades below B may result in dismissal from the program in accordance with the Graduate Rules. Graduate students may not withdraw from a course without the permission of the Graduate Director. Graduate students who are having problems should talk with the Graduate Director or either Departmental Chair, and may petition the Program Director permission to withdraw from a particular course. However, this permission will not automatically be granted.

4. **Stipend Payments**

GTAs and Graduate Research Assistants are paid on the 1st and 16th of each month. If these payday's fall on a weekend or holiday, payday is the last working day prior to the scheduled payday. Payment is distributed by direct deposit to the student's bank account. Tuition payments for GTAs and Graduate Research Assistants are made

directly to the University by the Graduate School or Department, as appropriate. Students should plan to pay required fees at the time of registration.

## 5. **Registration for Courses**

Entering students will meet with the Program Director prior to registration, to schedule courses for the upcoming semester. After advising, graduate students may register online. Students should have a VCU identification card and student ID number in order to register.

## 6. **Health Insurance**

All graduate students are required to have health insurance coverage. A health service fee is assessed every student. Students may also purchase an additional health insurance policy at registration.

## 7. **Choosing a Research Advisor**

Students should arrange individual sessions with those faculty members in whose research the student is interested to discuss potential research projects. Students who begin graduate studies in the fall semester should choose an advisor by December 15, and students who begin graduate studies in the spring semester should choose an advisor by April 15. The completed signature form (Appendix A of the Graduate Rules) must be submitted to the Program Director. The Program Director must approve all research advisor assignments prior to a student commencing research work in a faculty member's laboratory (see pp. 18-19 for more information).

## 8. **Library**

There are two libraries, the Cabell Library on the Monroe Park Campus and the Tompkins-McCaw Library on the Medical Campus. The Cabell Library will have much of the chemical literature and books that students will need. The student ID card is second floor of Cabell Library.

## 9. **Shuttle Bus System**

The VCU Campus Connector provides complimentary transportation service between the Monroe Park Campus and the VCU Medical Center. Service is provided for students, faculty and staff with a valid VCU Card. The first trips begin at Cabell Library and at Sanger Hall. VCU Campus Connector runs: Monday – Friday, 6:30 a.m. – 8:00 p.m. approximate 10-minute time intervals. Monday – Friday, 8:00 p.m. – 2:00 a.m. approximate 15-minute time intervals. Saturdays and Sundays, 10:00 a.m. until 9:00 p.m. approximate 15-minute time intervals. University observed holidays and breaks may conform to a different schedule. Please call the parking office or visit <http://www.bsv.vcu.edu/vcupark/transit.htm> for changes.

## 10. Mail

Each first year graduate student is assigned a mailbox in the chemistry department or physics department mailroom. Mail will be placed in this box once a day. In addition, important memos and notices will be placed in this box. The official Program mailing address is: Nanoscience and Nanotechnology, Box 842006, Virginia Commonwealth University, Richmond, VA 23284-2006. Please note that graduate students are responsible for checking both this mailbox and their official VCU e-mail on a regular basis.

## 11. **Chemistry Stockroom (Oliver Hall Room 3054)**

The chemicals for the freshman and organic laboratories are prepared by stockroom employees and placed in the teaching labs. If you run short of material or need something not supplied, you should come to the stockroom for those items yourself; do not send a student. However, you should not leave the lab while it is in session. Therefore you must check beforehand to ensure that you have sufficient chemicals and equipment to carry out the assigned experiments. If there are consistent problems, notify the Stockroom Manager.

## 12. Phone Number

The Chemistry Departmental telephone number is (804) 828-1298 while the Physics Department is (804) 828-1818.

## 13. Other Phone Numbers of Interest (All Area Code 804)

General Registration Information .....	828-1349
International Student and Scholar Services.....	828-0808
College of Humanities and Sciences .....	828-1674
School of Graduate Studies .....	828-6916
James Branch Cabell Library .....	828-1110
Tompkins-McCaw Library .....	828-0636
Student Health Services, Academic Campus .....	828-8828

## 14. Security

Building security is the responsibility of all building occupants. If you see a lab door open with no one present, close it. If you see people wandering around who obviously are not students or employees, do not be afraid to call the Campus Police. Keep doors locked and do not leave valuables unattended.

Emergency Numbers:	Campus Police	8-1234	Security Escort	8-9255
	Fire	8-1234	Chemical Spill	8-9834



## 15. Maintenance

If you see a problem with the physical plant, report it immediately. If it is during the day, report the problem to the stockroom. If it is at night or on the weekends, call the emergency repair number or campus security. The most obvious problem is water running out under a lab door. Do not just walk away from such problems.

Emergency Repairs Call: 8-9444

## 16. Department Faculty

Name	Phone Number	Office Number	E-Mail Address
Julio Alvarez	828-3521	4025	<a href="mailto:jcalvarez2@vcu.edu">jcalvarez2@vcu.edu</a>
Dusan Bratko	828-1865	4021	<a href="mailto:dbratko@vcu.edu">dbratko@vcu.edu</a>
Everett Carpenter	828-7508	3037	<a href="mailto:ecarpenter2@vcu.edu">ecarpenter2@vcu.edu</a>
Maryanne Collinson	828-7509	Temple 4429-O	<a href="mailto:mmcollinson@vcu.edu">mmcollinson@vcu.edu</a>
Hani El-Kaderi	828-7505	4019	<a href="mailto:helkaderi@vcu.edu">helkaderi@vcu.edu</a>
M. Samy El-Shall	828-3518	4026	<a href="mailto:selshall@vcu.edu">selshall@vcu.edu</a>
Alenka Luzar	828-3367	Temple 3304C	<a href="mailto:aluzar@vcu.edu">aluzar@vcu.edu</a>
Indika Arachchige	828-6855	4025	<a href="mailto:iuarchchige@vcu.edu">iuarchchige@vcu.edu</a>
Alison Baski	828-8295	2411	<a href="mailto:aabaski@vcu.edu">aabaski@vcu.edu</a>
Bertino, Massimo	828-6343	1515	<a href="mailto:mfbertino@vcu.edu">mfbertino@vcu.edu</a>
Jena, Peru	828-8991	1213	<a href="mailto:pjena@vcu.edu">pjena@vcu.edu</a>
Khanna, Shiv	828-1820	2407	<a href="mailto:snkhanna@vcu.edu">snkhanna@vcu.edu</a>
Reshchikov, Mikhail	828-1613	1613	<a href="mailto:mreshchi@vcu.edu">mreshchi@vcu.edu</a>
Ye, Dexian		2413	<a href="mailto:dye2@vcu.edu">dye2@vcu.edu</a>
Reed, Jason	828-2409	2409	<a href="mailto:jcreed@vcu.edu">jcreed@vcu.edu</a>
Reiner, Joseph	828-7079	2406B	<a href="mailto:jereiner@vcu.edu">jereiner@vcu.edu</a>

Chemistry faculty offices are located in Oliver Hall, 1001 W. Main Street while Physics faculty offices are located at 701 W Grace Street .

## **2. GRADUATE RULES**

# VIRGINIA COMMONWEALTH UNIVERSITY

## Graduate Program in Nanoscience and Nanotechnology

We have compiled the following information to aid applicants and students in understanding the nature and requirements of the graduate program for the Ph.D. degrees. This document is located at <http://www.nano.vcu.edu/graduate.html>

Additional information concerning graduate study may be obtained from the Graduate Bulletin of Virginia Commonwealth University <http://www.vcu.edu/bulletins/gpb/>. Questions should be addressed to the Program Director, P.O. Box 842006, Virginia Commonwealth University, Richmond, Virginia 23284-2006, (804) 828-1298.

### A. Degree Programs

Virginia Commonwealth University offers programs leading to the Doctor of Philosophy in Nanoscience and Nanotechnology in cooperation with the Departments of Chemistry and Physics. A plan of study is worked out individually for each student.

### B. Admission

Admission to the programs is open to students having either a bachelor's or master's degree in chemistry, physics or engineering. Acceptance is based upon excellence of undergraduate performance, satisfactory scores on the Graduate Record Examination, and letters of recommendation. Admission may be granted on a provisional basis when deficiencies exist; these deficiencies should be removed by the end of the first year of graduate study, at which time the student's progress will be evaluated. Courses which are remedial or designed to remove deficiencies will not be accepted for credit toward the fulfillment of the course requirements for the doctoral degree. Applications information is found on the program website at <http://www.nano.vcu.edu/graduate.html>.

Applications should be filed early to permit adequate review and insure consideration. All applicants will be notified of the decision made after applications are completed and reviewed.

In order to remain as an enrolled graduate student in nanoscience and nanotechnology, full-time or part-time, students must enroll in an approved graduate course for at least one semester hour of credit each semester during the academic year (fall and spring semesters). This rule is pursuant to the VCU Graduate Bulletin requirement, which applies to all graduate students. A student who does not enroll during any semester after admission to the program may be considered for readmission only after reapplying for readmission through University Enrollment Services.



Students must take written comprehensive examinations on nano topics at the end of their first year.

The written examination focuses on the subject matter deemed critical as a foundation in the program and must be completed by the end of first 12 months of graduate study (end of second year in special circumstances). The written examination is largely based on material covered in required course work and its application to theoretical and practical problems. This examination consists of questions from at least three topic areas. Contact your department's graduate program director for your specific departmental requirements. The department's graduate program director is responsible for overseeing the administration of the written portion of the exam. The questions are prepared and graded by Nanoscience and Nanotechnology faculty and, when appropriate, faculty from other VCU schools or colleges.

Students must complete an oral comprehensive examination during their 4<sup>th</sup> semester.

The student will submit one copy of an original Dissertation Research Proposal based upon their proposed research project, to each member of their dissertation committee. The dissertation committee may decide to return the proposal to the student if deficiencies exist prior to the examination. The Oral Candidacy Examination should be completed within six months after notification of completion of the cumulative exams. The proposal should follow the NSF Grant Proposal Guide

(<http://www.nsf.gov/pubs/policydocs/pappguide/nsf13001/gpgprint.pdf>)

Students must complete a dissertation.

Approved: \_\_\_\_\_ Date  
                    Chair, Graduate Program Director

## C. Financial Assistance

Graduate students may receive financial support by means of a teaching assistantship (TA), a research assistantship (RA), a fellowship, or a scholarship. Students receiving financial support from the University may not hold outside employment without the written permission of the Program Director. In order to continue to receive financial support it is necessary that the student maintain good standing and be making satisfactory progress toward a degree. (See the Graduate Bulletin <http://www.vcu.edu/bulletins/gpb/>)

Graduate students who are teaching assistants are required to perform teaching duties in recitation sections and in laboratory sections and related duties as assigned by the Assistant Chair. These duties are carried out under the direction of faculty who are assigned to supervise the teaching of that particular course.

Research assistants perform duties in the research laboratories of faculty members who have financial support of their research either from the University or from an outside agency.

All financial aid is awarded on an academic year basis of nine months unless otherwise stated. The beginning date for teaching assistants, research assistants, and fellows is August 10th unless otherwise stated. The Graduate Bulletin and the Undergraduate Bulletin of VCU should be consulted for the specific date for the beginning of classes.

Financial assistance for the summer is usually available and students requiring support for the summer months should consult with their research advisor or the Program Director during the Spring Semester. The program rules for awarding available financial support to graduate students are as follows:

1. A student who enters the graduate program with a bachelor's degree and who seeks the Ph.D. degree on a full-time basis may anticipate support from the department (either TA or RA) for a maximum period of **FIVE CALENDAR YEARS**, provided they are making satisfactory progress towards their degree and support is available.
2. A student who enters the graduate program with a master's degree and who seeks the Ph.D. degree on a full-time basis may anticipate support from the department (either TA or RA) for a maximum period of **FOUR CALENDAR YEARS**, provided they are making satisfactory progress towards their degree and support is available. (This assumes that only two courses from the previous degree will transfer to VCU.)
3. Students seeking additional support beyond the above period for any reason shall petition the faculty for each additional semester of support no later than mid-term of the final semester of support.

4. Stipends for teaching assistants and research assistants may vary depending upon assignment, experience, and quality of performance.

#### **D. Duties of Teaching Assistants**

The primary duties of the teaching assistants are to further the student's comprehension of chemistry or physics, to help the student develop proper laboratory techniques, and to develop the assistant's teaching effectiveness. Therefore, it is the assistant's responsibility to have a thorough knowledge of the material to be presented and to be prepared for the laboratory or recitation section. Each graduate student will be required to be a teaching assistant for at least one semester.

The presentation and organization of the subject material will be in accordance with the directives of the faculty member teaching the course. When the course is taught by more than one faculty member, one of them will act as Director. It is the teaching assistant's responsibility to know and follow the policies of the faculty member teaching the course concerning exams and grading, make-up laboratories, make-up laboratory assignments, make-up exams, safety, and any special rules pertaining to a particular course. The TA may also be required to assist in the grading of examinations for the course.

To ensure that the teaching assistant has a thorough knowledge of the material presented, inexperienced teaching assistants (i.e., those who have not taught the course at VCU before) will be required to attend all lectures for the course in which they are TA's. Students teaching the recitation section for freshman chemistry or physics should attend each of the lectures, and students teaching the laboratory sections for freshman should attend the appropriate laboratory lecture. Experienced teaching assistants (i.e., those who have taught the specific course before) or those TA's for upper level courses are encouraged to attend the lectures, but are not required.

#### **E. Advising of Graduate Students**

##### **1. Advising of New Students**

The Program Director will act as advisor for all entering graduate students. The Director will plan a course of study for the first year of graduate work and will follow closely the progress of each student and provide counseling until a research advisor is chosen. At the end of the fall and spring semester, the progress of all graduate students will be reviewed and evaluated by the graduate director and GEAC. Results in course work, performance in research, and performance on examinations will be considered. Based upon the results of these evaluations, students will be recommended either to continue or to terminate their graduate studies. It is the responsibility of each graduate student, full-time or part-time, to make an appointment to talk with the graduate director during the registration period at the start of each semester until a research advisor is chosen.

The rules regarding the performance of all graduate students in courses are as follows:

- a. A student seeking a Ph.D. degree must have a "B" average in graduate academic courses. A "B" average in course work excludes seminar and research grades.
- b. A student who receives a grade below "B" in any graduate course will receive a letter of warning from the Graduate Director.
- c. The status of a student who receives any grade below "S" in research will be reviewed by the program director, in consultation with the research advisor, and a plan for correcting the deficiency will be devised. Additional grades in research below "S" may lead to dismissal from the program.
- d. A student earning three grades below "B" in approved graduate courses during the first year of graduate study will be dismissed from the program. A student who earns a third grade below "B" in an approved graduate course after the first year of graduate study will be reviewed and may be dismissed from the program. If the student is seeking the Ph.D. degree, he or she may be permitted to complete the M.S. degree in Chemistry or Physics at the discretion of the faculty. In any event, a student must have no more than six credit hours or 20 percent of total credit hours attempted (whichever greater) at "C" or below level ("C," "D," "F"). Students who receive any grade of "D" or "F" will be reviewed for possible dismissal.
- e. A student may achieve a "B" average by:
  - i. earning sufficient grades of "A" in other approved graduate courses or
  - ii. taking recommended\* additional graduate courses beyond what is required and earning a grade of "B" or better.

\*(The Program Director will determine which course(s) may be used to correct deficiencies and when such courses are to be taken).

- f. To maintain satisfactory progress in the program, a graduate student may not withdraw from a course without the permission of the Program Director. A student seeking permission to withdraw from a course should petition the Director in writing prior to the official withdrawal date. The Director must receive a written evaluation of the student and recommendation about the petition from the course instructor prior to reaching a decision. Withdrawal without permission of the director may jeopardize financial support and/or continuance in the graduate program.



## 2. Selection of a Research Advisor

All graduate students entering will be required to schedule individual meetings with representative faculty members (at least 75%) from each of the two departments and obtain their signatures. Upon completion of these meetings, the student should select a research advisor, secure the potential advisor's signature, and turn in the completed form to the Graduate Director. Students who begin their studies in the fall semester should submit this form by December 15; students who begin their studies in the spring semester should submit this form by April 15. The student and advisor will be notified of the approval within two weeks of submission of the selection form.

A tenured faculty member can accept a graduate student as a research student

- \* if extramural support for research is either available or being sought by that faculty member, and
- \* if no more than one graduate students in that research group would then be supported by Program, College or University funds.

Upon selecting a research advisor all students must enroll in at least one semester hour of research, CHEM 697 or PHYS 697, each semester during the academic year until the completion of the degree sought.

The research advisor in consultation with the student shall appoint a committee which is composed of at least four members including the research advisor. This committee selection should be constituted by the end of the first summer of research. One member of the committee must be from outside the chemistry or physics department, and one member must be from outside of the department. The names of the committee members must be submitted to the Program Director for approval.

A Ph.D. student will meet with their committee as part of the comprehensive examination. In some cases, the committee may require future updates of the student's research progress. It is the responsibility of the student and the faculty advisor to schedule and hold these meetings at the agreed upon date, in order to fully satisfy the oral candidacy examination requirement.

The student is encouraged to consult any faculty member, including faculty not on their committee, concerning problems arising in the course of their research.

## **G. REQUIREMENTS - DOCTOR OF PHILOSOPHY DEGREE**

The awarding of the Ph.D. degree is not based solely upon the completion of a definite number of credit hours, but rather upon the accomplishments of the student in research, in course work, in individual examinations, and on the dissertation.

Requirements in detail are indicated below. Students seeking an exception to the graduate requirements must present their case to the Program Director.

## 1. Course Requirements

The student seeking the Ph.D. Degree in Nanoscience and Nanotechnology must have a minimum of 18 credit hours in eight graduate courses not including credit for seminar and research. The Graduate Admissions Committee will review the transcript of all transfer students. (See the Graduate Catalog for the University rules for transfer credit.)

All graduate students seeking the Ph.D. degree must complete 30 hours of CHEM or PHYS 697, Directed Research, as a part of fulfilling the requirements for the degree. All course work for the student will be determined in consultation with the research advisor and with the approval of the Program Director.

All full and part-time graduate students will enroll each semester in NANO 690, Research Seminar in Nanoscience and Nanotechnology, except during the semester that the student is presenting their literature seminar or thesis/dissertation seminar, when they should register for NANO 692, Nanoscience and Nanotechnology Seminar Presentation.

## 2. Comprehensive Examinations

In order to advance to doctoral candidacy, the student must pass both written and oral comprehensive examinations. Graduate students may not take the comprehensive exam if their overall GPA is less than 3.0. In the event of failure, the student may retake the oral and written comprehensive examination one time only. The re-examination requires the approval of the student's Advisory Committee. For additional details, see the graduate program director.

### Written Examination

The written examination focuses on the subject matter deemed critical as a foundation in the program and must be completed by the end of first 12 months of graduate study (end of second year in special circumstances). The written examination is largely based on material covered in required course work and its application to theoretical and practical problems. This examination consists of questions from at least three topic areas. Contact your department's graduate program director for your specific departmental requirements. The department's graduate program director is responsible for overseeing the administration of the written portion of the exam. The questions are prepared and graded by Nanoscience and Nanotechnology faculty and, when appropriate, faculty from other VCU schools or colleges.

## Oral Examination

Within six months after successful completion of the written examination, the student will submit one copy of an original Research Proposal based upon their proposed research project, to each member of their dissertation committee. The dissertation committee may decide to return the proposal to the student if deficiencies exist prior to the examination. The Oral Examination should be completed within the first two years of study, and no later than six months prior to defense of the dissertation.

The proposal consists of the problem and its proposed solution which has been developed by the student according to the following rules:

- a. The literature must be searched thoroughly to assure that the proposal is original and has not been reported previously.
- b. Pertinent examples in the literature bearing on the feasibility of the proposed solution should be cited.
- c. The report shall include:
  - (1) An Introduction (giving the background and known facts on which the problem is based)
  - (2) A Statement of the Problem (giving a description of the problem, its significance and the proposed experimental approach)
  - (3) A Work Completed Section (describing research completed to date)
  - (4) A Methods Section (describing the steps to be carried out, discussion of feasibility, and possible outcome)
  - (5) A Conclusion Section (describing the interpretation of possible experimental results and their bearing on the original hypothesis)
  - (6) A section of Bibliographic References (in a style acceptable for a dissertation)

The proposal is written according to the guidelines of the NSF. These guidelines can be found at [http://www.nsf.gov/pubs/policydocs/pappguide/nsf10\\_1/gpgprint.pdf](http://www.nsf.gov/pubs/policydocs/pappguide/nsf10_1/gpgprint.pdf). At the time of the oral examination, the student will be asked to explain the problem and to defend the proposed solution. It is presumed that a major portion of the questions in the examination will concern some facet of the proposal; however, questions may not be restricted to such areas.

A favorable decision of the Dissertation Committee with no more than one negative vote (all members being required to vote) shall be required to pass the oral portion of the candidacy examination. If a student fails the oral candidacy examination, a reexamination may be given at the discretion of the committee.

The oral candidacy examination is open to all members of the graduate faculty. Faculty members in attendance may ask questions of the candidate, but their questions shall not be presented until after the dissertation committee has completed its questions. Faculty members other than those on the committee shall neither vote nor indicate on the success or failure of the candidate. The time and place of the examination shall be posted at least seven days in advance. It is the responsibility of the graduate student to inform the Program Director of the time, date and title of the proposal defense. As stated previously, this examination must be successfully completed at least six months before submission of the dissertation. Upon successful completion of the oral candidacy examination, the student becomes a candidate for the Ph.D. degree.

Once the comprehensive examinations have been passed, and the student has completed all required course work (with a 3.0 GPA) and the literature seminar, the student must fill out and submit to the Graduate Program Director the [Application to Candidacy Form](#).

#### 4. Dissertation

The candidate must conduct a substantial original investigation under the supervision of the research advisor and prepare a dissertation reporting the results of the research and analyzing its significance in relation to existing scientific knowledge. Guidelines for preparation of the thesis can be found on the Graduate School website: <http://www.graduate.vcu.edu/community/thesis.html>

When the advisor and the candidate determine that sufficient research has been completed to prepare a dissertation, a meeting of the candidate's committee will be scheduled to review the completed work. The committee will then recommend that the candidate begin preparation of the dissertation or complete additional research. Since the Ph.D. is awarded for completion of an original research problem, evidence (at minimum, a draft manuscript) of publication of the results of this work should be presented to the committee at this meeting. This meeting will occur at least six months prior to the anticipated defense date, and the result will be reported to the Graduate Director.

When the dissertation has been completed and the advisor considers it acceptable and all the Ph.D. Degree requirements have been satisfied, the candidate so notifies the Program Director of the examination date. Copies of the dissertation in acceptable form and style are to be submitted to the dissertation committee.

The examiners for the dissertation are the student's dissertation committee members. These examiners decide upon the acceptability of the candidate's dissertation for defense. An external examiner may be invited to participate in the dissertation thesis examination by reason of specific expertise in the candidate's field. Upon tentative acceptance of the dissertation by the examiners, the candidate appears before them for a final oral examination. This examination is open to all members of the graduate faculty. The final examination will be limited to the subject of the candidate's dissertation and related matters. A favorable vote of the candidate's examiners, with no more than one negative vote shall be required for passing the final oral examination. There shall be prior public announcement of the candidate's name and department and title of dissertation at least seven days in advance. It is the responsibility of the graduate student to inform the Program Director of the time, date and title of the dissertation defense. Upon successful defense of the dissertation, the dissertation is to be corrected and submitted to the library via the electronic dissertation procedure. Note that two bound copies, to be prepared and bound at the student's expense, are required for the Nanoscience Program and the major professor. A suitable company for dissertation binding is [Thesis on Demand](#).

The doctoral dissertation must be sent to Xerox University Microfilm for microfilming and publication of the abstract of the dissertation in [Dissertation Abstracts International](#). Information pertinent to the preparation of the dissertation and the procedures for electronic publication of the dissertation can be found at <http://www.library.vcu.edu/preservation/theses.html>.

The candidate, having fulfilled all the requirements for the degree of Doctor of Philosophy, is recommended to the graduate faculty, general faculty, and the President of the University for the degree to be awarded.

##### 5. General Progress in Study and Research

It is deemed feasible for a well-prepared, full-time student commencing graduate studies with a bachelor's degree in an appropriate field to complete the Ph.D. requirements in four and one-half to five years. It is expected that the first academic year will be devoted primarily to course work; the effort of subsequent years should be divided between research, the completion of course work and required examinations, and preparation of the dissertation. Virginia Commonwealth University requires that all graduate degree requirements be completed within eight years from the date of admission to graduate study.

It is highly desirable that a good start be made on the research project during the summer after the first year, and that research be continued even while courses are in progress during the second year.

It is considered desirable that the student be present as much as possible at the University. Students should conduct research whenever course work and teaching duties allow.

## **H. SEMINARS**

All full-time graduate students will enroll each semester in NANO/CHEM/PHYS 690, Research Seminar, except during the semester that the student is presenting their literature seminar or thesis/dissertation seminar, when they should register for NANO/CHEM/PHYS 692, Seminar Presentation.

Each degree-seeking student will be required to present a minimum of two seminars. The first will be a literature seminar, presented no later than the end of the fourth semester of residence. The second seminar will be a research seminar presented prior to the student's thesis/dissertation defense. Students in the chemical physics program will present one seminar in each department with the final seminar being presented in the department of the dissertation research project. The assignment of a literature seminar topic, the format of the abstract and a grade will be determined according to the rules of the seminar committee. A student whose presentation is unsatisfactory (a grade of "C" or less) will be required to give an additional seminar. Questions concerning material presented in seminars may appear on appropriate examinations. All full-time graduate students are required to attend nano program seminars.

RESEARCH ADVISOR SELECTION FORM

APPENDIX A

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

Please have 75 % of the faculty and your proposed advisor sign this sheet and return it to the Graduate Director by December 15 (students commencing studies in the fall semester) or March 15 (students commencing studies in the spring semester).

\_\_\_\_\_  
Dr. J. Alvarez Date

\_\_\_\_\_  
Dr. P. Jena Date

\_\_\_\_\_  
Dr. E. Carpenter Date

\_\_\_\_\_  
Dr. S. Khanna Date

\_\_\_\_\_  
Dr. M.M. Collinson Date

\_\_\_\_\_  
Dr. M. Reshchikov Date

\_\_\_\_\_  
Dr. H.M. El-Kaderi Date

\_\_\_\_\_  
Dr. D. Ye Date

\_\_\_\_\_  
Dr. M.S. El-Shall Date

\_\_\_\_\_  
Dr. I. Arachchige Date

\_\_\_\_\_  
Dr. A Luzar Date

\_\_\_\_\_  
Dr. J. Reiner Date

\_\_\_\_\_  
Dr. A. Baski Date

\_\_\_\_\_  
Dr. J. Reed Date

\_\_\_\_\_  
Dr. M. Bertino Date

Student Name (print)

\_\_\_\_\_  
Signature of Graduate Director

Research advisor choice:

Dr. \_\_\_\_\_

\_\_\_\_\_  
Research Advisor's Signature

\_\_\_\_\_  
Student's Signature

-----  
Dr. \_\_\_\_\_ is approved as the research advisor of  
\_\_\_\_\_.

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

\_\_\_\_\_  
Date

### **3. SEMINAR RULES**



## **GUIDELINES FOR THE PRESENTATION OF GRADUATE STUDENT SEMINARS**

All graduate students must present two acceptable seminars. The first seminar will describe a topic from the literature unrelated to the student's research project and the second seminar will describe the student's thesis or dissertation research. Procedures for satisfying each of these requirements, suggestions for how to prepare for these seminars and the specific description regarding seminars from the Graduate Rules follow.

### **I. Literature Seminar**

- A. This seminar will be presented before the end of the student's fourth semester of residency. The student may choose when to present this seminar before the start of the third semester of residency. If this is not done the student will then be assigned a date for this seminar to be presented during the fourth semester of residency.
- B. The student must submit a topic for approval to the seminar chair. A form for topic approval is attached. Topic selection must occur at least one month prior to the start of the semester when this seminar is scheduled. The topic must not be related to the student's current or past research (e.g., B.S. research, M.S. research, job related research) or other research being conducted by the student's research advisor.
- C. The journal article for the literature seminar must be a full article, not a letter, note, or review. The article must have been published within the last three years.
- D. An abstract of the seminar must be prepared by the student and approved by the Program Director two weeks prior to the seminar. If this deadline is not met, the grade on this seminar will be lowered by one letter grade.
- E. The literature seminar requirement will be met by earning a grade of "B" or better. A grade below B will require the presentation of a seminar on a new topic during the following semester.

### **II. Thesis or Dissertation Seminar**

- A. This seminar will describe the thesis or dissertation research of the student and be presented prior to the student's thesis/dissertation defense. This seminar should be scheduled at least one month prior to the start of the semester of its presentation.

- B. The preparation and approval of an abstract will follow the description given earlier for literature seminars (I.C.)

### III. Suggestions for the Preparation of Seminars

- A. Always consult your research advisor regarding the selection of a topic for the literature seminar and the scheduling of the thesis/dissertation seminar.
- B. The abstract should be three to four pages in length, typed double spaced. It is the student's responsibility to have this done. References to the appropriate literature must follow the format given in Chemical Abstracts. The abstract should provide a concise introduction to the subject and sufficient references to the historical and contemporary literature to permit the audience to efficiently study the subject. After approval of the abstract by the seminar committee, reproduction and distribution will be handled by the department office.
- C. The graduate student is responsible for the preparation of any visual aids which are used in the presentation of the seminar. The American Chemical Society publication "Handbook for Speakers" is to be followed in the preparation of the presentation. Visual aids should be simple, uncluttered and legible. All visual aids should be prepared and viewed by the speaker from the back of the seminar room to confirm that they are legible.
- D. Suggestions on how to organize your seminar.
  1. Why was the project undertaken? This should be an introduction to the audience explaining why they should be interested in the topic to be discussed (1-3 minutes).
  2. What was done? This should be a historical development of the topic (5-15 minutes).
  3. What was learned? What concepts or theories have evolved and give an explanation of them (10-15 minutes).
  4. What does it mean? Discussion of the state of the art today, how it can be used, what could or should be done to expand or to elucidate current data (5-15 minutes).
  5. Summation. A brief overview of the facts presented in your talk (3-5 minutes).
- E. Seminars should last about 45 minutes so that 10 to 15 minutes of questions can follow at the conclusion of the presentation. Seminar grades may be lowered for

any seminar which is shorter than the 45 minutes. All graduate students are strongly encouraged to practice the seminar before fellow students, research advisors, or others in order to obtain suggestions which will improve the seminar. The timing of the seminar, (See III.D) oral clarity, and effective use of visual aids are very important. These mechanical considerations can insure that a scientifically sound seminar is understood.

- F. The graduate student should schedule an appointment with the seminar committee Chair to talk over the comments offered by those attending the seminar. The comments offered on the grading sheet (a copy is attached) should help to improve future presentations.

#### IV. Seminar Grading

All full and part-time graduate students will enroll each semester in NANO/CHEM/PHYS 690, Research Seminar, except during the semester that the student is presenting their literature seminar or thesis/dissertation seminar. A grade of S (satisfactory) or U (unsatisfactory) will be assigned based on seminar attendance and constructive participation in the asking of questions. During the semester that the student is presenting their literature seminar or thesis/dissertation seminar, they should register for NANO/CHEM/PHYS 692, Nanoscience and nanotechnology Seminar Presentation, and a grade of A, B, C, D, or F will be assigned based on the evaluation of the seminar by the faculty.

Nanoscience and Nanotechnology  
Virginia Commonwealth University

MEMORANDUM

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

To: Program Director

From: \_\_\_\_\_

Subject: Literature Seminar Title and Date Request

Once the seminar date has been assigned, the student may not cancel or delay the seminar without permission from the seminar committee. Abstracts are due to the seminar Chair two weeks prior to the seminar date.

Proposed Title:

(Attach short paragraph describing the scope of the topic, and pertinent references)

Proposed Dates: (consult with seminar chair or office staff first for available dates)

"This seminar topic is not related to my prior or current research or other research going on in my research group"

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Faculty Advisor's Signature

Nanoscience and Nanotechnology Graduate Program  
Virginia Commonwealth University

MEMORANDUM

Date: \_\_\_\_\_  
To: Program Director  
From: \_\_\_\_\_  
Subject: Research Seminar Title and Date Request

Once the seminar date has been assigned, the student may not cancel or delay the seminar without permission from the seminar committee. Abstracts are due to the seminar Chair two weeks prior to the seminar date.

Proposed Title:

Proposed Dates: (consult with seminar chair or office staff first for available dates)

Virginia Commonwealth University  
Nanoscience and Nanotechnology

Presenter: \_\_\_\_\_

Evaluator: \_\_\_\_\_

Evaluate each item, circling the most appropriate term. Please provide comments where appropriate. Rankings are 1-5 with 1 being Poor and 5 being Excellent.

**(40%) Organization ( 1 / 2 / 3 / 4 / 5 )**

Well prepared slides  
Clearly defined introduction  
Appropriate depth  
Strong conclusion  
Comments:

**(30%) Questions ( 1 / 2 / 3 / 4 / 5 )**

Management of Questions  
Perceived Competence  
Depth of Presentation  
Comments:

**(20%) Delivery ( 1 / 2 / 3 / 4 / 5 )**

Maintained Eye Contact  
Appearance  
Voice projection, rate, and clarity  
Comments:

**(10%) References ( 1 / 2 / 3 / 4 / 5 )**

Appropriateness of abstract  
Use of references  
Comments:

## **4. GRADUATE TEACHING ASSISTANT GUIDELINES**



## TEACHING PERFORMANCE AND RESPONSIBILITIES

GTA's teach courses under the direction of a faculty member. They are expected to follow the instructions of that faculty member in regard to conducting course sessions and grading. Students who are assigned to a recitation section and students who are assigned to upper level courses with reduced contact loads are expected to help the faculty member with the grading for the lecture portion of the course as part of their duties.

Graduate students in the Department are considered to be "junior faculty" and are expected to represent the Department in a professional manner. Since most graduate students have not been exposed to many of the situations and problems encountered in graduate school, particularly in teaching, some guidelines are given below.

- Meet all classes on time. If you are ill, it is your responsibility to find a qualified replacement for your teaching assignment (another graduate student in the program) and notify the professor in charge of the course of the situation. Never cancel a class without the permission of the professor in charge.
- Be prepared to answer questions and effectively present the class material assigned by the professor for whom you are teaching.
- If you are teaching a laboratory section, check the lab beforehand to ensure that all the needed chemicals and equipment are at hand. Make sure that the lab is clean, chemicals are put away, and wastes are disposed of properly. Enforce all departmental safety rules, and obey them yourself.
- Grade and return all work promptly. Know and enforce the VCU Honor Code. Suspected cheating cases should be discussed immediately with the professor in charge of the course.
- Do not discuss students' grades with other students in the class or other graduate students. A student is entitled to privacy regarding their performance in a course. Do not post grades by name or full Social Security number. Do not return graded papers/quizzes/exams/lab reports by hanging them in an envelope on the door or wall.
- Do not discuss your opinion of a course, test or examination, laboratory, book, or professor with students. For example, the slightest hint that a test or examination was too long causes many more problems for the GTA than for the student.

- Demonstrate respect for your students as you would wish them to respect you. Never tell a student that they asked a dumb question or that if they were smart they would see the answer. Never get into an argument with or raise your voice to a student. If you have a problem with a student, discuss the problem with the professor in charge of the course. If you feel you see a problem such as lack of respect with another GTA or professor, discuss it with the Chair or the Graduate Director. Do not discuss such problems with people outside of the Department.
- Do not become personally involved with students in your classes. At this point in your career, you cannot be a "buddy" to the students. If you find yourself in a situation in which you cannot impartially teach and grade a student, notify the Graduate Director immediately. Either your assignment will be changed or the student will be moved to another section.

Teaching performance is evaluated by the faculty member in charge of the course at the end of each semester. These evaluations are communicated to the Program Director, Research Advisor, and student.

## **7. GRADUATE STUDENT ACADEMIC APPEAL PROCEDURE**

## **GRADUATE STUDENT ACADEMIC APPEAL PROCEDURE**

Graduate students in the College of Humanities and Sciences at Virginia Commonwealth University have a right to appeal actions of an academic nature. If such action involves a course grade, the Grade Review Procedures should be followed. If such action involves computing, the Computer Ethics Policy should be followed. If such action involves dishonesty, the VCU Honor Code should be followed. For actions not governed by these policies the following procedures apply.

### **THE APPEAL PROCEDURE**

Graduate programs in the College of Humanities and Sciences are responsible for notifying students, in writing, of any academic actions taken that involve an individual student, and of the student's right of appeal as defined in this document.

If a student thinks that an academic action is the result of a breach of due process, the student should first discuss the matter with the individual(s) involved. The faculty member or other relevant University staff member will explain the basis of the academic action that has affected the student.

If the student seeks further explanation, he/she must submit a written appeal based on issues of due process to the departmental chair in which the student is enrolled within fifteen (15) academic working days of the notification of the academic action. This appeal must state the action being appealed and the reason for the appeal. Appeals submitted after this deadline will be reviewed only in exceptional cases as determined by the chair of the department of chemistry or physics. Within fifteen (15) academic working days of receipt of the student's written appeal, the chair of the department will conduct an investigation and will notify the student in writing of the decision. This document will describe the chair's investigation, adjudicate the dispute and notify the student of his/her right to appeal further.

If the student seeks still further (and final) inquiry, he/she must submit a request for final inquiry in writing to the chair of the department within five (5) academic working days of the receipt of the chair's decision. Upon receipt of this request, the chair is bound to forward to the Dean of the College three (3) documents within five (5) academic working days: the student's request for final inquiry, the Chair's decision-document and the student's appeal. The Dean and/or the Associate Dean for Graduate Studies will review the case to insure that the student's right of due process, both in the original dispute and in this appeal process, have been observed. A decision, which will be final and binding to all parties, will be provided in writing by the Dean or Associate Dean within fifteen (15) academic working days of receipt of the three documents.

## **SPECIAL PROVISIONS**

If the action being appealed directly involves the chair of the department, the initial appeal by the student shall be made to the Dean of the College. In such a case, by request for final inquiry shall be made to the Vice President for Academic Affairs.

If the Dean or Associate Dean is directly involved, they will be considered as regular faculty members within their academic departments. If the Associate Dean is directly involved, the student's right of final inquiry will be to the Dean; if the Dean is directly involved, the student's right of final inquiry will be to the Vice President for Academic Affairs.

When unusual circumstances warrant, the Dean or Associate Dean shall have the authority to modify the time limits stipulated above.

Approved by the Graduate Academic  
Committee, College of Humanities and  
Sciences, to supersede earlier documents  
6 April 1990

## **8. PROCEDURES FOR GRADUATION**

## Graduation Procedures

1. A student may receive their degree (graduate) in August, December, or May. The official commencement ceremony is held twice each year, in May and December. The dates for these ceremonies are listed in the annual graduate bulletin. Each semester a date is posted for submission of a graduation application. For example to graduate in May, a student must submit their graduation application to their advisor in January. The student initiates the graduation checkout process online via E-services. Students must be enrolled for a minimum of 1 credit at the time of application/reapplication for graduation. See the following website for more details: [http://www.graduate.vcu.edu/pdfs/edWeb\\_Guidelines.pdf](http://www.graduate.vcu.edu/pdfs/edWeb_Guidelines.pdf).
2. Graduation Application: The [Application to Graduate](#) can be found online. The student should complete the application, much of which is self-explanatory, and present it to their advisor for signature and submission to the Graduate Director. A few hints for completion of the application are given below.

List every course individually including research courses (CHEM 697) starting with the required lecture courses. Do not list CHEM 697 inclusively. Instead list each entry on the transcript with the number of credits, grade, and semester. Obviously, additional space will be required. Use a separate sheet of paper and note that Part I is continued on the separate sheet, but list the total credits on the original application.

To calculate your GPA, use only those credits for lecture courses. Do not include credits for research and seminar. Under VCU grade points, list the total grade points for your lecture courses (for each course, multiply the number of course credits times the quality points for the grade (A = 4, B = 3, C = 2)). Divide this number by the total lecture course credits and put this number in the space for GPA. Put an asterisk (\*) next to each of these numbers and add a statement below this section which reads "\*\*Does not include credits for research and seminar." Under the credits column, however, list all credits. The total credits required are, for an M.S., 27 (15 course + 12 research) plus 1 credit of seminar for each semester of residence, and for a Ph.D., 48 (18 course + 30 research) plus 1 credit of seminar for each semester of residence.

Approval Sheet (Part II of Graduation application). Section B, Preliminary review and approval must be signed by the advisor, graduate director and the Dean of the College of Humanities and Sciences and submitted to the graduation office by the required date (listed on the university calendar) each semester. You will receive a

copy of this form with the three required signatures – keep this form because you will need to complete either section B or C at the end of the semester. If all requirements have been met, then Section C must be signed by the advisor, graduate director and the Dean of the College of Humanities and Sciences. If the requirements have not been met by the end of the semester in which graduation application was submitted, then Section D must be completed, and submitted to the graduation office. Candidates who do not graduate at the end of the semester for which they have applied must reregister and reapply. The E-services checkout procedure will not allow you to proceed with reapplying for a graduation application unless Section D is completed. It is your responsibility to get all signatures and submit this form to the graduation office.

A date for the defense of the thesis or dissertation should be selected as early as possible and submitted to the Graduate Director. The last date for the defense of theses and dissertations for each semester is published in the annual graduate bulletin. The final copy of the thesis or dissertation must be uploaded to the [electronic thesis and dissertation website](#) and the final approval form must be submitted to the Dean's office with all signatures by this date. If these deadlines are not met, the graduation date will be postponed to the following semester. The rules regarding preparation of theses and dissertations are given at the following website:

<http://www.graduate.vcu.edu/community/thesis.html>.

Please note that there is a new approval form, [http://www.graduate.vcu.edu/pdfs/090730-01approval\\_form.pdf](http://www.graduate.vcu.edu/pdfs/090730-01approval_form.pdf), which is used in place of the old signature page, which is no longer required for theses or dissertations.



