Neuroscience Graduate Program

Virginia Commonwealth University

Student and Faculty Policies and Procedures

Revised June 2023

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I. Introduction

Welcome to the Neuroscience Graduate Program at Virginia Commonwealth University. The program offers an interdepartmental, integrated curriculum for graduate study leading to the Ph.D. degree in neuroscience. The program offers flexibility for students to train in a laboratory chosen among 60 neuroscience faculty members exploring the fields of molecular, cellular, developmental, systems, behavioral and clinical neuroscience.

Faculty members in the neuroscience program are affiliated with the departments of Anatomy and Neurobiology, Biochemistry and Cell Biology, Human and Molecular Genetics, Pathology, Pharmacology and Toxicology and Physiology and Biophysics. Investigators use a wide variety of state-of-the-art techniques to investigate topics whose scope ranges from the single molecule to integrated brain function. Regardless of the home department of their mentor, students will receive the Ph.D. degree in neuroscience.

The goal of the doctoral program in neuroscience is to provide students with a core of knowledge of the basic structure and function of the central nervous system while allowing flexibility in the choice of their advisers, electives and areas of research specialization. The curriculum consists of a set of core courses and electives that are customized for each student to best complement their individual research interests.

The program allows students to develop effective oral, written, and electronic communication skills; demonstrate the ability to formulate, design, implement and interpret experimental approaches; reach a level of competency to advance to positions as Neuroscience researchers and teachers in a broad spectrum of academic, industrial and government employment venues.

II. Overview and Timeline of the Training Program

Year 1: All students enter doctoral training via the Biomedical Sciences Doctoral Portal which allows students to remain uncommitted to a department or program until transitioning at the end of the first year. This mechanism provides students with interests in Neuroscience to either concentrate in that program from the beginning, or select Neuroscience after exploring other research opportunities in other departments and programs.

Students typically enroll in core courses during their first year which include a year-long course in Cellular and Systems Neuroscience and a year-long course in Biochemistry and Cell Biology. A required course for the Ph.D. degree may be waived only if the same course was offered at the graduate level at another institution and the student passed the course with a minimum grade of "B". Furthermore, the student requesting the waiver must provide the Steering Committee with specific documentation on the course content, e.g., a syllabus outline and/or any other supporting information required by the Committee. Each student request will be reviewed on an individual basis. Also during this year, students perform three research rotations. At the end of the first year, students formally transition into the Program and begin working in the laboratory of their mentor.

Year 2: During the second year, students enroll in two elective courses (selection based on their research interests), as well as Neuroscience Techniques (ANAT 615), Scientific Writing and Grantsmanship (ANAT 620), Neuroscience Journal Club (ANAT 630), Scientific Integrity (OVPR 601) and Neuroscience Seminar (NEUS 690). Students must register for 9-15 credit hours for Fall and Spring semesters, and three hours of NEUS 697 during Summer term to be considered full time and receive support. Students are required to maintain a minimum of a B average in all courses.

Students should have formed their Graduate Advisory Committee and held their first committee meeting prior to the end of the Fall semester. Part 1 of the comprehensive exam should be completed by the end of the Spring semester.

Year 3 and beyond: Students should complete Part 2 of the comprehensive examination (oral defense) prior to the end of the Fall semester. Thereafter, students focus entirely on their research and at the appropriate time prepare and defend their dissertation. It is expected that the entire process requires four to five years to complete.

MD/PhD students

Students in the MD/PhD program are not required to take Systems Neuroscience (ANAT 610) or the two semester Biochemistry, Cell and Molecular Biology series (BIOC 503/504). All other courses listed are required including two electives. It is anticipated that MD/PhD students will complete the written comprehensive exam at the end of their first year in the graduate phase and complete the oral comprehensive exam by the beginning of their second graduate year.

III. Coursework

A. Overview:

Year one:	NEUS 609	Cellular and Molecular Neuroscience (Fall)
	ANAT 610	Systems Neuroscience (Spring)
	BIOC 503/504	Biochemistry, Cell and Molecular Biol., (Fall & Spring)
	BIOC 661	Critical Thinking (Fall and Spring)
	NEUS 690	Neuroscience Seminar (Fall and Spring)
	IBMS 600	Laboratory Safety
Summer following year one:	Students begin working in the research laboratory of their chosen thesis advisor. Students should enroll in Directed Research (NEUS 697, 3 credits).	
Year Two:	ANAT 615	Techniques in Neuroscience and Cell Biology (Fall)
	ANAT 620	Scientific Writing and Grantsmanship (Spring)
	OVPR 601	Scientific Integrity (Fall)
	NEUS 690	Neuroscience Seminar (Fall and Spring)
	ANAT 630	Research Presentations and Journal Club (Fall & Spring)
	NEUS 697	Directed Research (Fall and Spring)
	Electives (2)	
Third Year and beyond:	NEUS 690	Neuroscience Seminar (Fall and Spring)
	ANAT 630	Research Presentations and Journal Club (Fall & Spring)
	NEUS 697	Directed Research (Fall and Spring)

B. Core Courses (Required)

Cellular and Molecular Neuroscience (NEUS 609)

Designed as an interdisciplinary introduction to the cellular and molecular aspects of central nervous system function. The basic principles of neuroscience including neuronal structure, electrical properties of single neurons, cell biology of neurotransmitter release and postsynaptic function will be discussed,

followed by intracellular signaling in neurons, gene regulation, transgenic model systems, glia, neuronal development, basic neurochemistry, and molecular and cellular aspects of motor, sensory and integrative function. The course will conclude with lectures on various aspects of neural injury and disease, including traumatic brain injury, Parkinson's and Alzheimer's diseases.

Systems Neuroscience (ANAT 610)
A study of the structure, connections and function of the central nervous system. Laboratory sessions complement lecture presentations, emphasizing light microscopic and ultrastructural neurohistology, gross and sectional anatomy of the brain, and tracing of functionally related CNS connections.

Biochemistry, Cell and Molecular Biology (BIOC 503 and 504)
A comprehensive, two-semester, introductory course that describes basic biochemistry and reviews current concepts of modern cell and molecular biology.

Critical Thinking (BIOC 661)
Students meet in small groups to present and discuss topical papers.

Neuroscience Seminar (NEUS 690)
Consists of faculty and visiting lecturers presenting current research in neuroscience. Students attend one seminar per week and submit a one-page summary description of the seminar.

Techniques in Neuroscience and Cell Biology (ANAT 615)
Designed to provide in-depth coverage of techniques commonly used in neuroscience and cell biology. Topics include tissue processing for light and electron microscopy, immunocytochemistry, laser confocal microscopy, protein purification and analysis, molecular approaches to the study of the nervous system, genetic manipulation of protein expression, gene arrays, transgenic and knockout animal modes, and electrophysiological techniques including single and multi-unit extracellular recording, sharp intracellular recording and patch clamp recording.

Scientific Writing and Grantsmanship (ANAT 620)
Lectures present an overview of preparation for writing scientific manuscripts and grant proposals. Emphasis is placed on putting methods of writing into practice. Students will submit written samples to be discussed and critiqued each week. Special sessions on manuscript and grant review processes are included, as well as instruction on how to best utilize electronic and library resources.

Research Presentations and Journal Club (ANAT 630)
Weekly research presentations by master's and doctoral students that focus on the student’s ongoing research. Course provides a forum for students to develop presentation skills and foster scientific discussion among students and faculty.

Scientific Integrity (OVPR 601)
A survey of contemporary issues relating to responsible conduct in research. Topics include academic integrity, mentoring, authorship and peer review, use of humans and animals in biomedical research, ownership of data, intellectual property, conflict of interest, scientific record keeping, collaborative research, research misconduct and genetic technology.

Interdisciplinary Biomedical Sciences (IBMS) Courses (Required)

Laboratory Safety (IBMS 600)
Describes health hazards commonly found in biomedical laboratories and their appropriate safety precautions, government regulations and emergency responses. Includes hazards of working with micro-organisms, experimental animals, and chemical, electrical and fire hazards.

Laboratory Rotations (IBMS 620) (not required for MD/PhD students)
Students conduct research rotations to gain direct exposure to individual research projects.

C. Elective Courses (minimum 6 credits total)

Students choose two elective courses relevant to their research specialty or need to supplement their background. An incomplete list of courses from a more extensive selection are shown below. Note that courses change yearly, so many additional courses are available or courses may cease to be available. In addition, some courses are offered in alternate years.

Anatomy and Neurobiology	
ANAT 608	Functional and Clinical Neuroanatomy
ANAT 611	Histology
ANAT 612	Human Embryology
Biostatistics	
BIOS 543	Graduate Research Methods
Human and Molecular Genetics	
HGEN 501	Introduction to Human Genetics
Interdisciplinary Biomedical Sciences	
IBMS 635	Cellular Signaling
Microbiology and Immunology	
MICR 505	Immunobiology
Pharmacology and Toxicology	
PHTX 630	Basic Concepts in Pharmacology for Graduate Students
PHTX 632	Neurochemical Pharmacology
PHTX 633	Behavioral Pharmacology
PHTX 636	Principles of Pharmacology
Physiology and Biophysics	
PHIS 501	Mammalian Physiology
PHIS 606	Molecular Basis for Disease
PHIS 620	Ion Channels in Membranes

IV. Comprehensive Examination

A. Overview

The comprehensive examination occurs in two parts, commencing during the second year for PhD students, or the first graduate year for MD/PhD students. Part 1 consists of a mini-review, written by the student and defended before their Graduate Advisory Committee. Part 2 consists of an oral defense of an NIH-style grant proposal prepared by the student, in consultation with their advisor, based on their research plan. Part 2 is also defended before their Graduate Advisory Committee. Students are strongly encouraged to submit their proposals for extramural funding (e.g., NIH predoctoral fellowships) where appropriate. Both phases of the comprehensive exam must be completed by the end of the Fall semester of the third year for PhD students, or the second graduate year for MD/PhD students.

The purpose of the comprehensive examination is to test a student's general knowledge in the field of their chosen research and to determine their suitability to continue that research. The exams focus on:

- Basic knowledge relevant to the student's disciplinary area, including the subject matter of courses taken by the student.
- Knowledge of research methodologies and how to apply them in the student's area of specialization.
- Theories and concepts that contribute to the body of knowledge in the student's area of specialization.
- Student's ability to discuss and defend their proposed research.

Part 1 of the comprehensive exam

Part 1 consists of two phases, written and oral. The written component is a **five-page** (Arial 11, 0.5" margins, single spaced) mini-review containing approximately 30 references. The 5-page limit *includes figures but not references*. The purpose of the mini-review is to summarize the background and outstanding questions in a particular field, potentially leading to a dissertation project. The topic of the review is selected by the student and dissertation mentor and approved by the Graduate Program Director. After approval, the student has 3 weeks to submit the mini-review to their mentor. **The document must represent the student's unaided efforts and may not be edited or critiqued in any form by another person, including the student's mentor and graduate thesis committee members.** All other resources are allowed except for the use of ChatGPT, which is forbidden.

The mini-review will be evaluated within three weeks from submission by each member of the student's Graduate Advisory Committee to determine if the mini-review is acceptable. If acceptable, the student's advisory committee will conduct an oral examination based on the mini-review. The oral examination phase should be scheduled within two weeks after the committee's approval of the mini-review.

During the oral examination, the student should present a 10 minute overview before committee members begin to ask questions. The purpose of the oral examination is to evaluate the student's comprehension of course work and ability to synthesize information, integrate the literature in a particular area, and formulate research questions.

Part 1 is designed to take approximately 2 months including time to write, submit, and prepare for the oral examination.

3 weeks - Preparation of the mini-review by the student
3 weeks - Evaluation of the mini-review by the Graduate Advisory Committee
2 weeks - Scheduling of the oral examination

Assessment rubric for Part 1:

Phase 1	Excellent	Good	Average	Below average	Poor
Identifies appropriate background / existing information					
Presentation, assessment and analysis of supporting evidence					
Develops, communicates & explains answer clearly & effectively					
Addresses questions appropriately					
Demonstrates ability to synthesize information creatively					

If a student does not pass the oral exam, they will be permitted one repeat attempt. Failure on the second attempt will result in dismissal from the Program.

Part 2

Following the successful completion of Part 1 of the comprehensive exam, the student will prepare an NIH-style grant proposal based on their research plan. This proposal must follow the F30/F31 NIH Predoctoral Fellowship format, if the student is eligible. International students who are not eligible to submit an NIH proposal may elect to substitute a proposal for an association or foundation for which they are eligible. These proposals must meet the NIH format as a minimum.

The purpose of this phase is to evaluate the ability of the student to design and interpret experiments at a level which is appropriate for their level of scholastic training. Preliminary data included in the proposal need not be extensive and may consist of previous results from the laboratory that were not generated by the student. **Unlike the written comprehensive, the student may receive assistance from his/her advisor and advisory committee regarding specific aims.** It is strongly encouraged that the student and advisor submit the proposal for funding.

After completion of the proposal to the advisor's satisfaction, the student will schedule the oral examination. The oral exam entails an oral defense of the student's grant proposal and will focus on the hypotheses, background information and methods in the grant proposal. The examination covers (1) course work related to the student's proposed research, (2) the literature cited in or related to the proposal, and (3) the research techniques and procedures presented in the proposal.

The oral examination is conducted by the student's graduate advisory committee and is restricted to faculty only. One member of the student's advisory committee from outside the department of the advisor will serve as the Examination Chair who will conduct the examination. A favorable vote of this committee with no more than one negative vote (all members being required to vote) shall be required to pass the oral portion of the comprehensive examination. The oral comprehensive examination is open to all members of the faculty. Faculty members in attendance may ask questions of the candidate. Faculty members other than those on the advisory committee do not vote on the student's performance.

Committee members will evaluate Part 2 using the following assessment tool.

Phase 2	Excellent	Good	Average	Below average	Poor
Identification and articulation of the problem					
Expression of background / existing information					
Presentation, assessment and analysis of supporting evidence					
Develops, communicates and explains project plan					
Displays mastery of subject matter					
Addresses questions appropriately					
Demonstrates ability to synthesize information creatively					

Successful completion of the oral exam advances the student to candidacy for the doctoral degree. If a student should fail the oral comprehensive exam they must petition the VCU School of Medicine Graduate Committee (via memo from the Graduate Program Director) to retake the examination. Failure on the second attempt results in dismissal from the program.

Scheduling Part 2

The oral exam is scheduled through the office of the Dean of Graduate Studies in the School of Medicine by completing the appropriate form online at GradTrak, no less than 10 working days prior to the date of the oral examination. The grant should also be distributed to the student's Graduate Advisory Committee at the time of scheduling the exam.

Scheduling Oral Comprehensive exam:

1. In consultation with their mentor, students select potential dates for the exam/defense.
2. Students poll their committee to determine an agreeable time.
3. Once the date is established, the student schedules the exam through GradTrak within 10 working days of the defense.
4. GradTrak will automatically generate a scheduling form page which includes the date, time and place for the exam. Graduate Advisory Committee member signatures are not required.

Timetable for completion of comprehensive exams:

- Part 1 should be completed no later than **June 30th following the Spring semester of the second year**. MD/Ph.D students should complete Part 1 no later than June 30th after their first year in the graduate phase.

- The Part 2 should be scheduled by the **end of the Fall semester of the third year** for Ph.D. students or the second year for MD/PhD students.

V. Preparation of the Dissertation and Final Defense

At the appropriate time in their research, the student will prepare a dissertation. Prior to preparing and scheduling the final dissertation, the Graduate Advisory Committee must meet with the student and concur that the body of research constitutes an adequate basis for writing of the thesis/dissertation.

The preparation of the dissertation is done under the supervision of the advisor, and should conform to the standards established by the University for the doctoral dissertation published in the handbook entitled University Graduate Council Thesis and Dissertation Manual. The format of the dissertation is the decision of the advisor and the student's graduate advisory committee. When the dissertation has been completed, copies, in acceptable form and style, are submitted to the members of the graduate advisory committee for initial review with a realistic deadline, i.e., 7-10 days, prior to scheduling the final defense.

The final defense is scheduled through the office of the Dean of Graduate Studies in the School of Medicine by completing the appropriate form online at GradTrak. No less than 10 working days prior to the date of the final defense, the student must submit to the Graduate Office the scheduling form with all required signatures and a copy of the dissertation. Follow the scheduling steps listed above for the Oral Comprehensive Exam.

If the graduate advisory committee accepts the dissertation for defense, the candidate appears before them for the defense. This examination is open to all members of the faculty. The examination will be limited to the subject of the candidate's dissertation and related basic science. A favorable vote of the candidate's graduate advisory committee with no more than one negative vote, is required for passing. All committee members must vote. There is no Examination Chair representative present, the student's advisor assumes that role. Preceding the defense, a seminar based on the dissertation will be presented, which is open to the entire university community. Following the seminar the student's graduate advisory committee conducts the oral exam. Other faculty may attend as observers. Prior to the examination, the student's advisor obtains the student's file and signature form from the Graduate Office. At the end of the defense, the committee must complete the final defense assessment form which is returned to the Chair for inclusion in the student's permanent file.

VI. Publication Requirements

All students must have at least one, first author paper either published or accepted for publication by the date of their final defense.

VII. Student Advising

A. New students

All students enter Ph.D. training through the Biomedical Science Doctoral Portal and remain as undeclared majors until the end of the first year. During this time all students attend a series of workshops and presentations to acquaint them with the offices and services available at the University, including a demonstration of library resources and facilities and an introduction to potential research mentors.

During this year, each student has a faculty Counselor who will oversee their first year in collaboration with the Chair of the Portal. The Counselor serves as the advisor for all new students during their first year in the program. The Counselor meets with each student at the beginning of the year to discuss coursework and identify potential mentors among the neuroscience faculty for laboratory research rotations. Laboratory rotations provide an opportunity for students to interact closely with faculty in order to determine a suitable match so that an informed decision can be made to join a particular research laboratory.

During the first year, the Counselor monitors student progress, meets with the student at least twice each semester, and assists with resolving academic issues if they arise. The Counselor also communicates with the Chair of the Doctoral Portal to assess performance in their research experiences.

By the end of the Spring semester of the first year, students affiliate with their chosen mentor who thereafter provides the major advising of the student. The selection of the research mentor is made in consultation with the potential mentors, the Counselor, the Chair of the Portal, and the student. The student then enters that laboratory and initiates their dissertation research.

B. Continuing students

1. Duties of the Mentor

Mentors are required to submit an annual Student Evaluation Form to the Steering Committee. These forms document completed course work, current grade point average, comprehensive exam dates and outcomes, research activity including publications and attendance at meetings, and student honors and awards. In addition, the evaluation includes comments on the student's overall performance and progress with specific suggestions for improvement where appropriate.

Faculty mentors are expected to provide a welcoming and supportive mentoring environment for students in the program, to provide adequate research resources for the trainees to accomplish their research goals, and to provide opportunities for exposure of their students to visiting faculty, the opportunity to attend various seminar series (especially those seminars related to Neuroscience), opportunities to go to meetings and present their work, and the time and opportunities to meet other requirements of the program. Mentoring also includes involving the trainee in all aspects of the work, including paper and grant writing, oral presentation, review, and the discussion of creative ideas and the intellectual property issues, as they are exercised in the mentors laboratory and in other laboratories.

2. Graduate Advisory Committee

During the Fall semester of the second year (first year in the graduate phase for MD/Ph.D. students), the student will form their graduate advisory committee. This committee provides additional guidance and expertise for the student, assists the student in determining appropriate electives, helps in the finalization of a dissertation project, and eventually, approves the dissertation.

The principal functions and responsibilities of the committee will include:

a Giving advice, counsel, and guidance during all phases of the dissertation research.
b Aid in planning and approving the student's curriculum
c. Evaluating the research paper submitted as the written comprehensive examination.
d. Administering the oral comprehensive examination.
e. Evaluating and approving of the dissertation research proposal.
f. Administering the final oral examination which constitutes the oral defense of the written

Ph.D. dissertation.

The composition of the committee is intended to reflect the scientific expertise needed to advise the student during their training. The committee consists of the student's advisor, two faculty members from the department in which the mentor has their primary appointment. The remaining two members must be from two different outside departments. All faculty serving on the committee must be members of the VCU Graduate Faculty. The Program Director serves as an ex officio on all student committees.

Selecting Advisory Committee members: To select Committee members, students access GradTrak and choose the faculty from the pull-down menu. Following submission of the list, GradTrak notifies the Program Director for approval.

Once formed, the student and advisor should call a meeting of the committee to review course work taken and the remaining course requirements, and to present the proposed research to be undertaken. At that time, the student's graduate advisory committee may decide if additional course work is required. The student should meet with their advisory committee as least once per year with an additional meeting no less than six months prior to the final dissertation defense. Any member of the committee or the student can request a committee meeting as needed. Minutes from the committee meetings must be taken and placed in the students file.

Student responsibilities

It is the responsibility of the student themselves with the following:

a. University guidelines
b. Examination scheduling deadlines and procedures
b. Blackboard
c. GradTrak
d. Completion of an Individual Development Plan (IDP)

The IDP is available from Science Careers at: http://myidp.sciencecareers.org/. This site will guide the student through the process of generating the IDP. The intent of the IDP is to:

a. Identify long-term career goals that fit their students skills, interests and values.
b. Make a plan for improving students skills.
c. Set Goals for the coming year to improve efficiency and productivity.
d. Structure productive conversations with mentors about career plans and development.

VIII. Program Administration

The Neuroscience Ph.D. Program is administered by the Neuroscience Steering Committee consisting of one faculty member from each of the major participating academic departments. Steering Committee members are selected by the Chairs of the major participating departments, Anatomy and Neurobiology, Biochemistry and Molecular Biology, Pharmacology and Toxicology, and Physiology and Biophysics. These departments house the major fraction of faculty participants and also host the majority of core and elective courses in the curriculum. In addition, a member from the Department of Psychology in the College of Humanities and Sciences is also appointed. The Steering Committee is chaired by the Graduate Program Director who is appointed by the Dean of the School of Medicine. The Office of

Graduate Education in the School of Medicine will provide oversight of the program to ensure that the composition of the Steering Committee and the identification of the Program Director will be sustained.

The Neuroscience Steering Committee is responsible for implementation and management of the curriculum, as described in this document, and for formulating new or amended policies and practices. In addition, the Committee conducts annual reviews of the program and curriculum as well as updating the list of faculty with Neuroscience Program affiliation. The Steering Committee meets at the end of each academic year to review student progress to ensure timely completion of program requirements and also meets, as necessary, to address any student issue.

The Neuroscience Steering Committee is responsible for identifying members of the Neuroscience Graduate Faculty. To be eligible, a faculty member must have at least one major research project which focuses on some aspect of Neuroscience.

IX. Support Guidelines

Only full time pre-doctoral graduate students in good academic standing (cumulative GPA of 3.0 or better) are eligible for support. Students are supported by the School of Medicine for their first two years in graduate school. Support after the second year needs to come from a fellowship to the student, or from funds made available by the principal investor whose laboratory the student has chosen to join. Support includes a stipend (the level is set by the Dean of the School of Medicine), health insurance, tuition and fees. Students receive a $1000 stipend increase after successfully passing their oral comprehensive exam and an additional $1000 if they are awarded a pre-doctoral fellowship. Students must maintain continuous enrollment (including summer) to receive support.

X. Training/Research Grant Requirements

Support by an NIH grant requires that students obtain instruction in the responsible conduct of research. Thus, it is required that all first year students (regardless of their source of support) take the University-sponsored course that is offered, either in the fall or in the summer. The required attendance information is maintained on file in the Curriculum Offices.

All students must obtain training in laboratory safety, for a level appropriate to the type of work they are doing. This includes radiation safety training if any work with radiation is involved. This latter training must occur PRIOR to the student working with radiation.

All students working with vertebrate animals must take the IACUC training course and be certified prior to working with animals in any laboratory, including rotations. They must be added to the principal investigators protocols that are relevant for the work they are doing. In addition, they must provide evidence of the training and appropriate laboratory protocols upon request.

All students working with Human Subjects must receive IRB certification, and have a current IRB protocol on file with the University IRB.

XI. Neuroscience Graduate Program Goals and Outcomes

Goal 1: Upon completion of the Neuroscience Ph.D. program, students will have demonstrated a mastery of Neuroscience and related Bioscience knowledge.

Outcome 1 Students will demonstrate acquisition of core knowledge presented in required and elective courses.

Outcome 2 Students will demonstrate the ability to integrate and comprehensively review the scientific literature.

Goal 2: Upon completion of the Neuroscience Ph.D. program, students will have developed effective oral, written and electronic communication skills.

Outcome 1 Students will prepare and deliver effective seminars and poster presentations.

Outcome 2 Students will generate an original dissertation and written comprehensive exam as well as prepare and publish high quality scientific manuscripts.

Goal 3: Upon completion of the Neuroscience Ph.D. program, students will have demonstrated the ability to formulate, design, implement and interpret experimental approaches.

Outcome 1 Students will evaluate existing scientific knowledge related to their project, identify a scientific question and formulate testable hypotheses.

Outcome 2 Students design experiments to test their hypotheses, carry out those experiments and interpret their results.

Goal 4: Upon completion of the Neuroscience Ph.D. program, students will have reached a level of competency to advance to positions as Neuroscience researchers and teachers in a broad spectrum of academic, industrial and government employment venues.

Outcome 1 Student will successfully obtain employment in a Neuroscience-related position.

XII. Program Review and Assessment

At the end of each academic year, the Neuroscience Steering Committee will meet to evaluate the goals and outcomes of the program. Based on the progress of students, the Committee will assess student's ability to:

Acquire the core knowledge of neuroscience
Demonstrate knowledge of the neuroscience scientific literature

Acquire competency of oral communication
Acquire competency of written communication
Demonstrate the ability to design experiments
Demonstrate the ability to conduct and interpret experiments
Success in obtaining employment

The results of the evaluation will be maintained on the VCU Assessmenet website. Any deficiencies in meeting the established measures will be recorded (Measures and Findings) and action plans established for the next evaluation cycle. In addition, the results of the evaluation will be shared with the Neuroscience faculty and the Chairs of the participating departments.