Program Description

Neuroscience is an interdisciplinary program, drawing on faculty and courses from many campus units, including the Colleges of Liberal Arts, Science, and Engineering, and the School of Medicine. Study programs lead to the Master of Science and the Doctor of Philosophy degree. The program provides training in the core foundations of neuroscience, ranging from cellular mechanisms to cognition and behavior, with a wide range of options for advanced training and specialization within specific subdisciplines.

The program is designed to provide training in fundamental concepts and methods in modern neuroscience, and emphasize interdisciplinary and integrative approaches which are seen as central to major advances in the field. The program also emphasizes the development of research skills that will position students to be competitive in academic and research-oriented careers. Student learning outcomes include 1) comprehensive understanding and ability to critically evaluate current knowledge and theories in neuroscience; 2) research skills to effectively identify, design and carry out independent research; and 3) professional development including communication and teaching, grant-writing, and ethics.

DOCTOR OF PHILOSOPHY DEGREE

A. Program Entrance Requirements

An applicant to the program at the doctoral level must meet all requirements established by the Graduate School. Students admitted to the program will be expected to have obtained at least a 3.0 undergraduate grade point average (4 point system), and a combined GRE score of 300 (2012 scoring system). Course preparation for the program will be determined on an individual basis. However, all students will be expected to have a basic background in science including a minimum of 3 semester credits each in Calculus, Physics, Chemistry, and Biology. Students lacking this background may be admitted with the provision that appropriate remedial coursework is completed.

B. Program Requirements

Academic requirements as determined by the Graduate School and the Program must be met by all program students. Required and elective courses must be chosen from the program curriculum outlined below, and the plan of study requires approval of the student’s advisor/examination committee and the program director.

Neuroscience Core Courses (46 units)

BIOL 675 - Neurobiology (3 units)
PSY 721 - Advanced Psychophysiology (3 units)
BIO/PSY/SOM - Journal club/ research presentations (4 units)
BIO/PSY/SOM - First year project (6 units)
BIO/PSY/SOM - Second year research (6 units)
BIO/PSY 799 - Dissertation research (24 units)
Courses meeting the first and second year research requirement:
BIOL 691 Independent study (6 units)
BIOL 792 Independent research (6 units)
BIOL 797 Thesis research (for MS degree)
CMPP 770 Research rotation (6 units)
CMPP 793 Independent study (3 units)
CMPP 797 Thesis research (for MS degree)
PSY 752 Graduate research (6 units)
PSY 755 Independent reading (9 units)
PSY 797 Thesis research (for MS degree)

Additional Course Requirements (8 units)
PSY 706 (or equivalent) - Statistics (3 units)
PSY/CS/BCH - Computing or bioinformatics options (3 units)
PHAR 725 - Ethics and scientific research (2 units)

Electives (18 units)
Note electives must include at least one course from each of the following clusters:

Cognitive Neuroscience (PSY)
PSY 627 - Computer applications (3 units)
PSY 709 - Comparative sensory neuroscience (3 units)
PSY 720 - Perception (3 units)
PSY 729 - Memory (3 units)
PSY 755 - Individual reading (multiple units)
PSY 761-3 - Special topics (multiple units)

Cellular and Molecular Neuroscience (BIO-CMB)
CMB 710 - Molecular cell biology (4 units)
BCH 704 - Molecular genetics (3 units)
BCH 706 - Functional genomics (3 units)
BCH 709 - Introduction to bioinformatics (3 units)
BIOL 677 - Genes, Brain and Behavior (3 units)
BIOL 676 - Clocks, Rhythms and Disease (3 units)
BIOL 650 - Special topics (Systems neuroscience) (3 units)
BIOL 671 - Neurobiology of Mental Illness (3 units)
BIOL 681 - Principles of animal behavior (3 units)
BIOL 654 - Genomic conflict, epigenetics (3 units)
BIOL 666 - Developmental biology (3 units)
BIOL 691 - Independent Study (3 units)
BIOL 705 - Current topics in cellular and molecular biology (multiple units)
BIOL 711 - Advanced cellular biology (3 units)
PHAR 710 - Molecular Pharmacology (3 units)

Offered every third year:
PHAR 730 - Introduction to Imaging and Optics (3 units)
CMPP 740 - Neuroeffector Pharmacology (3 units)
PHAR 750 - Molecular and Cellular Mechanisms of Excitability (3 units)

**Total units: 72**

General time-line for degree completion:

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<tr>
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<th>Fall Semester</th>
<th>Spring Semester</th>
<th>Summer</th>
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<tr>
<td><strong>1st Year</strong></td>
<td>• First year research project</td>
<td>• First year research project</td>
<td>• Written and Oral Qualifying Exam</td>
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<td>• Core coursework</td>
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<td>• Neuro Journal Club</td>
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<td><strong>2nd Year</strong></td>
<td>• Neuro Journal Club</td>
<td>• Neuro Journal Club</td>
<td>• Research</td>
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<td></td>
<td>• Advanced Graduate Coursework</td>
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<td><strong>3rd Year</strong></td>
<td>• Research</td>
<td>• Research</td>
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<tr>
<td><strong>4th Year</strong></td>
<td>• Research</td>
<td>• Dissertation Proposal / Fellowship Application</td>
<td>• Research / Thesis Defense</td>
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<td><strong>5th Year or beyond</strong></td>
<td>• Research / Thesis Defense</td>
<td>• Research / Thesis Defense</td>
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**Additional Program Requirements**

**First year research project**

Doctoral students in the Neuroscience program will complete 2 semesters of research in their first year. This is designed to expose students to research methods and questions in the discipline and to aid them in selecting an advisor.

**Second year fellowship application**

All doctoral students will be required to prepare and submit an application for an NSF graduate student fellowship (or equivalent) by the end of their second year. The application should be developed in collaboration with their faculty research advisor, and is designed both to build grant writing skills and develop their research program.

**Faculty Advisor and Thesis Committee**

Before the third semester in the program, each student must select a research/thesis advisor in consultation with the program directors and the desired faculty member, who must be an affiliate member of the program. The advisor will serve as chair of the student’s advisory/examination committee. The thesis committee must be chosen by the end of the third semester.

**Journal Club**

The journal club is designed to expose students to important current work in the field as well as familiarize them with diverse approaches and ongoing research within the program. The club is
also an important venue for students to present their own projects and develop their scientific communication skills. Active participation is required.

**Annual Research Retreat**

The Neuroscience program schedules an annual research retreat for graduate students, faculty, and research fellows. All graduate students are required to attend. Furthermore, students are required to present their research findings at this conference, either as a poster or talk, as determined by the retreat organizing committee. Graduate students who have completed their first or second year of studies may present their findings by either the poster or oral presentation method.

**Seminar Series**

The program also participates in an ongoing colloquium series hosting speakers from both within and outside the university. Graduate students play an active role in identifying the speakers and scheduling their visits as members of the Colloquium Committee, and are expected to attend the talks as well as additional opportunities to interact with the speakers.

**Continuous Enrollment**

Graduate students without an assistantship must enroll for three (3) graduate credits each fall and spring semester until graduation (this includes enrolling in three graduate credits in your final semester). Graduate students with an assistantship must enroll for six (6) graduate credits each fall and spring semester. Graduate students may also enroll in at least 1 credit during the summer sessions. For non-resident aliens who are not taxed, it is important to enroll in at least 1 credit in two of the three summer sessions to maintain student status and hence non-taxable status.

**C. Program Completion Requirements**

It is the student’s responsibility to fulfill all requirements in a timely manner, and all courses must be completed with a letter grade of B or higher. Failure to meet these requirements may result in academic probation, loss of funding, or dismissal from the program.

**Academic Requirements**

Academic requirements as determined by the Graduate School and the Program will be met by all Neuroscience students. Required courses will be chosen from core and elective courses as outlined above. The final decision on courses to be taken is made by each individual student’s advisory/examination committee, and approval by the program directors.

**Qualifying Exam**

Neuroscience graduate students are required to take a written and oral examination. However, students entering the program with a prior Masters degree are exempt from this requirement. The written exam will be offered at the end of the first year, and needs to be completed by June 30th. Students will have one week to complete the written section of the exam. If the scheduled time of the exam conflicts with travel, advisors may choose to reschedule the exam for a particular student. The advisor in this case would have to work with the exam committee to have the exam created and processed in a fair way.
The exams will be drawn from a test bank and will be an open book take-home exam. Details about the test bank will be specified elsewhere. Students will choose 5 out of 7 questions, and will provide an elaborate 1-page answer for each chosen question. The written answers will be graded anonymously by a Qualifying Exam Committee of 3 Neuroscience faculty to be appointed by the co-directors and the student's faculty advisor. This committee is also responsible for assembling and administering the exam each year. Students must pass 4 out of the 5 given questions to advance to candidacy. A student who fails the exam will be given one opportunity to retake the written exam within a month. Dates of make-up exams will be determined at the beginning of each fall semester. Any student failing the make-up exam may not continue in the Neuroscience Ph.D. program, and will be given the option to instead complete the requirements for an MS terminal degree.

After review of the graded exams, students who have failed the exam and wish to appeal the results must do so in writing to the Neuroscience co-directors within two weeks after notification of the results of the exam. Appeals will be decided by the co-directors and the Neuroscience steering committee. If the student's appeal is rejected, the student may then appeal the results to the Dean of the Graduate School.

The oral examination will be taken after successful completion (passing) of the written exam, and should also be completed by August 30th of the student's first year. The oral exam consists of presentation of the student's research or research plans, followed by questions based on their first year research project or planned research. It is the responsibility of the student to submit a request to his/her advisor to organize the oral examination, which will be conducted and evaluated by a committee composed of the Qualifying Exam Committee and the student's faculty advisor. If more than one negative vote is cast by members of the evaluation committee, the oral examination is failed. In case of failure, the committee can elect to not continue the student in the Ph.D. program or to allow the student one opportunity to retake the exam by the end of the student's third semester. Students who do not pass the oral exam will again be given the option to complete the requirements for an MS terminal degree.

Appeals for oral examinations proceed as with the written exam, with written appeal to the Neuroscience co-directors within two weeks of notification of the results of the exam. Appeals will be decided by the co-directors and Neuroscience steering committee, who will consult with the student and the examination committee before issuing a decision. If the student's appeal is rejected, the student may then appeal the results to the Dean of the Graduate School.

Qualifying Examination Schedule

The qualifying written and oral exam must be successfully completed and written notice of such, signed by each member of the exam committee, must be submitted to the NEUROSCIENCE program prior to registration for Semester IV. Registration and stipends (both research and teaching assistantships) will be blocked until written notice is provided. The fulfillment of this requirement is strictly the student's responsibility.

Dissertation Proposal and Advancement to Candidacy

During their 4th year, students should prepare a dissertation proposal outlining their planned research for the dissertation. The proposal should be written following the format of the NIH F31 Predoctoral Fellowship, and include the following sections: 1) project summary; 2) specific aims; 3) research strategy; and 4) references cited. In cases where a different funding agency is deemed by the student's committee to be more appropriate for the proposed work, the proposal
may instead be prepared in the format appropriate for that agency. Students are expected to give a seminar (either public or private as determined by the committee) on the proposed research and will then hold a private oral defense with their committee. Approval of the proposal by the committee will qualify the student to advance to candidacy. The plan of study may change during the course of conducting the dissertation research, but significant changes should be approved by the committee. Though not required, students are encouraged to submit their proposal as a full F31 (or equivalent) application to NIH, taking advantage of the feedback from their committee.

**Dissertation and Final Examination Requirements**

If a student has first author publications accepted in refereed journals at the time they have completed work, they may submit the publications to their thesis committee and petition to write an introduction to the work and have the dissertation consist of this introduction and the papers. The committee may decide that additional chapters be required along with the published papers. Prior to formally choosing a date for the final oral examination, graduate students must submit a copy of their final dissertation for review by their examining committee. The dissertation does not have to be in its final form, e.g. thoroughly referenced, perfect grammar, etc., but must contain sufficient information to allow their committee to make an informed decision about the state of completion of their studies. The purpose of the review is to discern whether a student has sufficiently completed their studies to announce a date for their final examination.

Following acceptance of the dissertation by the advisory/examination committee, all doctoral candidates in the Neuroscience program will schedule and present a research seminar on their dissertation research, which will be open to the general public. This seminar will constitute part of the final examination and must be presented while the candidate is still in residence. This seminar requirement is in addition to the final examination requirement of the Graduate School. Following the public portion of this seminar, the advisory/examination committee, expanded to include all appointed Graduate School representatives, will conduct a final oral examination in closed session. This oral examination will be so conducted as to meet all relevant examination requirements of the Graduate School. Doctoral candidates may register for one credit of Graduate Seminar during the semester in which this seminar is presented.

**D. Graduate Student Performance Standards**

All graduate students in the Neuroscience program are considered full-time scientists, and as such are expected to adhere to high standards of professional and personal behavior. Following are standards that are required of students, and disciplinary actions that may be taken if a student fails to measure up to these standards.

**Ethics**

All Neuroscience students are required to adhere to the scientific misconduct policy of the University of Nevada, Reno (Ethical Standards in the Conduct of Research). Failure to adhere to these standards may be grounds for removal from the program, at the discretion of the Program Directors.

**Disciplinary Actions**

In the event of a potential breach of ethics, evaluation of a student’s performance will be
determined by the Student Advisory Committee (SAC). The SAC may receive input from individual faculty and students. After preliminary considerations, the committee will inform the student of areas of concern, and may suggest disciplinary action. These can include i) probationary status, which may include loss of financial support and/or non-registration; ii) permanent expulsion from the program, which may be implemented without a probation period.

**MASTER OF SCIENCE DEGREE**

**A. Program Entrance Requirements**

An applicant to the program at the masters level must meet all requirements established by the Graduate School. Students admitted to the program will be expected to have obtained at least a 3.0 undergraduate grade point average (4 point system), and a combined GRE score of 300 (2012 scoring system). Course preparation for the program will be determined on an individual basis. However, all students will be expected to have a basic background in science including a minimum of 3 semester credits each in Calculus, Physics, Chemistry, and Biology. Students lacking this background may be admitted with the provision that appropriate remedial coursework is completed.

**B. Program Requirements**

Academic requirements as determined by the Graduate School and the Program must be met by all program students. Required and elective courses must be chosen from the program curriculum outlined below, and the plan of study requires approval of the student’s advisor/examination committee and the program directors.

**Neuroscience Core Courses (16 units)**
- BIOL 675 - Neurobiology (3 units)
- PSY 721 - Advanced Psychophysiology (3 units)
- BIO/PSY/SOM - Journal club/research presentations (4 units)
- BIO/PSY 797 - Thesis research (6 units)

**Additional Course Requirements (8 units)**
- PSY 706 (or equivalent) - Statistics (3 units)
- PSY/CS/BCH - Computing or bioinformatics options (3 units)
- PHAR 725 - Ethics and scientific research (2 units)

**Electives (6 units)** Note all electives cannot be taken from the cluster below:
- Cognitive Neuroscience (PSY)
- PSY 627 - Computer applications (3 units)
- PSY 709 - Comparative sensory neuroscience (3 units)
- PSY 720 – Perception (3 units)
- PSY 729 - Memory (3 units)
- PSY 755 - Individual reading (multiple units)
- PSY 761-3 - Special topics (multiple units)

**Cellular and Molecular Neuroscience (BIO-CMB)**
- CMB 710 - Molecular cell biology (4 units)
- BCH 704 - Molecular genetics (3 units)
- BCH 706 - Functional genomics (3 units)
- BCH 709 - Introduction to bioinformatics (3 units)
BIOL 677 - Genes, Brain and Behavior (3 units)
BIOL 681 - Principles of animal behavior (3 units)
BIOL 654 - Genomic conflict, epigenetics (3 units)
BIOL 666 - Developmental biology (3 units)
BIOL 691 - Independent Study (3 units)
BIOL 705 - Current topics in cellular and molecular biology (multiple units)
BIOL 711 - Advanced cellular biology (3 units)
PHAR 710 - Molecular Pharmacology (3 units)

Total Units = 30

Additional Program Requirements Thesis Research

Students in the Neuroscience MS program will complete 2 semesters of thesis research during their second year. In the first year, they have the option of earning elective credits for additional research in their first year, or substituting these credits with elective courses. MS students must complete a thesis based on an independent research project. The thesis must be defended orally before their examining committee.

Faculty Advisor

Before the third semester in the program, each student must select a research/thesis advisor in consultation with the program director and the desired faculty member, who must be an affiliate member of the program. The advisor will serve as chair of the student’s advisory/examination committee.

Journal Club

The journal club is designed to expose students to important current work in the field as well as familiarize them with diverse approaches and ongoing research within the program. The club is also an important venue for students to present their own projects and develop their scientific communication skills. Active participation is required.

Annual Research Retreat

The Neuroscience program schedules an annual research retreat for graduate students, faculty, and research fellows. All graduate students are required to attend. Furthermore, students are required to present their research findings at this conference, either as a poster or talk, as determined by the retreat organizing committee. Graduate students who have completed their first or second year of studies may present their findings by either the poster or oral presentation method.

Seminar Series

The program also participates in an ongoing colloquium series hosting speakers from both within and outside the university. Graduate students play an active role in identifying the speakers and scheduling their visits as members of the Colloquium Committee, and are expected to attend the talks as well as additional opportunities to interact with the speakers.

Continuous Enrollment
Graduate students without an assistantship must enroll for three (3) graduate credits each fall and spring semester until graduation (this includes enrolling in three graduate credits in your final semester). Graduate students with an assistantship must enroll for six (6) graduate credits each fall and spring semester. Graduate students may also enroll in at least 1 credit during the summer sessions. For non-resident aliens who are not taxed, it is important to enroll in at least 1 credit in two of the three summer sessions to maintain student status and hence non-taxable status.

C. Program Completion Requirements

It is the student’s responsibility to fulfill all requirements in a timely manner, and all courses must be completed with a letter grade of B or higher. Failure to meet these requirements may result in academic probation, loss of funding, or dismissal from the program.

Academic Requirements

Academic requirements as determined by the Graduate School and the Program will be met by all Neuroscience students. Required courses will be chosen from core and elective courses as outlined above. The final decision on courses to be taken is made by each individual student’s advisory/examination committee, and approval by the program directors.

Qualifying Exam

There is no qualifying exam requirement for students enrolled in a terminal Masters degree.

General Procedures and Examination Requirements

During the second semester of residence in the Neuroscience program, each MS student must select, in consultation with the program directors and the desired faculty member, a research/thesis advisor from among the program faculty. Selection depends on a mutual agreement between the student and the desired advisor, and the program cannot guarantee the availability of any particular advisor. This advisor will serve as chair of the student’s advisory/examination committee.

After having selected a research advisor, the student will arrange for one additional Neuroscience group faculty member to serve as an advisory/examination committee. At least one additional faculty will be appointed, representing the University at large, to meet Graduate School requirements. These additional appointments will be subject to approval of the committee chairperson (research/thesis advisor). Permanent constitution of the committee will be subject to the approval of the program directors. This committee will approve the final thesis, conduct the formal oral part of the thesis defense, and serve in an advisory capacity to the student during his or her tenure in the program.

Thesis Examination Requirements

Prior to formally choosing a date for the final oral examination, graduate students must submit a copy of their final thesis for review by their examining committee. The thesis does not need to be in its final form, e.g. thoroughly referenced, perfect grammar, etc., but must contain sufficient information to allow their committee to make an informed decision about the state of completion of their studies. The purpose of the review is to discern whether a student has sufficiently completed their studies to announce a date for their final examination. After
acceptance of the thesis (see Doctoral section for nature of thesis) by the advisory/examination committee, all MS candidates will schedule and present a research seminar on their thesis research which will be open to the public. This seminar will constitute part of the final examination and must be presented while the candidate is still in residence. Following the public portion of this seminar, the advisory/examination committee, expanded to include all appointed Graduate School representatives, will conduct, in closed session, a final oral examination, which will be so conducted as to meet all relevant examination requirements of the Graduate School.

**Non-thesis MS option**

In rare cases where the student’s advisor and committee deem it is not possible for the student to complete a research project for their thesis, at the discretion of the program the student may be allowed to complete a non-thesis MS degree. This option must be approved by the faculty advisor for the degree and by the program directors. Under this option the student will take additional course work in lieu of the thesis credits, and will prepare and defend a substantive critical review of the literature on a relevant topic in neuroscience. The specific topic and format of the review should be developed with and approved by the faculty advisor and committee. Award of the degree will be contingent on approval of the review by the committee.

**D. Graduate Student Performance Standards**

All graduate students in the Neuroscience program are considered full-time scientists, and as such are expected to adhere to high standards of professional and personal behavior. Following are standards that are required of students, and disciplinary actions that may be taken if a student fails to measure up to these standards.

**Ethics**

All Neuroscience students are required to adhere to the scientific misconduct policy of the University of Nevada, Reno (Ethical Standards in the Conduct of Research). Failure to adhere to these standards may be grounds for removal from the program, at the discretion of the Program Directors.

**Disciplinary Actions**

In the event of a potential breach of ethics, evaluation of a student’s performance will be determined by the Student Advisory Committee (SAC). The SAC may receive input from individual faculty and students. After preliminary considerations, the committee will inform the student of areas of concern, and may suggest disciplinary action. These can include i) probationary status, which may include loss of financial support and/or non-registration; ii) permanent expulsion from the program, which may be implemented without a probation period.

**GRADUATE SCHOOL FORMS**

You will need to become familiar with a set of forms from the Graduate School. They can be obtained from this website: http://www.unr.edu/grad/forms/

**As you progress through the program:**

- Graduate Credit Transfer Evaluation Request Form
- Program of Study Requirements (instructions & form)
- Change in program of Study
Change of Advisory Committee
Doctoral Degree Admission to Candidacy/Comprehensive Examination Report
Application for Leave of Absence

For PhD graduation:
Doctoral Committee Approval page (5 committee members)
Doctoral Committee Approval page (6 committee members)
Doctoral Microfilming Agreement (Only if you are submitting paper, print this)
Doctoral Complete Microfilming Agreement (see online form)
Doctoral Degree Notice of Completion
Doctoral Final Review Approval transmittal
Survey of Earned Doctorates (see online form)
Exit Survey

For MS graduation:
Master's Committee Approval page (3 committee members)
Master's Committee Approval page (4 committee members)
Master's Microfilming Agreement (Only if you are submitting paper, print this)
Master's Complete Microfilming Agreement (see online form)
Master's Degree - Notice of Completion
Master's Final Review Approval transmittal
Exit Survey