###### Ph.D. DEGREE

A Doctor of Philosophy (Ph.D.) degree, earned for scholarship and independent research in the Interdisciplinary Graduate Program in Biomedical Sciences (IGPBS)-Neuroscience (NSC) Doctoral Graduate Program is conferred by the Office of Graduate Studies. The NSC Doctoral Graduate Program is one of seven doctoral graduate programs that comprises IGPBS and is hosted by the Department of Pharmacology and Experimental Neuroscience.

The NSC Doctoral Graduate Programprovides foundational knowledge about biochemical, cell biology and physiological of neuronal and their interactions with immune cells. Research is also conducted in many areas of neuroscience including neuronal development, neuro-signaling, behavioral and cognitive and visual neuroscience, autonomic neuroscience, and neurological disorders. This research can be conducted in clinical and laboratory settings using unique animal models. This diversity of research interests offers a variety of distinctive and highly individualized opportunities for graduate training for the Ph.D. degree in the NSC Doctoral Graduate Program.

The NSC Doctoral Graduate Program involves over 70 faculty members across campus providing a high faculty/student ratio, while promoting an excellent environment for collegial interactions and stimulating exchanges of ideas. We also have strong working relationships with the [University](http://www.unomaha.edu/) of Nebraska Omaha, the [University](http://www.unl.edu/) of Nebraska Lincoln, and and can provide our students with even greater opportunities for collaborative research efforts.

Graduate students in the NSC Doctoral Graduate Program are firmly grounded in the basic principles of neuroscience, biochemistry, molecular biology, immunology, physiology, pharmacology, and medicinal chemistry. Through individual research efforts, students learn how to design experiments to test hypotheses, collect and analyze data, discover new knowledge and effectively communicate the scientific information. The doctoral training program prepares students to pursue successful independent research in academia, industry and regulation.

The Ph.D. degree is earned primarily through the pursuit of excellence in a specific field of scholarship, which involves the demonstrated ability to conduct independent research. On average, five full years of graduate study is typically required to complete a program for a Ph.D. degree for a student who enters the program. The Ph.D. degree must be completed within seven years from the date of initial registration.

**A. Admission requirements:**

Admission to the NSC program requires a Bachelor's degree from an accredited undergraduate institution with a recommended minimum GPA of 3.25 on a 4.0 grading scale.  Students should have completed undergraduate courses in biology, psychology, neuroscience, and chemistry. Official transcripts from **all** colleges/universities attended and three (3) letters of recommendation are also required.

For international applicants, a minimum TOEFL score of 95, with no less than 20 in any single section, or, an IELTS minimum overall score of 6.5, is recommended.  International students must also have their transcripts evaluated by credential evaluation service for translation and US.  The transcript evaluation must be a course-by-course evaluation that identifies and describes each diploma or certificate.  We will accept evaluations from World Education Services (WES), Educational Credential Evaluators (ECE), International Education Research Foundation (IERF) or Validential Sales.

The GRE is ***not required*** for NSC applicants, both domestic and international.  However, if an applicant chooses to submit GRE scores, the scores will be considered during application review.

If you choose to submit a GRE, the minimum GRE requirements that we are looking for are: a 60% average between the verbal and quantitative scores, with no less than 35% in either category.

### Application Process:

Applications to the NSC Doctoral Graduate Program are submitted through the [Interdisciplinary Graduate Program in Biomedical Sciences (IGPBS)](http://www.unmc.edu/igpbs/). Detailed application instructions are published on Graduate Studies admissions web site[: http://www.unmc.edu/gradstudies/admissions/how-to-apply/index.html](file:///E%3A%5CGeoff%20010115%5CGraduate%20Students%20Students%20Fellows%20and%20Residents%5CInterdisciplinary%20Immunology%2C%20Pathology%20and%20Infectious%20Disease%20program%20committee%5CPhD%20Description%5C%3A%20%20http%3A%5Cwww.unmc.edu%5Cgradstudies%5Cadmissions%5Chow-to-apply%5Cindex.html)

International applicants may apply to study for a Ph.D. degree if they meet the requirements of a four-year B.S. degree or equivalent and the other criteria listed in Section A. Graduate Studies Office provides further information regarding English language proficiency and transcript submission for [international applicants.](https://www.unmc.edu/gradstudies/admissions/international-students/index.html)

After review of a complete application packet (including personal narrative, resume, undergraduate transcripts, three letters of recommendation and TOEFL/IELTS score report for international students), competitive applicants will be interviewed either in person (usually domestic) or via Zoom (usually International Students not residing in the USA). After the interview, applicants will be notified by email. The Graduate Studies Office will send a letter of admission and admission certificate (if admitted), or a letter of rejection (if not admitted) based on the decision of the Graduate Committee. Admitted students can accept our offer or decline the offer.

**C. Following Acceptance into the NSC Doctoral Graduate Program:**

Upon the student’s acceptance, he/she will be expected to rotate through three laboratories for a brief research experience (5-6 weeks). Students will meet with the Chair of the Graduate Committee or with a member of the Graduate Committee to assist in selecting three laboratories for rotation. Near completion of the rotations, the student will select an advisor from one of the three laboratories, contingent upon mutual agreement between the student and the faculty director of the laboratory. The funding available for research and for student support should be discussed. The Compact should be signed between the advisor and the student that discussed expectations, goals and milestones.

After an advisor has been selected, the student (with approval of the advisor) selects a Supervisory Committee. The minimum requirement for committee composition is:

1) Five Graduate Faculty Fellows

2) The Supervisory Committee members must be members of the NSC Program and doing neuro-

 related research

3) At least two of the Supervisory Committee members must be at the Associate Professor rank or

 higher and at least one must be from outside the Mentor’s department

Following approval from Graduate Committee Chair and Graduate Studies Office, the supervisory committee will meet within six weeks to discuss and approve the student’s Program of Studies for their entire Ph.D. program.

Students are required to complete the following steps in sequential order:

* Select an advisor
* With advisor’s input, form the Supervisory Committee.
* In consultation with the advisor and Supervisory Committee, determine an appropriate Program of Studies.

 The Chair of the NSC Doctoral Graduate Program will review and approve each step via Seguidor.

Every semester, each NSC Doctoral program student will be responsible for ensuring that he/she is enrolled in at least 9 credit hours each semester. Specific curriculum requirements are below.

Students complete registration on-line via [MyRecords](http://www.unmc.edu/gradstudies/current/welcome-to-MyRecords.html). The students are required to obtain the instructor’s permission code, when applicable, for each course in which they enroll. Students must register for each semester and class they plan on attending in order to use UNMC facilities.

# D. Required Curriculum:

Prior to each semester, The Graduate Studies Office and the NSC Doctoral Program Coordinator sends an announcement to students regarding registration and other pertinent information for the upcoming semester. The courses available for that semester are listed in MyRecords only. As mentioned above, a student must consult with their advisor and Supervisory Committee to obtain an approved ‘Program of Studies’.

**All Ph.D. students in the NSC Doctoral Graduate program** are required to take a minimum of seven graded courses.

The required core courses

* Fundamentals of Cellular Processes (IPBS 805)
* Success Skills for Graduate Students (IPBS 860)
* Methods in Neuroscience (NSC 820)
* Molecular and Cellular Neuroscience (NSC 922)
* Systems Neuroscience (NSC 932)
* A Statistic course (for clinical research students PSYC 9020 or equivalent, for basic science

 students BIOS 806 or equivalent)

* Six semesters (three years) of Journal club (NSC 911)
* A minimum of 8 semesters (four years) of Seminars (NSC 970)

Elective courses

* Two additional courses based on research interest, including one at the 900 level

NSC Doctoral Graduate students must also complete UNMC’s Responsible Conduct in Research (RCR) to graduate with their PhD.

**1st Year, 1st Semester (9 credit hours)**

* NSC 820 Current Methods in Neuroscience (2 credits)
* NSC 970 - Seminar (1 credit)
* NSC 911 - Journal Club (1 credit)
* NSC 896 - Research other than thesis (1 credit)
* IPBS 805 - Fundamentals of Cellular Processes (3 credit)
* IPBS 860 – Success Skills for Graduate Students (1 credit)

**1st Year, 2nd Semester (9 credit hours)**

* NSC 922 Molecular and Cellular Neuroscience (3 credits)
* NSC 932 Systems Neuroscience (3 credits) – Students may elect to take this course in their 2nd year, 2nd semester
* NSC 970 Seminar (1 credit)
* NSC 911 Journal Club (1 credit)
* NSC 999 Research other than thesis (1-3 credits)

**1st Year, Summer Semester (9 credit hours)**

* A Statistic Course (PSYC 9020 offered at UNO for students planning on doing clinical research or any statistics course offered at UNMC)

**2nd Year, 1st Semester (9 credit hours)**

* Elective courses (max 6 credits), the student and supervisory committee can decide on courses). Examples include but not limited to

[IPMM 916](https://catalog.unmc.edu/search/?P=IPMM%20916) - Cardiopulmonary Function in Health & Disease,

[IPMM 922](https://catalog.unmc.edu/search/?P=IPMM%20922)- Redox Biology in Human Disease,

[MGCB 912](https://catalog.unmc.edu/search/?P=MGCB%20912) - Modern Approaches in Cell Biology & Molecular Genetics,

[NSC 930](https://catalog.unmc.edu/search/?P=NSC%20930) – Neuroimmunology,

[Phar 901](https://catalog.unmc.edu/search/?P=PHAR%20901) -- Receptor & Cell signaling

[Phar 902](https://catalog.unmc.edu/search/?P=PHAR%20902) - Human Specific Disease Modeling in Mice

NSC 913 – Data Science for Biomedical Researchers

900 levels courses are usually 2 or 3 credit hours, and a comprehensive list is provided on MyRecords

* NSC 970 Seminar (1 credit)
* NSC 911 Journal Club (1 credit)
* NSC 999 Doctoral Dissertation Research (1-3 credits)

Student should also assemble the Supervisory Committee and start planning for Comprehensive exam. The Supervisory Committee must meet every six months and a written report indicating if progress was satisfactory or not must be uploaded to Seguidor within one week after the meeting.

**2nd Year, 2nd Semester (9 credit hours)**

* Elective course(s) (up to 6 credits, Students and Supervisory committee can decide on courses)
* NSC 932 Systems Neuroscience (3 credits) if not taken 2nd semester of 1st year
* NSC 970 Seminar (1 credit)
* NSC 911 Journal Club (1 credit)
* NSC 999 Doctoral Dissertation Research (1-3 credits)

**Completion of comprehensive exam by the end of summer of 2nd year**

**3rd Year, 1st Semester (3 credit hours)**

* NSC 970 Seminar (1 credit)
* NSC 911 Journal Club (1 credit)
* NSC 999 Doctoral Dissertation Research (1 credit)

**3rd Year, 2nd Semester (3 credit hours)**

* NSC 970 Seminar (1 credit)
* NSC 911 Journal Club (1 credit)
* NSC 999 Doctoral Dissertation Research (1 credit)

**4th Year, 1st Semester (2 credit hours)**

* NSC 970 Seminar (1 credit)
* NSC 999 Doctoral Dissertation Research (1 credit)

**4th Year, 2nd Semester (2 credit hours)**

* NSC 970 Seminar (1 credit)
* NSC 999 Doctoral Dissertation Research (1 credit)

**5th Year, 1st Semester (2 credit hours)**

* NSC 970 Seminar (1 credit)
* NSC 999 Doctoral Dissertation Research (1 credit)

**5th Year, 2nd Semester (2 credit hours)**

* NSC 970 Seminar (1 credit)
* NSC 999 Doctoral Dissertation Research (1 credit)

**MD/PhD Students** required to take a minimum of four graded courses, with at least three at the 900 level.

The required core courses

* NSC 922 Molecular and Cellular Neuroscience I (3 credits) (This course may be waived for MD/PHD students based on medical school curriculum.)
* NSC 932 -System Neuroscience (3 credits)
* A Statistic Course (PSYC 9020 offered at UNO for students planning on doing clinical research or any statistics course offered at UNMC)
* The thesis committee could also suggest additional course(s), depending on the student’s academic goals
* Six semesters of (three years) of Journal club – NSC 911
* A minimum of 8 semesters (four years) of Seminars – NSC 970

Elective course

* One 900 level

NSC Doctoral Graduate students must also complete UNMC’s Responsible Conduct in Research (RCR) to graduate with their PhD.

**G1- 1st Year, 1st Semester (9 credit hours)**

* A Statistic Course (PSYC 9020 offered at UNO for students planning on doing clinical research or any statistics course offered at UNMC)
* NSC 970 - Seminar (1 credit)
* NSC 911 - Journal Club (1 credit)
* NSC 999 - Research other than thesis (4 credit)
* Any 900 elective course offered in Fall and approved by the Mentor
* Each student must also assemble a Supervisory Committee and start planning for Comprehensive exam

**G1, 1st Year, 2nd Semester (9 credit hours)**

* NSC 932 -Systems Neuroscience (3 credits) – Can be delayed until 2nd semester of 2nd year
* NSC 922 Molecular and Cellular Neuroscience (3 credits)
* NSC 970 Seminar (1 credit)
* NSC 911 Journal Club (1 credit)
* NSC 999 Research other than thesis (1 credits)

**G2- 2nd Year, 1st Semester (9 credit hours)**

* NSC 970 Seminar (1 credit)
* NSC 911 Journal Club (1 credit)
* NSC 999 Doctoral Dissertation Research (7 credits)
* Any course-related to research and approved by Supervisory Committee (not a requirement)

**G2- 2nd Year, 2nd Semester (9 credit hours)**

* NSC 970 Seminar (1 credit)
* NSC 911 Journal Club (1 credit)
* NSC 999 Doctoral Dissertation Research (1-3 credits)

**Completion of comprehensive exam (end of summer of 2nd year)**

**G3- 3rd Year, 1st Semester (3 credit hours)**

* NSC 970 Seminar (1 credit)
* NSC 911 Journal Club (1 credit)
* NSC 999 Doctoral Dissertation Research (1 credit)

**G3- 3rd Year, 2nd Semester (3 credit hours)**

* NSC 970 Seminar (1 credit)
* NSC 911 Journal Club (1 credit)
* NSC 999 Doctoral Dissertation Research (1 credit)

**G4- 4th Year, 1st Semester (2 credit hours)**

* NSC 970 Seminar (1 credit)
* NSC 999 Doctoral Dissertation Research (1 credit)

**G3- 4th Year, 2nd Semester (2 credit hours)**

* NSC 970 Seminar (1 credit)
* NSC 999 Doctoral Dissertation Research (1 credit)

**Student Seminar Requirements**

All graduate students (MD/PHD and PHD) must give two seminars prior to dissertation defense. For PHD students, a half hour seminar in their third year and a one hour seminar in their fourth year. For MD/PHD students, a half hour seminar after 2.5 years of their education and a one hour seminar at least six months prior to their defense. These seminars help the program track a student’s research progress.

**Responsible Conduct in Research (RCR) training:**

All Ph.D. graduate students must complete the Responsible Conduct in Research (RCR) training once during their program. This is a Graduate College requirement in addition to the coursework described above. RCR training is offered every fall and spring semester. Students can sign in following instructions in an e-mail notification from Graduate Studies

**Grading:**

A grade of B or higher is expected in each of the NSC core courses taken, with the exception of those listed as Pass/Fail.

**Changes to curriculum:**

NSC-Doctoral Graduate Students must complete the required courses. Any change in this requirements must be requested and approved by the Graduate Committee following a petition by the student and their supervisory committee.

**Semi-annual meetings and progress report:**

Students are required to meet with their supervisory committee ever six months (maybe start or end of each semester) and a written report indicating if progress was satisfactory or not and be uploaded to Seguidor within one week after the meeting.

**E. Comprehensive Examination. See additional document for more details on format and examination.**

1. Ph.D. and M.D./Ph.D. students must pass their comprehensive examination by the end of year 2 after the start of their program. Students need to have completed all their required and elective courses prior to scheduling their comprehensive examination.
2. The comprehensive examination will consist of review and oral defense of a research grant application written by the student using the [National Institute of Health (NIH) investigator-initiated research grant proposal (R01) format](http://grants1.nih.gov/grants/forms.htm). Note: students do not need to complete a budget or other forms. The subject matter of the research grant application must be approved by the student’s Supervisory Committee and may be on the student research project, providing that this project is not currently funded. If the project the student is working on is based on a funded grant that the Mentor has, then the subject matter for the comprehensive exam could be peripheral to the student research project.

The Supervisory Committee must approve the specific aims of the grant application before the full proposal is written and provide critiques of the full application before the comprehensive examination is scheduled. The total time from approval to comprehensive exam should be three months and the student should plan appropriately to complete the comprehensive exam by end of Summer of year 2. If necessary, the student could apply to the NSC-Graduate Committee (Dr. Keshore Bidasee) for up to three months extension.

Suggested plan for Comprehensive Exam.

1. Meet with your thesis committee at the start of the 2nd semester of 2nd year and discuss ideas for Comprehensive Exam
2. Send list of possible research topics to the committee by early February and for feedback within two weeks
3. By end of February finalize and topic
4. Start in early March to develop the specific aims around the topic
5. Send Specific Aims to Committee by End of March and request approval within two weeks. Indicate to Graduate Studies your intention to do comprehensive exam.
6. Set date for comprehensive exam well in advance for end of summer of the 2nd year or shortly after start of year 3.

There is a high expectation that the research proposal will explore new areas of interest. It is also expected that the hypothesis for the proposed research will be the result of a comprehensive review of the literature. Supporting data should be drawn from the students work (or literature) that is current and relevant to the topic.

The Comprehensive Exam Committee will consist of the student’s Ph.D. Supervisory Committee. **The Mentor will serve as a moderator of the Comprehensive Exam.**

1. The Examination consists of a closed room oral presentation by the student and questions by the Supervisory Committee.
2. During the oral defense of the comprehensive exam, the mentor can be present but not allowed to ask questions/add input to the student answers. After the mentor's questions, the student will leave the room and the mentor could provide confidential comments to the Supervisory committee. The Supervisory committee votes on the examination outcome.
3. The oral examination will include questions concerning the material in the research proposal, but must also include a general examination of the student’s area of research interest and graduate course studies, (e.g. neuroscience, virology, immunology, genetics, pathobiology, pharmacology etc). Students must be prepared to be tested on knowledge in areas beyond the research proposal.
4. The Examination Committee will use the Neuroscience Comprehensive Exam Report Rubric listed below to determine which level the student is performing.
5. If **two** or more members of the Examination Committee recommends failure in a comprehensive examination or defense of thesis (final oral examination), the student shall be considered to have failed the examination. In the event of failure, the examining committee will, within seven days, recommend to the Dean for Graduate Studies whether the student should be given the option of retaking the examination. If so, the committee will identify and clearly communicate the areas of weakness, which require special attention and any remedial actions, which the student needs to complete prior to re-examination. **Note that examining committees have only the options of pass, fail, or fail with recommendation to the Dean that the student be allowed to repeat the examination.**
6. The student’s Examination Committee members are responsible for evaluating the performance of the student and entering the exam outcome into [Seguidor](https://seguidor.unmc.edu/seguidor/public/page_home.php) individually within seven days of the exam. Students who pass the comprehensive examination and have also completed all course requirements will be admitted to candidacy for the Ph.D. degree.

**Time line:**

1. Students must follow specific deadlines defined in the NSC comprehensive examination guidelines
2. The proposal must be defended by the end of the 3rd year from the start date of entering the program. If the exam is failed, the student, with the approval of their Examination Committee, should defend a second attempt within the following three months.

**Sample Comprehensive Examination Report\***

To be completed by the student’s PhD Supervisory Committee upon completion of the Comprehensive Examination

The PI (mentor) and the student should not be in the room during the grading of the student.

Committee Member’s Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 1 to 5 scale, 1= strongly disagree, 5= strongly agree, 3 = neutral | 1 |  | 2 | 3 | 4 | 5  |
| 1. The student displays a strong general scientific background in their chosen discipline |   |  |   |   |   |   |
| 2. The student displays a strong in-depth understanding of their research area |   |  |   |   |   |   |
| 3. The student displays a strong capacity to think logically and creatively in the construction of experiments and interpretation. |   |  |   |   |   |   |
| 4. The student has strong written communication skills |   |  |   |   |   |   |

**F. Needed for Graduation:**

Prior to Dissertation Defense, the student should ensure that he/she has at least one-first authored research publication on Pubmed.

GPA of 3.0 in all NSC core courses.

After completion of a body of research, the Ph.D. student has to write and defend a dissertation. The dissertation research is presented to an audience of peers and faculty members and the public. The student will defend the premise, methods, results and conclusions of their research. After the presentation and defense, the Examination Committee (Supervisory Committee plus one faculty member outside the student’s Supervisory Committee as well as a member of the Graduate Committee) meets to determine if the student has adequately presented and defended their research, and whether their knowledge of the research problem and defense of the work was appropriate for granting the Ph.D. The committee may give suggestions concerning the dissertation and suggest changes, additions, deletions, etc. If more than one member recommends failure in a defense of dissertation (final oral examination), the student shall be considered to have failed the examination. In the event of failure, the examining committee will, within seven days, recommend to the Dean for Graduate Studies whether the student should be given the option of retaking the examination. If so, the committee will identify general areas of weakness, which require special attention and any remedial actions that the student needs to complete prior to re-examination. **Note that examining committees have only the options of pass, fail, or fail with recommendation to the Dean that the student be allowed to repeat the examination.**

Following defense of the dissertation, Student’s Exam Committee members are responsible for entering the exam outcome into Seguidor individually within seven days of the exam. The Supervisory Committee Members, Advisor, and the Chair of the Graduate Committee will sign the “Report on Doctoral Degree” form, which will be submitted to the Graduate Studies Office with all other required documentation, which are listed in ‘[Dissertation & Graduation Instructions for Ph.D. Candidates](http://www.unmc.edu/gradstudies/current/degree-requirements/phd/Dissertation-Graduation-Instructions-PhD-Candidates-May2015.pdf)’ document.

**G. Retaking Examinations:**

No student shall be permitted to take either the comprehensive examination or defense of dissertation (final oral examination) more than twice. If re-examination is recommended and approved, the student must wait a minimum of three months before retaking the examination. The same committee will give the re-examination unless the Supervisory Committee responsible for the student's program recommends and the Dean for Graduate Studies approves a substitution.

**Doctoral Degree Timeline**

UNMC Graduate Studies office as well as the NSC program coordinator oversees students’ progress. Detailed instructions for students to stay on track is provided on Graduate Studies web page: [**Doctoral Degree Timeline**](https://www.unmc.edu/gradstudies/current/degree-requirements/phd-timeline.html)

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