

NEUROSCIENCE (HERSHEY)

Joint Degrees

Joint M.D./Ph.D. with the college of Medicine

Requirements listed here are in addition to requirements listed in GCAC-211 Joint Degree Programs (<https://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/gcac-211-joint-degree-programs/>).

Admission Requirements

Applicants to the joint M.D./Ph.D. degree program must apply and be admitted to both the Neuroscience graduate program and the College of Medicine.

Students interested in simultaneously pursuing an M.D. and Ph.D. degree must apply to the College of Medicine M.D. program using the national American Medical College Application Service (AMCAS) application system and indicate their intent to pursue the joint degree program. Admission requirements and applications for admission for Penn State College of Medicine are available at the M.D. Program (<http://med.psu.edu/md/>) section of the Penn State College of Medicine website. The College of Medicine M.D./Ph.D. Admissions Committee reviews applications and evaluates applicants for acceptance into both the M.D. and Ph.D. program. Students not accepted into the joint degree program can be referred to either the M.D. or Ph.D. program, depending on their qualifications and interests.

After the review committee has accepted an applicant to the joint degree program, they must apply and be admitted to the Graduate School (<http://www.gradschool.psu.edu/prospective-students/how-to-apply/>) for admission to the graduate program. Requirements for the joint degree, additional to the general admission requirements for the Ph.D. degree, are:

- **Academic Achievement.** Applicants to our program generally have very strong grades and MCAT scores. In recent years, successful applicants have an average GPA of 3.75 and total MCAT scores of >85 percentile.
- **Research Experience.** We are especially interested in students with a strong and sustained background in research. Students who have spent 1-2 years after graduation conducting research are strongly encouraged to apply. Alternatively, in-depth research experience as an undergraduate can suffice.
- **Recommendations.** We are especially interested in receiving letters of recommendation from faculty with whom you conducted research and who can comment on your passion and potential for research.
- **Goals.** Applicants must be able to clearly articulate the reasons for pursuing the joint degree.
- **International Students.** All qualified students are eligible to apply regardless of citizenship.

Degree Requirements

Students must fulfill all requirements for each degree in order to be awarded that degree, subject to the double-counting of credits as outlined below. Degree requirements for the M.D. program are listed on the M.D. Program (<http://med.psu.edu/md/>) section of the Penn State College of Medicine website.

During the first two years of medical school, the student conducts at least three research rotations. In addition, students are required to take BMS 506A and BMS 506B during the M1 (Spring) and M2 (Fall), as well as either a 1 credit course in genetics or immunology. After successful

completion of the first two years of medical school, the student joins their dissertation lab in the Neuroscience graduate program.

During the summer after the second year of medical school M.D./Ph.D. students take Step 1 of the United States Medical Licensing Examination (USMLE), which serves in lieu of the knowledge-based portion of the qualifying examination for the Neuroscience program.

The Ph.D. committee of an M.D./Ph.D. student in the Neuroscience program is formed upon entry into the dissertation laboratory. In addition to the general Graduate Council requirements for Ph.D. committees (<http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation/>), the committee must include at least two members of the Neuroscience program Graduate Faculty and one M.D./Ph.D. steering committee member.

In addition to taking the required courses NEURO 590, BMS 591, and PHS 520, students are required to take the core neuroscience courses: NEURO 521 and NEURO 522. A minimum of 4 elective credits is required. Other elective courses are selected in consultation with the student's dissertation adviser and Ph.D. committee.

Code	Title	Credits
Required Courses		
NEURO 520	Cellular and Molecular Neuroscience	3
NEURO 521	Systems Neuroscience	3
NEURO 522	Seminars in Neuroscience I	2
NEURO 524	Neuroscience Bootcamp	2
NEURO 590	Colloquium	2
BMS 591	Biomedical Research Ethics	1
PHS 520	Principles of Biostatistics	3
Electives		
A minimum of 4 elective credits is required. Other elective courses are selected in consultation with the student's dissertation adviser and Ph.D. committee.		4
Total Credits		20

The Neuroscience program will accept passing grades in the medical school courses SPM 711 (11 cr.) and NBS 723 (3 cr.) in lieu of following 9 required credits for the Neuroscience Ph.D.:

Code	Title	Credits
BMS 501	Regulation of Cellular & Systemic Energy Metabolism	3
BMS 502	Cell and Systems Biology	3
NEURO 511	Neurobiology II	3

M.D./Ph.D. students are not required to take NEURO 602 (1 cr.).

The M.D./Ph.D. student prepares a written comprehensive examination in the format of a grant application and gives an oral presentation of this proposal to their Ph.D. committee.

M.D./Ph.D. candidates are required to have at least one paper accepted for publication in a major peer-reviewed scientific journal prior to the final oral examination, and this must be accepted before they return to the third year of medical school. A student may petition to waive this requirement due to extenuating circumstances (e.g., adviser relocation, abnormal issues with publication process). All waivers must be approved

by the Vice Dean for Research and Graduate Studies of the College of Medicine.

A dissertation must be prepared and defended by each M.D./Ph.D. candidate prior to returning to the M3 year of medical school. The dissertation must be accepted by the Ph.D. committee, the head of the graduate program, and the Graduate School, and the student must pass the final oral examination (the dissertation defense).

If a student decides not to return to medical school, or for some other reason is not able to complete the last two years of medical school, but they have successfully completed their Ph.D. dissertation and final oral examination and met all other degree requirements of the Neuroscience program, they will be able to complete the Ph.D. The latter will be conferred after the student notifies the program that she/he wishes to withdraw from the M.D. program and completes all requirements for conferral of the graduate degree.