Requirements for Graduate Students in the Vanderbilt Psychological Sciences Program

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I. Overview

This handbook outlines the requirements for graduate students in Psychological Sciences at Vanderbilt. Discussed are course requirements, milestones (e.g., the qualifying exam), and several additional issues related to the rights and responsibilities of graduate students. The development of an integrated program is an evolving process. Thus, this document will be periodically updated, based on changes that are approved by a vote of the Psychological Sciences faculty. It is the responsibility of the Directors of Graduate Study in the two departments to incorporate such changes into revisions of this document and to inform students and faculty about such revisions. It is the responsibility of the students to read the updated handbook and be aware of the revisions.

II. Areas of Specialization

Faculty members and graduate students are each associated with at least one of our six areas of specialization (denoted as programs or areas in the sections below): Clinical Science, Cognition and Cognitive Neuroscience, Cognition in Context, Developmental Science, Neuroscience, and Quantitative Methods.

Faculty members from the Departments of Psychology and Psychology and Human Development can contribute to multiple programs. Graduate students are admitted to a specific college, department, and program. Typically, they receive financial support from their home department and college. A common set of core requirements applies regardless of departmental affiliation. Students must meet the requirements both for the graduate program in Psychological Sciences as a whole and for the specific area to which they belong.

III. Accreditation

The Clinical Science program in the Department of Psychology and the Department of Psychology and Human Development is fully accredited and approved by the American Psychological Association and the Psychological Clinical Science Accreditation System.[1]

Vanderbilt University is accredited by the Commission on Colleges of the Southern Association of Colleges and Schools. Vanderbilt is a member of the Association of American Universities.

[1] Office of Program Consultation and Accreditation, American Psychological Association, 750 First Street NE, Washington, DC 20002-4242; phone: (202) 336-5500; website: http://www.apa.org/ed/accreditation Psychological Clinical Science Accreditation System (PCSAS) Indiana University, 1101 E. 10th Street Bloomington, IN 47405; website: https://www.pcsas.org/accreditation/

IV. Training Objectives and Mechanisms

The primary objective of graduate training is to promote the development of the necessary conceptual and methodological skills that will allow our graduates to function as independent scientists who conduct innovative and important research. Consistent with this goal, we expect our graduate students to be continually involved in research throughout their graduate training and to develop credentials that will establish a firm foundation for long-term contributions to the field.

Although a variety of means are used to promote the attainment of this objective, two distinctive mechanisms are particularly important. First, we expose students to a diverse array of experiences representative of the demands and challenges that they will confront in post-doctoral and employment settings. For example, we expect our students to be actively involved in research, the publication of articles, and the submission of grant proposals. Second, we use a one-on-one mentoring model of advisement (sometimes termed the "apprenticeship model") as a primary, though not exclusive, vehicle for the training of students. This model specifies that a critical component of training is the relationship between a student and a faculty mentor who is committed to that student's training and who works intensively and collaboratively with that student over time. The mentoring model is reflected in all phases of a student's education, from admissions through completion of the doctoral dissertation. Although most students continue with one primary advisor throughout their tenure in the program, students can have more than one advisor or change advisors as their research interests evolve over time.

Most of our graduates will accept positions that involve some degree of teaching. For this reason, an additional goal is training students to teach effectively. Towards this end, most of our students serve as teaching assistants at some point during their graduate careers (see Section XI below)..

V. Financial Support

All students receive financial support. Several mechanisms of support are used, including fellowships provided by Vanderbilt, research assistantships on funded research projects, fellowships provided by training grants, and teaching assistantships. Supported students receive a monetary stipend, tuition remission, and health benefits. All financial support is contingent on the student's continuance in good standing. At the present time, all students in good standing are guaranteed financial support during their first five years of training. The great majority of students have been supported throughout their graduate tenure.

Students are generally encouraged to submit a grant proposal to help support their research at some point during their residence in our program. This could be a federal grant or a private foundation grant. In addition, small grants to support research by graduate students are available from Vanderbilt University. Students can also apply for funds to facilitate travel and attendance at conferences or other scientific meetings.

Additional details about such funds are available from the Directors of Graduate Studies and the staff members who serve as their primary assistants.

VI. General Requirements

A. Course Requirements

The annual Graduate School Catalog contains the complete list of graduate courses in psychology. Those specific courses that are taught in a given year are listed in the Schedule of Courses that is circulated prior to each semester. At the present time, classes are listed separately by department (Psychology or Psychology and Human Development) in both sources, with the location of the listing determined by the home department of the instructor. When specific courses are indicated below, we will note both the course number and the department in which it is currently taught (A&S = Arts & Sciences Psychology; P = Peabody Psychology and Human Development).

Grades in courses that are below C- are considered failing. Grades of B- or below are considered cause for concern. A student must attain a grade of C or better in order to receive credit for fulfillment of the requirements below, although instructors may impose a higher minimal threshold in specific cases. All students enrolled in a given class will be explicitly informed about the minimal grade required for satisfactory completion of that class.

The course requirements applicable to all graduate students irrespective of area of specialization are as follows:

1. Statistics: The two courses that make up the first-year statistics sequence (6 credits). In the fall, PSY-GS 8861-P (Statistical Inference) is normally required. In the spring, either PSY 6104-A&S (Quantitative Methods and Experimental Design) or PSY-GS 8864-P (Analysis and Design of Experiments) is normally required. Students with clear demonstration of an advanced background in statistics may be advised to enroll in one or two advanced courses instead, and students who lack an appropriate undergraduate background in statistics may be advised to enroll in PSY-GS 8858-P (Introduction to Statistical Inference) before beginning the typical statistics sequence.
2. Research Seminar: A research seminar PSY 6300-A&S for A&S students, PSY-GS 8500-P for Peabody students taken in the fall semester of the first year. This seminar meets once per week. Core competencies of a successful scientist include scientific knowledge, research skills, communication skills, teaching, professionalism, and responsible conduct of research. This course will provide part of your introduction to each of these core competencies that will further develop as you progress through your graduate and postdoctoral training.
3. Breadth Requirement: One course from three of the areas of specialization listed below (9 credits total). One of the selected areas can correspond to the

student's area of specialization. Appendix A lists the specific courses offered in each area of specialization that can be used to fulfill this requirement. Although some courses are listed under more than one area of specialization, a given student can only count a given class within one category. Furthermore, a course that fulfills a specific area group requirement in the student's particular research area cannot also be used to satisfy the breadth requirement in a different area (e.g., Cognitive Neuroscience can be used to satisfy the core requirement in the Neuroscience area but it cannot also be used as a course from the Cognition and Cognitive Neuroscience area to satisfy the breadth requirement as well).

a. Clinical Psychology
b. Cognition and Cognitive Neuroscience
c. Developmental Psychology
d. Neuroscience/Physiological Psychology
e. Perception
f. Personality and Individual Differences
g. Quantitative Methods
h. Social Psychology

Specific area groups may require further coursework in addition to those required at the departmental level. See below for a description of the additional requirements in specific area groups.

B. Research Requirements and Milestones

As described above (see Section IV), the scientific training of our graduate students is the highest priority. Accordingly, we expect all graduate students to be continually involved in research during their tenure at Vanderbilt. As graduate students progress through the program, we expect to see increasing levels of research productivity and increasing levels of intellectual independence. Research productivity is demonstrated by completing research projects, presenting at conferences, publishing papers, and applying for grants. Intellectual independence is demonstrated by developing a command of the relevant literature, formulating new ideas for experiments and analyses, and theoretically integrating empirical findings in novel ways.

In addition, there are several research requirements and milestones that serve to promote students' development as scientists and to facilitate evaluation of progress. Specifically, all area groups: (1) evaluate students' research progress and relevant knowledge of the field during their initial years in the program; (2) require students to pass qualifying exams in order to advance to doctoral candidacy; and, (3) require students to satisfactorily complete a doctoral dissertation in order to receive the Ph.D. degree. The specific nature and timing of these milestones (particularly the first two noted above) vary somewhat across area groups. Therefore, research requirements and milestones are described in the sections below that focus upon specific area groups. The meetings in the first years typically require two dept faculty members in addition to the mentor, but an external faculty can be added as a fourth faculty member without DGS approval. However, an external faculty could substitute for one of the 2 departmental faculty

(other than the mentor) if it can be justified on the basis that there are no available departmental faculty with the relevant expertise and that this external faculty can provide that expertise (the student would also need do submit the external faculty's CV).

Above and beyond these general milestones, the graduate student's committee, in consultation with the relevant AGH (area group head) and DGS, can specify specific milestones that the graduate student must meet.

NOTE: Many of these milestones are capped off by an oral defense meeting. Graduate students should try to avoid scheduling the evaluation meetings for the first and second year, qualifying exam, and doctoral dissertation defense during summer months. Also note that two hours should be blocked for all milestone meetings, except for the Ph..D. thesis defense, for which 3 hours should be set aside given that the first 45mins-1 hour is for the public part of the defense.

C. Credits and Registration

Students should be aware of Vanderbilt University requirements that are applicable to all graduate students. Specifically, receipt of the Ph.D. requires at least 3 years of academic graduate study, and completion of 72 hours of graduate work for credit with a minimum of 24 hours in formal didactic course and seminar work. Generally, this minimum 24 hours does not include research or reading credits (e.g., 7031 or 7032, 7033, 7034, 7999, 8999, and 9999 in both departments), clinical practicum credits, or area colloquia (e.g., Seminar in Cognition and Cognitive Neuroscience, Seminar in Clinical Science, Seminar in Neuroscience). See the catalog of the Vanderbilt University Graduate School for additional details.

Students in the CCN and Neuroscience areas in the Department of Psychology (Arts & Science) are required to register for 12 credit hours per semester until they have completed the required 72 credit hours of graduate work. In the majority of cases (i.e., students who do not transfer credits from another institution), to fulfill this requirement these students register for 12 credit hours per semester for the first three years of graduate study. Students in the Clinical area in the Department of Psychology (Arts & Science) are required to register for at least 9 credit hours per semester until they have completed the required 72 credit hours of graduate work. Each semester, CCN and Neuroscience students typically should register for a variable number (0-12) of hours of research credit to make the total number of credit hours equal to 12 depending on their course load. Clinical students in the Department of Psychology (Arts & Science) should register for no more than three hours of research credit per semester. The 'research' course students register for depends on where they are in their progress towards their Ph.D. Specifically, first-year graduate students should register for PSY 7031-A&S (Fall) or PSY 7032-A&S (Spring) (Advanced Investigational Techniques), second-year graduate students should register for PSY 7033-A&S (Second-Year Research), and third-year graduate students should register for PSY 7034-A&S (Advanced Research in Psychological Sciences). Students in their fourth year and beyond who have not yet passed their qualifying examination (the MAP) should register for PSY 7999-A&S/PSY-G 7999-P or PSY 8999-

A&S/PSY-G 8999-P: Students should enroll in PSY 7999-A&S/PSY-G7999-P (Master's Thesis Research) if they have not yet reached their 72 credit hour limit and have not yet passed their qualifying exam (the MAP); whereas they should enroll in PSY 8999-A&S/PSY-G 8999-P (Non-candidate Research) if they have reached their 72 credit hour limit but have not yet passed their qualifying exam (the MAP). Students who have passed their qualifying exam (the MAP) should register for PSY 9999-A&S/ PSY-G 9999-P (Ph.D. Dissertation Research). Finally, when students have completed the required 72 hours, they should register for 0 credit hours of 8999 or 9999 (as appropriate) until the dissertation is successfully defended. Students should register for the minimal number of hours needed to exactly reach 72 hours when they arrive at that point in their program.

Except under exceptional circumstances, students will be registered for the summer session for 0 credits with the appropriate research course (e.g. PSY 7999-A&S; see above). Summer tuition ($200) is covered by the source of money that supports the student, while the mandatory summer activity fees ($92) is the student's responsibility.

Students in the Department of Psychology and Human Development are required to register for 9 credit hours per semester until they have completed the required 72 credit hours of graduate work. In the majority of cases (i.e., students who do not transfer credits from another institution), to fulfill this requirement students in Psychology and Human Development register for 9 credit hours per semester for the first four years of graduate study. When such students have completed the required 72 hours, they typically register for 0 credit hours.

Students who come to Vanderbilt with prior graduate experience at other institutions may be allowed to transfer graduate course credits in order to meet program, department, or university requirements. Such transfers require approval by the current instructor of the course and by the Director of Graduate Studies of the student's home department. In order to facilitate decisions about credit transfers, students should present as much documentation as possible about courses taken elsewhere (e.g., course syllabi, examinations). Approved transfer credits will count toward the 72 hours of total graduate credits required, and in rare cases one or two courses may also count toward the required 24 hours of formal course and seminar work. In addition, if incoming students already took graduate-level statistic courses that are equivalent to the first-year stats course sequence in our program, the students can substitute these courses with other advanced statistics courses taught in this or any other departments of the grad school. The student should check with the DGS to confirm that the identified courses correspond to an advanced level course.

<u>Important Note: For students in the Dept of Psychology (A&S), registration for the Fall & Spring semesters is the student's responsibility (Summer registration will be handled by the program coordinator). For students in the Department of Psychology and Human Development (Peabody), registration for the Fall & Spring semesters is the student's responsibility and summer registration is not permitted without prior approval.</u>

D. Internships

The PhD in Psychological Sciences does not include an internship as part of its formal training (with the exception of the Clinical Sciences Program). That said, graduate students may explore internship opportunities at other institutions or in industry during their graduate studies as long as those opportunities are broadly aligned with their PhD work. Such an internship would most likely occur in the summer (an internship during the academic year may incur a leave of absence) and require approval of the PhD supervisor, DGS and graduate school. Funding support during the internship is the sole responsibility of the graduate student. Students on internship need to register for 0 credits in a non-clinical section of PSY 8398 (Consult program manager or DGS for details).

VII. Course and Research Requirements in Specific Area Groups

A. Clinical Science Area

The Clinical Science program offers doctoral education and training in clinical psychological science. The primary mission of the program is to educate clinical scientists who have the ability to make important, innovative contributions to scientific knowledge and the ability to function as skilled clinicians who use empirically validated assessment methods and treatment modalities. In addition to the core requirements common to all students, the program has sufficient flexibility to allow students to concentrate their training and to develop expertise in given areas that draw on the strengths of our faculty and the opportunities for research and clinical training. Areas in which students can focus their training include psychopathology (including developmental psychopathology, adult psychopathology, developmental disabilities), clinical neuroscience, basic emotion processes, prevention and intervention, pediatric and adult health psychology, and quantitative analysis. The Vanderbilt Clinical Science program is accredited by the American Psychological Association, and the program curriculum as discussed in this handbook is structured to meet APA requirements.

A.1. Course Requirements

In addition to meeting all general course requirements applicable to all graduate students in Psychological Sciences, Clinical students must pass the following courses. These courses will typically be taken during the first two to three years of graduate study:

1. Psychopathology (PSY- GS 8200-P)
2. Research Methods in Clinical Psychology (PSY 8310-A&S)
3. Assessment
    1. Students must take and pass at least two of the following three courses:
        i. Cognitive Assessment PSY-GS 8300-P
        ii. Psychological Assessment PSY 8312-A&S
        iii. Clinical Neuropsychology PSY 8354-A&S

4. Theories of Psychotherapy (PSY 8315-A&S)
5. Professional Ethics in Clinical Psychology (PSY 8353-A&S)
6. Two additional classes from two of the three following areas:
    1. Psychopathology
    2. Intervention
    3. Assessment

7. To fulfill APA distribution requirements, students must pass at least one course covering the current body of knowledge in each of the following areas and demonstrate competence in each area by successful completion of the targeted course(s). Appendix B lists the specific classes that can be used to meet the requirements in each area. Note that some specific courses can be used to cover more than one core area requirement (see Clinical Program of Study).
    1. Affective Bases of Behavior
    2. Biological Aspects of Behavior
    3. Cognitive and Affective Bases of Behavior
    4. Developmental Aspects of Behavior
    5. Social Aspects of Behavior
    6. Individual Differences in Behavior
    7. History and Systems of Psychology (this requirement is met through the distribution of content that is included in the core courses in the clinical science curriculum).
    8. Psychological Measurement
    9. Research Methodology
    10. Techniques of Data Analysis

8. Additional APA distribution requirements for psychopathology, and professional standards and ethics are met through courses that are required by the Psychological Sciences program and/or the Clinical Science area group. APA distribution courses can also be used to fulfill departmental requirements.

9. All Clinical students must complete either four semesters of (a) PSY 8360-A&S (Seminar in Clinical Science, or (b) two semesters (not necessarily consecutive) of PSY-GS 8420-P (Seminar in Developmental Psychopathology).

10. APA accreditation requires that all clinical students demonstrate Advanced Integrative Knowledge of the Basic Discipline - Specific Content areas. To fulfill this APA requirement, students (a) must pass at least one course that integrates at least two basic content areas or (b) an approved educational experience that provides basic coverage in two areas and integration across those two areas. Appendix B lists the specific classes that can be used to meet the requirement in this area.

A.3. Practicum Requirements

All clinical students must successfully complete a minimum of four semesters of supervised practicum experience. A pre-practicum experience during which students can gain initial exposure to clinical settings begins in the second year with the approval of the faculty advisor. The full practicum experience typically begins during the third year in residence but can begin during the summer after the second year. Note that any summer practicum experiences must be audited, as enrolling over the summer in a practicum experience for credit hours will automatically result in a tuition charge to the student. Beyond the required four semesters, many students opt to pursue additional experiences during summers and/or in Year 5. It is expected that students will be engaged in practicum for 12 hours per week during semesters in which they are enrolled in practicum. Students are expected to receive two semesters of experience in both psychological assessment and intervention during the course of their practicum training. Typically, specific practica focus on either assessment or on intervention, although several combine training in both components. Ideally, students should receive training in both in-patient and out-patient settings.

A maximum of six credit hours may be applied toward meeting practicum requirements. Practicum credit will be awarded only for practica completed at agencies approved by the Co-Directors of Clinical Training. Additional information concerning practicum requirements and procedures is available in the *Practicum Handbook *B*: Practica Requirements and Procedures for Clinical Psychology.* Descriptions of the specific practicum sites are available in the brochure titled *Practicum Handbook *A*: Clinical Psychology Practicum Sites*.

Clinical students in the A & S Psychology Department who are receiving practicum training must enroll in (a) Year 3: either PSY 8323-A&S (Assessment) or PSY 8324-A&S (Psychotherapy) (usually PSY 8323-A&S); and, (b) Year 4: either PSY 8323-A&S (Assessment) or PSY 8324-A&S (Psychotherapy) (usually PSY 8324-A&S). Two semesters each of PSY 8323-A&S and PSY 8324-A&S are required. In Year 5 and beyond, students register for either PSY 8325-A&S (Advanced Assessment) or PSY 8326-A&S (Advanced Psychotherapy).

Clinical students in the Department of Psychology and Human Development who are receiving practicum training must enroll in either PSY-GS 9950-P or PSY-GS 9951 as part of their departmental supervision.

A.4. Annual Review

At the conclusion of the spring semester the clinical training faculty meet to evaluate the progress of each student in the program. All facets of a student's training are considered. Individual faculty advisors then complete an Annual Evaluation Form that summarizes the student's progress. Advisors then meet individually with each advisee to review the form and accompanying feedback, and both the advisor and trainee to sign the form.

Students who have advanced to doctoral candidacy (i.e., successfully completed the Qualifying Exam) are required to submit a curriculum vita and brief (i.e., one page) progress report detailing their accomplishments over the past year and plans for the next year.

A.5. Master's Thesis

The student will complete an original empirical masters research project by the end of the second year, which will serve as their Master's Thesis. This project will culminate in a manuscript that can be submitted for publication. The student's primary advisor will be the principal supervisor of the project.

The committee reviewing the master's thesis will consist of the primary advisor and at least one additional faculty member, but two additional faculty members are preferred. Students are encouraged to have at least one formal meeting with their advisory committee during each of the first three years in the program to evaluate progress and provide feedback (a minimum of two meetings is preferred). The student's advisory committee may require such meetings.

Students will submit their final manuscript to their committee for review. In consultation with their advisor, students will either: (1) meet with the advisor and the other faculty member(s) to discuss the paper; or, (2) receive detailed written feedback about the manuscript from the other faculty member(s). In both cases, members of the committee will complete a Research Evaluation form. The primary advisor will provide feedback to the student concerning the evaluations. Students are encouraged to discuss their manuscript and the evaluations with the other member(s) of their committee.

Students also will have the opportunity to present their work during clinical science seminar meetings, developmental psychopathology pro-seminar, and/or the intervention research pro-seminar. In addition, students are strongly encouraged to present their work at professional conferences and are expected to submit their work for publication.

A.6. Qualifying Examination

As described in the Graduate School Bulletin, the purpose of the qualifying (i.e., preliminary) examination is to evaluate the student's knowledge of the field of specialization, to assess familiarity with the published literature, and to determine whether the student possesses the skills necessary to be advanced to doctoral candidacy and to succeed in a scholarly career.

In the Clinical Science program, there are two options to meet the Qualifying Examination requirement. (1) A written product that constitutes the basis for the qualifying exam is a Major Area Paper (MAP) that is an integrative review of an area of study that typically has been the focus of the student's research for the past several years. The MAP will be expected to demonstrate the student's ability to integrate at least two basic content areas in scientific psychology: Affective Aspects of Behavior, Biological Aspects of Behavior, Cognitive Aspects of Behavior, Developmental Aspects of Behavior, and Social Aspects of Behavior. The MAP should have the scope, detail, and length of review articles that appear in Psychological Bulletin or Clinical Psychology Review. (2) Completion and submission of an application for a National Institutes of

Health (NIH) National Research Service Award (NRSA). The NRSA application will outline the student's proposed research (the Research Strategy component of the application) and the student's proposed research training (the Research Training component of the application). The NRSA application will be expected to demonstrate the student's ability to integrate at least two basic content areas in scientific psychology: Affective Aspects of Behavior, Biological Aspects of Behavior, Cognitive Aspects of Behavior, Developmental Aspects of Behavior, and Social Aspects of Behavior

A Qualifying Committee will evaluate the qualifying exam. The Qualifying Committee consists of at least four members of the Graduate Faculty of Vanderbilt University with at least three members from the Vanderbilt Psychological Sciences faculty and at least one faculty member from outside the home department (i.e., another Vanderbilt Department such as the Department of Psychiatry at the Vanderbilt Medical School). Outside-the-department committee members can come from the other Psychology Department as long as their affiliation is outside the students' area group (i.e., a Peabody and Human Development Clinical faculty member cannot serve as the outside member for a Clinical student from the Arts and Science Psychology department). Of course, a Clinical faculty member of the other department can count as one of the three members of the home department. Faculty members from other universities can serve on Qualifying Committees but cannot substitute for an outside the department representative from the Graduate Faculty of Vanderbilt. In forming a Qualifying Committee, students should consult with their advisors and the two should mutually decide upon a set of faculty members who would be appropriate for the committee. The student should then submit this set of recommendations to the Director of Graduate Studies of the home department. Following any discussions that may be necessary with the student, the Director of Graduate Studies will make recommendations to the Dean of the Graduate School for the formal appointment of the Qualifying Committee at least 2 weeks prior to the targeted date of the exam. The Qualifying Committee will also typically serve as the Dissertation Committee, although this is not a formal requirement.

The qualifying examination must be held no later than May 1st of the fourth year, and no later than May 1st prior to the fall semester during which a student intends to apply for internship. The student will meet with the Qualifying Committee for that examination. One focus of the meeting will be the written product (i.e., the MAP or the NRSA application) with additional foci introduced at the discretion of the committee. Any written product should be handed to the committee two weeks prior to the date of the exam. At the end of the meeting, the committee, in executive session, will vote on the performance of the candidate. The possible options are: (1) pass, which means that the student is advanced to doctoral candidacy and is allowed to prepare a dissertation proposal; (2) conditional pass, which means that the student must undertake some specific additional work before a pass can be recommended; (3) failure, either with the option of reexamination, or without (with the latter option meaning termination from the program). Failure to pass the qualifying examination after two tries will result in termination from the program.

A.7. Dissertation Proposal and Dissertation

Clinical students must follow the guidelines for dissertation proposal meetings and final orals outlined in Section IX below. The Clinical Science area group supports a presentation of the dissertation prior to the oral examination in a public format that is open to the broader University community. Only Committee members will be present during deliberations by the Committee concerning the student's qualifications and performance. Clinical students must have a dissertation proposal approved on or before October 15 of the fall semester during which they intend to apply for internship.

A.8. Clinical Internship

All clinical students are expected to complete successfully an APA approved clinical psychology internship. In rare cases, a student may attend a non-APA internship if it is judged by the faculty and the student to be in the student's best interest. Students must enroll for 0 credits in the Internship course PSY 8398 for the duration of the internship, and successful completion of the internship is reflected by credit for PSY 8398 in the transcript. Several requirements must be met for internship eligibility (i.e., for program permission for the student to apply for internship): (a) Students have met all of the course and practicum requirements of the department and the clinical area; (b) the clinical faculty agree that the student is academically, professionally, and personally ready to apply for internship; (c) students must have completed their qualifying exam by May 1st of the year during which they intend to apply for internship; and (c) the student must have had their dissertation proposal approved on or before October 15 of the year during which they intend to apply for internship. **These deadlines are absolute.** The latter two requirements presume that the student is applying for internship during the fall semester of a given year.

A.9. Clinical Science Area Milestones

Milestone	Deadline
1st Year committee progress evaluation	May 1st of Year 1
Research master's thesis completed and reviewed, and approved by committee	May 1st of Year 2
Pre-Practicum Requirements	During Year 2
Practicum Requirements	During Year 3
Major Area Paper (Qualifying Examination)	May 1st of Years 3-4
Dissertation Proposal	During Years 4-5
Dissertation Proposal Approved	Oct 15th of Years 4-5
Apply for Internship	During Year 4-5
Dissertation Defense	During Year 5

B. Cognition and Cognitive Neuroscience Area

Graduate students in the Cognition and Cognitive Neuroscience program become active in research during their first semester in the program and are required to engage in collaborative research throughout the degree program. Course work includes introductory survey courses, specialized didactic courses, advanced seminars, and methods courses.

Students also receive strong training in professional speaking and writing by way of semester research reports and colloquia.

B.1. Course Requirements

The Cognition and Cognitive Neuroscience area group requires participation in a weekly seminar (PSY 8557-A&S) that primarily involves presentations by faculty, students, and guests. Students formally register for this seminar during the second and third years (normally for 1 credit). In the first year, students audit this seminar.

B.2. Research Requirements during the First Two Years

Students are expected to complete a research project in each of the first two years. An Advisory Committee consisting of three faculty members from Psychological Sciences will evaluate students' research progress and provide feedback about research. The advisor will serve as chair of the Advisory Committee. Meetings with the Advisory Committee must occur by May 1st of each of the first two years. At least one week before the meeting, students will provide committee members with written evidence of research productivity. Such evidence may consist of a research article-styled document describing ongoing research project(s) or a paper(s) submitted or in progress for submission to journals or conferences. During the meeting, the Advisory Committee will discuss the presentation and written report with the student. At the end of each meeting, the members of the Advisory Committee will discuss and evaluate the student's progress without the student present. Following each meeting, the advisor will provide feedback to the student concerning the evaluations.

At the end of the first year, all students will give a brief public presentation of their research at the annual first-year research presentations scheduled for early to mid-May. Second-year and third-year students are expected to present their research at one of the CCN seminars (either the fall or the spring semester of the second year).

All students in the CCN program are expected to complete a graduate fellowship application in their first year as part of PSY 6300 requirements. If the students are eligible for funding from an agency, their advisor will determine whether the application should be submitted for review. For U.S. students, this will be an NSF graduate fellowship or an NRSA predoctoral fellowship from the NIH. For Canadian students, this will be an NSERC. For students from other countries, the advisor, area heads, and Director of Graduate Studies will attempt to find other possible sources for fellowship funding.

B.3. Qualifying Examination

As described in the Graduate School Bulletin, the purpose of the qualifying (i.e., preliminary) examination is to evaluate the student's knowledge of the field of specialization, to assess familiarity with the published literature, and to determine whether the student possesses the skills necessary to be advanced to doctoral candidacy and to succeed in a scholarly career.

A Qualifying Committee will evaluate the qualifying exam. The Qualifying Committee consists of at least four members of the Graduate Faculty of Vanderbilt University with at least three members within the student's area group (with the members coming from either A & S Psychology or P & HD; with the provision that at least one member is from the same Psychology Dept as the student) and at least one faculty member from outside the home department (i.e., either from the other Psychology Department or another Vanderbilt Department such as the Department of Computer Science). When the outside-the-department member is from the other Psychology Department (e.g., the Department of Psychology and Human Development in the case of an Arts & Science student), that individual should have a primary affiliation with an area group other than Cognition and Cognitive Neuroscience. Furthermore, students should consult with their advisor or the DGS to ensure that an outside committee member from the other psychology department is from a substantively different area of research (e.g., a Cognition and Cognitive Neuroscience graduate student doing cognitive neuroscience research should probably not select a Neuroscience faculty members from Psychology doing human cognitive neuroscience research). If the student has a minor concentration (see section X below), one member of the committee should be from the minor area.

Faculty members from other universities can serve on Qualifying Committees. If they are a fifth committee member, they can simply be added to the committee. But if this person is intended to count as the person from outside the home department, then the committee nomination form must be accompanied by the following: (1) A letter from the student's primary advisor that clearly states why this outside committee member has unique expertise that contributes a unique perspective on the student's work, (2) a description of how this outside committee member will contribute to the student's training above and beyond simply calling into the qualifying examination and dissertation meetings, and (3) a curriculum vitae of the outside committee member. The outside committee member must have academic credentials comparable to that of faculty at Vanderbilt. But just as important, there must be mechanisms in place that allow the graduate student to have meaningful interactions with the outside committee member apart from committee meetings – the most obvious mechanism would be an active collaboration, but other mechanisms are possible as well.

In forming a Qualifying Committee, students should consult with their advisors and the two should mutually decide upon a set of faculty members who would be appropriate for the committee. The student should then submit this set of recommendations to the Director of Graduate Studies of the home department. Following any discussions that may be necessary with the student, the Director of Graduate Studies will make recommendations to the Dean of the Graduate School for the formal appointment of the Qualifying Committee at least 2 weeks prior to the day of the Qualifying Exam. The Qualifying Committee will also typically serve as the Dissertation Committee, although this is not a formal requirement.

Students will be required to submit a reading list and a list of issues to be addressed in the qualifying examination by the end of the fall semester of their third year. This list will be generated by the student and approved by each member of the Qualifying Committee.

Committee members can add or delete readings from the list and, more generally, will have input on the list of issues to be addressed.

The written component of the qualifying examination will consist of a Major Area Paper (MAP) that is an integrative review of an area of study that typically has been the focus of the student's research for the past few years. It should have the scope and length of review articles that appear in Psychological Bulletin. The qualifying examination itself will consist of the written component plus an oral examination on the written component and the readings and issues previously agreed upon. The qualifying examination should be held no later than at the end of the third year. The paper should be distributed to the committee two weeks prior to the meeting.

At the end of the qualifying examination meeting, the committee will vote on the performance of the candidate. The possible options are: (1) pass, which means that the student is advanced to doctoral candidacy and allowed to prepare a dissertation proposal; (2) conditional pass, which means that the student must undertake some specific additional work before a pass can be recommended; (3) failure, either with the option of re-examination, or without (in the latter case, the student will be terminated from the program). Failure to pass the qualifying examination after two tries will result in termination from the program.

After the first two years in the program, students are expected to maintain an active, self-motivated research program. In addition to the qualifying examination described above, research achievement (as evidenced by published papers in peer-reviewed journals, presentations at national conferences, and book chapters) will be central to continued success and good standing in the program.

B.4. Dissertation Proposal and Dissertation

Students must follow the guidelines for dissertation proposal meetings and final orals outlined in Section IX below. The dissertation proposal must contain a substantive portion of the thesis work that has not been carried out yet, and the proposal shall be passed by the end of the 4th year. The Cognition and Cognitive Neuroscience area group requires a presentation of the dissertation just prior to the oral defense in a public format that is open to the broader University community. The oral defense portion of the meeting is typically conducted with only the committee members present. Deliberations concerning the student's qualifications and performance in the defense will always be limited to committee members.

B.5. CCN Milestones

Milestone	Deadline
1st year committee meeting reporting completed research	May 1st of year 1
2nd year committee meeting reporting completed research	May 1st of year 2
Major Area Paper (Qualifying Examination)	May 1st of year 3
Dissertation Proposal	During year 4
Dissertation Defense	During year 5

C. Developmental Science Area

The Developmental Science program offers students a program of studies that includes specific course requirements and extensive participation in research.

C.1. Course Requirements

In addition to meeting all general course requirements applicable to all graduate students, students in the Developmental Science program must earn a grade of B- or above in the following courses. These courses can also be used to fulfill general course requirements.

1. Developmental Psychology PSY-GS 8400-P or Seminar in Cognitive Development – PSY-GS 8450-P; meeting a breadth requirement under general course requirements)
2. *Three Additional Courses focused on Developmental Sciences*. Example classes include Seminar in Cognitive Development – PSY-GS 8450-P, Seminar in Social and Personality Development - PSY 8600-A&S, Advanced Seminar in Developmental Psychology – PSY-GS 8460-P, Cognitive Science to the Classroom – PSY-GS 8470-P, Educational Neuroscience – PSY-GS 8480-P. Other courses that have a substantial focus on development can receive approval by the Developmental Area Head. Individual advisors may require particular courses.
3. Cognitive Science of Learning and Development (CSLD) Research Forum – PSY-GS 8690-P. Students should enroll for 0 credit hours in the Fall and 1 credit hour in the Spring of each year. Students are expected to present their research once a year.

Substitutions or exceptions may be allowed with the written approval of the Developmental Sciences Area Head.

C.2. Research Requirements

It is expected that: (1) students will conduct at least one empirical research project, usually a Master's project, prior to reaching Ph.D. candidacy; (2) this project will culminate in first-author manuscript that can be submitted for publication; and, (3) this project will preferably be completed no later than the beginning of the third year. Multiple empirical research studies prior to reaching Ph.D. candidacy are encouraged. The student's primary advisor will be the principal supervisor of the projects. The Advisory Committee (see below) will review the empirical projects. Students will submit their final manuscript to their committee for review. The primary advisor will provide feedback to the student concerning the evaluations made by committee members. Students are encouraged to discuss their manuscript and the evaluations with the other member(s) of their committee.

Students also are expected to present their research each year during Cognitive Science of Learning and Development (CSLD) Research Forum. At the end of the first year, this research presentation is given during the annual first-year research presentation day scheduled near the end of the Spring semester. In addition, students are expected to present their work at professional conferences.

C.3. Advisory Committee
The Advisory Committee, whose job it is to oversee student progress, will be selected in the fall semester of the first year in collaboration with the major advisor. The Advisory Committee consists of three faculty members (including the student's advisor) chosen in the first year. When other committees are formed in subsequent years (e.g., the Master's Committee, the Continuing Committee evaluating the Qualifying Exam), that committee becomes the student's Advisory Committee. Membership on the Advisory Committee requires approval of the Developmental Sciences Area Head.

C.4. Master's Committee
The Advisory Committee may become the Master's Committee, but the committee may also be reconstituted to reflect the content of the Master's project. The committee consists of two or three faculty members (including the student's advisor), with at least two members being core members of the Developmental faculty. Committees must be approved by the Developmental Area Head.

C.5 Qualifying Exam Committee
The qualifying exam committee consists of at least four members of the Graduate Faculty with at least three members within the student's home department (typically P & HD) and at least one faculty member from outside the home department (i.e., either from the other Psychology Department or another Vanderbilt Department such as the Department of Psychiatry at the Vanderbilt Medical School).

Faculty members from other universities can serve on Qualifying Committees. If they are a fifth committee member, they can simply be added to the committee. But if this person is intended to count as the committee member from outside the home department, then the committee nomination form must be accompanied by the following: (1) A letter from the student's primary advisor that clearly states why this outside committee member has unique expertise that contributes a unique perspective on the student's work, (2) a description of how this outside committee member will contribute to the student's training above and beyond simply calling into the qualifying examination and dissertation meetings, and (3) a curriculum vitae of the outside committee member. The outside committee member must have academic credentials comparable to that of faculty at Vanderbilt. There must be mechanisms in place that allow the graduate student to have meaningful interactions with the outside committee member apart from committee meetings – the most obvious mechanism would be an active collaboration, but other mechanisms are possible as well.

In forming a Qualifying Committee, the students should consult with their advisors and they should mutually decide upon a set of faculty members who would be appropriate for the committee. The student should then submit this set of recommendations to both the Developmental Sciences Area Head and the Director of Graduate Studies. Following any discussions that may be necessary with the student, the Director of Graduate Studies will make recommendations to the Dean of the Graduate School for the formal appointment of the Qualifying Committee <u>at least 2 weeks prior to the day of the exam</u>. The Qualifying

Committee will also typically serve as the Dissertation Committee, although this is not a formal requirement.

C.5. Annual Review

The student will complete a milestone report and current CV to be submitted in the spring of each year. The Advisory Committee will meet with the student to review progress that was made during the previous academic year. The entire developmental faculty will then meet to review the Advisory Committee reports at the end of each academic year. It is the student's responsibility to prepare the report and convene the advisory committee before the faculty meets. The milestone report will include evidence of student progress in coursework, research, and other training. Evidence of research progress may include submissions to national or regional meetings, papers submitted, proposals written and defended, and data collected.

C.6. Qualifying Examination

The Qualifying Examination has two main purposes. First, as described in the Graduate School Bulletin, the purpose of the qualifying examination is to evaluate the student's knowledge of the field of specialization, to assess familiarity with the published literature, and to determine whether the student possesses the skills necessary to advance to doctoral candidacy and to succeed in a scholarly career. Second, the Qualifying Exam serves as an opportunity for students to gain experience with the process of reading, organizing, and synthesizing a body of research related to their primary interests. See the section on Qualifying Exam Committee for Graduate School rules on committee membership.

The qualifying exam consists of a written component plus an oral examination. For the written component, students may choose, in consultation with their advisor, to write a Major Area Paper or to take a preliminary exam. The required 24 hours of course work must be completed first. Either exam option should be undertaken during the third year and completed before the start of the fourth year. Per graduate school requirements, it must be completed by the end of the fourth year under normal circumstances.

The Qualifying Exam Committee and the student will develop a *reading list*. The student should submit the reading list for committee input and approval near the beginning of the third year.

Written Exam

Option 1: Preliminary exam. The written preliminary exam covers basic developmental issues and questions, research methods and statistics, and current literature in the field and in the student's specialty area. Students develop a reading list that typically covers 3 general topics based on readings from course work and 3 specialty topics based on the students' research interests, with about 10-15 articles per topic. At a designated time, students are given a set of potential essay questions and are asked to select 5 questions to answer over the course of 5 days. The exam is typically taken at the beginning of the spring semester of the third year and is distributed to all members of the Developmental Science faculty, as well as outside committee members.

Option 2: Major Area Paper. The Major Area Paper (MAP) is an integrative review of an area of research central to the students' own research. It should provide a synthesis, not just a summary, of research, and usually builds an argument for a particular perspective. The scope of the review should be defined so that 50-60 journal articles capture the key research in the area, but the review does not need to be exhaustive. A reading list is developed and approved by the committee in advance of writing the paper, with 60-75 proposed readings (assumes that some readings will ultimately not be included in the review paper). The reading list should be divided into sub-categories, with articles grouped into proposed sections for the paper. The paper should be 30-50 pages (excluding references) and written to be understandable to developmental science researchers outside the topic area. The paper should be distributed to the committee members as well as other members of the Developmental Science faculty. It is typically completed by the end of the spring semester of the third year.

Oral Exam: The oral component of the qualifying exam is administered by the Qualifying Exam committee and is not a public meeting. At least two weeks in advance of the oral meeting, the written component must be completed and the Graduate School must be notified. The exam begins with about a 20-minute presentation by the graduate student on their research area, focused on the MAP if applicable. Committee members will ask questions concerning the written exam, the reading list and the students' research interests.

After reviewing the oral qualifying exam, the committee will vote on the performance of the candidate. The possible options are: (1) pass, which means that the student advances to doctoral candidacy and is allowed to prepare a dissertation proposal; (2) conditional pass, which means that the student must undertake some specific additional work before a pass can be recommended; and, (3) failure, either with the option of re-examination, or without (in the latter case, the student will be terminated from the program). Per Graduate School requirements, failure to pass the qualifying examination after two tries will result in termination from the program.

C.7. Doctoral Dissertation

Developmental students must follow the guidelines for dissertation proposal meetings and final orals outlined in Section IX below.

C.8. Developmental Science Area Milestones

Milestone	Deadline
1st year committee meeting reporting completed research	May 1st of year 1
2nd year committee meeting reporting completed research	May 1st of year 2
Major Area Paper (Qualifying Examination)	Before the first day of class of year 4
Dissertation Proposal	During year 4
Dissertation Defense	During year 5

D. Neuroscience Area

The goal of the Neuroscience Program is to form the next generation of leading neuroscientists. To achieve this goal, our program emphasizes intensive research experience with one or more faculty members from the first year of graduate school. This laboratory experience is complemented in the first two years of graduate school by course work to provide at once a broad and deep conceptual background of the field.

D.1. Course Requirements

In addition to meeting all general course requirements applicable to all graduate students, students in the Neuroscience program must pass (with a grade of B- or greater) the following courses:

1. Fundamental Neuroscience (NURO 8340) taken in the first Fall semester in the program.
2. At least one of the following courses or other courses with approval of advisory committee and Director of Graduate Studies:
    a. Visual System PSY 5780-A&S
    b. Brain Imaging Methods PSY 8216-A&S
    c. Computational Cognitive Modeling PSY 6218-A&S
    d. Scientific Computing for Psychological and Brain Science PSY 6219-A&S
    e. Seminar: Neuroscience PSY 8744-A&S
    f. Electrophysiological Techniques PSY 8744-A&S
        i. Other topics as they are offered
    g. Scientific Writing in Psychology and Neuroscience PSY 8750-A&S
    h. Neuroanatomy NSC 3274
    i. Cognitive Neuroscience NURO 8330
    j. Fundamental Neuroscience NURO 8345 in Spring

3. The Neuroscience program requires participation in a weekly seminar (PSY 8758-A&S) that primarily involves presentations by faculty, students, and guests. Students formally register for this seminar during the second and third years. In the first year, students audit this seminar. We expect our graduate students to present seminars at least once a year.

D.2. Research Requirements

Students are expected to complete a research project in each of the first two years. An Advisory Committee, consisting of three faculty members (including the advisor) from Psychological Sciences, will evaluate students' research progress and provide feedback about research. The advisor will serve as chair of the Advisory Committee. Meetings with the Advisory Committee must occur by May 1st of each of the first two years. At least one week before the meeting, students will provide committee members with written evidence of research productivity. Such evidence may consist of papers describing completed research projects (e.g., APA style papers ready for submission to

journals) and/or papers submitted to conferences. During the Advisory Committee meeting, students will be expected to give an oral presentation describing the research that they have conducted during the past year. Following this presentation, the Advisory Committee will discuss the presentation and written report with the student. At the end of each meeting, the members of the Advisory Committee will individually complete Research Evaluation forms and discuss among themselves their ratings and comments including any discrepancies in their evaluations without the student present in the room. Following each meeting, the advisor will provide feedback to the student concerning the committee's evaluations.

At the end of the first year, students are encouraged, and may be required by their advisor, to give a brief public presentation of their research at the annual first-year research presentations scheduled for early May. Second and third-year year students are expected to present their research at one of the Friday Neuroscience seminars (either the fall or the spring semester of the second year).

D.3. Qualifying Examination

As described in the Graduate School Bulletin, the purpose of the qualifying examination is to evaluate the student's knowledge of the field of specialization, to assess familiarity with the published literature, and to determine whether the student possesses the skills necessary to be advanced to doctoral candidacy and to succeed in a scholarly career.

A Qualifying Committee will evaluate the qualifying exam. The Qualifying Committee consists of at least four members of the Graduate Faculty with at least three members within the student's home department (A&S Psychology) and at least one faculty member from outside the home department (e.g., either from the other Psychology Department or another Vanderbilt Department such as the Department of Pharmacology at the Vanderbilt Medical School). In forming a Qualifying Committee, students should consult with their advisors and the two should mutually decide upon a set of faculty members who would be appropriate for the committee. Students should consult with their advisor or the DGS to ensure that an outside committee member from Psychology and Human Development is from a substantively different area of research (e.g., a Neuroscience graduate student doing cognitive neuroscience research should probably not select a Cognition and Cognitive Neuroscience faculty member from Psychology and Human Development as their outside committee). Students should then submit this set of recommendations to the Director of Graduate Studies of the home department. Following any discussions that may be necessary with the student, the Director of Graduate Studies will make recommendations to the Dean of the Graduate School for the formal appointment of the Qualifying Committee at least 2 weeks prior to the day of the exam. The Qualifying Committee will also typically serve as the Dissertation Committee, although this is not a formal requirement.

Faculty members from other universities can serve on Qualifying Committees. If they are a fifth committee member, they can simply be added to the committee. But if this person is intended to count as the person from outside the home department, then the committee nomination form must be accompanied by the following: (1) A letter from the student's

primary advisor that clearly states why this outside committee member has unique expertise that contributes a unique perspective on the student's work, (2) a description of how this outside committee member will contribute to the student's training above and beyond simply calling into the qualifying examination and dissertation meetings, and (3) a curriculum vitae of the outside committee member. It probably goes without saying that the outside committee member must have academic credentials comparable to that of faculty at Vanderbilt. But just as important, there must be mechanisms in place that allow the graduate student to have meaningful interactions with the outside committee member apart from committee meetings – the most obvious mechanism would be an active collaboration, but other mechanisms are possible as well.

The qualifying examination will consist of the written component plus an oral examination that focuses on the written component but can encompass even broader issues of relevance. The written component of the qualifying examination will consist of a Major Area Paper (MAP) that is an integrative review of an area of study that typically has been the focus of the student's research for the past few years. It should have the scope and length of review articles that appear in the *Annual Review of Neuroscience*. The purpose of the qualifying exam is to evaluate breadth and depth of knowledge in the research domain; it is not as focused on issues of experimental design. The paper should be distributed to the committee two weeks prior to the meeting.

The qualifying examination must be held no later than May 1st of the third year. Students who fail to meet this requirement by the May 1st deadline may be put on probation or terminated from the program. One focus of the meeting will be the written product, though additional foci such as the student's fundamental knowledge in the concepts and methodologies of neuroscience may also be queried at the discretion of the committee.

At the end of the meeting, the committee, in executive session, will vote on the performance of the candidate. The possible options are: (1) pass, which means that the student advances to doctoral candidacy and is allowed to prepare a dissertation proposal; (2) conditional pass, which means that the student must undertake some specific additional work before a pass can be recommended; (3) failure, either with the option of reexamination, or without (with the latter option meaning termination from the program). Failure to pass the qualifying examination after two tries will result in termination from the program.

D.4. Dissertation Proposal and Dissertation

Students must follow the guidelines for dissertation proposal meetings and final orals outlined in Section IX below. As stated in the general guidelines, there is no single model or set of expectations for the final dissertation or the dissertation proposal. The specific expectations are determined by the advisor and the committee, in consultation with the student, but the thesis proposal must be presented by the end of the fourth year and it must include a substantial amount of proposed research that has yet to be carried out (see below and section IX). A dissertation may reflect a single substantive research project outlined in the proposal or it may reflect the culmination of a few years of coherent research on a single topic.

For the latter case, one model some advisors and committees have recommended for their graduate students is that the final dissertation should include work equivalent to three published papers (of average length as defined by the subarea of research). Under that model, a good rule of thumb is that the dissertation proposal should also reflect proposed research broadly equivalent to one or more of those to-be-published papers. The dissertation proposal should then include as appendices any completed manuscripts and publications that will be part of the final dissertation.

The Neuroscience area group requires a presentation of the dissertation just prior to the oral examination in a public format that is open to the broader University community. However, only Committee members will be present during the dissertation defense and during deliberations by the Committee concerning the student's qualifications and performance.

D.5. Neuroscience Area Milestones

Milestone	Deadline
1st year committee meeting reporting completed research	May 1st of year 1
2nd year committee meeting reporting completed research	May 1st of year 2
Major Area Paper (Qualifying Examination)	May 1st of year 3
Dissertation Proposal	During year 4
Dissertation Defense	During year 5

E. Quantitative Methods Area

The primary aim of the Quantitative Methods (QM) program is to train the next generation of leaders in quantitative psychology and psychometrics by offering students a flexible program of study that provides a balance between specific course requirements and intensive participation in research with dedicated faculty mentors. The program emphasizes the development of both quantitative and methodological expertise, research and teaching ability, and strong communication skills.

E.1. Course Requirements

1. **The core sequence**: The required first-year graduate statistics sequence as described in Section VI.A above.

2. **QM course requirements.** Ten additional courses are required beyond the core sequence and are chosen by the student together with their advisor from a list of offerings that includes standard courses, topical seminars, and appropriate courses in our own and in other graduate programs. The current list of courses offered by the QM program is provided on the QM program website. This list may include: Factor Analysis, Categorical Data Analysis, Nonparametric Statistics, Multilevel Modeling, Structural Equation Modeling, Item Response Theory I and II, Growth Curve Modeling, Mixture Modeling, Exploratory Data Analysis, Correlation and

Regression, Psychological Measurement, Multivariate Statistics for Data Science, Clinical Research Methods, Bayesian Analysis, Statistical Consulting Integrating AI, Survival Analysis, Advanced Structural Equation Modeling, and other topical Quantitative Seminars. Additional methods courses (e.g., in biostatistics, mathematics) can be counted towards the ten courses with approval from the program director and advisor. Beyond the 10 required quantitative courses, it is also required for the student to register for and attend the Quantitative Methods Forum every semester. Finally, additional Breadth course requirements of the College and Graduate School are detailed elsewhere in this document.

3. **Proficiency in one year of calculus.** Proficiency in two semesters of undergraduate-level first-year university calculus should be gained either through having taken the courses prior to entering the QM Program (e.g., during undergraduate training) or by attendance in classes offered at Vanderbilt (or some other university).

E.2. Research Expectations

QM students become active in research starting in their first semester in the program and continuing throughout the degree program. It is expected that QM students will conduct at least one research project, often a Master's thesis, prior to reaching Ph.D candidacy. This project will culminate in a first-author manuscript that can be submitted for publication. QM students give research presentations at QM forum once per year. In some instances these QM forum presentations may pertain to a student's first-year project, master's thesis project, or dissertation work. In other instances these presentations may involve, for instance, a practice conference talk, a literature review, or a tutorial. QM students are expected to present their work at professional conferences.

In the spring of each year QM students will complete the Peabody on-line progress report and submit a current curriculum vitae and updated QM portfolio to their advisor and the QM program director. At the end of each spring semester, QM faculty convene for an annual meeting to discuss student progress and review each student's submitted CV and portfolio. After this meeting, letters for each student incorporating feedback from the QM faculty are drafted by the QM program director, in collaboration with the student's advisor, and then emailed to each student. Copies of these letters are placed on file each spring with the Director of Graduate Studies of the home department.

E.3. Master's Thesis

QM students are expected to obtain a master's degree en route to their Ph.D. by completing the required coursework and (a) meeting the Graduate School's thesis requirement (by submitting an approved master's thesis to the Graduate School), or (b) by meeting the non-thesis requirement of the Graduate School (by being first author on a peer-reviewed manuscript that is accepted for publication). The advisor, QM program director, and DGS need to agree that this publication on the master's topic meets this criterion. QM students should obtain their master's degree by the end of their third year in the QM program. Students entering the Ph.D. program already with a master's degree

completed in a related field have the option of pursuing another master's degree en route to their Ph.D., or not. This decision should be made in consultation with their advisor and the program director. If the student chooses option (a), a master's committee consisting of 3 QM faculty, including the student's advisor, should be formed and the master's thesis is orally defended before this committee.

E.4. Qualifying Examination

After obtaining their master's degree, QM students should form a Qualifying Committee. As described in the Graduate School Bulletin, the purpose of the qualifying examination is to evaluate the student's knowledge of the field of specialization, to assess familiarity with the published literature, and to determine whether the student possesses the skills necessary to advance to doctoral candidacy and to succeed in a scholarly career. Typically, the qualifying examination is taken before the beginning of the fourth year, and must be taken before the end of the fourth year.

The Qualifying Committee should consist of at least four members of the Graduate Faculty of Vanderbilt University—three faculty members of the QM area, one from outside the home department (i.e., either from the other Psychology Department or another Vanderbilt Department such as Biostatistics or Sociology). The student's advisor is a member of the Qualifying Committee and is assumed to be from the student's home department. In forming a Qualifying Committee, the student should consult with her or his advisor and they should mutually decide upon a set of faculty members who would be appropriate for the committee. The student should then submit this set of recommendations to the Director of Graduate Studies of the home department, and also should notify the QM program director. Following any discussions that may be necessary with the student, the Director of Graduate Studies will make recommendations to the Dean of the Graduate School for the formal appointment of the Qualifying Committee at least 2 weeks prior to the beginning of the exam. The Qualifying Committee will also typically serve as the Dissertation Committee, although this is not a formal requirement.

Faculty members from other universities can serve on Qualifying Committees. If they are a fifth committee member, they can simply be added to the committee. But if this person is intended to count as the person from outside the home department, then the committee nomination form must be accompanied by the following: (1) A letter from the student's primary advisor that clearly states why this outside committee member has unique expertise that contributes a unique perspective on the student's work, (2) a description of how this outside committee member will contribute to the student's training above and beyond simply calling into the qualifying examination and dissertation meetings, and (3) a curriculum vitae of the outside committee member. The outside committee member must have academic credentials comparable to those of faculty at Vanderbilt. But just as important, there must be mechanisms in place that allow the graduate student to have meaningful interactions with the outside committee member apart from committee meetings – the most obvious mechanism would be an active collaboration, but other mechanisms are possible as well.

The qualifying exam consists of a written component plus an oral component. The written component of the exam can take one of two forms, chosen by the student in consultation with their advisor.

Option 1. The first written component option consists of a 1-day breadth exam requiring integrative thinking across previous coursework plus a 1-2 day depth examination in which the student answers specific questions relevant to a chosen set of three or four topics.

Option 2. The second written component option consists of a take home examination of up to a month on three or four topics that incorporates both breadth and depth exam questions; it requires detailed response documents that can be used to inform subsequent research projects.

Both of these options reflect a reading list which typically covers three or four main topics and which is developed by the student in consultation with their advisor, with input from the rest of the qualifying committee. After the student's reading list is approved by all members of their qualifying committee, the student typically studies these readings for two months and then takes their exam. All members of the qualifying committee contribute qualifying exam questions relating to one or more of the topics; these questions are provided to the advisor who then compiles these questions and distributes the exam to the student.

The written component of the qualifying examination will be reviewed by the qualifying committee, and the committee will then meet with the student for the oral component of their qualifying examination. The student's oral exam meeting occurs approximately two weeks after the student turns in their written qualifying exam to their qualifying committee. The questioning during the oral exam meeting focuses on the content of the written exam component, but encompasses even broader issues of relevance, including the reading list and the student's research interests. At the end of the oral exam meeting, the committee in executive session will vote on the performance of the candidate. The possible options are: (1) pass, which means that the student advances to doctoral candidacy and is allowed to prepare a dissertation proposal; (2) conditional pass, which means that the student must undertake some specific additional work before a pass can be recommended; and, (3) failure, either with the option of reexamination, or without (in the latter case, the student will be terminated from the program). Per Graduate School requirements, failure to pass the qualifying examination after two tries will result in termination from the program.

E.5. Dissertation Proposal and Dissertation

Students must follow the guidelines for dissertation proposal meetings and final orals outlined in Section IX. If needed, the student can have two tries to pass the dissertation proposal defense and two tries to pass the final dissertation oral defense.

The QM area expects a presentation of the dissertation before the oral examination in a public format that is open to the broader University community. The final dissertation

oral defense occurs next, and may be public or not at the committee's discretion. However, only Committee members will be present during deliberations by the Committee concerning the student's qualifications and performance.

E.6. Quantitative Methods Area Milestones

Milestone	Deadline
Peabody on-line progress report, current CV, and updated QM portfolio to advisor and QM program director	April 1st of each year
Quantitative Methods Forum presentation	Once per year
Develop a Master's thesis	During year 2
Complete the Master's degree requirements	During year 3
Qualifying Examination	Typically by Sept. 1st of year 4 but required by the end of year 4
Dissertation Proposal	During year 4
Dissertation Defense	During year 5

F. Cognition in Context Area

The Cognition in Context area offers students a program of studies that provides a balance between specific course requirements and participation in research. In doing so, the program encourages student participation in research laboratories. A strength of the program is built-in flexibility that allows students and advisors to plan a sequence of course work that is most fitting to a particular student's intellectual needs and interests. Many of the required courses fulfill departmental requirements, as well.

F.1. Course Requirements

In addition to program-wide psychological sciences requirements, the Cognition in Context area group requires participation in a weekly seminar, the Cognitive Science of Learning and Development seminar (PSY-GS 8690) that primarily involves presentations by faculty, students, and guests. In the first year, students participate in this seminar without registering. Students formally register for this seminar during the second and third years. In the fourth and subsequent years, students participate in this seminar without registering.

F.2. Integrated Teaching and Research Experiences

An innovative element of this program is explicit inclusion of opportunities for students to integrate research experience with dissemination (via teaching or public dissemination) in ways that will promote a) the student's transition to their first faculty position, and b) public dissemination of knowledge about the cognition in context. As such, students are

required to complete at least one integration experience. Example experiences are listed below. Students, in collaboration with their committees, can create a self-designed integration experience. Students who would like to complete more than one of these experiences are encouraged to do so.

a. Leadership of a vertically integrated research team. Many of the graduate and undergraduate classes and independent study credits in the area involve students at multiple levels (undergraduate, Masters-level, and PhD level) collaborating on a research project that will ideally result in a published or presented final product. This requirement can be met by leading such a team and by serving as mentor, by advising junior members of the team and assisting it, and by completing a high-quality research product.

b. Participation in a research project that includes direct involvement in a formal or informal learning setting. Many research projects in our department and others involve educational interventions in schools and other environments. To satisfy this requirement, the student should find such a project and negotiate (usually with the assistance of the student's advisor) a way in which they might support implementation of the project and possibly make a creative contribution to it over a limited course of time (for example, involvement over a summer or a single semester - however, students are encouraged to continue participation in the project beyond this timeframe). This participation should involve hands on participation directly in an educational setting or in creating instructional materials.

c. Completion of the Vanderbilt Center for Teaching's teaching certificate program.

d. Serving as primary instructor for a college or pre-college level course. There are sometimes opportunities for advanced graduate students to teach an undergraduate-level statistics or psychology course. In addition, there are sometimes opportunities for PhD students to teach Maymester or Vanderbilt Summer Academy courses, and any of these will meet this requirement.

e. Public dissemination of research. Students may choose to disseminate research to the public via digital means, or other public presentations at educational, civic, and/or commercial institutions.

F.3 Research Requirements During the First Two Years

It is expected that: (1) Students will complete a first-year paper that describes or introduces background for a research project; (2) students will complete at least one empirical research project, usually a Master's project, prior to reaching Ph.D. candidacy; (3) this project will ideally culminate in a first-author manuscript that can be submitted for publication or conference presentation; and (4) this project will preferably be completed no later than the beginning of the third year. Developing multiple empirical research studies prior to reaching Ph.D. candidacy is encouraged.

F.4. Advisory Committee

The Advisory Committee, whose job it is to oversee student progress, will be selected in the fall semester of the first year in collaboration with the major advisor. The Advisory Committee consists of two or three faculty members (including the student's advisor) chosen in the first year. When other committees are formed in subsequent years (e.g., the Master's Committee, the Continuing Committee evaluating the Qualifying Exam), that committee becomes the student's Advisory Committee. Membership on the Advisory Committee requires approval of the Area Head.

F.5. Master's Committee

The Advisory Committee may become the Master's Committee, but the committee may also be reconstituted to reflect the content of the Master's project. The committee consists of two or three faculty members (including the student's advisor), with at least two members being members of the Cognition in Context or Cognition in Cognitive Neuroscience faculty. Committees must be approved by the Area Head. There is no oral defense of the Master's thesis, but students are expected to present this research during a department research forum.

F.6. Annual Review

The student will complete a milestone report and current CV to be submitted in the spring of each year. The Advisory Committee will meet with the student to review progress during the previous year. The area faculty will then meet to review the Advisory Committee reports at the end of each academic year. It is the student's responsibility to prepare the report and convene the advisory committee before the faculty meets. The milestone report will include evidence of student progress in coursework, research, and other training. Evidence of research progress may include submissions to national or regional meetings, papers submitted, proposals written and defended, and data collected.

Students also are expected to present their research each year during Cognitive Science of Learning and Development (CSLD) Research Forum. At the end of the first year, this research presentation is given during the annual first-year research presentation day scheduled near the end of the Spring semester. In addition, students are expected to submit their work to present at professional conferences.

F.7. Qualifying Examination

As described in the Graduate School Bulletin, the purpose of the qualifying examination is to evaluate the student's knowledge of the field of specialization, to assess familiarity with the published literature, and to determine whether the student possesses the skills necessary to be advanced to doctoral candidacy and to succeed in a scholarly career. See the section on Qualifying Exam Committee for Graduate School rules on committee membership.

The qualifying exam consists of a written component plus an oral examination. For the written component, students may choose, in consultation with their advisor, to write a Major Area Paper or to take a preliminary exam. The required 24 hours of course work must be completed first. Either exam option should be undertaken during the third year and completed before the start of the fourth year.

The Qualifying Committee and the student will develop a *reading list*. The student should submit the reading list for committee input and approval near the beginning of the third year.

Written Exam

Option 1: Major Area Paper. The Major Area Paper (MAP) is an integrative review of an area of research central to the students' own research. It should provide a synthesis, not just a summary, of research, and usually builds an argument for a particular perspective. The scope of the review should be defined so that 50-60 journal articles capture the key research in the area, but the review does not need to be exhaustive. A reading list is developed and approved by the committee in advance of writing the paper, with 60-75 proposed readings (assumes that some readings will ultimately not be included in the review paper). The reading list should be divided into sub-categories, with articles grouped into proposed sections for the paper. The paper should be 30-50 double-spaced pages (excluding references) and written to be understandable to cognitive science researchers outside the topic area. The paper should be distributed to the committee members. It is typically completed by the end of the spring semester of the third year.

Option 2: Preliminary exam. The written preliminary exam covers basic issues in cognition, research methods and statistics, and current literature in the student's specialty area. Students develop a reading list that typically covers 6 topics, including general topics based on course readings and specialty topics based on the students' research interests. The reading list should have about 10-15 articles per topic, for a total of 60-75 proposed readings. At a designated time, students are given a set of potential essay questions and are asked to select 5 questions to answer over the course of 5 days. Each essay should be about 6-10 double-spaced pages (excluding references), for a total of 30-50 double-spaced pages of total length (excluding references) across the 5 questions. The exam is typically taken at the beginning of the spring semester of the third year and is distributed to all members of the committee.

Oral Exam: The oral component of the qualifying exam is administered by the Qualifying Exam committee and is not a public meeting. At least two weeks in advance of the oral meeting, the written component must be completed and the Graduate School must be notified. The exam begins with about a 20-minute presentation by the graduate student on their research area, focused on the MAP if applicable. Committee members will ask questions concerning the written exam, the reading list and the students' research interests.

After reviewing the oral qualifying exam, the committee will vote on the performance of the candidate. The possible options are: (1) pass, which means that the student advances to doctoral candidacy and is allowed to prepare a dissertation proposal; (2) conditional pass, which means that the student must undertake some specific additional work before a pass can be recommended; or (3) failure, either with the option of re-examination, or without (in the latter case, the student will be terminated from the program). Per Graduate School

requirements, failure to pass the qualifying examination after two tries will result in termination from the program.

F.8. Qualifying Exam Committee

The qualifying exam committee consists of at least four members of the Graduate Faculty with at least three members coming from either the Cognition in Context or the Cognition and Cognitive Neuroscience groups (in either the Department of Psychology or the Department of Psychology & Human Development), with the provisions that at least one member is in the Cognition in Context program in the Department of Psychology & Human Development, and at least one faculty member is from outside the home department (i.e., either from the Department of Psychology in the College of Arts & Sciences or another Vanderbilt Department such as the Department of Computer Science). When the outside committee member is from the Department of Psychology in the College of Arts & Sciences, that individual should have a primary affiliation with an area group other than Cognition and Cognitive Neuroscience. Furthermore, when the outside committee member is from the Department of Psychology in the School of Arts and Sciences, students should consult with their advisor or the DGS to ensure that the outside member is from a substantively different area of research (e.g., a Cognition in Context graduate student doing cognitive neuroscience research should not select a Neuroscience faculty member from Psychology doing human cognitive neuroscience research). The qualifying exam committee is typically formed after completion of the Masters' Thesis, while working on the reading list for the qualifying exam.

Faculty members from other universities can serve on Qualifying Committees. If they are a fifth committee member, they can simply be added to the committee. But if this person is intended to count as the committee member from outside the home department, then the committee nomination form must be accompanied by the following: (1) A letter from the student's primary advisor that clearly states why this outside committee member has unique expertise that contributes a unique perspective on the student's work, (2) a description of how this outside committee member will contribute to the student's training above and beyond simply calling into the qualifying examination and dissertation meetings, and (3) a curriculum vitae of the outside committee member. The outside committee member must have academic credentials comparable to that of faculty at Vanderbilt. There must be mechanisms in place that allow the graduate student to have meaningful interactions with the outside committee member apart from committee meetings – the most obvious mechanism would be an active collaboration, but other mechanisms are possible as well.

In forming a Qualifying Committee, the students should consult with their advisors and the two should mutually decide upon a set of faculty members who would be appropriate for the committee. The student should then submit this set of recommendations to both the Area Head and the Director of Graduate Studies of the home department. Following any discussions that may be necessary with the student, the Director of Graduate Studies will make recommendations to the Dean of the Graduate School for the formal appointment of the Qualifying Committee <u>at least 2 weeks prior to the day of the exam</u>. The Qualifying

Committee will also typically serve as the Dissertation Committee, although this is not a formal requirement.

F.9. Dissertation Proposal and Dissertation

Students must follow the guidelines for dissertation proposal meetings and final orals outlined in Section IX below. The area group expects a presentation of the dissertation just prior to the oral defense in a public format that is open to the broader University community. The committee may choose to conduct the oral defense portion of the meeting with only committee members present. Deliberations concerning the student's qualifications and performance in the defense will always be limited to committee members.

VIII. Master's Degree

Our program is not designed for students with a primary interest in a terminal Master's degree. Students can, however, receive a Master's degree (M.S., Master's of Science) during their tenure at Vanderbilt. Those who wish to receive a Master's degree must fulfill the requirements as listed in the Graduate School Bulletin. To be eligible to receive a Master's degree, the student must have completed a minimum of 30 hours of formal course work. The student must also complete a master's thesis project. The written thesis must be approved by two faculty members in the program.

IX. Doctoral Dissertation

All of our doctoral programs require that a doctoral dissertation proposal be submitted after the Qualifying Examination has been successfully completed. Unless otherwise noted, the dissertation proposal takes place in the fourth year. The student and his or her advisor will determine the composition of the Ph.D. Committee. Unless otherwise noted in this document, the Qualifying Committee will by default constitute the Ph.D. Committee though the candidate and advisor may request changes in the PhD committee composition. As is the case with the Qualifying Committee, the Ph.D. Committee should consist of at least four members of the Graduate Faculty with at least three members within the student's home department (A & S Psychology or P & HD) and at least one faculty member from outside the home department (i.e., either from the other Psychology Department or another Vanderbilt Department such as the Department of Psychiatry at the Vanderbilt Medical School). In the case of Clinical Science and Cognition and Cognitive Neuroscience students, outside-the-department committee members from the other Psychology Department must also be outside the students' area group (e.g., a Peabody and Human Development Cognition and Cognitive Neuroscience faculty member cannot serve as the outside member for a Cognition and Cognitive Neuroscience student from the Arts and Science Psychology department, though they could serve as one of the three members of the home department).Furthermore, to keep within the spirit of this rule, students in other area groups should consult with their advisor or the DGS to ensure that an outside

committee member from the other psychology department is from a substantively different area of research (e.g., a Neuroscience graduate student doing cognitive neuroscience research should probably not select a Cognition and Cognitive Neuroscience faculty member from Peabody as their outside committee member). Some area groups permit the outside committee member to be from outside of Vanderbilt; see the area group sections for a discussion of the rules for appointing a committee member from outside of Vanderbilt (under the section for the Qualifying Examination). The advisor will serve as Chair of this committee. The composition of the Ph.D. Committee must be approved by the Director of Graduate Studies of the student's home department and the Graduate School.

Working with the advisor, the student will prepare a dissertation proposal. The format of the dissertation proposal, as well as the format of the final dissertation, can vary quite a bit across area groups. Some may be proposals for a completely new line research, others may be proposals to continue a successful line of research in new directions, and others may include a fair amount of completed research as well as proposals for new experiments or new analyses. The student will need to work with their advisor and the committee members to determine what constitutes a sufficient proposal for new research for their dissertation. The dissertation committee has wide latitude in determining what is sufficient based on the norms for the area group and the field, and based on the body of independent research completed by the student throughout their graduate career at Vanderbilt.

There are no formal requirements for what should or should not go into the dissertation proposal, but the following guidelines may be useful:

- Proposals should include some general background about the scientific problem. This should not be a complete literature review, as might be done for MAP, nor should the MAP be pasted into the proposal. Instead, there should be a brief yet relatively complete discussion, such as you might see in the introduction to a large empirical or theoretical paper or see in the background section of a grant proposal.
- As appropriate, the proposal should include an integrative discussion of the student's past research on this scientific problem. This may be pilot research on the proposed experiments. It could also be completed manuscripts and publications that the student will include as part of their complete dissertation.
- If the final dissertation will include papers complete before the dissertation proposal meeting, those papers should be included as appendices to the proposal. The proposal itself should include a detailed discussion of those papers wherever appropriate in the text of the proposal. The completed papers themselves should not be simply pasted into the main body of the proposal itself.
- Students should respect the appropriate tense in their writing. Completed research should be written as completed research, not as proposed research. A large project may have data collection that has been completed and analyses that are proposed, and the proposal should be written to reflect that reality.

It is important to emphasize that the composition of the dissertation proposal is quite heterogeneous across area groups, advisors, and research areas. For some, the dissertation may constitute a single substantive research project completed during the dissertation year.

For others, the dissertation proposal may reflect one key aspect of a large-scale project the graduate student has been involved in over the span of several years. And for others, the dissertation proposal may include published or submitted papers completed before the proposal as well as a proposal for new research. The required composition of the dissertation proposal is determined by the advisor and committee, in consultation with the student. What another graduate student did or did not do for his or her proposal is not relevant to these discussions.

Another important consideration is that the proposal must include some new proposed research. As a rule of thumb, a third or more of the research to be included in the Ph.D. thesis ought to be included in the proposal and carried out after the proposal is passed. The purpose of the proposal meeting is not to rubber stamp completed research. Rather, it serves to help students develop publication-worthy rigorous research and set common expectations for the student and the committee of what should be included in the final thesis. The specific amount of new research in the proposal is determined by the advisor and committee, in consultation with the student.

Further information about particular models for dissertation proposals may also be provided under the descriptions of each area group.

The proposal should be distributed to committee members at least 2 weeks prior to a meeting of the thesis committee. During the meeting, it is the student's responsibility to demonstrate to the committee that the proposal is scientifically sound, that the proposed research procedures are feasible (such demonstrations frequently involve extensive pilot research and/or completed research in the area), and that the requisite skills and other resources are available to complete the proposed project in a reasonable time period. After the meeting, the committee can make several alternative decisions, ranging from complete acceptance and approval of the proposal to the requirement that the student prepare a completely different project proposal.

After the proposal is approved the student is free to complete the dissertation under the supervision of the advisor. We strongly discourage students from attempting to complete the dissertation in absentia. Students who decide to complete their dissertation in absentia must submit a timeline for completing their dissertation that must be approved by the advisor and the Director of Graduate Studies of the student's home department.

There may be times when significant changes to the proposed research are required after the proposal meeting (e.g., initial studies do not turn out as predicted, clinical populations cannot be recruited, etc.); the student should discuss with their advisor what constitutes "significant change" from the original proposal. If those changes are indeed significant, the student must contact the dissertation committee members to notify them of the need for a change and to invite the committee to have another meeting when necessary.

The dissertation defense should take place by the end of the fifth year of study (or sixth year for clinical students). When the advisor serving as the Ph.D. Committee Chair believes that the candidate has prepared an acceptable draft of the dissertation, the student will schedule

the final oral examination and inform the Department's Education Coordinator and Director of Graduate studies of the home department at least 2 weeks prior to the exam. The Director of Graduate Studies will then notify the Graduate School 2 weeks prior to the exam. The student will distribute the final draft to the committee members at least 2 weeks before the scheduled Final Oral Examination.

The Graduate school requires a public presentation that is open to the broader University community before the oral examination commences. However, only Committee members will be present during the dissertation defense and during deliberations by the Committee concerning the student's qualifications and performance.

Typically, the dissertation presentation consists of a summary by the student of the conceptual and methodological basis for the study or studies that were conducted and the results and conclusions. After this presentation, the PhD candidate may be asked to leave the room for the committee to confer prior to the defense. Committee members will then call the candidate aback and ask questions and stimulate discussion about various issues related to the dissertation project. At the end of the oral examination, the committee, in executive session, will vote on the performance of the candidate. The possible options are: (1) pass; (2) conditional pass, which means that the student must undertake some specific additional work before a pass can be recommended; (3) failure, either with the option of re-examination, or without (in the latter case, the student will be terminated from the program). The PhD candidate is called back to be informed of the committee decision.

The dissertation must be approved by the Ph.D. Committee before it is submitted to the Graduate School. Approval of the written dissertation may not occur on the day of the oral defense because of corrections suggested by the doctoral committee that need to be made prior to final approval. However, this should not delay forwarding to the Graduate School the decision on the outcome of the oral defense, which is documented with the "Results of Dissertation Defense" form, after the defense has concluded. The Graduate School has a set of guidelines available to students regarding the correct format for dissertations submitted to the Graduate School.

While our program expects students to defend by their fifth year (but see milestones table for clinical students), Vanderbilt University regulations stipulate that the Ph.D. dissertation must be completed and the dissertation defense passed within four years after the student has passed the Qualifying Exam and has been admitted to candidacy for the degree. Upon petition to the graduate school by the Director of Graduate Studies of the student's home department, a one-year extension of candidacy may be granted. If the time period allotted has expired without successful completion of the dissertation defense, the student is formally removed from the rolls of the Graduate School and will have to re-apply for admission which is subject to the approval of the program faculty. Students re-admitted in this manner may be required to retake the Qualifying Examination.

X. Minors

No minor concentration is required of students in Psychology, and the Neuroscience area requires that its students not seek a minor concentration. Students in other programs may elect to have a minor in an area of Psychology other than their primary area of specialization. Specific area groups determine whether a minor option is offered and the specific requirements for a minor. At the present time, the Cognition and Cognitive Neuroscience, Developmental Science, and Quantitative Methods areas offer minors. The Clinical Science and Neuroscience areas do not offer minors. The specific requirements are as follows:

A. Cognition and Cognitive Neuroscience

Four courses in the Cognition and Cognitive Neuroscience areas (12 credit hours) approved by the head of the Cognition and Cognitive Neuroscience area of the student's home department.

B. Developmental Science

Developmental Psychology – PSY-GS 8400-P *or* Seminar in Cognitive Development – PSY-GS 8450-P and three additional courses focused on Developmental Sciences (4 courses total). Courses outside of the area that have a substantial focus on development can receive approval by the Developmental Area Head.

C. Quantitative Methods

Doctoral students outside the QM program may elect to minor in quantitative methods. This formal minor involves taking four advanced methods courses from the QM program beyond the first year required graduate statistics sequence. The minor requires a 3.5 average GPA (for all 6 minor courses), with no grade below a B. The minor provides students with exceptional training in the application of complex psychometric and statistical procedures and provides students with skills that can enhance the quality of their research program over the course of their career. Many students find that the credential of a graduate minor in quantitative methods is a valuable asset in the pursuit of research-oriented academic positions after graduation.

XI. Teaching

Since the teaching of psychology is something most of our students will do at some point in their careers, it is important that they receive some instruction and experience in teaching. For this reason, the vast majority of students will serve as teaching assistants in Psychology during their residence: in A&S, there is a requirement of 2 semesters of TA'ship; in Peabody, there is no formal requirement. Importantly, in order to maintain good standing in the program, a graduate student funded by a teaching assistantship must show satisfactory performance in their TA duties, as assessed by faculty and student evaluations.

XII. Student Evaluations

The relevant departmental faculty reviews all students in yearly evaluation meetings that occur at the end of each spring semester; in some cases, faculty reviews also occur in the fall semester. The major components of these evaluations are: (1) grades in courses; (2) research performance; (3) performance of other milestones (e.g., written qualifying exams); and, (4) performance as a teaching or research assistant (if relevant). We also carefully consider other factors that have a bearing on scholarly potential and career development.

Grades in courses that are less than a C (C- or below) are considered failing, save for the exceptions noted in specific areas above. Grades of B- or below are considered cause for concern. All students must have a minimum grade point average of greater than 3.0 (A = 4, B = 3, C = 2) to remain in good standing. Courses included in the computation of GPA include all core courses and seminars. Courses not included in the computation include program seminar series, research credits, practicum credits, and lab/research meetings. Please note that this grade standard is higher than the minimum standard set by the Graduate School.

A satisfactory evaluation of research progress requires evidence of continual involvement in research-related activities, a level of competence appropriate to the student's experience and area of specialization, and satisfactory completion of research milestones in the required time frame. There should also be evidence for increased research productivity and increased intellectual independence as the graduate student moves through their graduate training.

A satisfactory evaluation of performance as a teaching or research assistant is determined through written evaluation by the faculty supervisor and by student course evaluations (in the case of TA appointments).

The faculty's annual evaluation of a student will result in one of four possible decisions:

(1) Good standing: The student is considered to be in good standing in the Department and is encouraged to continue.

(2) Probation. If placed on probation, a student will be given a limited period of time (usually a semester) within which he or she must demonstrate competence in the areas of substandard performance in order to be permitted to continue in the program. The specific accomplishments required of a student in order to be removed from probation will be stated to the student at the time a probation decision is made. If a student fails to remove him- or herself from probation during the allotted time, he or she may be permitted to take a terminal Master's degree, or may be asked to leave the program immediately, depending upon faculty evaluation of his or her work.

(3) Terminal Master's Degree. If the student has not yet received an M.S. in Psychology, the student will be permitted to submit work towards a terminal Master's degree, but will not be allowed to continue to the Ph.D. If this option is selected, it will normally be associated with a strict deadline to submit work specified by the program area in order to receive a terminal master's degree. Failure to meet this deadline will likely result in termination from the program.

(4) Termination from the Program. The student will be dropped from the program immediately. A majority vote of the relevant faculty in the home department is required to terminate a student from the graduate program. This recommendation will be transmitted to the relevant Graduate Dean. This decision may be appealed in writing.

It should be emphasized that most of our students remain in good standing throughout their graduate careers.

Within two weeks after the annual progress evaluation meeting, each student will receive a letter from the Director of Graduate Studies or program area head summarizing his or her program status. Some areas may require a separate evaluation process for their students that incorporates additional criteria (e.g., performance in practica in the case of clinical students).

XIII. Petitions and Exceptions to Requirements

In general, exceptions to the requirements may be granted upon petition to the relevant Director of Graduate Studies (DGS) and Area Group Head (AGH). The student will be required to write a petition explaining the reasons why an exception should be granted and, when appropriate, outline a proposed future course of action.

It is required that the student ask her/his advisor to submit an opinion about the petition. If the advisor does not submit such a statement, it will be assumed by the DGS and AGH that the advisor does not approve the petition. Students have the right to appeal the decision of the DGS and AGH by submitting a petition to the full voting faculty of the home department for consideration. If desired, any member of the student's current committee (e.g., Advisory Committee, Qualifying Committee), as well as the student, has the opportunity to appear before the faculty.

XIV. Ethics

All faculty and graduate students are expected to adhere to the ethical standards summarized in *Ethical Standards of Psychologists* (American Psychological Association). In addition, students are expected to adhere scrupulously to guidelines for treatment of research participants. These guidelines are detailed in *Ethical Principles in the Conduct of Research with Human Participants* (American Psychological Association). All students whose research involves animals are expected to be familiar with the contents of the *Vanderbilt University Information Manual and Guide for Research Animal Use*, and to comply with the policies, standards, and principles contained therein. Violations of ethical standards constitute potential grounds for dismissal from the program.

We expect that interactions among students, faculty, and staff will be collegial and ethical and will reflect the *APA Ethical Principles of Psychologists and Code of Conduct*. In the context of student-faculty relationships, the following sections of the ethical principles are particularly emphasized:

6.03 (b): When engaged in teaching or training, psychologists recognize the power they hold over students or supervisees and therefore make reasonable efforts to avoid engaging in conduct that is personally demeaning to students or supervisees.

6.05 (a): In academic and supervisory relationships, psychologists establish an appropriate process for providing feedback to students and supervisees.

6.05 (b): Psychologists evaluate students and supervisees on the basis of their actual performance on relevant and established program requirements.

If a student believes that violations of ethical principles have arisen in interactions with faculty, other students, or staff members, several avenues of recourse are available. We recommend that initial discussions be held with one of the following: the Director of Graduate Studies, the relevant Area Group head, or any other faculty member with whom the student feels comfortable. If issues of sexual harassment or discrimination are raised, the student will be encouraged to speak to a representative from the *Equal Opportunity, Affirmative Action, and Disability Services Department*, the on-campus facility that offers advice to complainants, investigates sexual harassment and discrimination claims, and can serve to mediate disputes.

XV. Accommodations

Students wishing to request accommodations can find out the procedure by visiting the Student Access website: https://www.vanderbilt.edu/student-access/

XVI. Complaints and Grievances

The Department of Psychology (Arts and Science) and the Department of Psychology and Human Development (GPC) adhere to Vanderbilt University policy concerning the filing of complaints and grievances. This policy is described in detail in the *Student Handbook* (Chapter 5: University Policies and Regulations), which can be accessed on the web at the following URL: http://www.vanderbilt.edu/student_handbook.

XVII. Freedom of Expression Statement

At Vanderbilt, we have a long tradition of free expression, which is one of our core principles. We believe in bringing together people of differing viewpoints for a common purpose. Learn more about how we practice free expression at Vanderbilt and read Vanderbilt's Freedom of Expression policy in the Student Handbook.

XVIII. Guidance of Acceptable Use of AI for Graduate Program Milestones

This policy describes guidelines for the use of generative artificial intelligence (AI) software, such as ChatGPT and other large language models, for graduate students submitting written work to satisfy milestone requirements of the Psychological Sciences graduate program, including the end-of-year committee meetings, Qualifying Exam, Master's Thesis, PhD proposal and PhD Dissertation. This policy is meant to provide guidelines in a manner consistent with both the University's Standards of Conduct and the Graduate Program's expectations. Note that expectations for use of AI for graduate coursework are at the discretion of the Course Instructor and may differ from the guidelines described here. Likewise, the use of AI for graded research or other research conducted under the supervision of a Principal Investigator (PI) is at the discretion of the PI. Students should discuss these guidelines and allowable use of AI with their PI. Finally, the permissible use of AI as part of TA duties should be discussed with the course instructor prior to the start of the semester.

Generative AI is now an integral part of how scholars think, write, and communicate. Used thoughtfully, these tools can help clarify ideas, explore multiple angles on a problem, and improve the clarity and structure of scientific writing. As a graduate program, we recognize that AI will be part of the future of research, and we want students to develop the judgment and skills to use it in ways that genuinely elevate the quality of their work—not replace critical thinking. The following guidelines are intended to help students engage with AI tools in a transparent, responsible, and academically rigorous way. We encourage all committees to have an explicit discussion of acceptable and unacceptable uses of generative AI-tools with input from both the student and committee members before the student starts work for each milestone requirement.

Issues with the use of AI:

1. **Plagiarism**: Copying and pasting text, images, media, etc. generated by AI software into your documents and presentations without attribution may count as plagiarism as defined by Vanderbilt. That includes repeating or slightly modifying phrases, sentences, or passages generated by AI tools. Your text must be your own. Using AI as a grammar correction tool does not count as plagiarism.
2. **Incorrect Information**: AI models can generate inaccurate or misleading information. Verify any information with credible sources, i.e., from multiple literature articles.
3. **Superficial Understanding:** AI is not a substitute for reading the literature on your own and applying critical thinking to the problems you face. An over-reliance on AI sources may result in a superficial understanding of your subject, which will become apparent in the oral and written component of the examination.
4. **Data Security:** Any content uploaded to AI tools may be retained by the tool's parent company and utilized in their training models. It is therefore not possible at this time to guarantee data security or privacy protections for such content. Hence, no confidential or non-public information should be entered into or generated from publicly-accessible AI tools (see Amplify note below).

AI tools do not qualify for authorship. All co-authors on submitted work are responsible for the content of the work. For student exams/papers, the student is ultimately responsible for the content of the submitted work. If you choose to use generative AI tools in your work, you must do so under the following guidelines and disclose its use.

Acceptable Uses of AI Tools:

1. Stimulate thinking: Brainstorm various angles of the significance or relevance of your scientific thoughts and identify knowledge gaps suitable for your proposal/research.
2. Structuring: Draft outlines.
3. Writing Refinement: Run abstracts, sentences, or paragraphs through the software to check for grammatical errors and improve writing style.
4. Feedback Incorporation/Revision: Direct the AI to provide ideas for restructuring documents based on feedback.
5. Computer Code: Debugging and coding can be assisted through the use of generative AI, but students are responsible for ensuring accuracy and reproducibility.
6. Data analysis. Can be used for suggestions for data analysis, troubleshooting, and interpretation (should be disclosed if need to be used).
7. Disclosure**:** If you use AI software beyond spell check and grammar suggestions, include a brief "AI Use Disclosure" statement just before your references to disclose which AI software you have used and how you have used it. APA guidelines for proper AI citation can be found here.
8. Students should use Vanderbilt's secure Amplify platform for inputting and/or outputting proprietary or unpublished research. Amplify offers a secure, chat-based environment for work and research, ensuring that your data and chat history remain private and protected within Vanderbilt's internal infrastructure.
9. The use of local LLMs that are data- and input-independent of the cloud and web are also allowable (issue of copyright still hold). The use of AI co-pilots in other software/platforms is admissible.

These guidelines were developed in Fall 2025 and are subject to amendments by the Program. Failure to follow these guidelines will be considered a violation of the Vanderbilt Honor Code

Appendix A: List of Courses that Fulfill Breadth Requirements

This appendix lists the courses within each of the eight areas of study that can be used to fulfill the breadth requirement of satisfactory completion of one course from three areas of specialization (9 credits total). This list pertains specifically to the program requirements discussed on page 6 and not requirements that are specific to any one area group (e.g., Clinical Science). For additional details concerning these and other graduate classes, see the current edition of The Catalog of Vanderbilt University Graduate School

I. Clinical Psychology

A. Psychology (Arts & Science)

PSY 8310-A&S. Research Methods in Clinical Psychology. Major methodological and quantitative issues in clinical psychology, including statistical significance testing and its alternatives; threats to internal and external validity; psychometric theory; quantitative approaches to classification; behavioral, genetic, and psychophysiological methods; animal models; analysis of change, mediation, and moderation.

PSY 8352. Seminar: Clinical Psychology.

B. Psychology and Human Development (GPC)

PSY-GS 8100-P. Behavioral Pediatrics and Child Health Psychology. Behavioral pediatrics and child health psychology for advanced predoctoral and postdoctoral trainees. Topics include the scope and definition of behavioral pediatrics, measurement of child behavior, children's health beliefs and understanding of illness, theories of psychosomatic illness, immunologic and endocrinologic aspects of stress, compliance, psychological effects of physical illness, families' responses to stress, and psychological intervention strategies.

PSY- GS 8200-P. Psychopathology. The major forms of psychopathology: child, adolescent, and adult. Recent research, classification systems, and developmental variables affecting psychopathology.

PSY-GS 8420-P. Advanced Seminar in Clinical Psychology.

II. Cognition and Cognitive Neuroscience

A. Psychology (Arts & Science)

PSY 3785-A&S. Brain Damage and Cognition. Effects of neurological impairment from stroke, injury, or disease on perception, speech, memory, judgment, and behavior. Relation between brain systems and cognitive systems.

PSY 5780-A&S. The Visual System. (Also listed as Cell and Developmental Biology 347, Electrical Engineering 351, Neuroscience 347) An interdisciplinary approach to how humans see and interpret their visual environment. Topics include the structure of the eye and brain (including optics), the physiology of individual cells and groups of cells, machine vision and models of visual function, visual attention, and mechanisms of complex visual perception. Lectures by faculty from Psychology, Engineering, and Cell and Developmental Biology. Graduate students attend a one-hour discussion section per week, in addition to lecture, and turn in a more extensive paper than undergraduates

PSY 6310-A&S. Advanced General Psychology (Cognitive)

PSY 6218-A&S. Computational Cognitive Modeling. PSY 6218-A&S. Computational Cognitive Modeling. Computational modeling of human perception and cognition. Model implementation, parameter estimation, statistical model evaluation; developing and testing new models; stochastic processes, simulation and Monte Carlo methods, high-performance computing.

PSY 6219-A&S. Scientific Computing for Psychological and Brain Science. Computer programming, scientific computing methods, and high-performance computing applied to psychological and brain sciences problems, such as experimental control, data analysis and visualization, image and signal processing, optimization, and simulation. Familiarity with computer programming is assumed.

PSY 6220-A&S. Bayesian Modeling with Python. Statistical and cognitive modeling. Models of memory, psychophysics, categorization, and decision-making. Probabilistic programming in Python. Bayesian parameter estimation and model comparison.

PSY 6775-A&S. Models of Human Memory. Mathematical and computational models of the cognitive processes underlying human memory. Attribute-based models, instance theories, neural network models, retrieved-context models, executive function and working memory models. Methods of fitting models to empirical data.

PSY 8505-A&S. Judgment & Decision-Making. Historical origins and development of human judgment and decision-making as a specialty within cognitive psychology. Expected utility theory; heuristics and biases; decision-making in clinical psychology; neurobiology of decision-making; neuroeconomics.

PSY 8507-A&S. Computational Neuroscience of Human Vision. Neurocomputational modeling and deep learning have transformed our understanding of how the brain encodes sensory information to interfere the presence of surfaces, shapes, and objects in complex scenes. This seminar will discuss key literature, computational models and deep neural networks, and provide computational assignments for students to gain experience.

PSY 8551-A&S. Seminar: Cognitive Psychology.

PSY 8744-A&S. Seminar: Neuroscience – [Neurobiology of Attention; Neuro of Consciousness, Brain Inside-Out]

PSY 8750-A&S Scientific Writing in Psychology and Neuroscience. Journal articles, grants, scientific papers, press releases, and dissertations. Revising and editing.

B. Psychology and Human Development (GPC)

PSY-GS 8360-P. Human Cognition. Current research and theory in cognitive psychology. Emphasis on memory, perception, and language. Some applications of cognitive theories are explored.

PSY-GS 8430-P. Advanced Seminar: Cognitive Studies. Special topics in cognitive studies.

PSY-GS 8450-P. Seminar in Cognitive Development. Major theoretical and conceptual issues in cognitive development. Emphasis in current research topics like memory development, reading, conceptual development, semantic development, problem solving, and reasoning. Recommended background: 352P and/or 360P.

C. Other

NSC 6270. Computational Neuroscience. Theoretical, mathematical, and simulation models of neurons, neural networks, or brain systems. Computational approaches to analyzing and understanding data from behavior, neurophysiology, electrophysiology, or brain imaging. Simulation methods for neural models. Course taught using Python.

NURO 8330. Cognitive Neuroscience. This course provides a broad understanding of the state of our knowledge in cognitive neuroscience. The emphasis is on the findings and concepts in the major branches of cognitive neuroscience, rather than techniques (although these will be discussed). The level of analysis will focus on human and non-human primate systems. Prerequisite: an introductory-level undergraduate course in neuroscience or physiological psychology. Basic knowledge of experimental cognitive psychology is desirable but not necessary.

III. Developmental Psychology

A. Psychology (Arts & Science)

PSY 6310-A&S. Advanced General Psychology (Developmental)

B. Psychology and Human Development (GPC)

PSY-GS 8815-P. Research Methods in Developmental Psychology. Major empirical approaches to the study of development. Emphasis on human behavioral development, although elements from comparative psychology and biomedical sciences included. [3] (Not currently offered)

PSY-GS 8400-P. Developmental Psychology. Central issues, theories, and methods.

PSY-GS 8450-P. Seminar in Cognitive Development. Major theoretical and conceptual issues in cognitive development. Emphasis in current research topics like memory development, reading, conceptual development, semantic development, problem solving, and reasoning. Recommended background: 352P and/or 360P.

PSY-GS 8600-P. Seminar in Social and Personality Development. Development of personality and social processes, with emphasis on methods of inquiry. Trait theory, socialization processes, origins of gender differences, cultural differences in childbearing practices, experimental and observational methods in developmental research, and development of motivational systems.

PSY-GS 8460-P. Advanced Seminar in Developmental Psychology. May be repeated with a change of topic.

IV. Neuroscience/Physiological Psychology

A. Psychology (Arts & Science)

PSY 5XXX-A&S. Laboratory in Behavioral Neuroscience. Experimental methods in behavioral neuro- science. Computer-based data acquisition and analysis, statistical reasoning, and manuscript preparation.

PSY 5780-A&S. The Visual System. (Also listed as Cell and Developmental Biology 8347 [Formerly Also listed as Cell and Developmental Biology 347], Neuroscience 8347 [Formerly Neuroscience 347]) An interdisciplinary approach to how humans see and interpret their visual environment. Topics include the structure of the eye and brain (including optics), the physiology of individual cells and groups of cells, machine vision and models of visual function, visual attention, and mechanisms of complex visual perception. Lectures by faculty from Psychology, Engineering, and Cell and Developmental Biology. Graduate students attend one hour discussion section per week, in addition to lecture, and turn in a more extensive paper than undergraduates.

PSY 6218-A&S. Computational Cognitive Modeling. Computational modeling of human perception and cognition. Model implementation, parameter estimation, statistical model evaluation; developing and testing new models; stochastic processes, stimulation and Monte Carlo methods, high-performance computing.

PSY 6219-A&S. Scientific Computing for Psychological and Brain Science. Computer programming, scientific computing methods, and high performance computing applied to psychological and brain sciences problems, such as experimental control, data analysis and visualization, image and signal processing, optimization, and simulation. Familiarity with computer programming is assumed.

PSY 6220-A&S. Bayesian Modeling with Python. Statistical and cognitive modeling. Models of memory, psychophysics, categorization, and decision-making. Probabilistic programming in Python. Bayesian parameter estimation and model comparison.

PSY 6310-A&S. Advanced General Psychology (Physiological)

PSY 6775-A&S. Models of Human Memory. Mathematical and computational models of the cognitive processes underlying human memory. Attribute-based models, instance theories, neural network models, retrieved-context models, executive function and working memory models. Methods of fitting models to empirical data.

PSY 8216-A&S. Brain Imaging Methods. Principles and methods used in human neuroimaging, with emphasis on functional magnetic resonance imaging (fMRI).

PSY 8505-A&S. Judgment & Decision-Making. Historical origins and development of human judgment and decision-making as a specialty within cognitive psychology. Expected utility theory; heuristics and biases; decision-making in clinical psychology; neurobiology of decision-making; neuroeconomics.

PSY 8507-A&S. Computational Neuroscience of Human Vision. Neurocomputational modeling and deep learning have transformed our understanding of how the brain encodes sensory information to interfere the presence of surfaces, shapes, and objects in complex scenes. This seminar will discuss key literature, computational models and deep neural networks, and provide computational assignments for students to gain experience.

PSY 8744-A&S. Seminar: Neuroscience – [Neurobiology of Attention; Neuro of Consciousness; Brain Inside-Out]

PSY 8750-A&S. Scientific Writing in Psychology and Neuroscience. Journal articles, grants, scientific papers, press releases, and dissertations. Revising and editing.

PSY 8906-A&S. Evolutionary Psychology. Interdisciplinary analysis of the origins of mind, with particular emphasis on the mind/brain as a product of biological evolution.

B. Psychology and Human Development (GPC)

PSY-GS 8440-P. Seminar in Behavioral Biology. Selected topics in behavioral biology—e.g., ethology. Content varies according to student needs and interests. May be repeated. [3]

C. Neuroscience (The Graduate School)

NURO 8324. Advanced Neurophysiology. (Also listed and Advanced Neurophysiology 8323 [Formerly Molecular Physiology and Biophysics 323]) Recent findings concerning the structure, function, and pharmacology of ion channels. Topics will include the relationship between amino acid sequence, protein subunit structure, and function of both voltage- and ligand-gated channels; the relationship between channel structure and pharmacology; the interaction of drugs with channels and receptor/channel proteins, with special emphasis on the interaction of compounds with different functional channel states; indirect coupling between ion channels and neurotransmitter and hormone receptors. Classes will include both presentations by the instructors and discussion of recent publications by students. Prerequisite: consent of instructor.

NURO 8325. Neuroscience Discussions. This two-semester course provides discussions on a broad range of neuroscience topics, ranging from reviews of historical concepts and individuals in neuroscience to science journalism. Other topics include scientific ethics, science policy, good grantspersonship, and communication skills.

NURO 8330. Cognitive Neuroscience. This course provides a broad understanding of the state of our knowledge in cognitive neuroscience. The emphasis is on the findings and concepts in the major branches of cognitive neuroscience, rather than techniques (although these will be discussed). The level of analysis will focus on human and non-human primate systems. Prerequisite: an introductory-level undergraduate course in neuroscience or physiological psychology. Basic knowledge of experimental cognitive psychology is desirable but not necessary.

NURO 8340. Fundamentals Neuroscience II. Required for Neuroscience majors in the Integrative/Cognitive track. Allows students to develop a working knowledge of neural networks and brain systems and the techniques used to study these functions. Includes an introductory overview of neuroanatomy, physiology, and behavior, and then moves on to the sensory and motor systems, motivation, and learning and memory.

NURO 8345. Fundamentals Neuroscience I. (Also listed as Cell and Molecular Neuroscience 8345,], [Formerly Molecular Physiology and Biophysics 345] required entry-level course for the Ph.D. in neuroscience and an elective for medical students. Students are exposed to fundamental concepts and techniques in molecular and cellular neuroscience and provided with a theoretical context for experimental analysis of brain function. The course is divided into four modules. Module I: Biophysics and Biochemistry of Synaptic Transmission reviews biophysical and molecular concepts relating to membrane excitability, action potential generation and propagation, and the molecular basis of chemical signaling at synapses. Module II: Synaptic

Integration and Plasticity discusses mechanisms and models of synaptic integration and plasticity and concentrates on how molecular changes translate into altered synaptic strength and gene expression programs that underlie short and long-term plasticity. Module III: Neural Development examines historical and current concepts in neural pattern formation, neural migration, axon guidance and synapse formation. Module IV: Neural Diseases and Disease Models focuses on specific brain disorders such as epilepsy, depression, schizophrenia, and Alzheimer's disease and current models used to investigate their origin and/or treatment. This course combines faculty lecture with discussion of original articles, with an emphasis on student participation.

NURO 8346. Advanced Molecular Neurobiology. (Also listed as Advanced Molecular Neurobiology 8346 in Pharmacology [Formerly also listed as Pharmacology 346). This course examines molecular components and interactions that regulate neuronal development, signaling, and disease. Topics include development of neuronal identity, axonal transport, growth factors and cell death, axon guidance and synapse formation, electrical and chemical transmission, regulation of neuronal excitability and genetic analysis of signaling and neural disorders. Didactic and literature discussions provide students with a sound foundation for understanding the molecular bases underlying the development and function of the nervous system. Prerequisite: NURO 8345 [Formerly NURO 345], or consent of instructor.

D. Neuroscience (College of Arts and Science)

NSC 5269. Developmental Neuroscience. Normal and abnormal brain development. Cell division, migration, and death; synapse formation and plasticity; and clinical syndromes.

NSC 5272. Structure and Function of the Cerebral Cortex. Classic and current concepts of cerebral function. Species differences, receptive field organization, neurotransmitters, modifications by experience, and behavioral effects. Prerequisite:

NSC 5274. Neuroanatomy. Gross structure, histological architecture, and techniques for creating images of the human brain.

NSC 6270. Computational Neuroscience. Theoretical, mathematical, and simulation models of neurons, neural networks, or brain systems. Computational approaches to analyzing and understanding data from behavior, neurophysiology, electrophysiology, or brain imaging. Simulation methods for neural models. Course taught using Python.

E. Other

BMW 7440. Neuroimaging. Applications of noninvasive imaging techniques including MRI, fMRI, optical, EEG, and PET to the study of neural systems. Emphasis on the human brain, with a focus on current scientific literature. Check with instructor to make sure you have requisite background.

CS 6350. Artificial Neural Networks. Theory and practice of parallel distributed processing methods using networks of neuron-like computational devices. Neurobiological inspirations, attractor networks, correlational and error-correction learning, regularization, unsupervised learning, reinforcement learning, Bayesian and information theoretic approaches, hardware support, and engineering applications

V. Perception

A. Psychology (Arts & Science)

PSY 5780-A&S. The Visual System. (Also listed as Cell and Developmental Biology 347, Electrical Engineering 351, Neuroscience 347) An interdisciplinary approach to how humans see and interpret their visual environment. Topics include the structure of the eye and brain (including optics), the physiology of individual cells and groups of cells, machine vision and models of visual function, visual attention, and mechanisms of complex visual perception. Lectures by faculty from Psychology, Engineering, and Cell and Developmental Biology. Graduate students attend one hour discussion section per week, in addition to lecture, and turn in a more extensive paper than undergraduates.

PSY 6310-A&S. Advanced General Psychology (Perception)

PSY 8543-A&S. Seminar: Perception

PSY 8507-A&S. Computational Neuroscience of Human Vision. Neurocomputational modeling and deep learning have transformed our understanding of how the brain encodes sensory information to interfere the presence of surfaces, shapes, and objects in complex scenes. This seminar will discuss key literature, computational models and deep neural networks, and provide computational assignments for students to gain experience.

PSY 8744-A&S. Seminar: Neuroscience - Sem: Neuro of Consciousness

B. Neuroscience (College of Arts and Science)

NSC 6270. Computational Neuroscience. Theoretical, mathematical, and simulation models of neurons, neural networks, or brain systems. Computational approaches to analyzing and understanding data from behavior, neurophysiology, electrophysiology, or brain imaging. Simulation methods for neural models. Course taught using Python.

VI. Personality and Individual Differences

A. Psychology and Human Development (GPC)

PSY-GS 8350-P. Individual Differences. Focuses on traditional concepts and findings in the area of individual differences broadly defined. The psychological content will primarily involve abilities, interests, and personality; methodological issues encountered in assessing these attributes will be stressed throughout; and particular attention will be devoted to how these concepts can enhance research programs in both applied and theoretical areas. The specific variables discussed within each domain will be restricted to those that have empirically "panned out" (viz., variables that are reliable and related to meaningful behaviors and outcomes that psychologists are interested in predicting and better understanding), rather than theoretical constructs and measures whose external validity is unknown.

VII. Quantitative Methods

A. Psychology (Arts & Science)

PSY 6218-A&S. Computational Cognitive Modeling. Computational modeling of human perception and cognition. Model implementation, parameter estimation, statistical model evaluation; developing and testing new models; stochastic processes, simulation and Monte Carlo methods, high-performance computing.

PSY 8305-A&S. Linear and Nonlinear Mixed Effects Models. The analysis of data from hierarchical and multilevel designs. Theory and computational methods, specification and testing of fixed effects, random effects and residuals, assessment of fit, graphical examination, applications to repeated measures data, and missing data models. Prerequisite: PSY-GS 8861-P (Statistical Inference) [Formerly PSY-GS 310-P] and PSY 6104-A&S (Quantitative Methods and Experimental Design) [Formerly PSY 304B - A&S]. PSY-GS 8870-P [Formerly PSY-GS 313-P], or equivalent preparation. Recommended: PSY-GS 8867-P [Formerly PSY-GS 312-P] or equivalent preparation.

PSY 8873-A&S. Structural Equation Modeling. Applications of structural equation modeling. Confirmatory factor analysis, path analysis, causal modeling with latent variables, latent growth curve and panel models, multiple-group and multiple-level models, and the treatment of missing data. Principles of identification, estimation, and fit. Prerequisite: PSY-GS 8861-P (Statistical Inference) [Formerly PSY-GS 310-P] and PSY 6104-A&S (Quantitative Methods and Experimental Design) [Formerly PSY 304B - A&S]. PSY-GS 8870-P [Formerly PSY-GS 313-P], or equivalent preparation. Recommended: PSY-GS 8867-P [Formerly PSY-GS 312-P] or equivalent preparation.

PSY 8310-A&S. Research Methods in Clinical Psychology. Major methodological and quantitative issues in clinical psychology, including statistical significance testing and its alternatives; threats to internal and external validity; psychometric theory; quantitative approaches to classification; behavioral, genetic, and psychophysiological methods; animal models; analysis of change, mediation, and moderation.

B. Psychology and Human Development (GPC)

PSY-GS 8850. Advanced Seminar in Measurement, Statistics, and Evaluation - Applied Nonparametric Statistics. This course covers nonparametric statistical methods useful when the assumptions of ordinary parametric statistics are not met, and for developing custom statistical techniques useful when other methods do not exist. Coverage is given to distribution-free procedures, sign tests, contingency tables, median tests, chi-square and other goodness-of-fit tests, rank correlations, randomness tests, ordinal regression, Monte Carlo methods, resampling methods (bootstrap and jackknife), tests of independence, 1-sample, 2-sample, and k-sample methods, permutation tests, function smoothing, and splines. Emphasis is placed on underlying theory, application to data, and software.

PSY-GS 8867-P. Multivariate Statistics for Data Science. Psychological measurement theory, along with correlational and regression analysis techniques essential to the development of that theory. Prerequisite: PSY-GS 8861-P (Statistical Inference) [Formerly PSY-GS 310-P] and PSY 6104-A&S (Quantitative Methods and Experimental Design) [Formerly PSY 304B - A&S]. PSY-GS 8870-P [Formerly PSY-GS 313-P], or equivalent preparation. Recommended: PSY-GS 8867-P [Formerly PSY-GS 312-P] or equivalent preparation.

PSY-GS 8870-P. Correlation and Regression Theory and practices underlying bivariate and multi-regression/correlation methods. Includes: the full range of correlation and covariance indices; an array of common regression analysis strategies (e.g., reduced-form regression, path analysis, ordered and unordered step-wise inclusion, mediator and moderator models); tests of assumptions and regression diagnostics; nonlinear regression and linearizing transformations; statistical power; and causal analysis with manifest variables. Prerequisite: At least 1 graduate-level statistics course.

PSY-GS 8873-P. Structural Equation Modeling. This course introduces the basic principles of path analysis, confirmatory factor analysis, and latent variable structural modeling, which constitute a powerful set of statistical tools for examining correlational, observational, and even experimental data in the social sciences. Computer techniques for conducting these analyses will also be taught: the LISREL program in particular, but AMOS will also be introduced. Prerequisite: PSY-GS 8861-P (Statistical Inference) and PSY 6104-A&S (Quantitative Methods and Experimental Design). PSY-GS 8870-P, or equivalent preparation. Recommended: PSY-GS 8867-P or equivalent preparation.
Exploratory Factor analysis.

PSY-GS 8820-P. Program Evaluation. The evaluation of social programs. The design of evaluations to produce both theoretically meaningful and practical information about the program and its effectiveness. Such topics as needs assessment, monitoring, impact assessment, and cost/effectiveness evaluations. Covers programs in education, health, and human services

PSY-GS 8876. Psychological Measurement. Fundamental concepts, methods, and principles of psychological measurement. Particular attention will be devoted to reliability and validity issues underlying psychometric theory, and how psychometric theory relates to the assessment of individual differences or human variation more generally. Topics will include multiple regression, factor analysis, and item response theory.

VIII. Social Psychology

A. Psychology (Arts & Science)

PSY 6310-A&S. Advanced General Psychology (Social Psychology)

PSY 8942-A&S. Seminar: Social

B. Psychology and Human Development (GPC)

PSY-GS 8430-P [Formerly PSY-GS 353-P]. Advanced Seminar: Cognitive Studies. Special topics in cognitive studies, if topic is relevant to social psychology. Permission of W. Smith or C. Smith is required in order for this course to count toward the Social Psychology area requirement.

PSY-GS 8600-P [Formerly PSY-GS 363-P]. Seminar in Social and Personality Development. Development of personality and social processes, with emphasis on methods of inquiry. Trait theory, socialization processes, origins of gender differences, cultural differences in childbearing practices, experimental and observational methods in developmental research, and development of motivational systems

C. Other

LAW 7298 [Formerly LAW 674]. Introduction to Behavioral Law and Economics. This course will explore the basic concepts of the rational-choice framework in economics and then analyze how individuals deviate from the standard assumptions economists make regarding human behavior. Combining empirical and experimental results from both psychology and economics, students will examine the roles that bounded rationality, willpower, and self-interest play in law and economics, and the legal system more broadly, and the consequences of these three departures from neoclassical economics. No previous background in economics is required. [3]
NOTE: This course requires completion of a "Request for Graduate Credit" form with the graduate school. If that form is not completed, you will need to paid Law School tuition.

LWEC 8403 [Formerly LWEC 403]. Behavioral Law and Economics I. Economic principles underlying behavioral law and economics research. Analyses of the rationality of individual choice will be undertaken, including research that involves the interaction of economics, psychology, and decision sciences. Applications of behavioral law and economics methods will be applied to the analysis of jury behavior. Pre- or co-requisite: ECON 304A. [3]
NOTE: This course can be taken with permission of the instructor without having taken ECON 304A. Some undergraduate coursework in microeconomics is required. This course may also require completion of a "Request for Graduate Credit" form depending on whether it is listed as a Law course or an Economics course.

LWEC 8404 [Formerly LWEC 404]. Behavioral Law and Economics II. Research contributions at the frontier of behavioral law and economics research. Each student will structure a controlled experiment to test the rationality of jury behavior, the effect of alternative jury instructions, or a similar kind of scientifically controlled study of behavior relating to the performance of the legal system. Students will administer and analyze the survey results and will prepare an original research paper on their chosen topic. Pre-requisite: LWEC 403. [3]
NOTE: This course may also require completion of a "Request for Graduate Credit" form depending on whether it is listed as a Law course or an Economics course.

Appendix B: List of Courses that Fulfill American Psychological Association (APA) Distributional Requirements

Note: These requirements only apply to Clinical Science students and are discussed on page 9.

I. Biological Aspects of Behavior

A. Psychology (Arts & Science)

PSY 6310-A&S [Formerly PSY 301a-A&S]. Advanced General Psychology (Physiological)

PSY 8744-A&S [Formerly PSY 344-A&S]. Seminar: Neuroscience

PSY 8758-A&S [Formerly PSY 358-A&S]. Seminar in Neuroscience. Integration of the subareas of neuroscience (enrollment for two semesters is required).

B. Psychology and Human Development (GPC)

PSY-GS 8440-P [Formerly PSY-GS 357-P]. Seminar in Behavioral Biology. Selected topics in behavioral biology—e.g., ethology. Content varies according to student needs and interests.

II. Cognitive and Affective Aspects of Behavior

A. Psychology (Arts & Science)

PSY 6310-A&S [Formerly PSY 301a-A&S]. Advanced General Psychology (Cognitive)

PSY 8551-A&S [Formerly PSY 351-A&S]. Seminar: Cognitive Psychology.

PSY 8352-A&S [Formerly PSY 352-A&S]. Seminar: Clinical Psychology (various topics)

PSY 8557-A&S [Formerly PSY 357-A&S]. Seminar in Cognitive Science. Integration of the subareas of cognitive science (enrollment for two semesters is required).

B. Psychology and Human Development (GPC)

PSY-GS 8360-P [Formerly PSY-GS 352-P]. Human Cognition. Current research and theory in cognitive psychology. Emphasis on memory, perception, and language. Some applications of cognitive theories are explored. [3]

PSY-GS 8430-P [Formerly PSY 353-P]. Advanced Seminar: Cognitive Studies. Special topics in cognitive studies.

PSY-GS 8450-P [Formerly PSY 361-P]. Seminar in Cognitive Development. Major theoretical and conceptual issues in cognitive development. Emphasis in current research topics like memory development, reading, conceptual development, semantic development, problem

solving, and reasoning. Recommended background: 352P and/or 360P.

III. Developmental Aspects of Behavior

A. Psychology (Arts & Science)

PSY 8600-P Seminar in Social and Personality Development

B. Psychology and Human Development (GPC)

PSY-GS 8400-P Developmental Psychology

PSY-GS 8450-P Seminar in Cognitive Development

PSY-GS 8460-P Advanced Seminar in Developmental Psychology

IV. Social Aspects of Behavior

A. Psychology (Arts & Science)

PSY 6310-A&S [Formerly PSY 301a-A&S]. Advanced General Psychology (Social Psychology)

PSY 8942-A&S [Formerly PSY 342-A&S]. Seminar: Social

B. Psychology and Human Development (GPC)

PSY-GS 8600-P [Formerly PSY-GS 363-P]. Seminar in Social and Personality Development. Development of personality and social processes, with emphasis on methods of inquiry. Trait theory, socialization processes, origins of gender differences, cultural differences in childbearing practices, experimental and observational methods in developmental research, and development of motivational systems

V. Individual Differences in Behavior

A. Psychology (Arts & Science)

PSY 8312-A&S [Formerly PSY 312-A&S]. Psychological Assessment. Major techniques of psychological assessment, with an emphasis on the rationale, administration, and interpretation of measures assessing personality and psychopathology

B. Psychology and Human Development (GPC)

PSY-GS 8350-P [Formerly PSY-GS 318-P]. Individual Differences. Focuses on traditional concepts and findings in the area of individual differences broadly defined. The psychological content will primarily involve abilities, interests, and personality; methodological issues encountered in assessing these attributes will be stressed throughout; and particular attention will be devoted to how these concepts can enhance research programs in both applied and theoretical areas. The specific variables discussed within each domain will be restricted to those that have empirically “panned out” (viz., variables that are reliable and related to meaningful

behaviors and outcomes that psychologists are interested in predicting and better understanding), rather than theoretical constructs and measures whose external validity is unknown.

VI. History and Systems of Psychology

History and systems of psychology is covered via an infusion approach such that relevant material is covered in a dedicated and integrated manner with the course content of a number of core courses (PSY- GS 8200-P [formerly PSY-GS 340-P], PSY 8310-A&S [Formerly PSY 310-A&S], PSY-GS 8876-P [Formerly PSY-GS 317-P], PSY-GS 8300-P [Formerly PSY-GS 343-P], PSY 8354-A&S[Formerly PSY 354-A&S]), research seminars (PSY-GS 8420-P [Formerly PSY-GS 349-P], PSY 8360-A&S[Formerly PSY 360-A&S]), and electives (e.g., PSY-GS 8500-P [Formerly PSY-GS 396-P]).

VII. Psychological Measurement

Psychological measurement is covered by the required course in psychological measurement (PSY-GS 8876-P) [Formerly PSY-GS 317-P]:

PSY-GS 8876-P [Formerly PSY-GS 317-P]. Psychological Measurement. Fundamental concepts, methods, and principles of psychological measurement. Particular attention will be devoted to reliability and validity issues underlying psychometric theory, and how psychometric theory relates to the assessment of individual differences or human variation more generally. Topics will include multiple regression, factor analysis, and item response theory.

In addition, psychological measurement is covered by the required classes in assessment (PSY 8312-A&S, PSY-GS 8300-P, and/or PSY 8354- A&S). [Formerly PSY 312-A&S, PSY-GS 343-P, and/or PSY 354-A&S]

VIII. Research Methodology

This requirement is fulfilled by the required course on research methods in clinical psychology (PSY 8310-A&S) [Formerly PSY 310-A&S]:

PSY 8310-A&S [Formerly PSY 310-A&S]. Research Methods in Clinical Psychology. Major methodological and quantitative issues in clinical psychology, including statistical significance testing and its alternatives; threats to internal and external validity; psychometric theory; quantitative approaches to classification; behavioral, genetic, and psychophysiological methods; animal models; analysis of change, mediation, and moderation.

For additional training, students can enroll in several other research methods classes offered by Psychological Sciences faculty (Research Methods in Developmental Psychology (PSY-GS 8815-P [Formerly PSY-GS 303-P]),

IX. Techniques of Data Analysis

This requirements is fulfilled by the required first-year statistics sequence (PSY-GS 8861-P[Formerly PSY-GS 310-P] and PSY 6104-A&S [Formerly PSY 304B-A&S]

PSY-GS 8861-P [Formerly PSY-GS 310-P]. Statistical Inference. Introductory course designed to familiarize doctoral students with the principles and procedures of statistical inference and to prepare them for more advanced work in research design and analysis

PSY 6104-A&S [Formerly PSY 304b-A&S]. Quantitative Methods and Experimental Design. Principles of experimental design and descriptive and inferential statistics.

X. Professional Standards and Ethics

This requirement is covered by:

Professional Ethics in Clinical Psychology (PSY 8353-A&S) [Formerly PSY 353-A&S]

X. Advanced integrative knowledge

The following courses satisfy the Advanced Integrative Knowledge Requirement

PSY-GS 8600-P. Seminar in Social and Personality Development.
PSY-GS 8450-P Seminar in Cognitive Development
PSY 8744-A&S Neuroscience – Neuromodulation of Behavior

For additional training, students can enroll in courses offered by the Quantitative Methods (QM) area group. See the listing of QM classes on pp.40-41.