PhD Learning Objectives – Natural Sciences

USC Dornsife Ph.D. students in the Natural Sciences are admitted to a five-year program that typically consists of one year of fellowship support and four years of graduate assistantship training.

Our Ph.D. programs in the Natural Sciences train graduate students at the highest level to conduct research in forefront areas in their chosen field of study. During the course of the graduate program, students are required to take core graduate courses, pass a screening examination during their first two years, and pass a Ph.D. qualifying exam during their first three years. Once they pass their qualifying exam, they are eligible to receive their Masters, and candidacy for their PhD. In order to confer the Ph.D. degree, students must successfully defend a dissertation.

Learning Objectives

- **Disciplinary Knowledge**: Master the fundamental knowledge of the field; develop problem solving skills and analytical thinking required to successfully conduct research – through coursework and passing the screening exam.
- **Basic Research Competence**: Engage in and conduct original research
- **Applied Research Competence**: Master the skills required for careers in basic and applied research, and teaching – through the required course in Pedagogy for Teaching Assistants
- **Methodological Mastery**: Working knowledge of classical and modern experimental and theoretical techniques – acquired in the Research Assistant years.
- **Technical Laboratory Competence**: Show competence in the use of laboratory equipment and the ability to master new techniques and equipment
- **Collaborative Skills**: Ability to work in collaboration with colleagues on research and/or articles for publication
- **Research Design**: Ability to independently plan and execute an original experiment or theoretical investigation
- **Research Review and Critique**: Ability to analyze research results critically and draw appropriate conclusions
- **Written and Oral Communication**: Proficiency in oral and written presentation of original scientific research – qualifying exams
• **Capstone/Dissertation:** Produce a capstone project – dissertation (an extended project which demonstrates the student’s ability to perform research at a level that makes a genuine contribution to the field) and a successful defense.

• **Professionalization:** Communicate complex scientific ideas concisely and accurately in writing as well as in oral presentations – journal publication and conference presentations.