

# GENETICS, PH.D.

## LEARNING OUTCOMES

1. Demonstrate a broad understanding in the principles of genetics and heredity in all organisms. They will develop particular expertise in at least one of the broad subject areas of the doctoral program.
2. Demonstrate a broad understanding of major current and past theories, research findings and methodologies and techniques in genetics, with particular expertise in their area of concentration, both orally and in writing.
3. Develop critical thinking skills. They will retrieve and examine scientific literature, evaluate evidence for and against hypotheses, identify knowledge gaps, strengths and weaknesses in existing literature, synthesize knowledge, develop conclusions, and formulate plans for moving the current state of knowledge forward.
4. Develop and complete original research that advances a specific field of study within one of the broad areas subject areas in genetics.
5. Retrieve, evaluate and interpret professional peer-reviewed literature and use this information to develop theoretical frameworks, testable hypotheses, and predictions for their own research projects.
6. Design research projects that are feasible, based on well-designed and internally controlled experiments, and address important unsolved problems in genetic or biomedical research.
7. Conduct independent research, critically evaluate and interpret the resulting data, and, based on that analysis, design future experiments that advance the state of the field.
8. Write, edit, and assemble manuscripts resulting from their independent research and submit these for publication in peer-reviewed professional journals.
9. Communicate effectively to diverse audiences in writing, through oral presentations, and during formal and informal discussions.
10. Write clear and concise research articles for publication in professional journals.
11. Present at scientific conferences and in both formal and informal seminars.
12. Master methods of communicating and interacting effectively with professional colleagues, and will prepare successful applications for research grant support.
13. Articulate their research and its significance both formally and informally to diverse audiences.
14. Give and receive feedback on communication skills both orally and in writing.
15. Be provided with opportunities to engage in public outreach and education.
16. Effectively teach the principles of genetics and the methods used in contemporary genetic research.
17. Receive in-class educational training by serving as teaching assistants for at least one semester of an undergraduate genetics course.
18. Be provided with opportunities to mentor other students (for example, undergraduate students) in a laboratory research setting. Interested students will have opportunities to perform outreach activities in which they educate school-age students or individuals from other fields on the principles of modern genetics.
19. Be provided with diverse training that will prepare them for a range of flexible and sustainable careers in, for example, academia, industry, government, science policy, administration, commerce, journalism, law, education and community outreach.
20. Develop broadly applicable skills in critical thinking and problem solving.
21. Be provided with opportunities for teamwork, written and oral communication skills and collaborations.
22. Receive training in professional ethics and the responsible conduct of science.
23. Be trained to use scientific rigor when designing experiments, collecting and analyzing data, and interpreting and reporting results.
24. Discuss and formulate opinions on the many situations that working scientists encounter involving professional ethics and conflicts of interest.
25. Receive training in laws, regulation, permits and licenses, occupational health, safety standards and best practices, will demonstrate understanding of such and adhere to compliance.