GENETICS, M.S.

Graduate training in genetics emphasizes study and research leading to a Ph.D. degree in genetics. A master’s degree in medical genetics with specialized training in genetic counseling are also available. For more information on a master’s degree in genetic counseling, see Genetic Counseling (http://www.med.wisc.edu/education/graduate-programs/genetic-counseling/main/26910).

LABORATORY OF GENETICS

The Laboratory of Genetics is the oldest and one of the finest centers of genetics in the nation. It is highly regarded for its research contributions in the areas of disease genetics (https://genetics.wisc.edu/disease-biology), cell biology (https://genetics.wisc.edu/cell-biology), neurogenetics (https://genetics.wisc.edu/neuro-and-behavioral-genetics), developmental genetics (https://genetics.wisc.edu/development), gene expression (https://genetics.wisc.edu/gene-expression), genomics (https://genetics.wisc.edu/genomics-and-proteomics), evolutionary and population genetics (https://genetics.wisc.edu/evolutionary-and-population-genetics), and computational biology (https://genetics.wisc.edu/computational-systems-and-synthetic-biology). The laboratory consists of two departments: Genetics, in the College of Agricultural and Life Sciences; and Medical Genetics, in the School of Medicine. Although administratively distinct, these two departments function as one at both the faculty and student levels.

ADMISSIONS

This M.S. is offered for work leading to the Ph.D. Students may not apply directly for the master’s, and instead contact the program. A master’s degree in medical genetics with specialized training in genetic counseling are also available. For more information on M.S. degrees in genetic counseling, see Genetic Counseling (http://www.med.wisc.edu/education/graduate-programs/genetic-counseling/main/26910).

FUNDING

GRADUATE SCHOOL RESOURCES

Resources to help you afford graduate study might include assistantships, fellowships, traineeships, and financial aid. Further funding information (https://grad.wisc.edu/funding) is available from the Graduate School. Be sure to check with your program for individual policies and processes related to funding.

REQUIREMENTS

MINIMUM GRADUATE SCHOOL REQUIREMENTS

Review the Graduate School minimum academic progress and degree requirements (http://guide.wisc.edu/graduate/

#policiesandrequirementstext), in addition to the program requirements listed below.

MAJOR REQUIREMENTS

MODE OF INSTRUCTION

<table>
<thead>
<tr>
<th>Mode of Instruction Definitions</th>
<th>Face to Face</th>
<th>Evening/Weekend</th>
<th>Online</th>
<th>Hybrid</th>
<th>Accelerated</th>
</tr>
</thead>
<tbody>
<tr>
<td>Evening/Weekend: These programs are offered in an evening and/or weekend format to accommodate working schedules. Enjoy the advantages of on-campus courses and personal connections, while keeping your day job. For more information about the meeting schedule of a specific program, contact the program.</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Online: These programs are offered primarily online. Many available online programs can be completed almost entirely online with all online programs offering at least 50 percent or more of the program work online. Some online programs have an on-campus component that is often designed to accommodate working schedules. Take advantage of the convenience of online learning while participating in a rich, interactive learning environment. For more information about the online nature of a specific program, contact the program.</td>
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<tr>
<td>Hybrid: These programs have innovative curricula that combine on-campus and online formats. Most hybrid programs are completed on-campus with a partial or completely online semester. For more information about the hybrid schedule of a specific program, contact the program.</td>
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<tr>
<td>Accelerated: These on-campus programs are offered in an accelerated format that allows you to complete your program in a condensed time-frame. Enjoy the advantages of on-campus courses with minimal disruption to your career. For more information about the accelerated nature of a specific program, contact the program.</td>
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</table>

CURRICULAR REQUIREMENTS

<table>
<thead>
<tr>
<th>Minimum Credit Requirement</th>
<th>Minimum Residence Credit Requirement</th>
<th>Minimum Graduate Coursework Requirement</th>
<th>Overall Graduate GPA Requirement</th>
<th>Other Graduate Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>32 credits</td>
<td>32 credits</td>
<td>Half of degree coursework must be completed graduate-level coursework; courses with the Graduate Level Coursework attribute are identified and searchable in the university's Course Guide (<a href="https://registrar.wisc.edu/course-guide/">https://registrar.wisc.edu/course-guide/</a>).</td>
<td>3.00 GPA required.</td>
<td>The Graduate School requires an average grade of B or better in all coursework (300 or above, not including research credits) taken as a graduate student unless conditions for probationary status require higher grades. Grades of Incomplete are considered to be unsatisfactory if they are not removed during the next enrolled semester.</td>
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</tbody>
</table>

Assessments and Examinations

Contact the program for information on required assessments and examinations.

Language Requirements

No language requirement.
REQUIRED COURSES

Students may earn an M.S. in Genetics on the way to the Ph.D. in Genetics under certain circumstances. Contact the Genetics graduate coordinator for more information.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>GENETICS 701</td>
<td>Advanced Genetics</td>
<td>3</td>
</tr>
<tr>
<td>GENETICS 702</td>
<td>Advanced Genetics II</td>
<td>3</td>
</tr>
<tr>
<td>GENETICS/ MD GENET 707</td>
<td>Genetics of Development</td>
<td>1</td>
</tr>
<tr>
<td>GENETICS/ MD GENET 708</td>
<td>Methods and Logic in Genetic Analysis 1</td>
<td></td>
</tr>
<tr>
<td>ONCOLOGY 715</td>
<td>Ethics in Science</td>
<td>1</td>
</tr>
<tr>
<td>Elective: Any graduate level Genetics course (including special topics)</td>
<td>3</td>
<td></td>
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<tr>
<td>Four seminars</td>
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<tr>
<td>Specialized elective coursework at the discretion of your thesis committee</td>
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</tbody>
</table>

1 GENETICS/MD GENET 707 Genetics of Development and GENETICS/MD GENET 708 Methods and Logic in Genetic Analysis are taken by the first and second years together; GENETICS/MD GENET 707 is offered one year and GENETICS/MD GENET 708 the next.

2 Permission must be obtained to register from the cancer biology department.

3 Students wishing to take a course outside of Genetics course offerings may petition the Graduate Program Committee.

POLICIES

GRADUATE SCHOOL POLICIES

The Graduate School’s Academic Policies and Procedures (https://grad.wisc.edu/acadpolicy) provide essential information regarding general university policies. Program authority to set degree policies beyond the minimum required by the Graduate School lies with the degree program faculty. Policies set by the academic degree program can be found below.

MAJOR-SPECIFIC POLICIES

GRADUATE PROGRAM HANDBOOK

The Graduate Program Handbook (https://genetics.wisc.edu/current-ph-d-students) is the repository for all of the program's policies and requirements.

PRIOR COURSEWORK

Graduate Work from Other Institutions

For well-prepared advanced students, the program may accept prior graduate coursework from other institutions toward the minimum graduate degree credit and minimum graduate coursework (50%) requirement. The minimum graduate residence credit requirement can be satisfied only with courses taken as a graduate student at UW–Madison. Coursework earned five or more years prior to admission to a master's degree is not allowed to satisfy requirements.

UW–Madison Undergraduate

For well-prepared advanced students, the program may decide to accept up to 7 credits numbered 300 or above completed at UW–Madison toward fulfillment of minimum degree and minor credit requirements. This work would not be allowed to count toward the 50% graduate coursework minimum unless taken at the 700 level or above. Coursework earned five or more years prior to admission to a master's degree is not allowed to satisfy requirements.

UW–Madison University Special

The program may decide to accept up to 15 University Special student credits as fulfillment of the minimum graduate residence, graduate degree, or minor credit requirements on occasion as an exception (on a case-by-case basis). UW–Madison coursework taken as a University Special student would not be allowed to count toward the 50% graduate coursework minimum unless taken at the 700 level or above. Coursework earned five or more years prior to admission to a master's degree is not allowed to satisfy requirements.

PROBATION

The Graduate School regularly reviews the record of any student who earned grades of BC, C, D, F, or Incomplete in a graduate course (300 or above), or grade of U in research credits. This review could result in academic probation with a hold on future enrollment or in being suspended from the Graduate School.

ADVISOR / COMMITTEE

Every graduate student is required to have an advisor. To ensure that students are making satisfactory progress toward a degree, the Graduate School expects them to meet with their advisor on a regular basis.

An advisor generally serves as the thesis advisor. In many cases, an advisor is assigned to incoming students. Students can be suspended from the Graduate School if they do not have an advisor. An advisor is a faculty member, or sometimes a committee, from the major department responsible for providing advice regarding graduate studies.

A committee often accomplishes advising for the students in the early stages of their studies.

CREDITS PER TERM ALLOWED

15 credits

TIME CONSTRAINTS

Master’s degree students who have been absent for five or more consecutive years lose all credits that they have earned before their absence. Individual programs may count the coursework students completed prior to their absence for meeting program requirements; that coursework may not count toward Graduate School credit requirements.

OTHER

n/a
PROFESSIONAL DEVELOPMENT

GRADUATE SCHOOL RESOURCES
Take advantage of the Graduate School's professional development resources (https://grad.wisc.edu/pd) to build skills, thrive academically, and launch your career.

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. Demonstrate research expertise in genetics by presenting to their supervisory committee a research report based on their own experimental work or based on critical review of original peer-reviewed literature on a topic of current interest in genetics.

5. Retrieve and interpret professional peer-reviewed literature and use this information to evaluate theoretical frameworks, testable hypotheses, and predictions.

6. Demonstrate the ability to critically evaluate research based on design, feasibility, and internal controls, and to explain how such research addresses important unsolved problems in genetic or biomedical research.

7. Communicate effectively to diverse audiences in writing, through oral presentations, and during formal and informal discussions.

8. Master methods of communicating and interacting effectively with professional colleagues.

9. Articulate their research and its significance both formally and informally to diverse audiences.

10. Give and receive feedback on communication skills both orally and in writing.

11. Be provided with opportunities to engage in public outreach and education.

12. Effectively teach the principles of genetics and the methods used in contemporary genetic research.

13. Receive in-class educational training by serving as teaching assistants for at least one semester of an undergraduate genetics course.

14. Be provided with opportunities to mentor other students (for example, undergraduate students) in a laboratory research setting.

15. Opportunities to perform outreach activities in which they educate school-age students or individuals from other fields on the principles of modern genetics.

16. 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.

17. Develop broadly applicable skills in critical thinking and problem solving.

18. Be provided with opportunities for teamwork, written and oral communication skills and collaborations.

19. Receive training in professional ethics and the responsible conduct of science.

20. Be trained to use scientific rigor when designing experiments, collecting and analyzing data, and interpreting and reporting results.

21. Discuss and formulate opinions on the many situations that working scientists encounter involving professional ethics and conflicts of interest.

22. Receive training in laws, regulation, permits and licenses, occupational health, safety standards and best practices, will demonstrate understanding of such and adhere to compliance.

PEOPLE

PROFESSORS
Doebly, John (chair); Engels, Bill; Gasch, Audrey; Ikeda, Aki; Laughon, Al; Masson, Patrick; Payseur, Bret; Pelegri, Francisco; Perna, Nicole; Prolla, Tom; Schwartz, David; Skop, Ahna; Wassarman, David; Yin, Jerry

ASSOCIATE PROFESSORS
Chang, Qiang; Hittinger, Chris; Pool, John

ASSISTANT PROFESSORS
Loewe, Laurence; Zhong, Xuehua

STUDENT SERVICES
Reck, Martha