***Twin Cities Campus***

# Molecular, Cellular, Developmental Biology and Genetics M.S.

*Genetics, Cell Biology, and Development TCBS, Genetics, Cell Biology, and Development TMED*

**Graduate School**

Link to a list of faculty for this program.

**Contact Information:**
MCDB&G Graduate Program, 6-160 Jackson Hall, 321 Church Street SE, University of Minnesota, Minneapolis, MN, 55455 (612-624-7470, fax: 612-626-6140)
Email: mcdbg@umn.edu OR gcgrad@umn.edu
Website: http://mcdbg.umn.edu OR http://cbs.umn.edu/genetic-counseling/home

- Program Type: Master's
- Requirements for this program are current for Spring 2018
- Length of program in credits: 30 to 55
- This program requires summer semesters for timely completion.
- Degree: Master of Science

Along with the program-specific requirements listed below, please read the General Information section of the catalog website for requirements that apply to all major fields.

The MCDB&G MS degree can be earned in one of three ways:

1. The MS with a genetic counseling track: This full-time program is designed to provide students with the academic foundation and clinical expertise necessary to enter the profession of genetic counseling. The curriculum integrates selected coursework with firsthand experience in the diagnostic medical genetics laboratories and supervised work in clinical settings with patients and families. The clinical component involves work in multiple clinical settings throughout the Twin Cities, the Mayo clinic in Rochester, St. Cloud and other centers. The MS with a genetic counseling track is accredited by the Accreditation Council for Genetic Counseling, and all graduates are eligible to apply to the American Board of Genetic Counseling for active candidate status and to sit for board certification.

2. The joint JD/MS-MCDB&G program: This program, offered in conjunction with the Joint Degree Program in Law, Science, and Technology, is unique in the nation and enables students to combine a JD degree with the MCDB&G MS degree. Students entering this program must be admitted to both MCDB&G and the Law School.

3. Eligible MCDB&G PhD students, who leave before they have completed their doctoral degree, may be offered the option to complete the MS. Eligibility to complete the MS is determined by the student's advisor and the MCDB&G director of graduate studies. MCDB&G does not offer a free-standing MS degree program in research.

## Program Delivery

This program is available:

- via classroom (the majority of instruction is face-to-face)

## Prerequisites for Admission

For genetic counseling admissions information go to http://cbs.umn.edu/genetic-counseling/admissions

For JD/MS admissions info - http://cbs.umn.edu/academics/departments/gcd/graduate/prospective

Other requirements to be completed before admission:
Applications to the MS with the genetic counseling track are stronger if the applicant has interacted with a practicing genetic counselor in the clinical setting, or in another capacity such as personal interviews that affords the applicant a real-life understanding of the profession. The application deadline date is December 15, and admission is for fall semester only.

Successful applicants to the joint JD/MS program must have previous research experience in an academic or industrial setting, in addition to any course-related laboratory experience. Demonstrated familiarity with and aptitude for basic science research is important prior to embarking on this dual degree program. The application deadline date is December 1, and admission is for fall semester only. Entry into the joint JD/MS program requires separate admittance to both the Law School and MCDB&G.

Applicants must submit their test score(s) from the following:

- GRE

International applicants must submit score(s) from one of the following tests:
- TOEFL
- IELTS

Key to test abbreviations(GRE, TOEFL, IELTS).

For an online application or for more information about graduate education admissions, see the General Information section of the catalog website.

## Program Requirements

**Plan A:** Plan A requires 20 major credits, 0 credits outside the major, and 10 thesis credits.The final exam is written and oral.

**Plan B:** Plan B requires 30 to 55 major credits and 0 credits outside the major.The final exam is written and oral.

This program may not be completed with a minor.

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 3.0 is required for students to remain in good standing.

The MS with genetic counseling track is offered with the Plan B option only.

Students pursuing the joint JD/MS program, and PhD students who change their degree objective to the MS, can complete the MS with either the Plan A or Plan B option.

**Course Requirements**

Students pursuing the joint J.D./M.S. degree, and Ph.D. students changing their degree objective to the M.S. take the following courses:

GCD 8151 - Cellular Biochemistry and Cell Biology (2.0 - 4.0 cr)
GCD 8131 - Advanced Molecular Genetics and Genomics (3.0 cr)
GCD 8161 - Advanced Cell Biology and Development (2.0 cr)
GCD 8171 - Literature Analysis (1.0 - 2.0 cr)
BIOC 8401 - Ethics, Public Policy, and Careers in Molecular and Cellular Biology (1.0 cr)
GCD 5005 - Computer Programming for Biology (3.0 cr)
MCDG 8920 - Special Topics (1.0 - 4.0 cr)
MCDG 8900 - Student Research Seminar (1.0 cr)
MCDG 8950 - Teaching Practicum (1.0 cr)
GCD 8900 - Seminar (1.0 - 2.0 cr)
GCD 8920 - Special Topics (1.0 - 4.0 cr)

**Plan A thesis credits**

In addition to the above courses, students completing the M.S. with the Plan A option must take master's thesis credits.
Take 10 or more credit(s) from the following:
- MCDG 8777 - Thesis Credits: Master's (1.0 - 18.0 cr)

**Joint- or Dual-degree Coursework:**JD/MS-MCDB&G (Joint Degree Program in Law, Science and Technology) Student may take a total of 12 credits in common among the academic programs.

## Program Sub-plans

A sub-plan is not required for this program.
Students may not complete the program with more than one sub-plan.

### Genetic Counseling

This sub-plan is limited to students completing the program under Plan B.

The MS with genetic counseling track is designed to be completed in 4 semesters and the interim summer. Most of the coursework is taken the first year, with more time during the second year dedicated to clinical experience. Students will be placed in laboratory and clinical observation experiences during the first year, five clinical genetic counseling internships during the second year, and will complete a minimum of 800 hours of direct patient contact. Students must earn a passing grade in their five clinical internship rotations and present a completed log of at least 50 clinical cases before the final oral examination.

Only under exceptional circumstances will the course of study be varied to meet the needs of a student with many of the courses already completed or with extensive clinical laboratory experience.
Plan B projects that qualify for the genetic counseling track include those that study a genetic counseling problem and add to the existing genetic counseling literature; produce materials that add to the profession, such as teaching materials or ways of evaluating the service; or produce educational materials needed by patient populations or the general public.

**First Year**

Students will take courses that focus on medical, human, and behavioral genetics and genetic counseling practice, and will have the option to choose between several electives from law and ethics, public health, and counseling psychology. In addition, students will observe in a clinical setting one day per week, and gain experience in the clinical laboratories one day per week. An elective course of the student's choice is an option.

GCD 8911 - Introduction to Genetic Counseling Skills and Practice (4.0 cr)
GCD 8912 - Genetic Counseling in Practice (4.0 cr)
GCD 8073 - Genetics & Genomics in Human Health (2.0 cr)
GCD 6110 - Science of Medical Practice (3.0 - 6.0 cr)
PSY 5137 - Introduction to Behavioral Genetics (3.0 cr)
GCD 8993 - Directed Studies (1.0 - 5.0 cr)
GCD 8994 - Research (1.0 - 5.0 cr)

**Summer**

During the summer between the first and second year of the program, students will begin their first clinical internship rotation with patient responsibilities. This 10-week rotation includes the expectation that students will spend between 2-3 days per week in the clinic. The students time in the clinic, which is set by the clinical supervisor, may exceed the 20-hour minimum.

GCD 8001 - Genetic Counseling Clinical Internship I (3.0 cr)

**Second Year**

Students will take courses that focus on the psychosocial issues and ethics of genetic counseling practice, and will have the option to choose an elective course from law and ethics, public health, counseling psychology or other relevant areas of study. Students will also complete internships in a clinical setting 2-3 days per week for 15 weeks in pediatrics, cancer, perinatal, and other specialty clinics.

GCD 8913 - Psychosocial Issues in Genetic Counseling I (3.0 cr)
GCD 8914 - Ethical and Legal Issues in Genetic Counseling (2.0 cr)
GCD 8920 - Special Topics (1.0 - 4.0 cr)
GCD 8002 - Genetic Counseling Clinical Internship II (5.0 cr)
GCD 8003 - Genetic Counseling Clinical Internship III (5.0 cr)