UNT HEALTH SCIENCE CENTER

Graduate School of Biomedical Sciences

Department of Forensic and Investigative Genetics

Graduate Degree Programs

DEPARTMENTAL HANDBOOK
2011-2013

(Find online at http://www.hsc.unt.edu/departments/bmsc/Specialized%20Master's%20Programs.cfm)

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Description of Programs

The Department of Forensic and Investigative Genetics (FIG) offers comprehensive training in analytical and computational methods necessary for studies in the various fields of applied genetics. Students may enter the advanced programs with a variety of academic backgrounds, providing that they have fulfilled prerequisite courses in molecular biology, biochemistry, genetics, and statistics. Students participate in seminars and teaching, and receive training in the techniques of contemporary molecular genetics.

The Department of Forensic and Investigative Genetics offers two program tracks:

1. Forensic Genetics Master of Science Professional Program:

A specialized program designed to offer a focused learning experience in forensic science with an emphasis on hands on training in current and future DNA technologies. The program prepares individuals for careers in forensic DNA sciences, emphasizing the application of current methods and technologies to human identification. The program was designed to meet all educational and many training requirements for Forensic DNA Analysts and Technical Leaders as outlined in the National Quality Assurance Standards for Forensic DNA Testing Laboratories adopted by the Federal Bureau of Investigation.

2. Traditional (Research Track) Master of Science (M.S.) and Doctor of Philosophy (Ph.D.)

Research track students perform original, publishable research and present their research findings at national and international scientific meetings. M.S. students are expected to graduate in 2 to 3 years, whereas Ph.D. students require 4 or more years to complete their degree.

A. Master of Science

Students following a traditional thesis-based research M.S. degree track will conduct original research. The M.S. degree requirements are met upon satisfactory completion of a minimum of 48 semester credit hours (SCH) of coursework and research credits, including the successful completion of a formal public seminar on their thesis research, oral final defense of their research and approval of a thesis. Submission of research results for publication and presentation at national level meetings is expected.

B. Doctor of Philosophy

Ph.D. studies in Forensic and Investigative Genetics are broadly interdisciplinary. Students may undertake research in areas such as forensic genetics, clinical genetics, computational genetics, evolutionary genetics, microbial genetics and many other interrelated disciplines. The Ph.D. degree requirements are met upon satisfactory completion of a minimum of 90 semester credit hours (SCH) of course work and research credits, including the successful completion of the

requirements for advancement to candidacy and defense of their dissertation research. Students entering the program with a non-terminal M.S. degree must complete a minimum of 60 SCH beyond that earned in their master's studies. It is expected that, prior to the awarding of the degree, students will have published, in press, or submitted two first-author publications in peer-reviewed journals.

FIG Courses

Departmental Course Offerings and descriptions can be found in the current *GSBS Catalog*.

Current Topics

All students in the Department of Forensic and Investigative Genetics are required to enroll and participate in the Seminar in Current Topics course (FGEN 5103) during each Fall and Spring semester. Students are responsible for presenting a synopsis and critical review of an assigned journal article.

Work in Progress Seminars (WIPS)

Traditional M.S. and Ph.D. Students are required to attend and participate in departmental WIPS throughout their tenure in the department.

The Department of Forensic Investigative Genetics follows all *UNTHSC Graduate School of Biomedical Sciences Guidelines for M.S. & Ph.D. Degrees*, *Forms*, and *Graduation Deadlines*. It is the responsibility of the student to meet or exceed these criteria.

Information specific to the Department of Forensic Investigative Genetics programs is outlined in the subsequent sections.

Forensic Genetics (FGEN) M.S. Professional Program Requirements

Each student is responsible for their own completion of the requirements and each item must be completed in the sequence and time period indicated. Forms are subject to revision and should be obtained from the Graduate School of Biomedical Sciences at:
http://www.hsc.unt.edu/education/gsbs/forms.cfm

The Forensic Genetics' Faculty review all applicants prior to acceptance into the FGEN M.S. Professional Program. A student must meet the general requirements of the graduate school as described in the current *GSBS Graduate Catalog*. All applications must be completed and received into the Graduate School according to the deadlines on the academic calendar posted by the Graduate School.

During the student's first semester a major professor will be assigned from within the department and an advisory committee consisting of two other graduate faculty members will be determined. After receiving consent from all committee members, the student must complete and submit the *Designation of Advisory Committee* form for transmittal to the Graduate School of Biomedical Sciences Office of Admission & Services (GSBS OAS). When the advisory committee has been formed, the dean will appoint a University Member. All advisory committee members must have UNTHSC GSBS graduate faculty status.

Upon completion of the program's coursework, the student will complete a moot court experience (FGEN 5095) which serves as their oral qualifying exam. This is the student's oral qualifying examination for the FGEN M.S. program. Grading is on a Pass/Fail basis and the grade will be determined by the FIG scoring criteria. 100% participation in all activities is mandatory. The student is permitted two attempts to pass the qualifying examination. Failure to pass the qualifying examination after two attempts will result in dismissal from the program.

The final scheduled semester of the program (2nd Spring Semester) is dedicated to completing hypothesis-driven thesis research under the direction of the student's mentor and committee. The proposal is to follow the *GSBS Proposal Guidelines*. A finalized proposal, approved by their major professor, is to be submitted to their advisory committee no later than 5 working days from the beginning of their individual research project.

Students will present their work in an oral presentation and written thesis. The oral presentation will be open to the public and will then be followed by a private defense with the advisory committee. Students should coordinate the reservation of a seminar room with the department's graduate secretary a minimum of one (1) month prior to the intended defense date. The major professor must approve the thesis prior to the student submitting it to committee members. Committee members must receive the approved thesis a minimum of ten working days prior to the scheduled defense date.

Following the defense, the major professor together with the other members of the committee will assign a Pass/Fail for BMSC 5395 based on guidelines outlined in the *M.S. Defense Scoring Rubric*. The student must submit the signed *Report of Final Comprehensive Examination (Defense)* form to the GSBS office. A copy of the approved Thesis must be submitted to the GSBS OAS before graduation in accordance with the graduate school rules and time limits for the M.S. thesis. (http://www.hsc.unt.edu/education/gsbs/gradinstructions.cfm)

Core Curriculum Courses

Students in the FGEN M.S. program are required to take the Core Curriculum courses that focus on Biochemistry, Molecular Biology, Cell Biology and Immunology. These course topics are mandated for forensic DNA analysts and technical leaders by the *National Quality Assurance Standards for Forensic DNA Testing Laboratories*.

Students experiencing difficulty in the Core Curriculum courses are highly encouraged to contact the Course Director responsible for the material you are having difficulty with at the

first sign you might require additional assistance. The students are also encouraged to contact the Course Director(s) for assistance and/or clarification of course expectations. Academic assistance is available to all students in The Center for Academic Performance (CAP), located in EAD 254. An appointment can be made with the CAP by email CAP@live.unthsc.edu, or by calling 735-2505, Monday through Friday, 8 AM - 5 PM.

Laboratory Requirements

Students will participate in several laboratory courses. During these laboratory courses, the student will be handling hazardous chemicals. Students will be instructed in the proper handling of any chemical hazards. The student is expected to provide two laboratory coats, one pair of safety glasses and a bound laboratory notebooks capable of generating removable copies. Latex gloves will be provided to the students. Please inform the Course Director(s) of any allergies or any other health issues that the student feels might affect his/her ability to participate fully in these courses. A student who is pregnant, suspects that she is pregnant, or becomes pregnant during these courses should consult the *UNTHSC Online Policy Manual, 07 – Student Affairs, Education and Funding, Number7.104 "Participation in Special Environments*" for information.

The following curriculum is required for students enrolled in the FGEN M.S. program:

MS Degree Plan for FGEN MS		
Year 1: Fall		
BMSC 6301	Integrative Biomedical Sciences I: Principles of Biochemistry	4 SCH
BMSC 6302	Integrative Biomedical Sciences II: Molecular Cell Biology	4 SCH
BMSC 5160	Biomedical Ethics	1 SCH
FGEN 5305	Introduction to Molecular Laboratory Methods	3 SCH
FGEN 5101	Forensic Hair Analysis	1 SCH
FGEN 5103	Seminar in Current Topics	1 SCH
		14 SCH
Year 1: Spring		
BMSC 6305	Integrative Biomedical Sciences IV: Immunology and Microbiology	3 SCH
FGEN 5103	Seminar in Current Topics	1 SCH
FGEN 5304	Forensic Anthropology	3 SCH
FGEN 5201	Overview of Forensic Sciences	3 SCH
FGEN 5306	Basic Methods in Forensic Molecular Genetics	3 SCH
		13 SCH

Year 1: Summer 2		
FGEN 5307	Advanced Methods in Forensic Molecular Genetics	4 SCH
BMSC 5400	Biostatistics for Biomedical Science	4 SCH
		8 SCH
Year 2: Fall		
FGEN 5400	Biological Evidence Evaluation	4 SCH
FGEN 5401	Forensic Genetic Data Analysis	3 SCH
FGEN 5103	Seminar in Current Topics	1 SCH
FGEN 5300	Expert Testimony	3 SCH
FGEN 5102	Blood Spatter Analysis	1 SCH
		12 SCH
Year 2: Spring		
FGEN 5095	**Oral Qualifying Exam – Moot Court**	0 SCH
BMSC 5998	Individual Research	3 SCH
BMSC 5395	Thesis	3 SCH
		6 SCH
TOTAL		**53 SCH**

Traditional M.S. and Ph.D. Programs

The Department of Forensic Investigative Genetics follows all *UNTHSC Graduate School of Biomedical Sciences Guidelines for M.S. & Ph.D. Degrees*, *Forms*, and *Graduation Deadlines*. It is the responsibility of the student to meet or exceed these criteria.

Students wishing to seek a degree through the Department of Forensic Investigative Genetics must have a designated major professor and have performed at least one rotation with FIG faculty members prior to acceptance into the program. Upon determination of a major professor, the professor and student should review and discuss the *Major Professor Designation/Compact Between Graduate Students and their Research Advisors* document which outlines the duties and expectations of both the student and major professor. This form must be signed and submitted to the GSBS OAS.

After admission to the FIG program, the student must select additional faculty members to serve as an advisory committee. The Advisory Committee will be determined as outlined by the *GSBS M.S. and Ph.D. Guidelines*. All advisory committee members must have UNTHSC GSBS graduate faculty status. If a student wishes to include non-GSBS faculty on their committee, a letter requesting graduate faculty status and CV of proposed committee member must be provided to the Graduate Advisor at the earliest convenience for consideration by the Graduate Council.

After receiving consent from all committee members, the student must complete and submit the *M.S.* or *Ph.D.* *Designation of Advisory Committee* form and must submit the signed form to the GSBS OAS.

The advisory committee will develop an appropriate degree plan based on the student's credentials and focus of study. The degree plan must be submitted to the GSBS OAS no later than 42 SCH into the student's program. It is the student's responsibility to set up an annual meeting with their advisory committee at least once per academic year. When the advisory committee has been formed, the Dean of the Graduate School of Biomedical Sciences will appoint a University Member per the *GSBS requirements*.

Advancement to Ph.D. Candidacy

Qualifying Examination

The qualifying examination within the Department of Forensic and Investigative Genetics must be successfully completed prior to earning 72 SCH of coursework. The qualifying examination consists of written and oral components. Fundamental knowledge and understanding of general research techniques in genetics and molecular biology, and concepts regarding the analysis of genetic data will be included. The student is encouraged to meet with their committee members to discuss topic areas for review. However, the committee members are in no means restricted to those discussed or provided to the student. Refusal to take a qualifying exam will result in dismissal from the FIG graduate program.

The initial phase of the qualifying examination consists of a set of written questions provided by all members of the student's Ph.D. advisory committee. The composition of the examination is determined by this committee. Written examinations from all advisory committee members must be completed within a two (2) week period and each committee member's examination will be allotted a maximum of 1 day (8AM – 5PM). Within two (2) weeks of the submission of the exam, each committee member will return a Pass/Fail grade and their written critique of the student's responses.

The student's oral examination is scheduled within 4 weeks of successful completion of the last written examination and in accordance with the GSGS guidelines. The oral examination will consist of questions that further explore the student's answers in the written phase, as well as questions on additional topics as deemed appropriate by the committee. The university member must be in attendance for the oral examination.

The qualifying examination will be graded on a Pass/Fail basis, following the *Scoring Rubric* implemented by the GSBS. Following completion of the oral qualifying exam the student must submit the signed *Oral Qualifying Exam Notice* to the GSBS OAS.

Successful completion of the qualifying examination must be accomplished before the student can register for Grant Writing (BMSC 6310). The student is permitted two attempts to pass the qualifying examination. Failure to pass the qualifying examination after two attempts will result in dismissal from the doctoral program.

Grant Writing (BMSC 6310)

After passing the qualifying examination, but prior to the completion of 84 SCH, the student must register for Grant Writing (BMSC 6310). This component of the advancement to Ph.D. candidacy process evaluates a student's aptitude for independent thought and scientific writing. The student is required to prepare a research grant proposal modeled after the current NIH R01 format. The student must present the proposal in a public seminar; and orally defend the proposal before his/her Ph.D. advisory committee. The grant proposal must be original, hypothesis driven, and must describe specific objectives and experimental approaches used to test the hypothesis.

It is suggested that the student start work on the basis for the proposal and have a working draft approved by their advisory committee prior to registering for the class. The student should meet with the advisory committee at least twice during the semester to review drafts of the proposal and provide to the advisory committee a final proposal approved by the major professor at least 10 working days prior to the public seminar and oral defense. The student's university member must be present for committee meetings, the public seminar, and oral defense of the proposal. The grant proposal, oral presentation, and defense will be evaluated on the basis of originality, feasibility, and ability to communicate the proposal content. The grant writing exercise will be graded on a Pass/Fail basis, following the *Scoring Rubric* implemented by the GSBS. Following completion of the grant defense the student must submit the signed *Grant Defense Notice* to the GSBS OAS.

Upon successful completion of the Grant Writing (BMSC 6310) requirements, the student is advanced to candidacy. Two attempts to successfully complete the BMSC 6310 requirements are permitted. If the grant proposal and/or oral defense are not approved on the first attempt, they may be offered a re-examination during the current semester if sufficient time permits. If a re-examination is not scheduled, the student will receive a failing grade for the class and he/she will be required to re-register for BMSC 6310 in the next long semester. The grant proposal and/or oral defense must be successfully defended on the second attempt, or the student will be dismissed from the Ph.D. program.

Defense of M.S. Thesis and Ph.D. Dissertation

Procedures for defense of M.S. Thesis and Ph.D. Dissertation follow the policies outlined in the *Current GSBS Graduate Catalog*.

Academic Dishonesty: Instances of cheating or other academic dishonesty will be handled according to the Policies of the University of North Texas Health Science Center, Section 07, *Number 7.126 Student Code of Conduct and Discipline*.