UNT Health FORT WORTH

COLLEGE OF BIOMEDICAL AND TRANSLATIONAL SCIENCES

Genetics Discipline Handbook 2025-2026

Regardless of the discipline, each CBTS student (MS or PhD) will receive the degree of Biomedical Sciences. The discipline is listed on the transcript as the Major.

The information provided in this document serves to supplement the requirements of the College of Biomedical and Translational Sciences detailed in the UNT Health Fort Worth Catalog with requirements specific to the Genetics discipline.

Table of Contents

1. Description of the Genetics Discipline

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Genetics is a broad interdisciplinary field that leverages biochemistry, microbial and cellular biology, molecular processes, biotechnology, computational biology, biogeography and human disease to gain an integrated understanding of environmental and clinical observations. The Genetics discipline offers training in analytical techniques and computational methods necessary for studies in the different fields of applied genetics. Our faculty have broad research interests as most analytical approaches to genetics studies are applicable to a myriad of biological processes. Faculty programs are funded by multiple sources including the federal government, state government, private foundations and industry, and collaboration between the various UNTHSC programs and schools is strongly supported. Students may undertake research in areas such as cancer genetics, computational genetics, pharmacogenetics, evolutionary genetics, medical genetics, microbial genetics, forensic genetics/genomics, and many other interrelated disciplines.

The faculty of the Genetics discipline have identified Student Learning Outcomes specific to the discipline. In addition to the CBTS competencies, graduates will:

- Demonstrate mastery of cutting-edge research approaches in genetics/genomics;
- Describe, critically evaluate, and apply current theoretical perspectives in genetics;
- Demonstrate proficiency in analytical and statistical procedures appropriate for genetic analyses; and
- Describe role of genetic and genomic assessment in clinical practice, including applications in disease screening, diagnosis, and pharmacogenetics.

Students may enter the discipline with a variety of academic backgrounds, provided they have fulfilled prerequisite core courses and have completed their required rotations with a minimum of one (1) Genetics faculty member. Experience in laboratory methods, computer programming and bioinformatics is strongly recommended. Students wishing to enter the discipline should meet with the Graduate Advisor at the earliest possible time to obtain information on the discipline and guidance in selecting lab rotations and potential mentors. Students may request to join the discipline at the end of the first semester.

Students will receive extensive training in the foundations and techniques of contemporary molecular genetics in their laboratories and through elective courses. Students will perform original, publishable research, and present their research findings at scientific meetings. Doctoral students are required to have a minimum of one paper published in their dissertation research area prior to applying to defend their dissertation. In addition, students are required to present an update on their research and solicit suggestions during the Department of Microbiology, Immunology and Genetics Works in Progress (WIPs) (MIMG 5140) sessions held weekly. With the consent of their research mentor, students may present their research progress at the annual UNTHSC Research Appreciation Day (RAD). Students should be aware that the timeline for their successful completion of the degree plan will vary depending upon the nature of their research, their time management skills and their level of academic development. Graduates with advanced degrees in Genetics typically find employment in higher education, industry and government agencies.

2. Genetics Graduate Faculty and their Research Interests

Graduate Faculty Membership Categories: *Associate members of the Graduate Faculty are able to serve as members of thesis or dissertation advisory committees, as major professors or co-major professors on thesis advisory committees, and as co-major professor on dissertation advisory committees with a full member as the other co-major professor. Full members of the Graduate Faculty are able to serve as members of thesis or dissertation advisory committees, and as major professors or co-major professors on thesis or dissertation advisory committees.*

Michael Allen, Ph.D.
Professor, Microbiology, Immunology & Genetics; **Full Member**

Dr. Allen's research focuses on microbial community dynamics in living and engineered systems, host-microbe interactions, and synthetic biology. Specific areas of interest include: the microbiomes of ticks and other disease vectors and their influence on disease transmission, pathogenicity of the Lyme disease agent *Borrelia burgdorferi*, development and engineering of microbes and bacteriophage for therapeutic treatments, and tracking of pathogens and antibiotic resistance genes in the environment.

Robert Barber, Ph.D.
Professor, Texas College of Osteopathic Medicine, Family Medicine; **Full Member**

Dr. Barber's research efforts are focused upon resolving biomarkers and genetic variants that mediate risk and progression of Alzheimer's disease (AD). Current research is broadly focused on the impact of genetic variation and epigenetic factors on risk for AD across diverse ancestral groups. Research projects include investigation of how DNA methylation and microRNA expression alter cellular phenotypes and impact risk for neurodegeneration as well as efforts to use patterns of DNA variation to predict the risk and progression rate of AD.

Jennifer Cihlar, Ph.D.
Assistant Professor, Microbiology, Immunology & Genetics; **Full Member**

Dr. Jennifer Cihlar is an Assistant Professor in the Microbiology, Immunology, and Genetics Department at UNTHSC and a member of the UNTHSC Center for Human Identification's Research Unit where her efforts focus on improving the forensic community's ability to identify humans associated with crime, missing persons, and human and wildlife trafficking victims through forensic genomic research. With these goals in mind, Dr. Cihlar's current research efforts include development of molecular biology technologies, optimization of SOPs for massively parallel sequencing and Rapid DNA technologies, bioinformatic assessment of the performance and noise in mitochondrial genome analyses that can help guide thresholding strategies for forensic laboratories, identification of novel genetic markers for human and wildlife identification, and investigation into the use of portable genetic technologies to aid law enforcement efforts in curtailing wildlife trafficking.

Benjamin Crysup, PhD
Research Assistant Professor, Microbiology, Immunology & Genetics

Dr. Benjamin Crysup is a Research Assistant Professor in the department of Microbiology, Immunology and Genetics at the University of North Texas Health Science Center. After getting a Ph.D. in computational chemistry, he has pivoted to using mathematics and computation to create,

improve and implement techniques in the fields of forensic and applied genetics under the auspices of the Center for Human Identification. Examples of recent research include proper genotyping in the context of mixtures (including atypical ploidies), applying machine learning to limit error in the estimation of haplotypes and developing a more conservative read merger.

Michael D. Coble, Ph.D.
Professor, Microbiology, Immunology & Genetics; **Full Member**

DNA evidence from crime scenes (including evidence from victims of sexual assault) can often contain mixtures of two or more contributors and can be challenging for the forensic scientist to interpret. Dr. Coble's research focuses on issues associated with DNA mixture interpretation and probabilistic methods of interpretation using software analyses. Other areas of research include haploid marker systems for forensic testing (mitochondrial DNA and Y-chromosome testing), and non-traditional marker systems (e.g. X-chromosomal STRs, insertion-deletion markers, etc.) to increase genetic information from challenged samples.

Nicole Novroski, Ph.D.
Associate Professor, Microbiology, Immunology & Genetics; **Full Member**

Dr. Novroski is an Associate Professor in the Center for Human Identification. Her research program specializes in using massively parallel sequencing (MPS; also known as next-generation sequencing) coupled with novel approaches and methodologies for improving forensic human identity testing. Her current focus is the exploration of previously uncharacterized genetic markers for improved DNA mixture de-convolution and the use of whole genome sequencing for human identity and kinship determination. Dr. Novroski is also interested in the characterization of sequence variation for human identity markers, and in the generation of sequence-based allele frequencies (and other population studies) for forensic applications worldwide.

Nicole Phillips, Ph.D.
Associate Professor, Microbiology, Immunology & Genetics; **Full Member**

Dr. Phillips' research interests lie in the study of genetic interactions that contribute to one's risk for developing complex, age-related diseases. The bulk of her wet lab work has focused on the role of mitochondrial genetics in the progression of late onset Alzheimer's disease.; however, she also works extensively with whole genome and transcriptome data. While her passion lies in the study of Alzheimer's disease, she has extended her skill set to the study of other age-related, complex diseases using novel *in silico* and experimental approaches. She is currently the Associate Director of Genomics for the Institute for Translational Research here at UNTHSC, where she oversees genetic testing for multiple NIH funded grants in the area of health disparities of aging and Alzheimer's Disease., Further, she collaborates closely with colleagues across campus in the study of preeclampsia (S. Goulopoulou), immune-psychosomatic stress (H. Jones), and drug addiction (R. Shetty, M. Forster), to name a few.

Austin Reynolds, Ph.D.
Assistant Professor, Microbiology, Immunology & Genetics; **Full Member**

Research in the Reynolds Lab is centered around the study of human genomic variation and its influence on health and disease. We use an interdisciplinary approach that combines expertise from the fields of population genetics, genomics, anthropology, and epidemiology to answer questions in four primary areas:

1) Human evolutionary genetics to understand how migration, admixture, demography, and natural selection have shaped genetic diversity and complex traits
2) The genomics of immune response and infectious disease risk

3) How our genomes interact with social and lifestyle factors to create health disparities in diverse populations worldwide
4) Using genomics to better identify and understand the etiology of rare diseases

August Woerner, Ph.D.
Associate Professor, Microbiology, Immunology & Genetics; **Full Member**

Dr. Woerner is an Associate Professor in the Center for Human Identification. His research interests are generally in the areas of computation and population genetics, with a focus in forensics, bioinformatics data science and machine learning. His current research projects are highly varied, and include applications in proteomics, metagenomics and human genetics, and often involve applying existing (and developing new) algorithms and computational approaches to difficult problems in biology. Examples include strictly computational work, like improving read mapping and merging in modern applications of genomics, as well as applied works, like using machine learning methods to identify individuals using the human skin microbiome.

Roxanne Zascavage, Ph.D.
Associate Professor, Microbiology, Immunology & Genetics; **Full Member**

Dr. Zascavage's research focuses primarily on the creation of streamlined processes for identification of forensic samples using Oxford Nanopore Technology's sequencing platforms. This includes development of novel protocols for whole mitochondrial genome sequencing, traditional short tandem repeat profiling, single nucleotide polymorphism typing on challenged samples, and microbial community interrogation for forensically relevant information (geolocation, PMI, etc.). Her team has also been assessing the utilization of methylation patterns for age assessment and body fluid identification. Furthermore, she is interested in researching the impacts of the mitochondrial DNA on health and aging, especially the cyto-nuclear interactions that contribute to late onset diseases.

Yan Zhang, Ph.D.
Research Assistant Professor, Microbiology, Immunology & Genetics; **Associate Member**

Dr. Zhang has interests in how the microbiome and host interact in health and disease. Her projects include tick microbiomes and diseases associated with the human microbiome, using genomic and metagenomic approaches to investigate the microbiome dynamics and understand their role in disease development (such as tick-borne disease, Phenylketonuria, Alzheimer's disease, inflammation after severe injury, etc.). Dr. Zhang provides services for Next Generation Sequencing using the Illumina MiSeq platform. She also develops bioinformatics and statistical tools for metagenomic analysis.

3. Requirements

Students must have completed the first semester CBTS core courses and been enrolled in a rotation with a minimum of one Genetics faculty member prior to submitting a discipline change form to the CBTS Dean's Office. Although the discipline has several uniform course requirements, we try to work with each student in tailoring a degree plan that fits their particular interests and goals. Students entering Genetics must enroll in the two discipline specific required courses: MIMG 6301-Molecular Genetics and New Course-Genetic Analysis for the Spring semester of their first year. Students are expected to score a minimum B grade in the CBTS core courses (BMSC 6200, BMSC 6201, BMSC 6202, BMSC 6203, and BMSC 6204). A student who receives a single "C" in a CBTS core course but maintains an overall GPA of 3.0 or better after the first semester will be permitted to enter the discipline. Acceptance into the Genetics Discipline is dependent on signing the Designation/Compact between the graduate student and their research advisor/mentor and completion of the Discipline Change Form.

Students in Genetics are required to enroll and participate in the Genetics Journal Club course (MIMG 5170) beginning in the Spring semester and during all long semesters for the duration of their enrollment. The faculty encourage students to explore the other areas of biomedical science that are available at UNTHSC. Students are advised to discuss course selection with their mentor and advisors to determine the courses from Genetics, as well as other disciplines, that are most advantageous for achieving their individual goals and objectives.

The requirements below are in addition to the CBTS requirements listed in the CBTS Degree Programs chapter of the UNTHSC Catalog.

I Genetics Required Courses

Genetics students are required to take the following discipline specific courses:

MIMG 6301 – Molecular Genetics
New Course – Genetic Analysis

A student who receives a "C" in one of the discipline-specific required courses (Molecular Genetics or Genetic Analysis) will be required to retake the course prior to taking the oral qualifying exam. If the student receives an "A" or a "B" upon retaking the course, they will be allowed to proceed forward with taking the oral qualifying exam.

II Journal Clubs and Seminar Courses

Students are required to enroll in each of these courses every long semester until program completion. All MS and PhD students are required to present their research in Seminar in Microbiology, Immunology and Genetics (MIMG 5140), also known as "Works in Progress or WIPs," once per year beginning in their second year.

MIMG 5140 Seminars in Microbiology, Immunology and Genetics (1SCH)
MIMG 5170 Journal Club in Genetics (1 SCH)

III Advanced Elective Courses and Technique Courses

Students are encouraged to select elective courses from the following listing in addition to offerings from other disciplines under the advice of their Advisory Committee. (4-6 SCH for M.S. students and 8-10 SCH for Ph.D. students).

MIMG 6200 Mitochondria and Complex Diseases (2 SCH); Offered Fall
MIMG 6250 Molecular and Cell Biology of Cancer (2 SCH); Offered Spring
MIMG 6202 Fundamentals of Microbiology (2 SCH); Offered Spring
MIMG 6203 Advanced Cell Biology (2 SCH); Offered Spring
MIMG 5215 R Programming for Biomedical Sciences (2 SCH); Offered Fall
PHRM 6440 Methods in Molecular Biology (4 SCH); Offered Summer

IV Degree Plans

M.S. Degree Plan for Genetics

YEAR 1	**Fall**	BMSC 6200 Introduction to Experimental Design and Biostat. Methods BMSC 6201 Fundamentals of Biomedical Science I BMSC 6202 Fundamentals of Biomedical Science II BMSC 6203 Fundamentals of Biomedical Science III BMSC 6204 Fundamentals of Biomedical Science IV BMSC 5150 Lab Rotations (2) **MILESTONES***: (1) File Request for Change of Discipline* *(2) File Major Professor Designation/Compact*	2 SCH 2 SCH 2 SCH 2 SCH 2 SCH 2 SCH **12 SCH**
	Spring	MIMG 6301 Molecular Genetics New Course Genetic Analysis BMSC 5160 Biomedical Ethics MIMG 5140 Seminars in Microbiology, Immunology & Genetics MIMG 5170 Journal Club in Genetics BMSC 5998 Individual Research **MILESTONES***: (1) File Designation of Advisory Committee* *(2) File M.S. Degree Plan*	2 SCH 2 SCH 1 SCH 1 SCH 1 SCH 5 SCH **12 SCH**
	Summer	BMSC 5998 Individual Research for MS Students BMSC 5108 Transferable Skills Advanced Electives and/or Technique Courses	1-5 SCH 1 SCH 0-4 SCH **6 SCH**
YEAR 2	**Fall**	BMSC 5998 Individual Research for MS Students MIMG 5140 Seminars in Microbiology, Immunology & Genetics MIMG 5170 Journal Club in Genetics Advanced Electives and/or Technique Courses **MILESTONES***: (1) File Notice of Research Proposal Seminar and Defense 30 days prior to proposal defense* *(2) Complete and file Research Proposal (Advanced to Candidacy)* Note: course load reduces to 9 SCH for long semesters only after advancement to candidacy; the degree plan from this point on assumes successful advancement in Year 2 Fall.	4-8 SCH 1 SCH 1 SCH 2-6 SCH **12 SCH**
	Spring	BMSC 5395 Thesis MIMG 5140 Seminars in Microbiology, Immunology & Genetics BMSC 5215 Principles of Scientific Communications MIMG 5170 Journal Club in Genetics (Continued enrollment in these courses until completion) **MILESTONES***: (1) File Intent to Graduate (according to Academic Calendar deadline)* *(2) File Declaration of Intent to Defend 30 days prior to thesis defense* *(3) File Traditional MS Evaluation of Thesis Defense form*	5 SCH 1 SCH 2 SCH 1 SCH **9 SCH**
		TOTAL	**51 SCH**

Ph.D. Degree Plan for Genetics

YEAR 1	**Fall**	BMSC 6200 Introduction to Experimental Design and Biostat. Methods	2 SCH
		BMSC 6201 Fundamentals of Biomedical Science I	2 SCH
		BMSC 6202 Fundamentals of Biomedical Science II	2 SCH
		BMSC 6203 Fundamentals of Biomedical Science III	2 SCH
		BMSC 6204 Fundamentals of Biomedical Science IV	2 SCH
		BMSC 6150 Lab Rotations (2)	2 SCH
			12 SCH
		MILESTONES*: (1) File Request for Change of Discipline* *(2) File Major Professor Designation/Compact*	
	Spring	MIMG 6301 Molecular Genetics	2 SCH
		New Course Genetic Analysis	2 SCH
		BMSC 5160 Biomedical Ethics	1 SCH
		MIMG 5140 Seminars in Microbiology, Immunology & Genetics	1 SCH
		MIMG 5170 Journal Club in Genetics	1 SCH
		BMSC 6998 Individual Research	5 SCH
			12 SCH
		MILESTONES*: (1) File Designation of Advisory Committee;(2) File Ph.D. Degree Plan*	
	Summer	BMSC 6998 Individual Research	1-5 SCH
		BMSC 5108 Transferable Skills	1 SCH
		Advanced Electives and/or Technique Courses	0-4 SCH
			6 SCH
		MILESTONES: *(1) File Evaluation of Oral Qualifying Examination*	
YEAR 2	**Fall**	BMSC 6998 Individual Research	0-9 SCH
		MIMG 5140 Seminars in Microbiology, Immunology & Genetics	1 SCH
		MIMG 5170 Journal Club in Genetics	1 SCH
		BMSC 6102 Grant Writing	1 SCH
		Advanced Electives and/or Technique Courses	0-9 SCH
			12 SCH
	Spring	BMSC 6998 Individual Research	0-5 SCH
		MIMG 5140 Seminars in Microbiology, Immunology & Genetics	1 SCH
		MIMG 5170 Journal Club in Genetics	1 SCH
		BMSC 5215 Principles of Scientific Communications	2 SCH
		Advanced Electives and/or Technique Courses	0-5 SCH
			9 SCH
	Summer	BMSC 6998 Individual Research	1-5 SCH
		BMSC 6101 Responsible Conduct of Research	1 SCH
		Advanced Electives and/or Technique Courses	0-4 SCH
			6 SCH
		MILESTONES*: (1) File Notice of Research Proposal Seminar and Defense 30 days prior to proposal defense* *(2) Complete and file Research Proposal (Advanced to Candidacy)* Note: These milestones may be completed in Spring or Summer of Year 2; course load reduces to 6 SCH for long semesters *only* after advancement to candidacy; the degree plan from this point forward assumes successful advancement by Year 2 Summer.	

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YEAR 3	**Fall**	BMSC 6395 Doctoral Dissertation	2 SCH
		MIMG 5140 Seminars in Microbiology, Immunology & Genetics	1 SCH
		MIMG 5170 Journal Club in Genetics	1 SCH
		BMSC 6998 Individual Research	0-2 SCH
		Advanced Electives and/or Technique Courses	0-2 SCH
			6 SCH
	Spring	BMSC 6395 Doctoral Dissertation	2 SCH
		MIMG 5140 Seminars in Microbiology, Immunology & Genetics	1 SCH
		MIMG 5170 Journal Club in Genetics	1 SCH
		BMSC 6998 Individual Research	0-2 SCH
		Advanced Electives and/or Technique Courses	0-2 SCH
			6 SCH
	Summer	BMSC 6395 Doctoral Dissertation	2 SCH
		BMSC 6998 Individual Research	1-4 SCH
		Advanced Electives and/or Technique Courses	0-4 SCH
			6 SCH
YEAR 4	**Fall**	BMSC 6395 Doctoral Dissertation	2 SCH
		MIMG 5140 Seminars in Microbiology, Immunology & Genetics	1 SCH
		MIMG 5170 Journal Club in Genetics	1 SCH
		BMSC 6998 Individual Research	0-2 SCH
		Advanced Electives and/or Technique Courses	0-2 SCH
			6 SCH
	Spring	BMSC 6395 Doctoral Dissertation	2 SCH
		MIMG 5140 Seminars in Microbiology, Immunology & Genetics	1 SCH
		MIMG 5170 Journal Club in Genetics	1 SCH
		BMSC 6998 Individual Research	0-2 SCH
		Advanced Electives and/or Technique Courses	0-2 SCH
			6 SCH
	Summer	BMSC 6395 Doctoral Dissertation	6 SCH
			6 SCH
YEAR 5 (onward)	**Fall**	BMSC 6395 Doctoral Dissertation	6 SCH
		(maintained in continuous enrollment until completed)	**6 SCH**
	Spring	**MILESTONES**: *(1) File Intent to Graduate (according to the posted Academic Calendar deadline)*	
	Summer	*(2) File Declaration of Intent to Defend 30 days prior to thesis defense*	
		(3) File Ph.D. Evaluation of Dissertation Defense form	
		Note: These may be completed at the conclusion of the semester once requirements to defend and graduate are complete (e.g., in Spring of Year 4, if requirements are met).	
		Note: Once a candidate files their Intent to Graduate with CBTS, they may drop enrollment to 3 SCH of Doctoral Dissertation for the terminal semester	
		TOTAL	**114 SCH**

4. Advancement to Candidacy

I. Master of Science

Advancement to Master's Candidacy is achieved after successful completion of a research proposal. The research proposal is a detailed outline of the thesis project and may be formatted according to general guidelines provided by CBTS or as specified by a target grant mechanism (e.g., NIH R21). It must include a summary of the proposed project, the hypothesis and aims to be investigated, significance and innovation of the project, research design and methodology to be used, a review of the salient literature that supports or opposes the hypothesis, and potential limitations. To take advantage of the advisory committee's expertise and advice, and to clearly define the project and the committee's expectations, it is imperative that the student meets with their advisory committee before preparing the research proposal. **The research proposal should be provided to the advisory committee no later than 14 days prior to the defense.** The formal presentation and defense of the research proposal will only be to the members of the student's advisory committee. The research proposal must be approved by the advisory committee and the Dean prior to registering for Thesis (BMSC 5395). It is expected that M.S. students will complete their Research Proposal in the Fall of Year 2.

Research Proposal Guidelines and the Research Proposal approval forms are available on the CBTS Forms and Guidelines website.

Once a master's student has successfully advanced to candidacy, they may use "MS Candidate" as a title on any general business correspondence such as business cards, e-mail messages, etc. In addition, the minimum number of credit hours required for full-time enrollment drops from 12 SCH to 9 SCH in long semesters.

II. Doctor of Philosophy

Doctoral students must complete the following two-part process to be advanced to candidacy. First, a discipline-based qualifying examination, designed and administered by the Discipline's graduate faculty, must be successfully completed. Second, the student must submit and defend their research proposal to their advisory committee. When successfully completed, the student is advanced to candidacy and must enroll in a minimum of 2 SCH of Doctoral Dissertation (BMSC 6395) in the first long semester immediately following approval of the research proposal and maintain continuous enrollment in this course until dissertation is defended and approved.

A. Qualifying Examination

The qualifying examination within the Genetics Discipline must be successfully completed by the end of Summer of Year 1 or Fall of Year 2. The qualifying examination ensures that a doctoral student has sufficient mastery of fundamental principles in the biomedical sciences to be successful as a Ph.D. candidate. Topics included in the oral qualifying examination consist of fundamental understanding of biomedical sciences, genetics, experimental design, statistics and research techniques based on relevant CBTS core courses and the Genetics Discipline advanced courses.

The qualifying examination is administered by a committee comprised of members of the CBTS graduate faculty who have expertise in Genetics and the student's university member. The student will be provided the committee roster at least two weeks prior to the exam. The committee is established by the Genetics Graduate Advisor. The committee is typically comprised of faculty members that taught in the advanced core courses and develop the exam

questions as a committee. The Graduate Advisor will chair the committee, unless they are the major professor for the student taking the oral qualifying exam. In such a case, an alternate chair will be appointed by the graduate advisor. The student's major professor may request to attend the qualifying examination by contacting the Graduate Advisor but they may not serve on the committee, ask questions, be present during the voting, or cast a vote. The qualifying examination will be administered in the summer of the first year.

The student will be given a list of questions covering topics from core and required advanced courses. The student will be given 1 hour of preparation time to review the questions and select a specified number of questions upon which they will be examined. The student will address the selected topics as well as any questions from the committee that may arise from the question-and-answer session. CBTS Oral qualifying Examination Procedures and Evaluation Rubrics are available on the CBTS Forms and Guidelines website. Successful completion of the oral qualifying exam will be determined by the committee. If unsuccessful on the first attempt, a student may be allowed to retake the examination. The second examination should be completed within twelve weeks of the original examination, unless otherwise specified by the examination committee. If unsuccessful on the second attempt, the student will be required to transfer to the MS degree program to complete the requirements for the MS degree.

B. Research Proposal

Following the successful completion of the qualifying examination, the student should meet with their advisory committee to establish a tentative timeline for development of their research proposal and establish a tentative date for the proposal defense. All doctoral students must submit their dissertation research proposal no later than the end of the second year of study. The research proposal is an outline of the dissertation project and may be formatted according to general guidelines provided by CBTS or as specified by a target grant mechanism (e.g., NIH R21). It must include a summary of the proposed project, the hypothesis to be investigated, significance of the project, research design and methodology to be used, and a thorough review of the salient literature that supports or opposes the hypothesis and potential limitations. To take advantage of the advisory committee's expertise and advice, students are encouraged to meet with committee members regularly during the development of their research project. Students should refer to the CBTS Research Proposal Guidelines in the preparation of their document (also available at the CBTS Forms and Guidelines website). The written proposal must be supplied to the Advisory Committee **no less than two weeks (14 days) prior** to the scheduled proposal defense date for review. The student must prepare a formal oral presentation outlining their project, specific aims and proposed methodology in sufficient detail for the Advisory Committee to assess the scientific merit of the project. The research proposal must be approved by the Advisory Committee and the Dean prior to registering in Dissertation (BMSC 6395). Thereafter, the student is required to enroll for dissertation credit and must maintain continuous enrollment in Doctoral Dissertation (BMSC 6395) until the dissertation has been completed.

Upon completion of the qualifying exam and the research proposal, a Ph.D. student will be **advanced to candidacy,** and they may use "PhD Candidate" or "Doctoral Candidate" as a title on any general business correspondence such as business cards, e-mail messages, etc. Once a PhD student has advanced to candidacy (completed OQE and research proposal milestones), they can enroll in a minimum of 6 SCH (decreased from 12 SCH) per semester. However, **at least two** of the six SCH must be in BMSC 6395 (Doctoral Dissertation). This is to maintain full-time status. Once a PhD candidate submits the "Declaration of Intent to

Graduate" Form, they can enroll in a total of 3 SCH of Doctoral Dissertation in the semester in which they will defend their dissertation (the final semester of enrollment). The minimum requirement to graduate for BMSC 6998 (Individual Research) is 6 SCH. A maximum of 20 SCH of BMSC 6998 can be applied to the 90 SCH minimum required for the PhD degree.

5. Additional Information

In addition to all of the information provided in this document, students should consult the CBTS catalog for admissions information, general degree information, and academic procedure information (selecting the appropriate term in the dropdown menu at the top of the Catalog site).