

**BIOMEDICAL FORENSIC SCIENCES PROGRAM
GRADUATE STUDENT GUIDELINES
2008-2009**



**DEPARTMENT OF ANATOMY AND NEUROBIOLOGY
DIVISION OF GRADUATE MEDICAL SCIENCES
BOSTON UNIVERSITY SCHOOL OF MEDICINE**

Supplement to Boston University Division of Graduate Medical Sciences Guidebook

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Guide for Masters Degree Candidates

I. Admission to the Program

Students admitted into the MS Program in Biomedical Forensic Sciences must begin their course of study in the fall semester. Students wishing to begin taking classes during the spring or summer semesters may do so as a non-degree student only and apply for admission into the Program for the following fall. Priority for admission into the Program will be given to applicants whose completed applications are received by February 1st. Completed applications received on February 2nd through June 30th will be considered as they are received. Applications received on July 1st or after will be considered for admission for the following academic year.

II. Graduate Student Committee

This committee directs and oversees the Biomedical Forensic Sciences Graduate Program within the Department of Anatomy and Neurobiology. Its responsibilities include but are not limited to: admission decisions, policy-making, the establishment of academic requirements, the resolution of disputes, curriculum development, and advice on the administration of certain programs (e.g. training grants) affecting graduate students. The Committee consists of the Director of the Biomedical Forensic Sciences Graduate Program, the Associate Director and/or the Assistant Director of the Biomedical Forensic Sciences Graduate Program and two other faculty members.

The credentials of each student applicant will be thoroughly reviewed by at least two members of the Committee before an applicant can be recommended for admission into the Program.

III. Brief Description of the MS Program

1. Coursework

The program for the MS degree consists of the equivalent of approximately two years of fundamental course work, including laboratory-based course work and at least one semester of thesis research work. Candidates are required to complete 38 credits (22 core coursework credits, 4 lab credits, 4 credits of directed studies/thesis research and 8 elective credits) at the graduate level and pass a competency examination. If desired, students may tailor their choice of elective courses towards one of two specified tracks: Forensic Chemistry-Trace Evidence Analysis or Forensic Biology-DNA Analysis.

2. Program Advisor

Upon beginning the MS program, each student will be assigned a program advisor to assist him/her in selecting an appropriate course of study. Program advisors will be faculty members in the Biomedical Forensic Sciences Program and will: approve and sign course registration forms, approve and assign grades for internships and help students choose an appropriate thesis advisor

by the end of the first year of study. Students should initiate a meeting with their program advisor every semester to be sure they are choosing an appropriate course of study.

3. Grades

To receive graduation credit in any course taken as part of the MS program, students must receive a grade of B- or better.

If a grade of C+ or lower (including grades of an “I” after one year) occurs in a total of eight credit hours or more, a student will be automatically dismissed from the Program.

When the work of a course has not been completed within the semester of registration due to extenuating circumstances, the grade of “I” may be assigned by the instructor. *A grade of “I” can only be given if a student is doing passing work.* This automatically becomes a permanent grade of “I” (unsatisfactory grade) unless the course work is completed within one year. “Incomplete” grades may not be changed after a period of one year from the time the original grade is recorded. Grades of “I” (after one year) and C+ or lower are interpreted as failures.

IV. Requirements for the MS Degree

1. Core Course Requirements

Students entering the program will be required to take the following core courses plus 2 of the laboratory courses listed in italics under the elective’s courses. Planning of the academic schedule shall be carried out in consultation with the student’s program advisor.

- Crime Scene Investigation
- Forensic Pathology
- Forensic Chemistry
- Criminal Law and Ethics
- Forensic Biology
- Trace Evidence Analysis
- Forensic DNA Analysis
- Criminal Law II - Mock Court
- Directed Studies in Biomedical Forensic Sciences
- Thesis Research in Biomedical Forensic Sciences

Students may transfer credits for any of the above courses if it is deemed that an equivalent and appropriate graduate level course has been successfully completed in the preceding three years at an accredited college or university. In order to obtain transfer credits, students must provide a course description, transcript and syllabus from the completed course. Additionally, some students presently working in a crime lab or similar setting may already possess a level of expertise in one or more forensic disciplines. These students may seek to have the core course requirement in the corresponding discipline waived based on his/her prior work experience and on-the-job-training. Students who receive a waiver for a core course must complete an elective

course in its place. Requests to substitute an equivalent course for credit or to waive a core course due to work experience must be submitted on the appropriate forms to the Graduate Student Committee.

2. Elective Courses

In addition to the core courses listed above, students will be required to complete their credit hours with the elective courses listed below (subject to change). Course selection will be carried out in consultation with the student's program advisor. All students are required to take a minimum of 2 elective laboratory sessions in: Forensic Biology, Trace Evidence Analysis, Forensic Instrumental Analysis or Forensic DNA Analysis (listed in italics below).

- *Trace Evidence Analysis Laboratory (2 Credits)*
- *Forensic Instrumental Analysis Laboratory (2 Credits)*
- Advanced Topics in Forensic Chemistry (2 Credits)
- Analysis of Ignitable Liquids and Explosives (2 Credits)
- Forensic Toxicology/Analysis of Controlled Substances (2 Credits)
- *Forensic Biology Laboratory (2 Credits)*
- *Forensic DNA Analysis Laboratory (2 Credits)*
- Advanced Topics in Forensic DNA Analysis (2 Credits)
- Pattern Evidence Analysis (2 Credits)
- Bloodstain Pattern Analysis (2 Credits)
- Forensic Medicine - Anatomy and Osteology (2 Credits)
- Forensic Anthropology (2 Credits)
- Medicolegal Death Investigation (2 Credits)
- Homicide Investigation (2 Credits)
- Special Topics in Forensic Science: Human Identification (2 Credits)
- Techniques in Firearms Investigation (2 Credits)
- Internship in Biomedical Forensic Sciences (2 Credits)

In addition, students may take up to 6 credits in relevant graduate courses offered by the Division of Graduate Medical Sciences or the Graduate School of Arts and Sciences. Course selection will be carried out in consultation with the student's program advisor. Examples of acceptable courses include genetics, biochemistry, molecular biology, histology, pathology, epidemiology, biophysics, population genetics and pharmacology. Students with no prior coursework in statistics are encouraged to register for an elementary statistics course such as BS 701 offered by the School of Public Health.

3. Additional Course Requirements for Specialized Tracks

Students may also tailor their choice of elective courses towards one of two specified tracks: Forensic Biology-DNA Analysis or Forensic Chemistry-Trace Evidence Analysis. The designated track chosen by the student will not officially appear on the student's transcript

though each student who completes a specified track will receive a letter from the Graduate Student Committee stating that the necessary course work for the designated track has been successfully completed.

A. Forensic Chemistry-Trace Evidence Analysis Track

- Forensic Instrumental Analysis Laboratory (2 Credits)
- Trace Evidence Analysis Laboratory (2 Credits)
- Advanced Topics in Forensic Chemistry (2 Credits)
AND 4 credits selected from the following:
- Forensic Toxicology/Analysis of Controlled Substances (2 Credits)
- Analysis of Ignitable Liquids and Explosives (2 Credits)
- An approved chemistry-related course from outside the Biomedical Forensic Sciences Program

B. Forensic Biology-DNA Analysis Track

- Forensic Biology Laboratory (2 Credits)
- Forensic DNA Analysis Laboratory (2 Credits)
- Advanced Topics in Forensic DNA Analysis (2 Credits)
AND 3-4 credits selected from the following:
- Forensic Anthropology (2 Credits) OR Forensic Medicine - Anatomy & Osteology (2 Credits)
- Elementary Biostatistics (BS 701 - 3 Credits) OR Biostatistics (BS 703 - 4 Credits)
- An approved biology-related course from outside the Biomedical Forensic Sciences Program (Biochemistry, Molecular Genetics, etc.)

Students interested in working in the field of forensic DNA analysis should consult Section 5.2.1 of the Standards for Forensic DNA Testing Labs set forth by the Federal Bureau of Investigation to ensure that all of the degree requirements for forensic DNA analysts have been successfully completed.

4. Competency Examination

Near the completion of his/her course work, each student will be required to take a general competency examination that will cover topics from various core courses completed during the Program. The exams will be graded by the instructors who submitted the questions or other qualified personnel. A passing grade (equivalent to a B- or better) for each one of the questions answered on the examination is required in order to graduate. The exam will be administered each year in October, February and June. Students who fail any part of the exam will be required to retake the entire exam the next time it is offered in order to graduate.

Students who choose to complete the requirements for a specialized track will be required to take an additional competency examination covering topics from the courses in the chosen specialty area. The exams will be graded by the instructors who submitted the questions or other qualified personnel. As with the general competency exam, a passing grade (equivalent to a B- or better) for each of the questions answered on the examination is required in order to successfully meet

the specialized track requirement. The exam will be administered each year in October, February and June. Students who fail any part of the specialty exam will be required to retake the entire exam the next time it is offered in order to graduate with specialty track status.

5. Required Seminars and Training

During the first semester of the MS Program, each student will be required to attend an introductory seminar on scientific reading and a seminar on writing a thesis, which will be presented by a member of the Graduate Student Committee. The purpose of these seminars is to familiarize the student with reading advanced scientific literature, improving the students' skills of understanding and critically evaluating the research publications in their field of study, and.

Every student at BU School of Medicine is required to attend a Laboratory Safety and Hazardous Waste Management Training session prior to participating in a laboratory course or lab-based research. The trainings are provided by the Office of Environmental Health and Safety, and are typically given once a month including during new student orientation. Laboratory Safety and Hazardous Waste Management Training is required before performing any work in the lab and annually thereafter. It is the responsibility of the student to attend the training and provide verification of attendance to his/her appropriate lab instructor or thesis advisor.

V. Thesis and the Research Committee

To complete the Master's Degree in Biomedical Forensic Sciences each student must complete a program of laboratory or library research, the results of which will be incorporated into a thesis. By the end of the first year (or completion of 18 credits) in the graduate program, each student will select a Research Committee in consultation with his/her program advisor. The Research Committee will consist of one full time faculty from Biomedical Forensic Sciences and a second member. This second member may be another faculty member from Biomedical Forensic Sciences (full time or adjunct) or person with a MS or Ph.D. degree who is not associated with the program but is knowledgeable in the relevant area of research. (The student's program advisor may or may not be part of the Research Committee, depending on his/her area of specialty.) One of the Research Committee members will be the primary thesis advisor and the first reader. The second committee member will be the second reader of the thesis. If a reader is not a full-time faculty member the student will obtain a one-day special appointment for that individual through the Registrar's office to enable the committee member to sign the signature page of the final approved thesis. This will be done when the thesis is ready for final signatures.

The student will meet with his/her research committee at least every two months once the student begins planning and working on his/her research. These meetings will be initiated and arranged by the student. The duties of the Research Committee are to consider the student's research plan, assist in implementing that plan and guide the writing process. Since the two members of the student's Research Committee must sign the finished thesis, the student should seriously consider the advice of the Research Committee.

The process of conducting research and writing a thesis requires approximately **two semesters or 8 to 10 months to complete**. This is the same whether library or laboratory research is conducted. The thesis is not a term paper, book review or an in-depth laboratory report. The thesis will clearly state a hypothesis or scientific question that is being investigated. The hypothesis or question is investigated in a laboratory setting or through extensive library research. This will include planning and implementing the research and writing the thesis.

Four credit hours will be devoted to the thesis research. Each student will register for a semester of Directed Studies (GMS FS 870, 2 credits) during which time the student will have the initial meeting(s) with his/her committee, will understand the outline of the research plan and begin the project. The student will meet with one or both readers at least two times during this semester. Initial drafts of some or all sections of the thesis can be written during this semester.

The student will register for Thesis Research (GMS FS 970 or 971, 2 credits) in the semester in which the student anticipates graduation from the program. A “draft” of the thesis is the completed work of the student which is presented to the readers for review and comment. The reader(s) and the student may have previously worked on and revised individual sections of the document. The completed draft of the thesis must be submitted to both readers at least **4 weeks prior** to the “first draft deadline” set by the registrar’s office. The revised second draft of the thesis must be given to both readers at least **2 weeks prior** to the “final deadline” set by the registrar’s office. The readers must be allowed at least 1 week to read and return the drafts with their comments for revisions. The student should consider that the number of requested changes may differ depending on the writing and organizing skills of the student.

It is the student’s responsibility to obtain the deadlines for graduation from the registrar’s office and to meet these deadlines. Extensions are **not** provided when students do not meet graduate school deadlines. It is highly recommended that the student frequently communicate with his/her advisors regarding their progress as it relates to their proposed graduation date. It is the responsibility of the student to schedule and meet with the Registrar, Millie Agosto, to ensure the use of proper formatting in advance of all deadlines. **Failure to meet the required deadlines will result in the student being required to register as a continuing student and pay the associated tuition fee for an additional semester.**

The complete set of formal requirements for a thesis is given in material that may be obtained from the Division of Graduate Medical Sciences (*Research Guide for Writers of Theses and Dissertations*, prepared by Boston University's Mugar Memorial Library). Among other requirements are the following:

1. All work must be cited in an accepted format. All statements and facts that are not the student’s own conclusions **must** be cited.
2. The majority of citations **must** be from peer-reviewed journal articles. Textbook citations should be limited to less than 5% of literature cited.
3. Use of web sites is highly discouraged and should be limited as many are not peer-reviewed and often contain errors.

4. Students must incorporate a minimum of **30 references** into their overall work. The body of their thesis needs to be **a minimum of 45 double spaced pages in length** not including the bibliography.
5. Arrangements must be made to present one bound copy of the final thesis to the Departmental Library and one copy to the Biomedical Forensic Sciences Office.

Communication with the Research Committee and attention to detail can contribute significantly to the process of executing the research and writing of the thesis. After digesting the guidelines mentioned above, the student should not hesitate to bring additional questions to his/her advisor or Research Committee members.

VI. Internships

Students may pursue an approved internship in a forensic setting, although an internship is not required for graduation. Students will be responsible for locating their internship with the assistance of the Graduate Student Committee. With prior approval from the student's thesis advisors and the internship site supervisor, work completed at an internship may be used as the basis of the student's thesis. Students may receive 2 credits for their internship at the discretion of the student's program advisor, depending on the number of hours and the nature of the work completed during the internship. A completed evaluation from the internship supervisor describing the nature of the work completed and the quality of the student's performance will be required. In addition, the student will be required to write an 8-10 page summary of his/her internship experiences and responsibilities. The paper should include a description of any skills or knowledge gained during the internship and the results of any experiments or research conducted. The basis for evaluation (grade) for an internship will be the written paper, which will be graded by the student's program advisor, as well as input from the internship supervisor. It is the responsibility of the student to make sure the evaluation form and the written paper are turned in to his/her program advisor in order for a grade to be assigned. Students who register for an internship and fail to submit the required documents will receive a grade of "I".

VII. Required Texts

The books listed below represent a series of widely accepted and detailed professional textbooks that cover a range of topics in various forensic disciplines. Students can expect to repeatedly reference these texts in many courses during the Program and again in the workplace. The purchase of this series, therefore, is a required part of the Program.

Forensic Science Handbook Vol. I, 2nd Edition by Richard E. Saferstein, Pearson Prentice Hall, 2002

Forensic Science Handbook Vol. II, 2nd Edition by Richard E. Saferstein, Pearson Prentice Hall, 2005

Forensic Science Handbook Vol. III by Richard E. Saferstein, Pearson Prentice Hall, 1993.

VIII. Professional Organizations

Students are strongly encouraged to join the American Academy of Forensic Sciences www.aafs.org as well as other forensic professional organizations such as the International Association for Identification www.theiai.org or the Northeastern Association of Forensic Scientists www.neafs.org . All membership fees are the responsibility of the student.

IX. Background Checks

While not required for entry into the graduate program, students should be aware that employment in a crime laboratory (government or private) or law enforcement agency typically requires successful completion of an extensive personal background check which may include a criminal history investigation, fingerprint check, polygraph examination and drug testing.