

# HANDBOOK FOR MASTERS STUDENTS IN FORENSIC SCIENCE

John Jay College of Criminal Justice  
The City University of New York (CUNY)  
524 W. 59<sup>th</sup> Street  
New York NY 10019

2016

The information contained in this handbook is current as of October 2016 and is supplementary to the information and regulations contained in the *CUNY Bulletin, Student Handbook and Bylaws and Governance of John Jay College of Criminal Justice-CUNY*.



**Disclaimer: This handbook is provided to the incoming graduate student attending the John Jay College of Criminal Justice-CUNY Master of Science Program in Forensic Science. While every effort is taken to keep all information current, the student is responsible for verifying all information and referring to the College for any changes to procedure that have not made it into this Handbook. This Handbook is provided by the Graduate Program Director and is intended to supplement, not replace, official College documents such as the Graduate School Bulletin. In the event that the student finds content of this Handbook to be incorrect, outdated, ambiguous or otherwise contradictory to College policies, the student is to rely on the Graduate School Bulletin and any official College documentation. Students are encouraged to bring any errors, omissions or changes to the Program Director so that the Handbook may be updated accordingly.**

**Edited by Mechthild Prinz & Christina Cangelosi, October 2016.**

**Governing Structure for the Master of Science Program in Forensic Science and  
Administration of the Graduate Program**

The Dean of Graduate Studies is the Principal Administrative officer of the Graduate Program and also chairs the Committee on Graduate Studies.

The Committee consists of the Dean of Graduate Studies (Chairperson), the Dean of Students, the Vice President of Enrollment Management, the Chief Librarian, the Graduate Program Directors, the BA/MA Director and two graduate students. The Committee is responsible for establishing general policy for the Graduate Program, which is subject to review by the College Council. The Committee has primary responsibility of admissions, curriculum, degree requirements, course and standing matters, periodic evaluation of the Graduate Program and other areas of immediate and long-term importance to the quality and growth of the Graduate Program in Forensic Science. Responsibilities of the Committee also include advising on all matters pertaining to graduate student honors, prizes, scholarships and awards. The Program Directors are also the academic and professional advisors on course requirements, scholarship issues, thesis related issues, the selection of thesis advisors, opportunities for advanced graduate work, and career opportunities and requirements.

*Handbook for Masters Students in Forensic Science*

**Table of Contents**

<b><u>Section Title</u></b>	<b><u>Page Number</u></b>
<b>Disclaimer</b>	<b>2</b>
<b>Governing Structure</b>	<b>3</b>
<b>Introduction</b>	<b>6</b>
<b>General Requirements for Admission</b>	<b>7-8</b>
<b>Admission Status</b>	<b>8</b>
<b>Permit Students</b>	<b>8</b>
<b>Registration Information</b>	<b>9-10</b>
<b>General Procedures</b>	<b>9</b>
<b>Late Registration</b>	<b>9</b>
<b>Resignation and Change of Program</b>	<b>9-10</b>
<b>Transfer of Credit</b>	<b>10</b>
<b>Independent Study</b>	<b>10</b>
<b>General Degree Requirements</b>	<b>11-12</b>
<b>Dismissal and Probation</b>	<b>11</b>
<b>Academic Integrity</b>	<b>11</b>
<b>Retention Standards</b>	<b>11</b>
<b>Time Limit</b>	<b>11</b>
<b>Readmission</b>	<b>11</b>
<b>Maintenance of Matriculation</b>	<b>11</b>
<b>Graduation</b>	<b>11</b>
<b>Commencement</b>	<b>12</b>
<b>Course Load and Grading for the Master of Science Program</b>	<b>12</b>
<b>Credit Load</b>	<b>12</b>
<b>Grades</b>	<b>13-15</b>
<b>Change of Final Grade</b>	<b>14</b>
<b>Class Attendance</b>	<b>14</b>
<b>Program Specific Requirements for the Degree of Master of Science in Forensic Science</b>	<b>15</b>
<b>Degree Requirements</b>	<b>15</b>
<b>Advisement of Students</b>	<b>15</b>
<b>Master Thesis</b>	<b>15</b>
<b>Other Information</b>	<b>16</b>
<b>On Campus Employment</b>	<b>16</b>
<b>Student Travel</b>	<b>16</b>
<b>Student Complaints</b>	<b>16</b>
<b>Program of Study</b>	<b>17-18</b>
<b>Course Sequence</b>	<b>19</b>
<b>Course Descriptions</b>	<b>20-27</b>

<b>Student Support</b>	<b>28</b>
<b>Academic Counseling</b>	<b>28</b>
<b>Personal Counseling</b>	<b>28</b>
<b>Career Advisement</b>	<b>28</b>
<b>Housing</b>	<b>28</b>
<b>Financial Aid</b>	<b>28-29</b>
<b>Appendices:</b>	
<b>Appendix 1: Course Checklist</b>	<b>Appendix 1 – All Pages (1-2)</b>

## **Introduction**

The degree of Master of Science (M.S.) is an advanced degree awarded to an individual who has successfully completed a specific program of study. The Forensic Science Master's program at John Jay College of Criminal Justice-City University of New York (CUNY) includes the completion of a series of specific, rigorous graduate-level courses followed by completion of a research-based thesis on a topic relevant to the field of forensic science.

Forensic science is generally described as the application of the natural sciences to matters of the law. Forensic science is unique in that it encompasses many different areas of study and contains several sub-specialties, all of which interact with law enforcement and the legal system. The scientific method is a theoretical and analytical approach routinely used in scientific discourse, including forensic science. In the mid-20th century, Hans Gross coined the term "Criminalistics," which has become generally accepted in the forensic profession as including the scientific study and research of physical evidence in both public and private "crime laboratories." The American Academy of Forensic Sciences (AAFS) has ten separate sections of which Criminalistics is the largest, accounting for approximately 40% of the Academy's membership.

The Master of Science in Forensic Science (MS-FOS) degree program at John Jay College of Criminal Justice-CUNY was established in 1968 and has been developed and maintained by highly respected and internationally recognized faculty. This faculty encompasses a wide range of expertise in both general physical and biological sciences and specific forensic disciplines. The Masters program is an eclectic program designed to provide graduate level education to individuals wishing to become scientists, administrators, laboratory directors, educators and professionals in a number of forensic science sub-specialties. The program draws from several areas of the hard sciences, including biology and molecular biology, organic, physical and analytical chemistry, physics and analytical methods such as microscopy and instrumental analysis. In addition, the program addresses current issues and trends in forensic science and includes courses on law and legal issues, ethics and statistics. Furthermore, the program focuses on forensic science and research, providing both classroom and laboratory experience. It involves the mastery of techniques routinely employed in both the laboratory and the court. The curriculum is designed to meet the urgent national need for personnel adequately trained to conduct casework analysis in crime laboratories as well as personnel that oversee and supervise the crime laboratories.

The Master of Science program is based upon approximately 40-45 credits of courses and the writing of a research-based thesis. The program offers three specializations: Criminalistics, Forensic Toxicology, and Molecular Biology. All students are required to take a series of required courses followed by a selection of courses specifically geared towards the student's selected specialization. The required core classes are designed to cover fundamental concepts relevant to general forensic science. Students in the Criminalistics specialization take a series of

advanced criminalistics courses that cover the fundamental principles and concepts in the analysis and evaluation of trace evidence and physiological fluids. The students in the Forensic Toxicology specialization take a series of courses concerned with the biochemical activities of drugs and poisons and the use of chemical techniques to isolate and identify these types of materials. Finally, students in the Molecular Biology specialization take courses based upon genetics and forensic applications of molecular biology, with a focus on the isolation, analysis and typing of DNA. A variety of electives are offered in order to provide a well-rounded course of study that introduces the student to the identification and analysis of different types of evidence, analytical techniques in a forensic laboratory, and additional forensic sub-disciplines (such as crime scene investigation, forensic anthropology and firearms analysis). The thesis requirement involves the student working under the tutelage of a faculty member to conduct research in a forensic field. The research culminates in the writing of and approval of a thesis. The student is guided through the research process with the assistance of required courses and academic advisement. The goals of preparing and writing a thesis is for the student to both present and publish their research in a forensic science forum, which will ultimately benefit the student's professional development and help to establish them in the field of forensic science.

### **Admission Procedure**

#### **General Requirements for Admission**

The following is a list of requirements for admission into the Master of Science in Forensic Science (MS-FOS) program at John Jay College of Criminal Justice-CUNY:

1. A baccalaureate degree or equivalent from an accredited institution
2. A minimum undergraduate grade point average (GPA) of 3.0 or equivalent overall and specifically in natural science and math courses.
3. The successful completion of the following undergraduate STEM coursework: two semesters (one year) of general biology, general chemistry, organic chemistry, physics and calculus and one semester of biochemistry, physical chemistry and statistics. In some instances, applicants may be required to provide information about undergraduate courses (such as a syllabus or course outline) in order to establish that the content is equivalent to a prerequisite. Students who are deficient in no more than three courses may qualify for conditional acceptance.
4. The taking of the Graduate Record Examination (GRE) aptitude test, administered by Educational Testing Services (ETS), is required of all applicants. For information and scheduling with regard to the examination, applicants are referred to the official website of the ETS, [www.ets.org/gre/](http://www.ets.org/gre/) or the ETS general inquiry phone numbers, 1-609-771-7670 or 1-866-473-4373. Students should have a combined GRE score of 297 or higher

(150+ Quantitative Reasoning and 147+ Verbal Reasoning) and a score of 3.0 or higher on the Analytical Writing section.

5. Applicants who did not complete their undergraduate degree at an English-speaking institution are required to submit the Test of English as a Foreign Language (TOEFL) score report. John Jay College's TOEFL code number is 2115-99. The required minimum TOEFL scores are 550 for the paper-based test, 213 for the computer-based test and 79-80 for the Internet-based test. Students can also take the International English Language Testing System (IELTS). A score of 70 is required on the IELTS.

### **Admission Status**

There are two categories of graduate students- matriculated (or fully matriculated) and matriculated with conditions (or, conditional matriculation). An applicant may be admitted to the graduate program under one of these two categories:

1. Fully matriculated students are those that have fulfilled all general and specific requirements for admission into the graduate program.
2. Conditionally matriculated students are those that have deficiencies in their undergraduate coursework, but who otherwise are qualified for admission into the graduate program. Such deficiencies must be removed upon completion of no more than fifteen (15) credits in the graduate program. In addition, the student must maintain a 3.0 (B) average in their coursework to become full matriculated and considered to be a degree student.

### **Permit Students**

All City University of New York permit students must apply via the ePermit system at [www.jjay.cuny.edu](http://www.jjay.cuny.edu). John Jay College graduate students wishing to enroll in courses at other colleges of The City University of New York may do so with the permission of the appropriate graduate program director or the Dean of Graduate Studies and the appropriate authority at the other institution. These courses, upon satisfactory completion, will be credited toward the degree. Grades received for graduate courses at other colleges are computed in the student's grade point average.

Students from other CUNY colleges wishing to enroll in graduate courses at John Jay may do so on recommendation of their college and with the approval of the Dean of Graduate Studies. At the time of registration, they must file a statement from the registrar of their college certifying to



their matriculation in the graduate program and giving them permission to pursue specific graduate courses at John Jay.

## **Registration Information**

### **General Procedures**

Students register for classes using the College's online registration tool, CUNYfirst (<http://doitapps.jjay.cuny.edu/cunyfirst/>). Prospective and new students are referred to the John Jay College Student Info center (<http://jstop.jjay.cuny.edu/onestop.php>) for information on registration, fees, financial aid and access to CUNYfirst. New graduate students will receive an invitation to an academic advisement session prior to registration and a new student orientation immediately preceding the semester in which they plan to begin their studies. The date time and location of the orientation can also be found on the John Jay website (<http://www.jjay.cuny.edu/student-orientation>). The student is responsible for any fees pertaining to College tuition and enrollment in addition to any fees incurred for late registration. It is the student's responsibility to contact the Colleges Offices of the Registrar, Bursar and Financial Aid as needed.

### **Late Registration**

Students who register for courses during late registration are responsible for all work assigned from the beginning of the term; they are also subject to the instructor's attendance policy, beginning with the first class meeting of the semester. Syllabi may be reviewed in the Office of Graduate Studies, enabling late registrants to purchase texts and complete first and second week assignments.

### **Resignation and Change of Program**

A student who is unable to meet attendance requirements may, by written application, request permission to resign from a course. The course withdrawal online application is on the Jay Stop website <http://jstop.jjay.cuny.edu>. Please see the academic calendar for last day to submit withdrawal request. The form is accessible daily from 6:00 AM to 8:00 PM.

Before the first day of the semester and during the Program Adjustment Period (the first three weeks of the semester), all resignations will be processed in accordance with the College's change of program procedures under which courses may be dropped and added. Refunds will be made according to the refund schedule listed in the section of the graduate bulletin titled Tuition and Fees.

Beginning with the fourth week and continuing through the tenth week of the semester, students may resign without academic penalty by filing an Application for Resignation, signed by the

instructor or the Dean of Graduate Studies. The final date of this period is published in the Academic Calendar each semester.

Requests to resign after the tenth week must be filed at Jay Express Services Center and must include the signature of the instructor as well as medical, occupational, psychological, or other appropriate documentation. Such resignations must be approved by the Vice President for Enrollment Management. If approval is denied and the student does not complete the course in question, he or she receives a grade of WU, which is the equivalent of an F.

In rare circumstances, students can apply for a retroactive resignation from courses taken in the previous semester. However, such resignation must be for all courses taken in that semester and must be based on special hardships, substantiated by appropriate documentation. Under no circumstances will a retroactive resignation from an entire semester be allowed more than once in a student's graduate course of study. Applications for retroactive resignation may be obtained at the Jay Stop website: <http://jstop.jjay.cuny.edu>. All resignations are subject to final authorization by the Registrar.

### **Transfer of Credit**

Matriculated students may apply for up to 12 transfer credits for prior graduate work at accredited colleges, provided the courses were completed with a grade of B or higher within an appropriate time preceding the time of application. Courses taken more than seven years preceding the time of graduate application for admission will be accepted only in exceptional circumstances.

Credits must be approved by the program director of the respective degree program. Students must list the courses taken at the other institution(s) and must also submit the course description from the college catalog. Forms are available on the Jay Stop website.

A request for transfer of credit should be filed during the first semester a student attends the graduate program. The program director must submit the completed form to the Office of the Registrar.

### **Independent Study**

Students are limited to one independent study course in the graduate program. To register for an independent study course, a student must have completed twelve or more graduate credits with a minimum grade point index of a 3.30. Students must also complete the Independent Study Course Request Form, which is available on the Jay Stop website <http://jstop.jjay.cuny.edu>.

## Requirements for the Master of Science Program

### **General Degree Requirements**

**Dismissal and Probation.** Graduate students must maintain a 3.0 average. All student transcripts are reviewed after the end of each semester. A student whose grade point average falls below 3.0 is subject to probation or dismissal. Those placed on probation should discuss their standing with their program director or the Dean of Graduate Studies.

**Academic Integrity.** Academic dishonesty is prohibited in the City University of New York and is punishable by penalties including failing grades, suspension and expulsion. Students should consult the Graduate Bulletin for the complete text of John Jay College's Policy on Academic Integrity.

**Retention Standards.** If, after completing twelve credits including any prerequisites, conditionally matriculated students that achieve an overall average of B or better and have met all other admissions requirements will become fully matriculated and be considered degree candidates.

**Time Limit.** All Master's degree requirements in a specific program must be completed within eight years of the date of entrance into the program. A student may refrain from matriculating for no more than four semesters within this eight-year period. Any exceptions to this rule must be based on very compelling extenuating circumstances and must be approved by the Dean of Graduate Studies or the Vice President for Enrollment Management.

**Readmission.** A student in good standing (i.e. with a GPA above 3.0), who has not registered for one or more (consecutive) semesters, is required to file an application for readmission at least one month before the beginning of the registration period. This application is available from the Jay Stop website <http://jstop.jjay.cuny.edu>. A readmission fee of \$10 will be billed along with tuition and fees upon the first fall or spring semester when the student is accepted for readmission. Readmitted students may be subjected to any changes in the program requirements that are made during the student's absence. Students that left the College with a GPA below a 3.0 may apply for reinstatement, but are not assured of acceptance.

**Maintenance of Matriculation.** Students must register for courses or maintain matriculation status in the semester in which they file for and obtain their degree. Students not taking courses should register to maintain matriculation (MAM 791) in order to remain on the active rolls of John Jay College. Students who have not maintained active status for one semester or more must apply for readmission. In order to comply with the CUNY Board of Trustees reporting and funding requirements, all maintenance of matriculation fees must be received by the end of the second week of classes.

**Graduation Requirements.** Candidates for graduation must have all degree requirements completed by the end of the semester in which they plan to graduate. An Incomplete grade in a

course will result in removal from the list of graduates. Students will also be barred from graduation if they have outstanding Lloyd George Sealy Library or CUNY Interlibrary fines. Application for Graduate Degree must be filed online on the Jay Stop website <http://jstop.jjay.cuny.edu> according to the date listed in the Academic Calendar. Please check the Registrar website for Graduation deadlines.

**Commencement.** Participation in the annual spring commencement ceremony is accorded to students who have been awarded the master's degree the previous August or February and students who are certified by the Registrar's Office to complete their degree requirements by the end of that spring semester. Students planning to complete their degree requirements at the end of the summer session may participate in the annual commencement ceremony provided they have submitted an application for graduation by the deadline date, have two courses or less left to complete their degree (certified by the Registrar's Office) and are currently registered for those courses in the summer session.

### **Course Load and Grading for the Master of Science Program**

**Credit Load.** Full-time graduate students normally register for 12 credits per semester; part-time students normally take 6 credits per semester. Students employed full-time are advised to limit themselves to no more than 6 credits per semester. Students matriculated-with-conditions are expected to take 6 credits per semester. In exceptional circumstances, students may exceed or fall short of these limits with the permission of a graduate program director or the Dean of Graduate Studies.

No student may register for more than 60 graduate credits during their graduate course of study at John Jay without the approval of the Dean of Graduate Studies and the Vice President for Enrollment Management, and then may only register for courses needed for graduation. In addition, no student may register for more than 15 credits in a given semester without the approval of the Dean of Graduate Studies.

**Grades.** The following grades are used in the Graduate Program:

Grade	Explanation	Index Value
A	Excellent	4.0
A-		3.7
B+		3.3
B	Good	3.0
B-		2.7
C+		2.3
C	Unsatisfactory	2.0
C-		1.7
F	Failure	0.0
P	Pass	-
INC	Incomplete	-

\*Note: No grade can be eliminated from the grade point average by retaking the course

**An F grade** is used for students who have been doing unsatisfactory work and who resign from a course after the tenth week of the semester. (For the exact date in any given semester, please see “Last Day to Resign without Academic Penalty” in the Academic Calendar on the John Jay website: [www.jjay.cuny.edu](http://www.jjay.cuny.edu)). This grade may also be awarded for excessive absences, or for very unsatisfactory work, or for student withdrawal without official approval. The grade of F on the graduate level cannot be eliminated by retaking the course and remains permanently a part of the student’s grade point average. However, if the F grade was received for a required course, the student must retake the course.

**A grade of INC** is given in lieu of a grade only in exceptional circumstances for students who have been doing satisfactory work and have been unable to complete course requirements. Students who receive an Incomplete must fulfill their academic obligation within one calendar year of the end of the semester in which the grade of Incomplete is given. In extraordinary circumstances and with the approval of the Dean of Graduate Studies or the Vice President for Enrollment Management, the time limit may be extended one additional year. Incompletes unresolved in the above-mentioned time period become permanent entries in students’ records as an Incomplete (no-credit) and may not be changed thereafter. A maximum of three grades of Incomplete may be converted to regular grades during the course of a student’s enrollment in graduate studies at John Jay College. In rare circumstances, more than three grades of Incomplete may be converted to regular grades with the approval of the Dean of Graduate Studies or the Vice President for Enrollment Management. Incomplete grades that are not resolved within the above- mentioned time period become permanent Incompletes. Such grades will not be counted in the student grade point average. No credit is awarded for Incompletes that have not been appropriately resolved.

### **Grade of W (Withdrawal)**

This grade indicates withdrawal with permission of the Registrar while students are doing satisfactory work. Normally this can be done only through the tenth week of the semester. This withdrawal is without academic prejudice.

Graduate students who receive loans or other forms of federal financial assistance should check with the Financial Aid Office before withdrawing from courses.

### **Grade of WN (Withdrawal – Did Not Attend)**

This grade is calculated the same as a W grade and is assigned by the instructor when the instructor has no record of the student attending the course for the semester.

### **Grade of WU (Withdrew Unofficially)**

The grade of WU is assigned by the instructor when a student has ceased attending class and has not submitted an Application for Resignation. The grade is computed as a failure (0.0) in the grade point average (GPA), which may result in the adjustment of financial aid funds. Students who want to withdraw from a class are therefore advised to submit an official Application for Resignation online via Jay Stop (<http://jstop.jjay.cuny.edu>) prior to the end of the tenth week of classes.

**Change of Final Grade.** Application for a change of grade assigned by a member of the Faculty may be made at any time within one year from the end of the semester in which the course was taken. This request may be made by either the student or the instructor. The procedures outlined below apply to the change of grades of A, A–, B+, B, B–, C+, C, C– and F.

1. **Grade Appeal.** An appeal of a final grade must be filed by the 25th calendar day of the subsequent long semester. (Grades for courses taken in the spring or summer must be appealed by the 25th calendar day of the fall semester; grades for courses taken in the fall or winter must be appealed by the 25th calendar day of the spring semester). To appeal a final grade of A, A–, B+, B, B–, C+, C, C– or F, a student should first meet with the faculty member to discuss the final grade. If an agreement is reached, the instructor is responsible for submitting the Change of Grade form to the Registrar's Office. If, after consultations with the faculty member, the final grade is reaffirmed, a student who questions the grade should consult his or her program director. If this does not resolve matters, the student has the right to appeal. To file a grade appeal, the student should complete a grade appeal form available from the Office of the Dean of Graduate Studies. The form requires the specification of reasons for the appeal. Students must provide a copy of the course syllabus, all available graded course materials and any supporting documentation, such as the midterm, final exam and research papers. Upon receiving a grade appeal request, the Dean will convene the indicated program's grade appeal

committee to hear the appeal. The committee has thirty calendar days to hear the appeal. The decision of the committee will be communicated in writing by the Chair of the grade appeal committee to the Dean who will inform the student, faculty, and Registrar of the decision. The decision of the subcommittee is final.

2. **Class Attendance.** Class attendance and participation are factors in assessing student performance. Faculty will advise students of at the beginning of the semester of the requirements for attendance.

## **Program Specific Requirements for the Degree of Master of Science in Forensic Science**

### **Degree Requirements**

Program requirements consist of 41-43 credit hours. Core courses provide the student with the knowledge and skills required of crime laboratory analysts; elective courses, coupled with research experience, provide training in more specialized areas such as microspectrophotometry, forensic anthropology, and firearm examination. All students are required to write a thesis. There are no alternatives.

### **Advisement of Students**

Upon acceptance into the program, the student will be assigned a faculty member who will help guide the student in their course of study. The MS-FOS advisor team (Professors Cheng, Prinz and Rourke) will work with the students on the optimal course sequence based on student's schedule (full time versus part time) and any missing pre-required undergraduate coursework, and the desired specialization. At a minimum, the student must meet with his or her academic advisor towards the end of each semester to get course specific permission in CUNYfirst to register for the coming semester.

It is the responsibility of the student to meet with their advisor to have the Course Checklist Form (Appendix 1) filled out and the appropriate CUNYfirst course registration service indicator set to release. The advisor will file the course checklist with the Program Director each semester.

### **Master Thesis**

In order to not delay graduation, a student should start inquiring about MS-FOS faculty research and searching for a thesis advisor during the first year of study. The thesis advisor will guide the student through their research project, serve as the thesis committee chair person and keep the Program Director informed about the student's progress.

Students must successfully complete the Thesis Prospectus series (FOS795-797) in order to be allowed to submit the thesis. This series of classes will introduce students to research related topics and available resources.

In accordance to John Jay College Graduate Studies guidelines, all students must complete the thesis within one year of completion of all other program degree requirements. Only in exceptional circumstances may the student request an extension by written petition to the faculty advisor, program director and dean. If the request is approved, the student will be granted a limited time period to complete the thesis

Check Appendix 2, the Master Thesis Guide for detailed information on the thesis process.

### **Other MS-FOS Information**

#### **On Campus Employment**

In addition to other John Jay College employment opportunities, the Sciences Department may be looking for qualified undergraduate course technicians or instructors for fall, spring, and summer semesters. Please contact the Program Director to obtain more specific information.

#### **Student Travel**

There is no better way to learn about the field of Forensic Science and build a network of colleagues or potential employers than attending a scientific meeting. Graduate students with at least a 3.0 GPA who have completed at least 12 credits are eligible to apply for John Jay College Student travel funds. These funds (up to \$1,500) are preferably awarded to students presenting at a meeting, but in the past have also been given for regular conference attendance. Information can be found under: <http://www.jjay.cuny.edu/studenttravel>

#### **Student Complaints**

The CUNY bylaws stress the importance of encouraging critical thinking and giving freedom from discrimination. Students have a right to complain. Please refer to current John Jay College Graduate Bulletin for “Policies, Rules and Regulations” section for college guidelines on the institutional complaint process and how student complaints will be addressed. In addition, the Program Director of the MSFOS Program is always available to handle complaints, maintains an internal record of student complaints, and will make sure all complaints and their resolutions will be documented.



## MS FOS Program of Study

### Forensic Science Graduate Course List

Program requirements consist of 41-43 credit hours. [Prerequisites are in brackets]

#### **Required Courses:**

FOS Course No.	Title of Course	Total Credits
706	Physical and Biological Evidence	3
795, 796, 797	Thesis Prospectus	3 (1 credit each)
707	Principles of Forensic Toxicology	3
710	Advanced Criminalistics I [Prereqs: 706,722]	5
721	Instrumental Analysis I	5
722	Instrumental Analysis II [Prereqs: 721]	5

**Specializations and their required courses** (each student is required to select one of the following specializations):

#### **Criminalistics**

FOS Course No.	Title of Course	Total Credits
711	Advanced Criminalistics II [Prereqs: 710]	5
730	Forensic DNA Technology	3
717	Organic Compound Structure Determination (Identification of Organic Molecules) <b>OR</b>	3
735	Advanced Topics in Physical Science [710,711,721,722] <b>OR</b>	3
736	Forensic Examination of Firearms and Toolmarks [706] <b>OR</b>	3

#### **Molecular Biology**

FOS Course No.	Title of Course	Total Credits
704	Advanced Genetics	3
732	Advanced Molecular Biology I [Prereqs: 704]	5
733	Advanced Molecular Biology II [Prereqs: 732]	5

#### **Forensic Toxicology**

FOS Course No.	Title of Course	Total Credits
725	Forensic Toxicology I [Prereqs: 707]	5
726	Forensic Toxicology II [Prereqs: 707,725]	5
730	Forensic DNA Technology	3

**Elective Courses:**

FOS Course No.	Title of Course	Total Credits
705	Statistics for Forensic Scientists	3
760	Scientific Evidence, Expert Testimony and Ethics	3
761	Forensic Anthropology: Osteological & Genetic Identification	3
735	Advanced Topics in Physical Science [710.711,721,722]	3
736	Forensic Examination of Firearms and Toolmarks [706]	3
708	Law, Evidence and Ethics (CRJ Elective course)	3
822	Data Analysis for Forensic Scientists [Mat 301 or Mat 710]*	3
823	Forensic Electron Microscopy	3

**\*New course being taught on an experimental basis**

**Course Sequence for Students.** Please note, that most of the graduate classes are offered either only in the Fall or only in the Spring and for some of them enrollment is conditional on having passed another graduate course (see pre-requisites in brackets above). See below for the course sequence that should be followed in order to complete the degree in four semesters. While there is some flexibility regarding the lecture classes and electives may be taken earlier than indicated, the lecture/laboratory course sequence is critical.

Advance planning for the thesis project is also important for achieving this two-year timeline. Students can apply for graduation and participate in the annual Spring commencement ceremony, if they are finishing their coursework that semester and will be able to submit their thesis prior to the summer semester deadline.

Part-time students and students with missing undergraduate coursework having been conditionally admitted to the program will need to plan for at least one additional semester.

All students should make sure to meet with one of the members of the MS-FOS advisement team (Professors Cheng, Prinz and Rourke).

**YEAR 1**

<p><b>Fall Semester</b>            All: FOS706            All: FOS707            All: FOS721*            All: FOS795</p>
12 credits

<p><b>Spring Semester</b>            All: FOS722*             All: FOS796            Spec Crim: FOS730            Spec MoBio: FOS704            Spec Tox: FOS725*</p>
9-11 credits

<p><b>Summer</b>            Thesis</p>
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**YEAR 2**

<p><b>Fall Semester</b>            All: FOS710*            All: FOS797            Spec Crim: Elective 1            Spec MoBio: FOS732*            Spec Tox: FOS726*</p>
9-11 credits

<p><b>Spring Semester</b>            All: Elective 2            Spec Crim: FOS711* and FOS717            or FOS735 or FOS736            Spec MoBio: FOS733*            Spec Tox: FOS730            MoBio and Tox: Elective 1</p>
9-11 credits

<p><b>Summer</b>            Thesis</p>
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\* Indicates a lecture/laboratory course

## Course Descriptions

### **FOS 704 Advanced Genetics**

This course provides an in-depth treatment of selected topics in the field of modern genetics. Topics are drawn from classical, molecular, and population genetics and include the nature of genetic variation and mutations, genetic disorders, recombination and repair mechanisms. Ethical issues and the relevance of genetics to clinical medicine (recombinant DNA therapy, cloning) and forensic science (polymorphisms, population genetics) will be explored. Quantitative analysis and problem-solving skills are emphasized.

**Prerequisite(s):** Coursework necessary for admission to Master of Science in Forensic Science Program.

### **FOS 705 Mathematical Statistics for Forensic Scientists**

This course is a calculus-based course intended to provide a solid understanding of probability and mainstream statistical techniques for research and professional applications in the field.

**Prerequisite or Co-requisite:** One year of undergraduate calculus.

### **FOS 706 Physical and Biological Evidence**

This course provides an introduction to the problems encountered and the techniques used in the scientific examination of physical and biological evidence. Topics include crime scene procedures, physical evidence documentation, application of the scientific method in crime scene investigation, scientific and legal integrity of physical evidence, ethical issues, professional standards, expert testimony and the theoretical bases of methods of comparison and their influence on the interpretation of scientific data. Emphasis is placed on practical problem solving in forensic science. Students should register for this course during their first year of study.

**Prerequisite(s):** Coursework necessary for admission to Master of Science in Forensic Science Program.

### **FOS 707 Principles of Forensic Toxicology**

This course serves as an introduction to the basic principles of forensic toxicology. This course emphasizes the common drugs/poisons that are encountered by a practicing forensic toxicologist and the approach to determining their medico-legal role in establishing the cause of death and disease. Topics include the pharmacology and pharmacokinetics of drugs, impairment versus intoxication, and the interpretation of drug effect in the criminal court setting. The science of ethanol and drugs of abuse, along with other important agents (sports doping drugs, therapeutic drugs, CO etc.), will be discussed as they relate to toxicology. An introduction to the basic applied methods of forensic toxicology is also presented including biological samples, analytical

schemes, and some of the special problems commonly encountered in forensic toxicology. Lectures, directed readings, and participatory discussions will introduce the science of forensic toxicology.

**Prerequisite(s):** Coursework necessary for admission to Master of Science in Forensic Science Program.

### **FOS 710 Advanced Criminalistics I**

Fundamental principles used in the analysis and evaluation of physical evidence using micro techniques are stressed in the course. The course emphasizes microscopy and microchemistry of trace evidence such as controlled substances, glass, and fibers. Documentation and photography skills are developed. Students will begin to develop their ability to critically assess forensic situations. Case studies are also used in lectures to integrate theoretical concepts with practical applications.

**Prerequisite(s):** FOS 706 - Physical and Biological Evidence and FOS 722 - Advanced Instrumental Analysis II.

### **FOS 711 Advanced Criminalistics II**

This course teaches concepts and techniques employed in the analysis of physiological fluids using non-instrumental methods. Micro techniques and microscopy are employed for soil analysis, wood identification, and hair examination. Additional documentation and photography skills are developed. Case studies are used in lectures to integrate theoretical concepts with practical applications. The lab course culminates with the analysis and interpretation of trace evidence from a case simulation.

**Prerequisite(s):** FOS 710 - Advanced Criminalistics I.

### **FOS 717 Organic Compound Structure Determination**

This is an advanced course in the use of modern instrumentation, both spectroscopic and chromatographic techniques, for the solution of chemical problems. This course discusses relationships between functionality and the observed spectroscopic properties of organic molecules. These relationships are then rationalized and used to logically deduce structures of unknown compounds. Chromatographic techniques and principles will be emphasized. Subsequently, five different spectroscopic methods, Nuclear Magnetic Resonance, Mass Spectrometry, Infrared, Ultraviolet Spectroscopy, and Chiro-optical Spectroscopy will be applied in the structural assignment of unknown compounds. The principles behind these methods will be discussed. There will be considerable emphasis on problem solving to determine molecular structure utilizing all available spectroscopic data. Some lecture classes will be practical demonstration of the concepts presented.

**Prerequisite(s):** Coursework necessary for admission to Master of Science in Forensic Science Program.

### **FOS 721 Advanced Instrumental Analysis I**

The purpose of this course is to introduce the student to the use of chemical instrumentation and spectrophotometric techniques for the analyses of physical evidence materials of forensic import. The course includes lectures and problem sessions and has as a critical portion, hands-on laboratory sessions. The successful student will understand the fundamental use and operation of certain types of chemical instrumentation and their application to forensic analytical problems. He/she will also be able to choose the proper technique to successfully analyze a material, and increase his/her knowledge and understanding of the analytical approach and interpretation of quantitative data by proper calibration techniques.

The lectures include the descriptions of various instruments including their designs, the theory of operation, and the fundamental science on which they are based. Applications of these instruments to forensic samples will be discussed. The accuracy and precision of measurements as well as error analysis will be introduced. This course is concentrated on electronic and vibrational spectra, although other instrumentation topics will be covered.

**Prerequisite(s):** Coursework necessary for admission to Master of Science in Forensic Science Program.

### **FOS 722 Advanced Instrumental Analysis II**

The purpose of this course is to introduce the student to the use of instrumental chemical separation techniques for the analyses of physical evidence materials of forensic import. The course includes lectures and problem sessions and has as a critical portion of hands-on laboratory sessions. The successful student will understand the fundamental use and operation of certain types of chemical instrumentation and their application to forensic analytical problems. He/she will also be able to choose the proper technique to successfully analyze a material, and increase his/her knowledge and understanding of the analytical approach and interpretation of quantitative data.

The lectures include the descriptions of various instruments including their designs, the theory of operation, and the fundamental science on which they are based. Applications of these instruments to forensic samples will be discussed. This course is concentrated on chromatography and other separation techniques although other instrumentation topics will be covered.

**Prerequisite(s):** FOS 721 - Advanced Instrumental Analysis I.

## **FOS 725 Forensic Toxicology I**

This course introduces students to methods of determining the presence or absence of drugs (and metabolites) and chemicals in human fluids and tissues and evaluating their role as a contributory factor in the cause or manner of death and disease. This course deals with the systematic approach to processing biological samples for the presence of drugs and poisons. Students are introduced to the fundamental theoretical principles applied to forensic toxicology with topics including: postmortem and ante mortem toxicology, sample preparation and extraction techniques, and methods of analytical screening and confirmation (chromatography, GCMS, LCMS, immunoassay), that are used to solve problems confronting the forensic toxicologist. Advanced topics associated with pharmacokinetics and pharmacodynamics are discussed as they relate to the interpretation of toxicological results. The general focus of the course will be to examine the scientific aspects of the detection of intoxications and the role of intoxicating agents in the commission of crimes and/or overdose and poisoning. The laboratory sessions introduce the basic analytical principles that are common in forensic toxicology. This includes the various methods of sample preparation, extraction, and drug screening, determination of blood ethanol levels and qualitative and quantitative analysis of specimens for various drugs of abuse. Common acidic, basic, and neutral drug screening methods will be applied along with the concepts of conformational analysis.

**Prerequisite(s):** FOS 707 - Principles of Forensic Toxicology

## **FOS 726 Forensic Toxicology II**

This course is a continuation of the advanced study of the scientific principles associated with the medico-legal aspects of drugs and poisons. It builds upon the specific forensic material, general pharmacology, and toxicology presented in previous courses. Forensic toxicology is an evolving science dealing with the qualitative and quantitative identification of poisonous substances and the consequent application of the results to an episode of intoxication. Forensic Toxicology II is intended to formulate a basis through which the student becomes more conversant with a wide range of practical components designed to reinforce topics covered earlier and seeks to give students experience in analytical problems specific to the human biological condition. This course covers the applied aspects commonly encountered in the practice of forensic toxicology: human performance testing, workplace/occupational drug testing, sports medicine, clinical toxicology, the role of the toxicologist in the courtroom and expert testimony, QA/QC and toxicology laboratory management issues. Specific problems will be expanded to include consideration of the impact resulting from a variety of synthetic and/or natural toxins. In this framework, aspects of terrorist attacks with potential weapons of mass destruction will also be discussed. Parallel laboratory sessions dealing with the above topics will be included in order to demonstrate some of the practical aspects associated with these issues. Methods of workplace drug testing, detection of doping agents, therapeutic drug monitoring, and QA/QC topics will be addressed in the laboratory environment.

**Prerequisite(s):** FOS 707 - Principles of Forensic Toxicology and FOS 725 - Forensic Toxicology I.

### **FOS 730 Forensic DNA Technology**

Many advances in molecular biology that impact on the medico-legal fields have taken place in recent years. Analytical procedures used to study DNA have been developed for genetic research, clinical studies, and human/non-human identification. Molecular Biology for Forensic Scientists is a survey course geared to forensic science students in the criminalistics and forensic toxicology specializations. Lecture topics include: an overview of forensic biology, statistics and population genetics including: sample collection; bioethics; DNA extraction, quantitation, and typing; databases; lab validation, including quality assurance and quality control, and emerging technologies.

**Prerequisite(s):** Coursework necessary for admission to Master of Science in Forensic Science Program.

### **FOS 732 Advanced Molecular Biology I**

Many advances in molecular biology that impact on the medico-legal fields have taken place in recent years. Analytical procedures used to study DNA have been developed for genetic research, clinical studies, and human/non-human identification. Molecular Biology for Forensic Scientists is a survey course geared to forensic science students in the criminalistics and forensic toxicology specializations. Lecture topics include: an overview of forensic biology, statistics and population genetics including: sample collection; bioethics; DNA extraction, quantitation, and typing; databases; lab validation, including quality assurance and quality control, and emerging technologies.

**Prerequisite(s):** FOS 704 - Advanced Genetics.

### **FOS 733 Advanced Molecular Biology II**

This course provides an in-depth treatment of selected topics in molecular biology. Lecture topics include the structure and function of nucleic acids and proteins; DNA replication, recombination, and repair; mutagenesis; transcription and translation; regulation of gene expression; mobile genetic elements, and molecular biological techniques.

The laboratory introduces experimental methodologies: cell culture techniques, transformation, DNA and protein isolation, electrophoresis, Southern and Western blotting, DNA sequencing, and recombinant DNA techniques. QA/QC topics will be addressed in the laboratory environment.

**Prerequisite(s):** FOS 732 - Advanced Molecular Biology I.



### **FOS 735 Advanced Topics in Physical Science**

This course will introduce the student to the use of advanced instrumental techniques for the analyses of physical evidence materials of forensic import. The course includes lectures and problem sessions. At the conclusion of the course the successful student will understand the use and operation of certain types of advanced chemical instrumentation and their application to certain forensic samples. The student will also be able to choose the proper techniques to successfully analyze these materials. Qualitative methods will be covered and quantitative analysis will be stressed.

Evidence types to be covered are glass, paints, fibers, metals, gunshot residues, and inorganic materials. Careful calibration, which is necessary for quality analysis will be stressed. Ethical concerns over interpretation and report generation will be covered.

**Prerequisite(s):** FOS 710, 711, 721 and 722

### **FOS 736 Forensic Examination of Firearms and Toolmarks**

After a brief review of the development of firearms and ammunition, a detailed examination of the manufacturer of firearms and ammunition will follow. These principles will be developed to provide a robust background for the student to understand the concepts and theoretical basis of comparison microscopy as it is used to associate fired ammunition to the firearm from which it was discharged. The same principles will also be applied to the forensic analysis of toolmarks. Grading will be based on the written and oral assignments, the examinations and class participation.

**Prerequisite(s):** FOS 706

### **FOS 760 Scientific Evidence, Expert Testimony and Ethics for Research and Forensic Scientists**

This is a course of study designed to introduce the forensic science student to the inter-relationship of science and the law as well as discuss some of the ethical problems that may confront him/her in their role as an expert witness and scientific researcher. The role of the expert and his testimony in assisting the court and the trier of fact will be explored. Classic Frye rule considerations will be presented, as well as the newer Daubert guidelines. The impact of the Federal Rules of Evidence will be discussed.

The course will be taught by lectures and by the Socratic Method. Students will be given assignments from textbooks, handouts, and library research and are expected to be prepared for class discussions each period. A portion of the instruction will be on how to prepare and testify as an effective expert. Some time will be spent on dealing with cross-examination.

**Prerequisite(s):** Coursework necessary for admission to Master of Science in Forensic Science Program.

### **FOS 761 Forensic Anthropology: Osteological & Genetic Identification**

This course will introduce students to methods in forensics, with applications ranging from the study of ancient civilizations to modern criminal cases. As part of the course, students will become familiar with crime scene investigation techniques and excavations of human remains in archaeological contexts. Students will be introduced to sample collection and identification methods for human and nonhuman remains, including DNA analyses, osteology, and facial reconstruction. The students will also develop skills in basic human skeletal anatomy, pathology and trauma investigation, sample/evidence collection, genotyping, and the study of changes occurring in bodies post-mortem, or taphonomy. Finally, the broader social and legal context of forensic analyses in different communities will be presented in the course by discussing well-known archaeological and criminal investigation cases.

**Prerequisite(s):** None

### **FOS 795 Thesis Prospectus I**

The first in a series of three seminar courses is designed to introduce the student to scholarly research, scientific writing, library research and professional and ethical issues in scientific research and forensic science. Students will develop critical analysis and oral communication skills. Students should register for FOS 795 in their first semester of study. In FOS 795, students will be introduced to current topics in forensic science, John Jay college resources, and faculty research projects.

**Prerequisite(s) for 795:** Coursework necessary for admission to Master of Science in Forensic Science Program.

### **FOS 796 Thesis Prospectus II**

The second in a series of three seminar courses is designed to introduce the student to scholarly research, scientific writing, library research and professional and ethical issues in scientific research and forensic science. Students will develop critical analysis and oral communication skills. Students will present journal club style presentations in FOS 796.

**Prerequisite(s) for 796:** FOS 795

### **FOS 797 Thesis Prospectus III**

The third in a series of three seminar courses is designed to introduce the student to scholarly research, scientific writing, library research and professional and ethical issues in scientific research and forensic science. Students will develop critical analysis and oral communication skills. In FOS 797 students present the development of their thesis research, from literature

review and experimental design to preliminary data. Students must develop and submit a thesis prospectus by the end of this course.

**Prerequisite(s) for 797:** FOS 796

### **FOS 780-781 Fieldwork in Forensic Science**

This course provides the student with supervised fieldwork experience in appropriate institutional settings. A variety of patterns of involvement is available, varying in terms of hours of work, location, nature of assignment, etc.

**Prerequisite(s):** GPA of 3.0 or higher and permission of the program director.

### **FOS 822 Data analysis for Forensic Scientists\***

This course trains forensic scientists in the concrete application of intermediate to advanced methods of multivariate statistics to data they will commonly encounter in their careers. The course is aimed at students interested in trace evidence, fire debris, toolmarks, spectroscopy and quantification of evidence.

**Prerequisites(s):** MAT 301 or MAT 710

### **FOS 823 Forensic Electron Microscopy\***

This is a lecture, demonstration and laboratory class that will introduce the student to the theory and applications of electron microscopy as well as that of x-ray spectrometry to forensic and chemical analysis. Diffraction theory in electron microscopes will also be introduced. The class will concentrate on Scanning Electron Microscopy (SEM), with less emphasis on Transmission Electron (TEM) and Analytical Electron Microscopy (AEM) techniques.

**Prerequisite(s):** FOS 710, FOS 721, FOS 722 or permission of the instructor.

### **CRJ 708 Law, Evidence and Ethics**

Examines the rules of evidence followed in criminal investigations, criminal trials and administrative proceedings. Pays special attention to the methods and ethical obligations of government agents assigned to gather evidence.

**Prerequisite(s):** None

Note: \*This is a new course being taught on an experimental basis

## **Student Support**

### **Academic Counseling**

Graduate advisors and the Program Director are available for consultation on academic matters throughout the year. Students must meet with their advisors prior to registration each semester or when other academic questions arise.

### **Personal Counseling**

Licensed professionals offer a range of psychological and counseling support services to meet the adjustment, mental health and developmental needs of students and others in the campus community. To help foster academic, personal and vocational development in students, a wide range of counseling, outreach, training, consultation and educational services are offered by staff and graduate externs. The office (212.237.8111) also supports the academic goals of the College through consultation with faculty, staff and campus organizations. A vital component of counseling services is provided by the Women's Center (212.237.8184) as well.

### **Career Advisement**

The Center for Career & Professional Development (212.237.8754 and located at L72.00 NB) offers a range of services to support and foster the development of graduate students. The office fosters training, consultation and other services to those students who are seeking professional experience in their various fields of study before completion of their degrees. Career advisers are available to meet with graduate students on an individual basis for career consultations. The Center for Career & Professional Development even offers evening appointments and the option to request a phone or SKYPE appointment. To set up an advising appointment please visit: <https://jjay-cuny-csm.symphlicity.com/students/> to log in or create your John Jay Careers account.

### **Housing**

Currently, there are no housing facilities available to graduate students at John Jay College of Criminal Justice-CUNY. Students who are accepted to the Graduate Program in Forensic Science are advised to allow ample time to find housing. Students requiring assistance in finding housing should contact the Office of Student Activities. Material regarding contact information and the description of services offered by the Office of Student Activities can be found on John Jay College's website

### **Financial Aid and Fellowships**

Financial aid is available to matriculated students in the form of grants, loans and part-time student employment opportunities (Federal Work Study). Interested students are encouraged to contact John Jay College's Financial Aid Office for additional information and scheduling

appointments to speak with a financial aid advisor. The Office of Fellowship & Scholarship Opportunities is available for information about opportunities open to graduate students. <http://www.jjay.cuny.edu/academics/6434.php>

Master of Science (MS): Forensic Science (FOS)  
Course Checklist

Student Name: \_\_\_\_\_ EMPL ID#: \_\_\_\_\_

Concentration: \_\_\_\_\_ Academic Advisor: \_\_\_\_\_

**Part One: Core Requirements**

Course Title	Course #	#Credits	Term
<input type="checkbox"/> Physical and Biological Evidence	FOS 706	<u>3</u>	_____
<input type="checkbox"/> Principles of Forensic Toxicology	FOS 707	<u>3</u>	_____
<input type="checkbox"/> Thesis Prospectus 1	FOS 795	<u>1</u>	_____
<input type="checkbox"/> Thesis Prospectus 2 [FOS795]*	FOS 796	<u>1</u>	_____
<input type="checkbox"/> Thesis Prospectus 3 [FOS796]	FOS 797	<u>1</u>	_____
<input type="checkbox"/> Instrumental Analysis I	FOS 721	<u>5</u>	_____
<input type="checkbox"/> Instrumental Analysis II [FOS721]	FOS 722	<u>5</u>	_____
<input type="checkbox"/> Advanced Criminalistics I [FOS706, FOS722]	FOS 710	<u>5</u>	_____

(\*) = *Brackets indicate pre-requisites***SUBTOTAL CREDITS = 24****Part Two: Concentration Requirements****Criminalistics (Concentration credits = 14)**

<input type="checkbox"/> Advanced Criminalistics II [FOS710]	FOS 711	<u>5</u>	_____
<input type="checkbox"/> Forensic DNA Technology	FOS 730	<u>3</u>	_____
<input type="checkbox"/> Organic Compound Structure Determination OR	FOS 717	<u>3</u>	_____
<input type="checkbox"/> Advanced Topics in Physical Science OR	FOS 735	<u>3</u>	_____
<input type="checkbox"/> Forensic Examination of Toolmarks OR	FOS 736	<u>3</u>	_____
<input type="checkbox"/> <i>Elective</i> _____	_____	<u>3</u>	_____

**TOTAL CREDITS = 41****Molecular Biology (Concentration credits = 19)**

<input type="checkbox"/> Advanced Genetics	FOS 704	<u>3</u>	_____
<input type="checkbox"/> Advanced Molecular Biology I [FOS704]	FOS 732	<u>5</u>	_____
<input type="checkbox"/> Advanced Molecular Biology II [FOS732]	FOS 733	<u>5</u>	_____
<input type="checkbox"/> <i>Elective</i> _____	_____	<u>3</u>	_____
<input type="checkbox"/> <i>Elective</i> _____	_____	<u>3</u>	_____

**TOTAL CREDITS = 43****Forensic Toxicology (Concentration credits = 16)**

<input type="checkbox"/> Forensic Toxicology I [FOS707]	FOS 725	<u>5</u>	_____
<input type="checkbox"/> Forensic Toxicology II [FOS725]	FOS 726	<u>5</u>	_____
<input type="checkbox"/> Forensic DNA Technology	FOS 730	<u>3</u>	_____
<input type="checkbox"/> <i>Elective</i> _____	_____	<u>3</u>	_____
<input type="checkbox"/> <i>Elective</i> _____	_____	<u>3</u>	_____

**TOTAL CREDITS = 43****Available Electives**

<input type="checkbox"/> Mathematical Statistics for Forensic Scientists	FOS 705	<u>3</u>	_____
<input type="checkbox"/> Advanced Topics in Physical Evidence	FOS 735	<u>3</u>	_____
<input type="checkbox"/> Forensic Examination of Firearms and Toolmarks	FOS 736	<u>3</u>	_____
<input type="checkbox"/> Scientific Evidence, Expert Testimony and Ethics	FOS 760	<u>3</u>	_____
<input type="checkbox"/> Forensic Anthropology: Osteological & Genetic Identification	FOS 761	<u>3</u>	_____
<input type="checkbox"/> Data Analysis for Forensic Scientists	FOS 822	<u>3</u>	_____
<input type="checkbox"/> Law, Evidence and Ethics	CRJ 708	<u>3</u>	_____

Appendix 1: Course Checklist

Part Three: OTHER COURSES (If applicable)

CONDITIONS

<input type="checkbox"/>	_____	3	_____
<input type="checkbox"/>	_____	3	_____
<input type="checkbox"/>	_____	3	_____

Part Four: Thesis Requirement

- Advisor Agreement in place
- Thesis Submitted

Part Four: GPA

- Final GPA greater than or equal to 3.0

Date: _____	Advisor's Name: _____	Signature: _____
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