

FORENSIC SCIENCE (FRSC)

100 Level Courses

FRSC 101: *Principles of Forensic Science*. 3 credits.

The forensic sciences encompass the skills and expertise of individuals from a multitude of scientific disciplines to assist in the investigation of cases of legal significance. This course is designed to provide the student with a broad introduction to the methods and techniques utilized by today's forensic professionals. We will explore the application of the physical, medical, natural and engineering sciences to specialized legal contexts, investigation of a crime scene, the role of law enforcement crime labs, and other important issues relating to forensic investigations. Offered by College of Science (<http://catalog.gmu.edu/colleges-schools/science/>). Limited to three attempts.

Mason Core: Mason Core (All), Natural Science Overview (<http://catalog.gmu.edu/mason-core/>)

Schedule Type: Lecture

Grading:

This course is graded on the Undergraduate Regular scale. (<http://catalog.gmu.edu/policies/academic/grading/>)

200 Level Courses

FRSC 200: *Survey of Forensic Science*. 3 credits.

This course will familiarize students with the basic principles, professional practice, quality assurance, and quality control measures employed in the practice of forensic science in the American system of justice. An introduction to topics including the nature of evidence and the law, crime scene investigations, serology, DNA analysis, bloodstain pattern, trace evidence, microscopy, forensic pathology, anthropology, odontology and entomology/ Offered by College of Science (<http://catalog.gmu.edu/colleges-schools/science/>). Limited to three attempts.

Schedule Type: Lecture

Grading:

This course is graded on the Undergraduate Regular scale. (<http://catalog.gmu.edu/policies/academic/grading/>)

FRSC 201: *Introduction to Criminalistics*. 3 credits.

This course will provide an overview of the field of criminalistics, with a focus on the recognition, collection, preservation, and analysis of physical evidence. During the course, the student will be introduced to topics such as fingerprints, question documents, firearms, drugs of abuse, explosives and arson to prepare them for additional, more in-depth classes in criminalistics/forensic science. Offered by College of Science (<http://catalog.gmu.edu/colleges-schools/science/>). Limited to three attempts.

Schedule Type: Lecture

Grading:

This course is graded on the Undergraduate Regular scale. (<http://catalog.gmu.edu/policies/academic/grading/>)

300 Level Courses

FRSC 302: *Forensic Trace Analysis*. 3 credits.

This course will provide an overview of the field of forensic science with specific emphasis on areas of trace and biological evidence, including topics such as the analysis of hair, soil, glass, paint, and other trace material. A laboratory component provides an introduction to microscopy which assists students master the foundation tools used in

analyzing forensic trace evidence. Offered by College of Science (<http://catalog.gmu.edu/colleges-schools/science/>). Limited to three attempts.

Mason Core: Mason Core (All) (<http://catalog.gmu.edu/mason-core/>)

Specialized Designation: Writing Intensive in Major

Registration Restrictions:

Required Prerequisites: (FRSC 200^C or 200^{XS}) and (FRSC 201^C or 201^{XS}).

^C Requires minimum grade of C.

^{XS} Requires minimum grade of XS.

Schedule Type: Lecture

Grading:

This course is graded on the Undergraduate Regular scale. (<http://catalog.gmu.edu/policies/academic/grading/>)

FRSC 303: *Forensic Evidence and Ethics*. 3 credits.

This course will acquaint the student with the application of scientific methods and the interaction it may have with legal principles. It will prepare the student for future applications of forensic science with its role in the administration of justice, courtroom testimony, and the ethical rules and duties under codes of professional conduct and practice. Offered by College of Science (<http://catalog.gmu.edu/colleges-schools/science/>). Limited to three attempts.

Registration Restrictions:

Required Prerequisites: ((FRSC 200^C or 200^{XS}) and (CRIM 100^C or 100^{XS})).

^C Requires minimum grade of C.

^{XS} Requires minimum grade of XS.

Schedule Type: Lecture

Grading:

This course is graded on the Undergraduate Regular scale. (<http://catalog.gmu.edu/policies/academic/grading/>)

FRSC 304: *Forensic Chemistry*. 3 credits.

Introduction to the chemical principles and methods used in the application of forensics toward the elucidation of criminal activity and to support litigation. Students will be learning the fundamentals of statistics (QA/QC), chromatography (GC and LC), and instrumentation (microscopy, FTIR, and MS) that will enable forensics analysis of trace evidence relating to: drugs, explosives, toxicology, arson, firearms, volatiles, and hair/fibers. Offered by College of Science (<http://catalog.gmu.edu/colleges-schools/science/>). Limited to three attempts.

Mason Core: Mason Core (All) (<http://catalog.gmu.edu/mason-core/>)

Specialized Designation: Writing Intensive in Major

Registration Restrictions:

Required Prerequisites: (FRSC 200^C or 200^{XS}) and (FRSC 201^C or 201^{XS}) and (CHEM 211^C or 211^{XS}) and (CHEM 213^C or 213^{XS}) and (CHEM 212^C or 212^{XS}) and (CHEM 214^C or 214^{XS}) and (CHEM 313^C or 313^{XS}) and (CHEM 315^C or 315^{XS}).

^C Requires minimum grade of C.

^{XS} Requires minimum grade of XS.

Schedule Type: Lecture

Grading:

This course is graded on the Undergraduate Regular scale. (<http://catalog.gmu.edu/policies/academic/grading/>)

FRSC 305: Forensic Chemistry Laboratory. 1 credit.

This course will correlate laboratory exercises to the theoretical and investigative principles of forensic chemistry. The laboratory experiments and activities have been designed to expand on and support the material taught in the lecture section of the Forensic Chemistry course (FRSC 304). Students will have hands-on experience with basic forensic chemistry procedures and commonly used laboratory instrumentation. This laboratory course will enable students to explore the use of presumptive testing, controlled substance analysis, blood alcohol measurements, explosive residue analysis, ignitable liquid residue analysis, and chemical enhancement techniques used at crime scenes and in investigative procedures. The students will have hands-on experience using TLC, GC, GC/MS, and FTIR instrumentation and they will learn the fundamentals of how they operate and how to interpret the data generated by these systems. Offered by College of Science (<http://catalog.gmu.edu/colleges-schools/science/>). Limited to three attempts.

Registration Restrictions:

Required Prerequisites: ((FRSC 200^C or 200^{XS}) and (FRSC 201^C or 201^{XS}) and (FRSC 304^C or 304^{XS}) and (CHEM 211^C or 211^{XS}) and (CHEM 212^C or 212^{XS}) and (CHEM 213^C or 213^{XS}) and (CHEM 214^C or 214^{XS}) and (CHEM 313^C or 313^{XS}) and (CHEM 315^C or 315^{XS})).

* May be taken concurrently.

^C Requires minimum grade of C.

^{XS} Requires minimum grade of XS.

Schedule Type: Laboratory

Grading:

This course is graded on the Undergraduate Regular scale. (<http://catalog.gmu.edu/policies/academic/grading/>)

FRSC 325: Molecular Biology. 3 credits.

This course will cover the structure and function of genes. Students will study nucleic acid structure and the mechanics of replication, repair, transcription, and translation in bacteria, archaea, and eukaryotes. A central goal is understanding gene expression and regulation at all levels, and the structure-function relationships of nucleic acids and proteins. Critical experiments will be examined to learn how our current understandings have developed from experimental results. Techniques in molecular biology will be examined in lecture as necessary to understand experiments and concepts. The course will also cover protein structure and function- especially protein interactions with nucleic acids- and post-translational events that effect the functional output of genes. The course will also pursue a selection of topics which varies from year to year but all impact on interpretation of forensic DNA evidence. Offered by College of Science (<http://catalog.gmu.edu/colleges-schools/science/>). Limited to three attempts.

Recommended Corequisite: FRSC 326

Registration Restrictions:

Required Prerequisites: (BIOL 213^C or 213^{XS}) and (BIOL 214^C, 214^{XS}, STAT 250^C or 250^{XS}) and (BIOL 311^C or 311^{XS}).

^C Requires minimum grade of C.

^{XS} Requires minimum grade of XS.

Schedule Type: Lecture

Grading:

This course is graded on the Undergraduate Regular scale. (<http://catalog.gmu.edu/policies/academic/grading/>)

FRSC 326: Molecular Biology Laboratory. 1 credit.

This laboratory course will cover basic laboratory methods in molecular biology. The emphasis will be on existing and emerging techniques utilized in forensic DNA laboratories. Techniques will include, extraction, quantitation, STR typing, and SNP microarray genotyping. Offered by College of Science (<http://catalog.gmu.edu/colleges-schools/science/>). Limited to three attempts.

Registration Restrictions:

Required Prerequisites: (BIOL 213^C or 213^{XS}) and (BIOL 214^C, 214^{XS}, STAT 250^C or 250^{XS}) and (BIOL 311^C or 311^{XS}) and (FRSC 325^C or 325^{XS}).

* May be taken concurrently.

^C Requires minimum grade of C.

^{XS} Requires minimum grade of XS.

Schedule Type: Laboratory

Grading:

This course is graded on the Undergraduate Regular scale. (<http://catalog.gmu.edu/policies/academic/grading/>)

400 Level Courses

FRSC 401: Crime Scene Investigations. 3 credits.

This course provides the scientific principles of crime scene investigations by applying the basic knowledge of proper documentation, collection and preservation of physical evidence. Proper crime scene protocols and evidence processing techniques will be performed in areas such as, forensic photography, sketching, blood stain pattern analysis, trajectory, skeletal remains, and fingerprinting. Offered by College of Science (<http://catalog.gmu.edu/colleges-schools/science/>). Limited to three attempts.

Recommended Prerequisite: Completion of 90 credits

Registration Restrictions:

Required Prerequisites: (FRSC 200^C or 200^{XS}) and (FRSC 201^C or 201^{XS}) and (FRSC 303^C or 303^{XS}) and (FRSC 302^C or 302^{XS}).

^C Requires minimum grade of C.

^{XS} Requires minimum grade of XS.

Enrollment is limited to students with a major in Forensic Science.

Enrollment limited to students in the SC-BS-FRSC program.

Schedule Type: Lecture

Grading:

This course is graded on the Undergraduate Regular scale. (<http://catalog.gmu.edu/policies/academic/grading/>)

FRSC 404: Advanced Instrumentation in Forensic Chemistry. 4 credits.

This course will introduce advanced themes of forensic science and the application of analytical chemistry using state-of-the-art instrumentation hardware and software platforms. Students will perform hands-on experiments using instruments that are commonly found at the federal level and in more advanced state crime laboratories. The students will be exposed to widely used concepts in the advanced forensic analysis of drugs of abuse, toxicology, arson, inks, paints, polymers, and explosives. In addition, the operational concepts of commonly used analytical instrumentation such as GC-MS, FTIR, and TQMS will be taught, demonstrated, and used by the students. More advanced instrumentation will also be introduced in the course that may include: LC/MS, LC-MS/MS, QE+ with ESI and API front ends, high resolution mass measurements, MALDI-TOF, and advanced portable instruments. Offered by College of

Science (<http://catalog.gmu.edu/colleges-schools/science/>). Limited to three attempts.

Recommended Prerequisite: FRSC 303 or Permission of Instructor

Registration Restrictions:

Required Prerequisites: (CHEM 314^C or 314^{XS}) and (CHEM 318^C or 318^{XS}) and (CHEM 321^C or 321^{XS}) and (MATH 114^C or 114^{XS}) and (STAT 250^C, 250^{XS}, BIOL 214^C or 214^{XS}) and (FRSC 304^C or 304^{XS}).

^C Requires minimum grade of C.

^{XS} Requires minimum grade of XS.

Schedule Type: Laboratory, Lecture

Grading:

This course is graded on the Undergraduate Regular scale. (<http://catalog.gmu.edu/policies/academic/grading/>)

FRSC 405: Independent Research Methods. 3 credits.

This course is designed to allow students to complete an approved independent forensic science research project under the guidance of a faculty mentor. A formal research proposal will be prepared and submitted. In addition to conferring with the instructor regularly regarding the process of their research, students will also be introduced to research and writing methods throughout the course. Offered by College of Science (<http://catalog.gmu.edu/colleges-schools/science/>). Limited to three attempts.

Recommended Prerequisite: Completion of 90 credits or permission of instructor.

Registration Restrictions:

Enrollment limited to students in the SC-BS-FRSC program.

Schedule Type: Research

Grading:

This course is graded on the Undergraduate Regular scale. (<http://catalog.gmu.edu/policies/academic/grading/>)

FRSC 406: Forensic Internship. 3 credits.

This course is designed to allow students the opportunity to enhance their academic coursework with field work either at an approved agency or under the guidance of an approved faculty mentor that will substantially correlate with a discipline of forensic science. For successful completion, the student must complete a minimum of 135 hours of work. Offered by College of Science (<http://catalog.gmu.edu/colleges-schools/science/>). Limited to three attempts.

Recommended Prerequisite: Completion of 60 credits or permission of instructor.

Registration Restrictions:

Enrollment limited to students in the SC-BS-FRSC program.

Schedule Type: Internship

Grading:

This course is graded on the Undergraduate Regular scale. (<http://catalog.gmu.edu/policies/academic/grading/>)

FRSC 415: Selected Topics in Forensic Science. 1-3 credits.

Topics vary according to instructor's specialty. Note: If multiple courses are taken, topics must be different. Offered by College of Science (<http://catalog.gmu.edu/colleges-schools/science/>). May be repeated within the term for a maximum 6 credits.

Specialized Designation: Topic Varies

Recommended Prerequisite: Permission of instructor

Schedule Type: Lecture

Grading:

This course is graded on the Undergraduate Regular scale. (<http://catalog.gmu.edu/policies/academic/grading/>)

FRSC 418: Analytical Thinking and Violent Crime Profiling. 3 credits.

This is a course on Analytical Thinking in the context of Criminal Investigative Analysis (CIA) from a forensic, and behavioral perspective. CIA is commonly referred to as Profiling. CIA is the behavioral interpretation of a violent crime scene, or series of scenes through the lens of multiple crime scene behaviors. During the course, concepts of Criminal Investigative Analysis will be discussed including such topics: victimology, offender risk Level, method of victim access, crime scene planning, the presence and absence of forensic evidence, offender motivation, body disposal, anthropological perspectives etc. Subject matter experts will make presentations on a variety of topics relevant to CIA. A wide variety of cases will be discussed including, both criminal and terrorism cases, and current cases that are being discussed in the media. Offered by College of Science (<http://catalog.gmu.edu/colleges-schools/science/>). Limited to three attempts.

Recommended Prerequisite: Permission of Instructor. Eligibility for registration will be determined by the following: a minimum of 30 credits completed in the Natural Sciences Core and 19 credits completed in the Forensic Science Core. Student shall have consistent high achieving marks in the major with a minimum of a 3.4 major GPA.

Registration Restrictions:

Enrollment is limited to students with a major in Forensic Science.

Schedule Type: Lecture

Grading:

This course is graded on the Undergraduate Regular scale. (<http://catalog.gmu.edu/policies/academic/grading/>)

FRSC 450: Practical Forensic Skeletal Biology. 3 credits.

Practical forensic skeletal biology is the application of human skeletal biology that includes all aspects of musculoskeletal anatomy, physiology, and changes due to pathogens as it applies in a medico-legal context. It also includes in-depth knowledge of bone as a source of cellular regeneration for normal repair as well as highly specialized knowledge of surface anatomy, including all aspects of human growth and development. Actual cases in combination with hands-on practical experiences in the classroom and at our outdoor training facility will examine how modern forensic science examines human thanatobiomes, apneumones, volatile organic compounds, modern survey techniques to determine the postmortem fate of human remains. Offered by College of Science (<http://catalog.gmu.edu/colleges-schools/science/>). Limited to three attempts.

Recommended Prerequisite: At least 60 credit hours.

Registration Restrictions:

Required Prerequisites: ((FRSC 200^C or 200^{XS}) and (FRSC 201^C or 201^{XS})).

^C Requires minimum grade of C.

^{XS} Requires minimum grade of XS.

Schedule Type: Lecture

Grading:

This course is graded on the Undergraduate Regular scale. (<http://catalog.gmu.edu/policies/academic/grading/>)

FRSC 460: Forensic DNA Analysis. 3 credits.

This course will provide an understanding of body fluid identification and molecular biology testing methodologies as applied to the analysis of forensic samples. The process of forensic DNA analysis will be covered in depth. Current topics in forensic DNA analysis will be reviewed including population genetics, validation, quality assurance, the CODIS database, Y-STRs, mitochondrial DNA testing, SNPs and current research. Offered by College of Science (<http://catalog.gmu.edu/colleges-schools/science/>). Limited to three attempts.

Recommended Corequisite: FRSC 461

Registration Restrictions:

Required Prerequisites: (FRSC 200^C or 200^{XS}) and (FRSC 201^C or 201^{XS}) and (BIOL 213^C or 213^{XS}) and (BIOL 311^C or 311^{XS}).

^C Requires minimum grade of C.

^{XS} Requires minimum grade of XS.

Schedule Type: Lecture

Grading:

This course is graded on the Undergraduate Regular scale. (<http://catalog.gmu.edu/policies/academic/grading/>)

FRSC 461: Forensic DNA Analysis Laboratory. 1 credit.

This laboratory course will present the most common serological and DNA laboratory techniques associated with forensic casework as taught in the lecture section of the Forensic DNA Analysis course. Students will have hands-on experience with basic forensic DNA procedures including the examination and identification of bodily fluid stains, DNA extraction, quantitation, PCR amplification, genotyping, and interpretation. Offered by College of Science (<http://catalog.gmu.edu/colleges-schools/science/>). Limited to three attempts.

Registration Restrictions:

Required Prerequisites: (FRSC 200^C or 200^{XS}) and (FRSC 201^C or 201^{XS}) and (BIOL 213^C or 213^{XS}) and (BIOL 311^C or 311^{XS}) and (FRSC 460^{*C} or 460^{XS}).

^{*} May be taken concurrently.

^C Requires minimum grade of C.

^{XS} Requires minimum grade of XS.

Schedule Type: Laboratory

Grading:

This course is graded on the Undergraduate Regular scale. (<http://catalog.gmu.edu/policies/academic/grading/>)

FRSC 470: Forensic Genomics. 4 credits.

This course will cover advanced principles and methods related to DNA typing in a forensic context. The course will review the current applications of DNA typing, and then address emerging methods and technological advances. The focus of the course will be on methods and techniques involved in Investigative Genetic Genealogy. A second focus of the course will be on how to properly interpret these data. Particular emphasis will be placed on how these emerging methods can advance the field of forensic DNA typing and lead to new capabilities in human identification. Students will gain an understanding of the capabilities and limitations of these emerging areas within forensic science, covering how they build on current practices. Data review and analysis from forensic DNA results will be included in the course. Offered by College of Science (<http://catalog.gmu.edu/colleges-schools/science/>). Limited to three attempts.

Registration Restrictions:

Required Prerequisites: (BIOL 213^C or 213^{XS}) and (BIOL 214^C, 214^{XS}, STAT 250^C or 250^{XS}) and (BIOL 311^C or 311^{XS}) and (FRSC 460^C or 460^{XS}).

^C Requires minimum grade of C.

^{XS} Requires minimum grade of XS.

Schedule Type: Lecture

Grading:

This course is graded on the Undergraduate Regular scale. (<http://catalog.gmu.edu/policies/academic/grading/>)

FRSC 499: Comprehensive Examination. 0 credits.

The comprehensive examination ensures that the student is prepared to engage in an entry level forensic profession, in advanced forensic training or a graduate program. Students are required to pass this examination prior to graduation. Offered by College of Science (<http://catalog.gmu.edu/colleges-schools/science/>). May be repeated within the degree.

Registration Restrictions:

Required Prerequisites: ((FRSC 200^C or 200^{XS}) and (FRSC 201^C or 201^{XS}) and (FRSC 302^C or 302^{XS}) and (FRSC 303^C or 303^{XS}) and (FRSC 304^{*C} or 304^{XS}) and (FRSC 401^{*C} or 401^{XS}) and (FRSC 460^{*C} or 460^{XS})).

^{*} May be taken concurrently.

^C Requires minimum grade of C.

^{XS} Requires minimum grade of XS.

Enrollment limited to students in the SC-BS-FRSC program.

Schedule Type: Independent Study

Grading:

This course is graded on the Satisfactory/No Credit scale. (<http://catalog.gmu.edu/policies/academic/grading/>)

500 Level Courses

FRSC 500: Introduction to Forensic Science. 3 credits.

This course will provide an overview of the foundation and history of forensic science. During the course, the various disciplines and specialties within forensic science will be discussed such as biology, chemistry, toxicology, microscopy, odontology, and anthropology. Additionally, the different types of physical evidence and instrumentation encountered in the field will be reviewed. Topics within ethics and quality assurance are also discussed. Offered by College of Science (<http://catalog.gmu.edu/colleges-schools/science/>). May not be repeated for credit.

Registration Restrictions:

Enrollment limited to students with a class of Advanced to Candidacy, Graduate, Junior Plus, Non-Degree or Senior Plus.

Enrollment is limited to Graduate, Non-Degree or Undergraduate level students.

Students in a Non-Degree Undergraduate degree may **not** enroll.

Schedule Type: Lecture

Grading:

This course is graded on the Graduate Regular scale. (<http://catalog.gmu.edu/policies/academic/grading/>)

FRSC 510: Basic Crime Analysis. 3 credits.

This course examines the role of the crime scene investigator, search, seizure and related legal issues; crime scene documentation (note taking, photography, sketching, and measurements); processing of latents and 2-

D and 3-D impressions; collection, packaging and preservation of physical evidence. Offered by College of Science (<http://catalog.gmu.edu/colleges-schools/science/>). May not be repeated for credit.

Registration Restrictions:

Enrollment limited to students with a class of Advanced to Candidacy, Graduate, Junior Plus, Non-Degree or Senior Plus.

Enrollment is limited to Graduate, Non-Degree or Undergraduate level students.

Students in a Non-Degree Undergraduate degree may **not** enroll.

Schedule Type: Lecture

Grading:

This course is graded on the Graduate Regular scale. (<http://catalog.gmu.edu/policies/academic/grading/>)

FRSC 511: Advanced Crime Scene Analysis. 3 credits.

Advanced Crime Scene Analysis is designed to build on concepts introduced in FRSC 510 (Basic Crime Scene Analysis), and to provide an enhanced foundation in the field of criminalistics for those students who are interested in learning the application of science to solving crimes. Offered by College of Science (<http://catalog.gmu.edu/colleges-schools/science/>). May not be repeated for credit.

Registration Restrictions:

Required Prerequisites: (FRSC 510^{B-} or 510^{XS}).

^{B-} Requires minimum grade of B-.

^{XS} Requires minimum grade of XS.

Enrollment limited to students with a class of Advanced to Candidacy, Graduate, Junior Plus, Non-Degree or Senior Plus.

Enrollment is limited to Graduate, Non-Degree or Undergraduate level students.

Students in a Non-Degree Undergraduate degree may **not** enroll.

Schedule Type: Lecture

Grading:

This course is graded on the Graduate Regular scale. (<http://catalog.gmu.edu/policies/academic/grading/>)

FRSC 512: Physical Evidence Laboratory. 3 credits.

This is a series of practical laboratory exercises that introduces the student to the analysis of physical evidence including the examination of pattern and trace evidence such as hairs, tool marks, firearms evidence, and shoe prints; processing of fingerprints using various chemicals, powders, and alternate light sources. Offered by College of Science (<http://catalog.gmu.edu/colleges-schools/science/>). May not be repeated for credit.

Registration Restrictions:

Required Prerequisites: (FRSC 510^{B-} or 510^{XS}).

^{B-} Requires minimum grade of B-.

^{XS} Requires minimum grade of XS.

Enrollment limited to students with a class of Advanced to Candidacy, Graduate, Junior Plus, Non-Degree or Senior Plus.

Enrollment is limited to Graduate, Non-Degree or Undergraduate level students.

Students in a Non-Degree Undergraduate degree may **not** enroll.

Schedule Type: Laboratory

Grading:

This course is graded on the Graduate Regular scale. (<http://catalog.gmu.edu/policies/academic/grading/>)

FRSC 513: Forensic Photography. 3 credits.

This series of lecture and practical photography exercises introduces the student to photographic crime scene documentation techniques including concepts of controlling exposure, lighting, focus, and composition as it relates to matters of a forensic nature; photographic documentation of criminal artifacts including fluorescent fingerprints and Blue Star treated blood stains. Offered by College of Science (<http://catalog.gmu.edu/colleges-schools/science/>). May not be repeated for credit.

Registration Restrictions:

Enrollment limited to students with a class of Advanced to Candidacy, Graduate, Junior Plus, Non-Degree or Senior Plus.

Enrollment is limited to Graduate, Non-Degree or Undergraduate level students.

Students in a Non-Degree Undergraduate degree may **not** enroll.

Schedule Type: Lecture

Grading:

This course is graded on the Graduate Regular scale. (<http://catalog.gmu.edu/policies/academic/grading/>)

FRSC 514: Survey of Forensic Chemistry, Biology, and DNA Analysis. 3 credits.

This course will provide an overview of the history, theory and principles of the various processes of Forensic Biology and Chemistry analysis, including quality assurance. General applications of chemistry analysis as applied to forensic evidence will be covered, as well as, the biology and genetics of DNA and the typing systems used in Forensic DNA analysis. The technology and instrumentation used in forensic chemistry analysis and the analysis of biological fluids and DNA will also be covered. Offered by College of Science (<http://catalog.gmu.edu/colleges-schools/science/>). May not be repeated for credit.

Registration Restrictions:

Enrollment limited to students with a class of Advanced to Candidacy, Graduate, Junior Plus, Non-Degree or Senior Plus.

Students in a Non-Degree Undergraduate degree may **not** enroll.

Schedule Type: Lecture

Grading:

This course is graded on the Graduate Regular scale. (<http://catalog.gmu.edu/policies/academic/grading/>)

FRSC 515: Selected Topics in Forensic Science. 1-3 credits.

Topics vary with instructor's specialty. Offered by College of Science (<http://catalog.gmu.edu/colleges-schools/science/>). May be repeated within the term for a maximum 21 credits.

Specialized Designation: Topic Varies

Registration Restrictions:

Enrollment limited to students with a class of Advanced to Candidacy, Graduate, Junior Plus, Non-Degree or Senior Plus.

Enrollment is limited to Graduate, Non-Degree or Undergraduate level students.

Students in a Non-Degree Undergraduate degree may **not** enroll.

Schedule Type: Lecture

Grading:

This course is graded on the Graduate Regular scale. (<http://catalog.gmu.edu/policies/academic/grading/>)

FRSC 516: *Forensic Drone Photography*. 3 credits.

This course explores the rapidly expanding use of Unmanned Aerial Systems (UAS) or Unmanned Aerial Vehicle (UAV) also referred to as a drone to assist forensic investigators to document scenes. These capture platforms allow the user to document events using both video and photographs from a vantage point not easily obtained. The data collected can then be further extracted to form maps and models of the scene. Students in this course will first be taught the knowledge and skills necessary to apply for a FAA Part 107 Commercial Drone (UAS) license. Next, they will develop their piloting skills to capture data through a series of lectures and practical problems typically found by forensic investigators. Finally, a survey of legal requirements for drone use and procedures to follow to seek authorizations to fly in certain areas. Offered by College of Science (<http://catalog.gmu.edu/colleges-schools/science/>). May not be repeated for credit.

Registration Restrictions:

Enrollment limited to students with a class of Advanced to Candidacy, Graduate, Junior Plus, Non-Degree or Senior Plus.

Students in a Non-Degree Undergraduate degree may **not** enroll.

Schedule Type: Lecture

Grading:

This course is graded on the Graduate Regular scale. (<http://catalog.gmu.edu/policies/academic/grading/>)

FRSC 517: *Questioned Document Examination*. 3 credits.

Theory and principles of handwriting and printing processes, paper manufacture and fiber analysis, fracture match comparison, ink analysis, and indented writing examinations; methods of examining questioned documents. Offered by College of Science (<http://catalog.gmu.edu/colleges-schools/science/>). May not be repeated for credit.

Registration Restrictions:

Enrollment limited to students with a class of Advanced to Candidacy, Graduate, Junior Plus, Non-Degree or Senior Plus.

Enrollment is limited to Graduate, Non-Degree or Undergraduate level students.

Students in a Non-Degree Undergraduate degree may **not** enroll.

Schedule Type: Lecture

Grading:

This course is graded on the Graduate Regular scale. (<http://catalog.gmu.edu/policies/academic/grading/>)

FRSC 518: *Analytical Thinking & Violent Crime Profiling*. 3 credits.

This is a course on Analytical Thinking in the context of Criminal Investigative Analysis (CIA) from a forensic, and behavioral perspective. CIA is commonly referred to as Profiling. CIA is the behavioral interpretation of a violent crime scene, or series of scenes through the lens of multiple crime scene behaviors. During the course, concepts of Criminal Investigative Analysis will be discussed including such topics: victimology, offender risk Level, method of victim access, crime scene planning, the presence and absence of forensic evidence, offender

motivation, body disposal, anthropological perspectives etc. Subject matter experts will make presentations on a variety of topics relevant to CIA. A wide variety of cases will be discussed including, both criminal and terrorism cases, and current cases that are being discussed in the media. Offered by College of Science (<http://catalog.gmu.edu/colleges-schools/science/>). May not be repeated for credit.

Registration Restrictions:

Enrollment limited to students with a class of Advanced to Candidacy, Graduate, Junior Plus, Non-Degree or Senior Plus.

Students in a Non-Degree Undergraduate degree may **not** enroll.

Schedule Type: Lecture

Grading:

This course is graded on the Graduate Regular scale. (<http://catalog.gmu.edu/policies/academic/grading/>)

FRSC 520: *Toxicology*. 3 credits.

Forensic Toxicology examines the adverse effects of alcohol, drugs and other chemicals on the human body. A lecture style course integrating pharmacology, toxicology and analytical chemistry to understand how the principles of toxicology are applied to the legal system. Offered by College of Science (<http://catalog.gmu.edu/colleges-schools/science/>). May not be repeated for credit.

Recommended Prerequisite: Advanced level undergraduate course in Chemistry, Biology or Biochemistry or permission of instructor.

Registration Restrictions:

Enrollment limited to students with a class of Advanced to Candidacy, Graduate, Junior Plus, Non-Degree or Senior Plus.

Enrollment is limited to Graduate, Non-Degree or Undergraduate level students.

Students in a Non-Degree Undergraduate degree may **not** enroll.

Schedule Type: Lecture

Grading:

This course is graded on the Graduate Regular scale. (<http://catalog.gmu.edu/policies/academic/grading/>)

FRSC 525: *Molecular Biology*. 3 credits.

This course will cover the structure and function of genes. Students will study nucleic acid structure and the mechanics of replication, repair, transcription, and translation in bacteria, archaea, and eukaryotes. A central goal is understanding gene expression and regulation at all levels, and the structure-function relationships of nucleic acids and proteins. Critical experiments will be examined to learn how our current understandings have developed from experimental results. Techniques in molecular biology will be examined in lecture as necessary to understand experiments and concepts. The course will also cover protein structure and function- especially protein interactions with nucleic acids- and post-translational events that effect the functional output of genes. The course will also pursue a selection of topics which varies from year to year but all impact on interpretation of forensic DNA evidence. Offered by College of Science (<http://catalog.gmu.edu/colleges-schools/science/>). May not be repeated for credit.

Recommended Prerequisite: The successful completion of coursework in topics covering Cell Biology, Statistics, and Genetics.

Recommended Corequisite: FRSC 526

Registration Restrictions:

Enrollment limited to students with a class of Advanced to Candidacy, Graduate, Junior Plus, Non-Degree or Senior Plus.

Students in a Non-Degree Undergraduate degree may **not** enroll.

Schedule Type: Lecture

Grading:

This course is graded on the Graduate Regular scale. (<http://catalog.gmu.edu/policies/academic/grading/>)

FRSC 526: Molecular Biology Laboratory. 1 credit.

This laboratory course will cover basic laboratory methods in molecular biology. The emphasis will be on existing and emerging techniques utilized in forensic DNA laboratories. Techniques will include, extraction, quantitation, STR typing, and SNP microarray genotyping. Offered by College of Science (<http://catalog.gmu.edu/colleges-schools/science/>). May not be repeated for credit.

Recommended Prerequisite: The successful completion of coursework in topics covering Cell Biology, Statistics, and Genetics

Registration Restrictions:

Required Prerequisite: FRSC 525^{*B}.

* May be taken concurrently.

^B Requires minimum grade of B.

Enrollment limited to students with a class of Advanced to Candidacy, Graduate, Junior Plus, Non-Degree or Senior Plus.

Students in a Non-Degree Undergraduate degree may **not** enroll.

Schedule Type: Laboratory

Grading:

This course is graded on the Graduate Regular scale. (<http://catalog.gmu.edu/policies/academic/grading/>)

FRSC 530: Law and Forensic Science. 3 credits.

A detailed examination and analysis of the law affecting forensic science across the discipline range. Special emphasis is given to the laws affecting evidence, courtroom procedure, ethics, and professional responsibilities of the forensic expert. Offered by College of Science (<http://catalog.gmu.edu/colleges-schools/science/>). May not be repeated for credit.

Registration Restrictions:

Enrollment limited to students with a class of Advanced to Candidacy, Graduate, Junior Plus, Non-Degree or Senior Plus.

Enrollment is limited to Graduate, Non-Degree or Undergraduate level students.

Students in a Non-Degree Undergraduate degree may **not** enroll.

Schedule Type: Lecture

Grading:

This course is graded on the Graduate Regular scale. (<http://catalog.gmu.edu/policies/academic/grading/>)

FRSC 540: Advanced Forensic Chemistry. 3 credits.

The principles of forensic chemistry will be addressed in this course, including analytical chemistry, instrumental methods of analysis, sample handling, drug chemistry and toxicology. Offered by College of Science (<http://catalog.gmu.edu/colleges-schools/science/>). May not be repeated for credit.

Recommended Prerequisite: Undergraduate degree in chemistry or biology. The student must have a good understanding of general Chemistry including polarity and acid/base chemistry. A student should have taken Organic Chemistry, and be able to identify functional groups and other chemistry structures that make up a molecule. Any exposure to instrumental techniques such as gas chromatography, mass spectrometry and infrared spectroscopy are helpful.

Registration Restrictions:

Required Prerequisites: ((FRSC 541^{*B-} or 541^{XS}) and (FRSC 514^{B-} or 514^{XS})).

* May be taken concurrently.

^{B-} Requires minimum grade of B-.

^{XS} Requires minimum grade of XS.

Enrollment limited to students with a class of Advanced to Candidacy, Graduate, Junior Plus, Non-Degree or Senior Plus.

Enrollment is limited to students with a concentration in Forensic Chemistry Analysis.

Enrollment is limited to Graduate, Non-Degree or Undergraduate level students.

Students in a Non-Degree Undergraduate degree may **not** enroll.

Schedule Type: Lecture

Grading:

This course is graded on the Graduate Regular scale. (<http://catalog.gmu.edu/policies/academic/grading/>)

FRSC 541: Forensic Chemistry Laboratory. 1 credit.

This course will familiarize students with chemical knowledge gained from experimental observations and studies in the laboratory. Students will examine, test and establish for themselves the forensic chemistry discussed in the lecture courses. Note: The successful passing of a Virginia Department of Forensic Science background check is required prior to gaining access to this laboratory course. Offered by College of Science (<http://catalog.gmu.edu/colleges-schools/science/>). May not be repeated for credit.

Recommended Prerequisite: Undergraduate degree in chemistry or biology. The student must have a good understanding of general Chemistry including polarity and acid/base chemistry. A student should have taken Organic Chemistry, and be able to identify functional groups and other chemistry structures that make up a molecule. Any exposure to instrumental techniques such as gas chromatography, mass spectrometry and infrared spectroscopy are helpful.

Registration Restrictions:

Required Prerequisites: FRSC 540^{*B-} or 540^{*XS}.

* May be taken concurrently.

^{B-} Requires minimum grade of B-.

^{XS} Requires minimum grade of XS.

Enrollment limited to students with a class of Advanced to Candidacy, Graduate, Junior Plus, Non-Degree or Senior Plus.

Enrollment is limited to students with a concentration in Forensic Chemistry Analysis.

Enrollment is limited to Graduate, Non-Degree or Undergraduate level students.

Students in a Non-Degree Undergraduate degree may **not** enroll.

Schedule Type: Laboratory**Grading:**

This course is graded on the Graduate Regular scale. (<http://catalog.gmu.edu/policies/academic/grading/>)

FRSC 550: *Issues in Forensic Anthropology*. 3 credits.

This course examines issues related to the recovery and analysis of human skeletal remains in a medicolegal context. Topics include detection and mapping approaches for human remains, assessment of biological information from the skeleton (such as sex, ancestry, age, and stature), and the analysis of skeletal trauma. Offered by College of Science (<http://catalog.gmu.edu/colleges-schools/science/>). May not be repeated for credit.

Registration Restrictions:

Enrollment limited to students with a class of Advanced to Candidacy, Graduate, Junior Plus, Non-Degree or Senior Plus.

Enrollment is limited to Graduate, Non-Degree or Undergraduate level students.

Students in a Non-Degree Undergraduate degree may **not** enroll.

Schedule Type: Lecture**Grading:**

This course is graded on the Graduate Regular scale. (<http://catalog.gmu.edu/policies/academic/grading/>)

FRSC 560: *Advanced Forensic DNA Sciences*. 3 credits.

This is a seminar style course providing an overview of the history, theory and principles of the various processes of Forensic DNA analysis. The biology and genetics of DNA and the typing systems used in Forensic DNA will be reviewed. The technology used in the analysis of DNA, including data analysis, interpretation, CODIS database and statistical applications will also be covered. Offered by College of Science (<http://catalog.gmu.edu/colleges-schools/science/>). May not be repeated for credit.

Recommended Prerequisite: Undergraduate coursework in molecular and/or cell biology, as well as genetics, prior to taking this course or permission of instructor.

Registration Restrictions:

Required Prerequisites: ((FRSC 561^{*B-} or 561^{XS}) and (FRSC 514^{B-} or 514^{XS})).

* May be taken concurrently.

B- Requires minimum grade of B-.

XS Requires minimum grade of XS.

Enrollment is limited to students with a concentration in Forensic Biology Analysis.

Enrollment is limited to Graduate level students.

Students in a Non-Degree Undergraduate degree may **not** enroll.

Schedule Type: Lecture**Grading:**

This course is graded on the Graduate Regular scale. (<http://catalog.gmu.edu/policies/academic/grading/>)

FRSC 561: *Forensic DNA Laboratory*. 1 credit.

This laboratory course will provide comprehensive coverage of the various types of DNA testing currently used in forensic biology laboratories. Students will have hands-on experience with the analytical

equipment employed and the techniques used for human identification in forensic casework, such as, DNA extraction, quantitation, PCR amplification, genotyping, and interpretation. Note: The successful passing of a Virginia Department of Forensic Science background check is required prior to gaining access to this laboratory course. Offered by College of Science (<http://catalog.gmu.edu/colleges-schools/science/>). May not be repeated for credit.

Registration Restrictions:

Required Prerequisites: FRSC 560^{*B-} or 560^{*XS}.

* May be taken concurrently.

B- Requires minimum grade of B-.

XS Requires minimum grade of XS.

Enrollment limited to students with a class of Advanced to Candidacy, Graduate, Junior Plus, Non-Degree or Senior Plus.

Enrollment is limited to students with a concentration in Forensic Biology Analysis.

Enrollment is limited to Graduate, Non-Degree or Undergraduate level students.

Students in a Non-Degree Undergraduate degree may **not** enroll.

Schedule Type: Laboratory**Grading:**

This course is graded on the Graduate Regular scale. (<http://catalog.gmu.edu/policies/academic/grading/>)

FRSC 570: *Trace and Physical Evidence Concepts*. 3 credits.

Prepares students to evaluate physical evidence through the use of microscopic, chemical, and instrumental means. The course will emphasize the scientific procedures used to identify the evidence, the analysis of data generated during the identification phase, and the inductive reasoning process which allows the forensic scientist to draw conclusions based on the evidence at hand. Offered by College of Science (<http://catalog.gmu.edu/colleges-schools/science/>). May not be repeated for credit.

Registration Restrictions:

Enrollment limited to students with a class of Advanced to Candidacy, Graduate, Junior Plus, Non-Degree or Senior Plus.

Enrollment is limited to Graduate, Non-Degree or Undergraduate level students.

Students in a Non-Degree Undergraduate degree may **not** enroll.

Schedule Type: Lecture**Grading:**

This course is graded on the Graduate Regular scale. (<http://catalog.gmu.edu/policies/academic/grading/>)

FRSC 580: *Facial Reconstruction*. 3 credits.

This course begins with an introduction to methods used in image analysis, and the methods of facial reconstruction. The course will then explore modern techniques applied to several areas of forensic imaging. Advance topics in forensic sculpturing, 3D imagery, and post-mortem imagery will be explored. Offered by College of Science (<http://catalog.gmu.edu/colleges-schools/science/>). May not be repeated for credit.

Registration Restrictions:

Enrollment limited to students with a class of Advanced to Candidacy, Graduate, Junior Plus, Non-Degree or Senior Plus.

Enrollment is limited to Graduate, Non-Degree or Undergraduate level students.

Students in a Non-Degree Undergraduate degree may **not** enroll.

Schedule Type: Lecture

Grading:

This course is graded on the Graduate Regular scale. (<http://catalog.gmu.edu/policies/academic/grading/>)

FRSC 590: *Medicolegal Death Investigation and Pathology*. 3 credits.

Introduction to the pathology and physiology of the human body with an emphasis on scientific and medical terminology, in addition to the various techniques used in medicolegal death investigation. Discussion of death scene analysis, autopsy procedures, and unidentified remains. Overview of the role of the medical examiner's office within the United States and an introduction to the forensic investigation of sudden and unexpected deaths, including homicides, suicides, accidents, accidental deaths, and various traumatic deaths. Offered by College of Science (<http://catalog.gmu.edu/colleges-schools/science/>). May not be repeated for credit.

Registration Restrictions:

Required Prerequisites: (FRSC 510^{B-} or 510^{XS}).

^{B-} Requires minimum grade of B-.

^{XS} Requires minimum grade of XS.

Enrollment limited to students with a class of Advanced to Candidacy, Graduate, Junior Plus, Non-Degree or Senior Plus.

Enrollment is limited to Graduate, Non-Degree or Undergraduate level students.

Students in a Non-Degree Undergraduate degree may **not** enroll.

Schedule Type: Lecture

Grading:

This course is graded on the Graduate Regular scale. (<http://catalog.gmu.edu/policies/academic/grading/>)

600 Level Courses

FRSC 600: *Forensics Seminar*. 1 credit.

Presentations are made about selected topics in law enforcement, homeland security and forensic science presented by professionals working in the field and forensic science research presented by GMU graduate students. Students must also write an article, not to exceed four pages, chosen by the students from a set of recent, peer-reviewed scientific journals established by the instructor. Students will analyze the scientific method used in the article and critique the research performed. Notes: Students enrolled in the forensic science MS program must attend at least 80% of the seminars. Offered by College of Science (<http://catalog.gmu.edu/colleges-schools/science/>). May be repeated within the degree for a maximum 3 credits.

Registration Restrictions:

Enrollment limited to students with a class of Advanced to Candidacy, Graduate, Junior Plus, Non-Degree or Senior Plus.

Enrollment is limited to Graduate, Non-Degree or Undergraduate level students.

Students in a Non-Degree Undergraduate degree may **not** enroll.

Schedule Type: Seminar

Grading:

This course is graded on the Graduate Regular scale. (<http://catalog.gmu.edu/policies/academic/grading/>)

FRSC 601: *Quantitative Methods for Forensic Scientists*. 3 credits.

This is an introductory course in quantitative methods as related to forensic science. It focuses on the most important principles of statistics and concepts relevant to methodologies used by forensic scientists in their research and laboratory casework. Topics include data analysis and interpretation for one and multiple variables, probability, estimation, and hypothesis testing for proportions and means, correlation, and regression. Specific, forensic science-related topics include, but not limited to Likelihood Ratios and their importance to DNA interpretation, Discriminant Function Analysis, and its importance to Forensic Anthropology. Court cases pertinent to forensic science will also be examined, for example, PCAST motions. Statistical software will be used for assignments. Offered by College of Science (<http://catalog.gmu.edu/colleges-schools/science/>). May not be repeated for credit.

Registration Restrictions:

Enrollment limited to students with a class of Advanced to Candidacy, Graduate, Junior Plus, Non-Degree or Senior Plus.

Students in a Non-Degree Undergraduate degree may **not** enroll.

Schedule Type: Lecture

Grading:

This course is graded on the Graduate Regular scale. (<http://catalog.gmu.edu/policies/academic/grading/>)

FRSC 610: *Forensic Research Project*. 1-4 credits.

This course is a two semester course required for all graduate students prior to graduation. The first semester course consists of a 1.0 Credit Course where the students select a research topic and a qualified research advisor (faculty member or affiliated forensic science professional). The second semester course is a 3.0 Credit Course where the students perform their research, write their research paper and make a presentation of their research project to GMU Forensic Science Faculty members. Offered by College of Science (<http://catalog.gmu.edu/colleges-schools/science/>). May be repeated within the degree for a maximum 4 credits.

Registration Restrictions:

Enrollment limited to students with a class of Advanced to Candidacy, Graduate, Junior Plus, Non-Degree or Senior Plus.

Enrollment is limited to students with a major in Forensic Science.

Enrollment is limited to Graduate or Non-Degree level students.

Students in a Non-Degree Undergraduate degree may **not** enroll.

Schedule Type: Research

Grading:

This course is graded on the Graduate Special scale. (<http://catalog.gmu.edu/policies/academic/grading/>)

FRSC 620: *Face and Biometric Pattern Analysis*. 3 credits.

This course will familiarize students with the basic principles and uses of biometrics for automated searches and comparisons by forensic examiners. This course will review the basics of face, fingerprints, iris,

and speaker recognition. Students should gain an understanding of how automated systems and forensic examiners perform recognition. Students will also learn the capabilities and limitations of biometric recognition. Offered by College of Science (<http://catalog.gmu.edu/colleges-schools/science/>). May not be repeated for credit.

Registration Restrictions:

Enrollment limited to students with a class of Advanced to Candidacy, Graduate, Junior Plus, Non-Degree or Senior Plus.

Enrollment is limited to Graduate, Non-Degree or Undergraduate level students.

Students in a Non-Degree Undergraduate degree may **not** enroll.

Schedule Type: Lecture

Grading:

This course is graded on the Graduate Regular scale. (<http://catalog.gmu.edu/policies/academic/grading/>)

FRSC 630: *Fingerprint Identification*. 3 credits.

This course will cover the exploration of the techniques and methods of identification, capture and analysis of fingerprint evidence, including consideration of the fundamentals of fingerprint patterns, classification formulas and extensions, techniques for taking good fingerprints, problems in fingerprinting, preparation of fingerprint charts for court testimony, and practical exercises for capturing fingerprints. Offered by College of Science (<http://catalog.gmu.edu/colleges-schools/science/>). May not be repeated for credit.

Registration Restrictions:

Enrollment limited to students with a class of Advanced to Candidacy, Graduate, Junior Plus, Non-Degree or Senior Plus.

Enrollment is limited to Graduate, Non-Degree or Undergraduate level students.

Students in a Non-Degree Undergraduate degree may **not** enroll.

Schedule Type: Lecture

Grading:

This course is graded on the Graduate Regular scale. (<http://catalog.gmu.edu/policies/academic/grading/>)

FRSC 640: *Legal, Privacy and Ethical Issues in Identity Analysis*. 3 credits.

This course will review basic policies and doctrinal guidance related to the applications of biological, physical, chemical, and medical sciences to questions of evidence and law. In doing so, students should gain a basic understanding of the high level policies, protocols, standards, privacy, civil liberties, and doctrine related to the forensic sciences as they are practiced relating to identity analysis. Offered by College of Science (<http://catalog.gmu.edu/colleges-schools/science/>). May not be repeated for credit.

Registration Restrictions:

Enrollment limited to students with a class of Advanced to Candidacy, Graduate, Junior Plus, Non-Degree or Senior Plus.

Enrollment is limited to Graduate, Non-Degree or Undergraduate level students.

Students in a Non-Degree Undergraduate degree may **not** enroll.

Schedule Type: Lecture

Grading:

This course is graded on the Graduate Regular scale. (<http://catalog.gmu.edu/policies/academic/grading/>)

FRSC 650: *Identity Analysis Applications*. 3 credits.

This course will review the basics of biometrics and how the various biometric modalities can be used to aid in identification and identity verification. The course will also focus on how biometrics and forensics are used, or can be used, in various applications from military uses, intelligence/counter-terrorism, border and immigrations control and in support of state development. Offered by College of Science (<http://catalog.gmu.edu/colleges-schools/science/>). May not be repeated for credit.

Registration Restrictions:

Enrollment limited to students with a class of Advanced to Candidacy, Graduate, Junior Plus, Non-Degree or Senior Plus.

Enrollment is limited to Graduate, Non-Degree or Undergraduate level students.

Students in a Non-Degree Undergraduate degree may **not** enroll.

Schedule Type: Lecture

Grading:

This course is graded on the Graduate Regular scale. (<http://catalog.gmu.edu/policies/academic/grading/>)

FRSC 660: *FARO Forensic 3D Documentation*. 3 credits.

This course will provide in-depth knowledge and operational training of FARO laser scanners in conjunction with the use of the FARO scan software. Laser scanning is a high precision method of rapidly documenting crime scenes and items of forensic nature by capturing millions of data points to create a 3D point cloud. Students will create accurate 3D scans in indoor and outdoor scenarios, import them into the software, extrapolate critical measurements, and prepare scan projects for mock courtroom presentation. This course will give students the opportunity to become Certified FARO Focus Operators upon successful completion of the FARO Focus Certification Examination. Offered by College of Science (<http://catalog.gmu.edu/colleges-schools/science/>). May not be repeated for credit.

Recommended Prerequisite: Completion of 18 graduate credits.

Registration Restrictions:

Required Prerequisite: FRSC 510^{B+}.
^{B+} Requires minimum grade of B+.

Enrollment limited to students with a class of Advanced to Candidacy, Graduate, Junior Plus, Non-Degree or Senior Plus.

Enrollment is limited to students with a major in Forensics or Forensic Science.

Enrollment limited to students in a Graduate Certificate or Master of Science degrees.

Schedule Type: Lecture

Grading:

This course is graded on the Graduate Regular scale. (<http://catalog.gmu.edu/policies/academic/grading/>)

FRSC 670: *Forensic Genomics*. 4 credits.

This course will cover advanced principles and methods related to DNA typing in a forensic context. The course will review the current applications of DNA typing, and then address emerging methods and

technological advances. The focus of the course will be on methods and techniques involved in Investigative Genetic Genealogy. A second focus of the course will be on how to properly interpret these data. Particular emphasis will be placed on how these emerging methods can advance the field of forensic DNA typing and lead to new capabilities in human identification. Students will gain an understanding of the capabilities and limitations of these emerging areas within forensic science, covering how they build on current practices. Data review and analysis from forensic DNA results will be included in the course. Offered by College of Science (<http://catalog.gmu.edu/colleges-schools/science/>). May not be repeated for credit.

Recommended Prerequisite: The successful completion of coursework in topics of Cell Biology, Statistics, Genetics, and Forensic DNA Analysis.

Registration Restrictions:

Enrollment limited to students with a class of Advanced to Candidacy, Graduate, Junior Plus, Non-Degree or Senior Plus.

Students in a Non-Degree Undergraduate degree may **not** enroll.

Schedule Type: Lecture

Grading:

This course is graded on the Graduate Regular scale. (<http://catalog.gmu.edu/policies/academic/grading/>)

FRSC 690: Capstone - Moot Court & Expert Testimony. 3 credits.

In this course, students will learn and practice how to incorporate forensic science theory, research, analysis, writing and speaking skills into a life like moot court experience. They will learn how and why forensic science evidence is admitted into court proceedings, and their role in the admission of evidence. Topics will include Federal and state rules of evidence; admission of forensic science testimony into criminal and civil cases; the process of being qualified as an expert witness, including the Voir dire Process; The role and responsibility of expert witnesses; Developing an Expert Witness Curriculum CV, and trial preparation; Proper laboratory and CSI report development and writing for presentation in court, and developing proper speaking skills for courtroom testimony. Offered by College of Science (<http://catalog.gmu.edu/colleges-schools/science/>). May not be repeated for credit.

Registration Restrictions:

Required Prerequisites: ((FRSC 500^{B-} or 500^{XS}) and (FRSC 510^{B-} or 510^{XS}) and (FRSC 530^{B-} or 530^{XS})).

^{B-} Requires minimum grade of B-.

^{XS} Requires minimum grade of XS.

Enrollment limited to students with a class of Advanced to Candidacy, Graduate, Junior Plus, Non-Degree or Senior Plus.

Enrollment is limited to Graduate, Non-Degree or Undergraduate level students.

Students in a Non-Degree Undergraduate degree may **not** enroll.

Schedule Type: Lecture

Grading:

This course is graded on the Graduate Regular scale. (<http://catalog.gmu.edu/policies/academic/grading/>)

FRSC 699: Comprehensive Examination. 0 credits.

The comprehensive examination ensures that the student is prepared to engage in a forensic profession. Students are required to pass this examination prior to graduation. Offered by College of Science (<http://catalog.gmu.edu/colleges-schools/science/>). May be repeated within the degree.

catalog.gmu.edu/colleges-schools/science/). May be repeated within the degree.

Registration Restrictions:

Required Prerequisites: ((FRSC 500^{B-} or 500^{XS}) and (FRSC 510^{B-} or 510^{XS}) and (FRSC 530^{B-} or 530^{XS})).

^{B-} Requires minimum grade of B-.

^{XS} Requires minimum grade of XS.

Enrollment limited to students with a class of Advanced to Candidacy, Graduate, Junior Plus, Non-Degree or Senior Plus.

Students in a Non-Degree Undergraduate degree may **not** enroll.

Schedule Type: Independent Study

Grading:

This course is graded on the Satisfactory/No Credit scale. (<http://catalog.gmu.edu/policies/academic/grading/>)

700 Level Courses

FRSC 790: Internship in Forensic Science. 1-3 credits.

On the job experience for graduate students in industry, government laboratories, investigative units, or approved study programs with forensic science employers. Students work in observational, experimental, or theoretical research, and prepare weekly journals, as well as midpoint and final evaluations completed by the employer. The student is responsible for applying to and obtaining the internship prior to registering for this course. Offered by College of Science (<http://catalog.gmu.edu/colleges-schools/science/>). May be repeated within the term for a maximum 6 credits.

Specialized Designation: Topic Varies

Registration Restrictions:

Enrollment is limited to students with a major in Forensics or Forensic Science.

Enrollment is limited to Graduate or Non-Degree level students.

Students in a Non-Degree Undergraduate degree may **not** enroll.

Schedule Type: Internship

Grading:

This course is graded on the Graduate Regular scale. (<http://catalog.gmu.edu/policies/academic/grading/>)

FRSC 799: Master's Thesis. 1-6 credits.

Project chosen and completed under guidance of graduate faculty member. Comprehensive report (thesis) acceptable to student's advisory committee is required. Offered by College of Science (<http://catalog.gmu.edu/colleges-schools/science/>). May be repeated within the degree for a maximum 6 credits.

Registration Restrictions:

Enrollment is limited to Graduate or Non-Degree level students.

Students in a Non-Degree Undergraduate degree may **not** enroll.

Schedule Type: Thesis

Grading:

This course is graded on the Satisfactory/No Credit scale. (<http://catalog.gmu.edu/policies/academic/grading/>)