FORENSIC SCIENCE (FRSC)

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. May not be repeated for credit.

Schedule Type: Lecture

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. May not be repeated for credit.

Schedule Type: Lecture

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. May not be repeated for credit.

Specialized Designation: Writing Intensive in the Major

Registration Restrictions:
Required Prerequisites: FRSC 200E and 201E.
C Requires minimum grade of C.

Schedule Type: Lecture

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. May not be repeated for credit.

Registration Restrictions:
Required Prerequisites: FRSC 200E and CRIM 100E.
C Requires minimum grade of C.

Schedule Type: Lecture

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, FTLR, 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. May not be repeated for credit.

Specialized Designation: Writing Intensive in the Major

Registration Restrictions:
Required Prerequisites: FRSC 200E, 201E, CHEM 211E, 213E, 212E and 214E.
C Requires minimum grade of C.

Schedule Type: Lecture

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. May not be repeated for credit.

Registration Restrictions:
Required Prerequisites: FRSC 200E, 201E and 303E.
C Requires minimum grade of C.

Enrollment limited to students in the BS Forensic Science program.

Schedule Type: Lecture

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. May not be repeated for credit.

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

Registration Restrictions:
Enrollment limited to students in the BS Forensic Science program.

Schedule Type: Research

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. May not be repeated for credit.

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

Registration Restrictions:
Enrollment limited to students in the BS Forensic Science program.
FRSC 415: Selected Topics in Forensic Science. 3 credits.
Topics vary according to instructor’s specialty. Notes: May be repeated only with permission of program chair. Offered by College of Science. May be repeated within the degree for a maximum 6 credits.

Recommended Prerequisite: Permission of instructor

FRSC 420: Forensic Toxicology. 3 credits.
Examines toxic substances and their effects on human cellular and organ systems. The course focuses on human physiological concepts, the human enzymatic detoxification processes, methodologies for identifying toxins, and specific toxic analytes. Offered by College of Science. May not be repeated for credit.

Recommended Prerequisite: Completion of Forensic Science Foundation courses

FRSC 440: Advanced Forensic Chemistry. 3 credits.
The principles of forensic chemistry will be addressed in this course, including analytical chemistry, instrumentation, sample handling, drug chemistry and pharmacology, and analysis of physical evidence such as papers, inks, paints, and coatings. Offered by College of Science. May not be repeated for credit.

Recommended Prerequisite: Completion of Forensic Science Foundation courses

FRSC 460: Forensic DNA Sciences. 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 contemporary research. Offered by College of Science. May not be repeated for credit.

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. May be repeated within the degree for a maximum credits.

Recommended Corequisite: FRSC 304, 401 and 460.

FRSC 500: Introduction to Forensic Science. 3 credits.
Overview of forensic science and related investigative techniques. Includes coverage of crime scene investigation, crime scene procedures, the role of the forensic pathologist, the modern forensic laboratory, DNA analysis techniques, microanalysis, examination of trace evidence, hair and fibers, examination of questioned documents, forensic anthropology, forensic odontology, homicide investigation, and analysis of a mock crime scene. Offered by College of Science. May not be repeated for credit.

Registration Restrictions:
Enrollment limited to students with a class of Advanced to Candidacy, Graduate, 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.

FRSC 510: Basic Crime Analysis. 3 credits.
Examines the role of the first officer at the scene, search, seizure and related legal issues, traditional crime scene measurements, photogrammetry, processing latents, crime scene reconstruction methods, 2-D and 3-D impressions, blood spatter analysis, collection of trace evidence, packaging and preserving evidence, outdoor crime scenes, and explosion and fire scenes. Offered by College of Science. May not be repeated for credit.

Registration Restrictions:
Enrollment limited to students with a class of Advanced to Candidacy, Graduate, 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.

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. May not be repeated for credit.

Recommended Prerequisite: FRSC 510 or permission of instructor

FRSC 512: Physical Evidence Analysis. 3 credits.
This is a series of practical laboratory exercises that introduces the student to sophisticated crime scene documentation techniques including collection of evidence, examination of hairs, fibers, toolmarks
and other trace evidence. Advanced topics in blood spatter, trajectory, pattern casting, and alternate light sources will be explored. Offered by College of Science. May not be repeated for credit.

**Recommended Prerequisite:** FRSC 510 or permission of instructor.

**Registration Restrictions:**
Enrollment limited to students with a class of Advanced to Candidacy, Graduate, 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

**FRSC 513: Forensic Photography.** 3 credits.
This series of lecture and practical exercises introduces the student to sophisticated crime scene documentation techniques including photography, digital imaging, use of lighting, and legal issues relating to images. Offered by College of Science. May not be repeated for credit.

**Recommended Prerequisite:** Admitted to the Forensic Science Master's Program, or permission of instructor.

**Registration Restrictions:**
Enrollment limited to students with a class of Advanced to Candidacy, Graduate, 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

**FRSC 515: Selected Topics in Forensic Science.** 3 credits.
Topics vary with instructor's specialty. May be repeated only with permission of program chair. Offered by College of Science. May be repeated within the degree for a maximum 12 credits.

**Registration Restrictions:**
Enrollment limited to students with a class of Advanced to Candidacy, Graduate, 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

**FRSC 517: Questioned Document Examination.** 3 credits.
Theory and principles of handwriting, duplicating 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. May not be repeated for credit.

**Registration Restrictions:**
Enrollment limited to students with a class of Advanced to Candidacy, Graduate, 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

**FRSC 520: Toxicology.** 3 credits.
Examines toxic substances and their effects on human cellular and organ systems. The course focuses on human physiological concepts, the chemistry of toxins, the human enzymatic detoxification processes, and the analytical techniques required for detecting the presence of toxins and their metabolites in human tissue or serum. Offered by College of Science. May not be repeated for credit.

**Recommended Prerequisite:** Advanced level undergraduate course in molecular or cellular biology, biochemistry or permission of instructor.

**Registration Restrictions:**
Enrollment limited to students with a class of Advanced to Candidacy, Graduate, 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

**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, and the forensic expert. Offered by College of Science. May not be repeated for credit.

**Recommended Prerequisite:** Minimum of 10 credit hours of graduate Forensic Science coursework.

**Registration Restrictions:**
Enrollment limited to students with a class of Advanced to Candidacy, Graduate, 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

**FRSC 540: Forensic Chemistry.** 3 credits.
The principles of forensic chemistry will be addressed in this course, including analytical chemistry, instrumentation, sample handling, drug chemistry and pharmacology, and analysis of physical evidence such as papers, inks, paints, and coatings. Offered by College of Science. May not be repeated for credit.

**Recommended Prerequisite:** Undergraduate degree in chemistry or biology, or permission of instructor.

**Registration Restrictions:**
Enrollment limited to students with a class of Advanced to Candidacy, Graduate, 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
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. May not be repeated for credit.

**Recommended Corequisite:** FRSC 540.

**Registration Restrictions:**
Enrollment limited to students with a class of Advanced to Candidacy, Graduate, 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

FRSC 550: *Issues in Forensic Anthropology.* 3 credits.
Examines issues related to skeletal analyses and interpretation of forensic case reports in determining personal identification and cause of death. Discussions include skeletal variation, age criteria, sexing criteria, pathology, trauma, and postmortem damage. Offered by College of Science. May not be repeated for credit.

**Registration Restrictions:**
Enrollment limited to students with a class of Advanced to Candidacy, Graduate, 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

FRSC 560: *Forensic DNA Sciences.* 3 credits.
Intensive introduction to parameters affecting data QC and analysis, including factors arising from biochemistry, chemistry, genetics, statistics, instrumentation, and software. Offered by College of Science. May not be repeated for credit. Equivalent to BINF 637.

**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:**
Enrollment limited to students with a class of Advanced to Candidacy, Graduate, 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

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. May not be repeated for credit.

**Recommended Corequisite:** FRSC 560.

**Registration Restrictions:**
Enrollment limited to students with a class of Advanced to Candidacy, Graduate, 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

FRSC 570: *Introduction to Biochemical Forensics.* 3 credits.
An introduction to biochemical forensics for non-scientists. This class will first lay a basic groundwork in chemistry and biochemistry. The background will be used in the explanation of forensic toxicology, DNA and blood analysis, identification of bodily fluids and stains, and analysis of controlled substances. Offered by College of Science. May not be repeated for credit.

**Recommended Prerequisite:** A course in introductory biology or chemistry, or permission of instructor.

**Registration Restrictions:**
Enrollment limited to students with a class of Advanced to Candidacy, Graduate, 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

FRSC 580: *Image Analysis in Forensic Science.* 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. 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:**
Enrollment limited to students with a class of Advanced to Candidacy, Graduate, 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

FRSC 590: *Medicolegal Death Investigation and Pathology.* 3 credits.
Medical, scientific, sociological, and legal methodologies applied to sudden or unexpected deaths, homicides, suicides, accidental deaths, and trauma. Aspects of death scene analysis by a medicolegal death investigator, and autopsy procedures, unidentified remains, child death
This course will review the basics of biometrics and how the various biometric modalities can be used to aid in identification and identity verification. 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. May not be repeated for credit.

Registration Restrictions:
Enrollment limited to students with a class of Advanced to Candidacy, Graduate, 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

600 Level Courses

FRSC 600: Forensics Seminar. 1 credit.
Selected topics in forensic science research, generally consisting of research presentations by forensic professionals and faculty members. Students must write an article of their choosing, not to exceed four pages, from a set of peer-reviewed journals to be established by the instructor. Recent articles are preferred; generally those having been published during the previous two years. Notes: Students enrolled in the forensic science MS program must attend at least 80% of the seminars. Offered by College of Science. May be repeated within the degree for a maximum 3 credits.

Recommended Prerequisite: Admission to the Forensic Science MS program.

Registration Restrictions:
Enrollment limited to students with a class of Advanced to Candidacy, Graduate, 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

FRSC 610: Forensics Research Project. 1-4 credits.
Research project in a current area of forensic science performed under the direction of a faculty member or affiliated forensic science professional. Offered by College of Science. May be repeated within the degree for a maximum 4 credits.

Recommended Prerequisite: Admission to the Forensic Science MS program.

Registration Restrictions:
Enrollment limited to students with a class of Advanced to Candidacy, Graduate, 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: Research

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. May not be repeated for credit.

Registration Restrictions:
Enrollment limited to students with a class of Advanced to Candidacy, Graduate, 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

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. May not be repeated for credit.

Registration Restrictions:
Enrollment limited to students with a class of Advanced to Candidacy, Graduate, 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

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. May not be repeated for credit.

Registration Restrictions:
Enrollment limited to students with a class of Advanced to Candidacy, Graduate, 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

FRSC 650: Identity Analysis Applications. 1 credit.
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. May not be repeated for credit.
Registration Restrictions:
Enrollment limited to students with a class of Advanced to Candidacy, Graduate, 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

FRSC 690: Forensics Capstone Course. 3 credits.
Integrates all the various techniques used in the study of forensic science and medicine, and applies them to the interpretation of facts and the reconstruction of the sequence of events at a variety of typical death scenes. Integrates medical, scientific, sociological, and legal methodology as they apply to medicolegal death investigations, using a variety of forensic literature and text resources. Presents an integrative approach to crime scene analysis based on actual case studies, in which students apply theoretical concepts discussed in class to real-world situations. Includes weekly group projects, with students organized in rotating groups and assigned a research topic in forensic medicine. Students discuss, examine, and analyze forensic, medical, and physical elements present at the death scenes, and develop their own hypotheses, which are then evaluated and discussed as the case is reconstructed. Offered by College of Science. May not be repeated for credit.

Registration Restrictions:
Enrollment limited to students with a class of Advanced to Candidacy, Graduate, 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

700 Level Courses
FRSC 790: Internship in Forensic Science. 1-3 credits.
On the job experience for Forensic Science majors in industry or government laboratories or investigative units, or approved study programs with specific employers. Students work in observational, experimental, or theoretical research, and prepare weekly journals, as well as a written report at the end of the internship. Offered by College of Science. May be repeated within the degree for a maximum 6 credits.

Recommended Prerequisite: Admitted to Forensic Science Program, or permission of instructor.

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

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

Schedule Type: Internship

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. May be repeated within the degree for a maximum 6 credits.

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