Forensic and Investigative Science

Degrees Offered

• Bachelor of Science in Forensic Biology
• Bachelor of Science in Forensic Chemistry
• Bachelor of Science in Forensic Examiner

Nature of the Program

The Department of Forensic and Investigative Science (FIS) offers a Bachelor of Science degree in three major areas: Forensic Biology, Forensic Chemistry, and Forensic Examiner. All of these majors provide students with a strong background in the fundamental science and applied practice associated with forensic science. The Program is accredited by the Forensic Education Programs Accreditation Commission (http://fepac-edu.org/) (FEPAC).

Because of the unique nature of the profession of forensic science, students are forewarned that a record of criminal, unethical, or other socially unacceptable behavior (such as illicit drug use or alcohol offenses) could negatively affect their ability to pass a background check, which may in turn make it difficult or impossible and complete the degree. Department guidelines are available from departmental advisers.

Students who earn a degree in the Eberly College of Arts and Sciences must complete the University requirements, the College requirements for their specific degree program, and their major requirements.

Minors

All students have the possibility of earning one or more minors; click the following link for a list of all available minors and their requirements (http://catalog.wvu.edu/undergraduate/minors/). Please note that students may not earn a minor in their major field.

Certificate of Global Engagement

Students in the Eberly College, regardless of their major, can earn a Certificate of Global Engagement. Completion of the Certificate demonstrates the student’s knowledge of diverse cultures, as well as the ability to communicate and interact effectively with people of different cultural backgrounds. Students will be required to apply their knowledge of contemporary issues and global social contexts to their coursework and their broader citizenship. For details regarding Certificate requirements, please visit the Eberly College page (http://catalog.wvu.edu/undergraduate/eberrycollegeofartsandsciences/#otherdegreestext).

FACULTY

CHAIR

• Casper Venter - PhD (University of South Africa)
  Seized Drugs, Latent Fingerprint Development and Comparison

PROFESSORS

• Glen Jackson - PhD (West Virginia University)
  Ming Hsieh Distinguished Professor, Forensic Chemistry, Mass Spectrometry
• Keith Morris - PhD (University of Port Elizabeth)
  Ming Hsieh Distinguished Professor, Impression Evidence, Evidence Interpretation

ASSOCIATE PROFESSORS

• Tina Moroose - MS (Marshall University)
  Graduate Studies Coordinator, Forensic Biology, Quality Assurance
• Jacqueline Speir - PhD (Rochester Institute of Technology)
  Forensic Informatics, Microscopy

ASSISTANT PROFESSORS

• Luis Arroyo - PhD (Florida International University)
  Toxicology, Environmental Forensics
• Robin Bowen - PhD (West Virginia University)
  Minor Coordinator, Ethics, Bloodstain Pattern Analysis
• Roger Jefferys - M.Sci (West Virginia University)
  Criminalistics
Admissions

Admissions requirements are the same for the Forensic Biology, Forensic Chemistry, and Forensic Examiner Majors.

- First Time Freshmen with a MATH ACT of 22 or a MATH SAT of 540 are admitted to the major directly. Test optional students must have a 3.75 cumulative high school GPA and are encouraged to take ALEKS upon admission to determine math and chemistry placement. A minimum ALEKS score of 45 is recommended for the timely completion of the degree. Directly admitted students will be advised by FIS advisors and are eligible to participate in the Living Learning Community and other departmentally-sponsored first-year programs.
- Students who wish to transfer from another WVU major must have completed CHEM 115 or higher with a C-.
- Students wishing to transfer from outside of WVU must have completed CHEM 115 or higher with a C-.

Students who do not meet these requirements will be advised by the Center for Learning, Advising, and Student Success.

Due to Covid-19 – Admission requirements may differ from what is listed on this page. Please review the most up-to-date program admission requirements for the Bachelor of Science in the following majors.

- Forensic Biology (https://admissions.wvu.edu/academics/majors/forensic-biology/)
- Forensic Chemistry (https://admissions.wvu.edu/academics/majors/forensic-chemistry/)
- Forensic Examiner (https://admissions.wvu.edu/academics/majors/forensic-examiner/)

ADMISSION REQUIREMENTS 2022-2023

The Admission Requirements above will be the same for the 2022-2023 Academic Year.

Major Code: 14D9: - Forensic Biology
Major Code 14C6: - Forensic Chemistry
Major Code 14E1: Forensic Examiner

Degree Progress

- By the start of the third regular semester (Fall or Spring) in the major, students must be enrolled in or have successfully completed CHEM 116 and CHEM 116L with a C-.
- During their first four semesters, students are expected to complete their foundational biology, chemistry, math, and physics courses. These fundamentals must be completed prior to taking upper-level FIS courses. Many of these courses will satisfy the GEF 1, 2, 3, 4, and 8 requirements, as well as the College B.S. requirements. Students interested in the forensic chemistry major are strongly encouraged to take the CHEM 117 (http://catalog.wvu.edu/search/?P=CHEM%20117) /CHEM 118 (http://catalog.wvu.edu/search/?P=CHEM%20118) and PHYS 111 (http://catalog.wvu.edu/search/?P=PHYS%20111)/PHYS 112 (http://catalog.wvu.edu/search/?P=PHYS%20112) series if they qualify.
- To begin taking upper-level FIS courses, typically in the fifth semester/fall of the junior year, students must have completed the courses listed below with a grade of C- or better. If students are deficient in a single course requirement but can complete it in the fall semester, they may be permitted to enroll in upper-division FIS courses, based on availability of seats. Additionally, all students must complete their foundational courses by the end of their sixth regular semester.
- Beyond the fifth regular semester, all students must maintain an overall GPA of at least 2.5 in their FIS coursework. The majority of coursework must be completed with a C- or better prior to graduation.
- All majors must meet with a FIS adviser each semester.

Students who do not meet major benchmarks may be removed from the major.

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 117</td>
<td>Introductory Physiology</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 118</td>
<td>Introductory Physiology Lab</td>
<td>1</td>
</tr>
<tr>
<td>CHEM 234</td>
<td>Organic Chemistry</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 236</td>
<td>Organic Chemistry Lab</td>
<td>1</td>
</tr>
<tr>
<td>PHYS 102</td>
<td>Introductory Physics</td>
<td>4</td>
</tr>
<tr>
<td>or PHYS 112</td>
<td>General Physics</td>
<td></td>
</tr>
<tr>
<td>MATH 155</td>
<td>Calculus 1</td>
<td>4</td>
</tr>
<tr>
<td>or MATH 154</td>
<td>Calculus 1b with Precalculus</td>
<td></td>
</tr>
</tbody>
</table>
COURSES

FIS 191. First-Year Seminar. 1-3 Hours.
Engages students in active learning strategies that enable effective transition to college life at WVU. Students will explore school, college and university programs, policies and services relevant to academic success. Provides active learning activities that enable effective transition to the academic environment. Students examine school, college and university programs, policies and services.

FIS 194. Professional Field Experience. 1-18 Hours.
PR: Consent. (May be repeated up to a maximum of 18 hours.) Prearranged experiential learning program, to be planned, supervised, and evaluated for credit by faculty and field supervisors. Involves temporary placement with public or private enterprise for professional competence development.

FIS 199. Orientation to Forensic Investigative Science. 1,2 Hour.
Orientation to degree programs and requirements, departmental resources, curriculum options, student responsibilities and opportunities.

FIS 201. Introduction to Forensic Identification. 3 Hours.
A survey course in forensic science including overview of the various scientific disciplines that handle crime scene evidence and the systematic method of evidence analysis. Students learn about the collection, preservation, and methods of analysis of biological, chemical, and physical evidence.

FIS 202. Crime Scene Investigation Overview. 3 Hours.
PR: FIS 201 with a minimum grade of C-. An overview of the crime scene investigation process for the non-examiner. Course topics include: safety, evidence collection, processing, and documentation. Virtual scenarios will serve as teaching aids.

FIS 301. Science/Technology of Fingerprint Identification. 3 Hours.
PR: FIS 201 with a minimum grade of C-, FIS majors only. Introduces basics of fingerprint analysis and comparisons. Focuses on basis patterns used in fingerprint comparisons and classifications of each fingerprint type, including Henry, National Crime Information Center, Integrated Automated Fingerprint Identification System pattern classification codes. This course is reserved for FIS majors.

FIS 302. Crime Scene Investigation 1. 3 Hours.
PR: FIS 201 with a minimum grade of C- and PR or CONC: FIS 303 with a minimum grade of C-. Forensic Examiner majors only. An introductory course providing basic competencies required for crime scene examiners. The course will focus on developing a consistent approach to the processing of a crime scene with a major focus on recovery/processing of physical evidence.

FIS 303. Crime Scene Investigation 1 Laboratory. 1 Hour.
PR: FIS 335 with a minimum grade of C- and PR or CONC: FIS 302 and FIS 405 with a minimum grade of C- in each, Forensic Examiner majors only. The laboratory extension of an introductory course in crime scene investigation, covering skills from initial scene assessment through debriefing and clean-up. Scientific and practical methods of securing, collecting and analyzing this evidence will be taught and practiced. Forensic Examiner majors only.

FIS 305. Biological Evidence for Forensic Examiners. 3 Hours.
PR: FIS 202 or FIS 302 with a minimum grade of C- in each. This is an elective course for students in the Forensic & Investigative Science major and minor. The course focuses on the collection and testing of body fluids as well as death scene investigation procedures.

FIS 306. Expert Testimony Perspectives. 3 Hours.
PR: FIS 201. A comprehensive review of expert testimony that broadens perspectives of the role of the scientist in the courtroom as well as improving expert witness capabilities.

FIS 314. Introduction to Microscopy. 3 Hours.
PR: CHEM 234 and CHEM 236 and (PHYS 102 or PHYS 112) with a minimum grade of C- in each. Basic skills and theory of light, chemical and polarized light microscopy. Practice of proper technique associated with micro-manipulation, sample preparation, the care and maintenance of the microscope, and the origin and significance of qualitative and quantitative observations diagnostic of forensic trace evidence.

FIS 320. Science and Culture of Illicit Drugs. 3 Hours.
PR: This course is for students enrolled in the FIS minor only. A survey of the major drugs of recreational use and abuse in the contemporary United States. Covers the chemical production of illicit drugs; associated paraphernalia; and the biochemistry and physical symptoms of consumption. Also explores the history and cultural significance of illicit drug consumption.

FIS 330. Principles of Forensic Photography. 3 Hours.
PR: FIS 201. Introduces basic principles of forensic photography for the non-investigator. Includes the history of photography, theories behind photography, and techniques for photographing type of crime scenes and evidence.

FIS 335. Forensic Photography. 3 Hours.
PR: PHYS 102 or PHYS 112 with a minimum grade of C-, Forensic Examiner majors only. Focuses on the use of digital photography in forensic science. Topics include the use of digital cameras, scanners, photomicrography, and macrophotography to document a range of evidence types. Students will learn how such images may be processed and enhanced without compromising legal requirements. This course is intended for FIS majors.

FIS 340. Forensic Chemical Analysis. 3 Hours.
PR: CHEM 233 and CHEM 235 with a minimum grade of C- in each. Students develop critical thinking, writing and communication skills related to fundamental concepts of analytical instrumentation and its application to the forensic discipline.
FIS 341. Forensic Chemical Analysis Laboratory. 1 Hour.
PR or CONC: FIS 340 with a minimum grade of C-. Students develop laboratory skills with analytical instrumentation as applied in forensic science.

FIS 380. Social Relations of Forensic and Law Professionals. 3 Hours.
PR: FIS 201 with a minimum grade of C-. Introduction to the relationships among attorneys, experts, and law enforcement professionals; how individuals work together for the investigative process from the initial investigation to the courtroom.

FIS 385. Professional Internship Preparation. 1 Hour.
PR: CHEM 234 and CHEM 236 and (STAT 215 or STAT 312) with a minimum grade of C- in all. Development of professionalism in forensic science. Skills for career building and professional norms and behaviors will be presented. Students learn about internship sites, protocols for application, and expectations for on-the-job roles and behavior.

FIS 386. Forensic Identification Internship. 3-6 Hours.
PR: FIS 385 and one of the following sets of courses: (FIS 302 and FIS 303) or (FIS 340 and FIS 341) or (BIOL 432 and BIOL 434) with a minimum grade of C- in every course. Supervised field or research experience in a forensic, research, or law enforcement setting. Provides students with relevant professional experience based on their forensic interest, skills, and knowledge. Develops professional and networking skills.

FIS 393. Special Topics. 1-6 Hours.
Investigation of topics not covered in regularly scheduled courses.

FIS 401. Professional Forensic Communication. 3 Hours.
PR: ENGL 103 or (ENGL 101 and ENGL 102) and FIS 201. Familiarizes students with forensic literature, literature searching techniques, bibliographic software; and provides students with the writing and presentation skills essential to forensic professionals.

FIS 402. Crime Scene Investigation 2. 3 Hours.
PR: FIS 302 and FIS 303 with a minimum grade of C- in each, Forensic Examiner majors only. An extension of FIS 302. This course will outline procedures for collection of biological and trace evidence using scientific and practical methods of securing, collecting, analyzing this evidence, in accordance with known standards.

FIS 404. Law and Evidence. 3 Hours.
PR: FIS 201. This course presents a comprehensive review of criminal law relating to evidence in court cases and the student's ability to relate legal precedents to procedures in collecting, processing, and securing evidence used in criminal cases.

FIS 405. Latent Fingerprint. 3 Hours.
PR: FIS 301 and CHEM 233 and CHEM 235 with a minimum grade of C- in each, FIS Majors only. Identification techniques used in fingerprint development for processing crime scenes and evidence for latent prints, focusing on latent print development and preservation, including crime scene processing and blood prints. Focuses on latent print comparisons as stipulated by FBI and IAI standards.

FIS 406. Court Testimony. 3 Hours.
PR or CONC: FIS 404. A skills intensive course that combines in-class instruction with practical experience in the area of court testimony, legal writing presentation, and creation and presentation of exhibits in an actual court setting.

FIS 407. Gravesite Forensics. 3 Hours.
PR: FIS 202 or FIS 302 with a minimum grade of C-. This course is an introduction to terrestrial carrion decomposition and to the means of locating, excavating and recovering human remains deposits. This course also covers the identification of carrion-associated insects and their use in determining minimum postmortem interval.

FIS 409. Blood Stain Pattern Analysis. 3 Hours.

FIS 414. Trace Evidence Examination. 3 Hours.
PR: FIS 314 and FIS 341 with a minimum grade of C- in each. Introduces students to fundamental concepts for the identification, collection, examination and interpretation of trace evidence. Students become familiar with the forensic analysis of glass, paint, tape, hairs, fibers, inks and firearm discharge residues.

FIS 416. Trace Evidence Examination Laboratory. 1 Hour.
PR: FIS 314 and PR or CONC: FIS 414 with a minimum grade of C- in each. Develops laboratory skills for forensic examination of trace evidence, including collection, recovery, preservation, analysis, and interpretation of trace materials commonly analyzed in crime laboratories (glass, paint, tapes and adhesives, gunshot residues, inks and paper, soil, fibers and hair).

FIS 421. Introduction to Firearms Examination. 3 Hours.
PR or CONC: FIS 335 with a minimum grade of C-. Fundamentals of firearms-related evidence. Detailed study of design, mechanism, and manufacture of firearms as well as interior, exterior, and terminal ballistics. Includes a laboratory component.

FIS 435. Advanced Forensic Photography. 3 Hours.
PR: FIS 335. A more in-depth photography course for students who wish to pursue forensic photography as a possible employment option upon graduation.

FIS 450. Computational Forensics. 3 Hours.
PR: MATH 155 or consent. An introductory-level course exposing students to non-traditional and technology driven approaches to forensic analysis, with specific emphasis on forensic imaging, analytical modeling, and computer programming.
FIS 451. Arson and Explosives Analysis. 3 Hours.
PR: FIS 340 and FIS 341 and PR or CONC: FIS 452 with a minimum grade of C- in each. Examines the chemistry of combustion and the chemical analysis of ignitable liquids, explosives and post-combustion residues. The course relies heavily on instrumental methods of analysis, including various forms of chromatography and mass spectrometry. A laboratory component provides hands-on experience with interpreting data involving ignitable liquid residues and explosives.

FIS 452. Arson and Explosives Analysis Lab. 1 Hour.
PR: FIS 340 and FIS 341 and PR or CONC: FIS 451 with a minimum grade of C- in each. Develops laboratory skills related to chemical analysis of ignitable liquids, explosives and post-combustion residues. Emphasis on instrumental methods of analysis, including various forms of chromatography and mass spectrometry and extensive hands-on experience interpreting data derived from analyzing ignitable liquid residues and explosives.

FIS 460. Analysis of Seized Drugs. 3 Hours.
PR: FIS 340 and FIS 341 and PR or CONC: FIS 461 with a minimum grade of C- in each. Develops students’ abilities to properly conduct seized drug analyses, including: 1) the history and origin of drugs of abuse; 2) the appropriate handling and storage of evidence/samples; 3) selecting appropriate analytical schemes for the identification of seized drugs; 4) the scheduling of controlled substances; 5) techniques to understand the synthetic pathways and distribution networks of seized drugs.

FIS 461. Analysis of Seized Drugs Laboratory. 1 Hour.
PR: FIS 340 and FIS 341 and PR or CONC: FIS 460 with a minimum grade of C- in each. Develops laboratory skills applicable to the chemical analysis of seized drugs. Emphasis on instrumental methods of analysis, including various forms of chromatography and mass spectrometry, and extensive hands-on experience with the interpretation of data involving analysis of unknown seized drugs.

FIS 470. Analytical Forensic Toxicology. 3 Hours.
PR: FIS 460 and FIS 461 and PR or CONC: FIS 471 with a minimum grade of C- in each. Application of fundamental principles of mode(s) of action of different drugs, the primary mechanisms of drug administration and distribution, drug metabolism and the excretion of xenobiotics. Current and historical cases.

FIS 471. Analytical Forensic Toxicology Laboratory. 1 Hour.
PR or CONC: FIS 470 with a minimum grade of C- in each. Develops laboratory skills applicable to forensic toxicological analysis of drugs. Students practice using sample preparation strategies such as liquid-liquid extraction, solid phase extraction, derivatization, and instrumental analysis techniques for screening and confirmation via chromatography and mass spectrometry.

FIS 480. Forensic Quality Assurance. 2 Hours.
PR: FIS 201. Quality assurance in a laboratory setting to include quality control/assurance, management, and application of statistics. ASCLD-LAB and ISO accreditation and professional certification procedures.

FIS 485. Professional Ethics in Forensic Science. 3 Hours.
Foundational ethical concepts as they relate to forensic science and other associated professional cultures. Applied case-study examples are used to analyze ethical and moral boundaries of practice.

FIS 490. Teaching Practicum. 1-3 Hours.
PR: Consent. Teaching practice as a tutor or assistant.

FIS 491. Professional Field Experience. 1-18 Hours.
PR: Consent. (May be repeated up to a maximum of 18 hours.) Prearranged experiential learning program, to be planned, supervised, and evaluated for credit by faculty and field supervisors. Involves temporary placement with public or private enterprise for professional competence development.

FIS 492. Directed Study. 1-3 Hours.
Directed Study, reading, and/or research.

FIS 493. Special Topics. 1-6 Hours.
PR: Consent. Investigation of topics not covered in regularly scheduled courses.

FIS 495. Independent Study. 1-6 Hours.
Faculty supervised study of topics not available through regular course offerings.

FIS 497. Research. 1-6 Hours.
Independent research projects.

FIS 498. Honors. 1-3 Hours.
PR: Students in Honors Program and consent by the honors director. Independent reading, study or research.