

# Forensic Chemistry, B.S.

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## Degree Offered

- Bachelor of Science

## 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 to 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.

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## FACULTY

### CHAIR

- Casper Venter - Ph.D. (University of South Africa)

### DIRECTOR OF GRADUATE STUDIES

- Tina Moroosse - M.S. (Marshall University)

### DIRECTOR OF UNDERGRADUATE STUDIES

- Rachel Mohr - Ph.D. (Texas A&M University)

### PROFESSORS

- Glen Jackson - Ph.D. (West Virginia University)  
Regular Graduate Faculty, Ming Hsieh Distinguished Professor, Forensic Chemistry, Mass Spectrometry
- Keith Morris - Ph.D. (University of Port Elizabeth)  
Regular Graduate Faculty, Ming Hsieh Distinguished Professor, Impression Evidence, Evidence Interpretation

### ASSOCIATE PROFESSORS

- Tina Moroosse - M.S. (Marshall University)  
Regular Graduate Faculty, Forensic Biology, Quality Assurance
- Jacqueline Speir - Ph.D. (Rochester Institute of Technology)  
Regular Graduate Faculty, Forensic Informatics, Microscopy

### ASSISTANT PROFESSORS

- Luis Arroyo - Ph.D. (Florida International University)  
Regular Graduate Faculty, Toxicology, Environmental Forensics
- Robin Bowen - Ph.D. (West Virginia University)  
Associate Graduate Faculty, Ethics, Bloodstain Pattern Analysis
- Tiffany Edwards - M.S. (University of Central Oklahoma)  
Criminalistics, Death Investigation
- Arati Iyengar - Ph.D. (University of Southampton)  
Regular Graduate Faculty, DNA, Forensic Genetics
- Roger Jefferys - M.S. (West Virginia University)  
Criminalistics

- Lisa Licata - M.S. (University of North Texas Health Science Center)  
Criminalistics, DNA
- Rachel Mohr - Ph.D. (Texas A&M University)  
Associate Graduate Faculty, Forensic Entomology
- Robert O'Brien - M.S. (St. Joseph's College)  
Associate Graduate Faculty, Crime Scene Investigation
- Tatiana Trejos - Ph.D. (Florida International University)  
Regular Graduate Faculty, Trace Evidence, Elemental Analysis

## Admissions

- First Time Freshmen with a MATH ACT of 22 or a MATH SAT of 540 or with a 3.75 cumulative high school GPA are admitted to the major directly. A minimum ALEKS score of 45 is recommended for the timely completion of the degree.
- 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 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. Only students who are admitted directly are eligible to participate in the Living Learning Community and other departmentally-sponsored first-year programs.

## ADMISSION REQUIREMENTS 2024-2025

The Admission Requirements above will be the same for the 2024-2025 Academic Year.

Major Code 14C6

## General Education Foundations

Please use this link to view a list of courses that meet each GEF requirement. (<http://registrar.wvu.edu/gef/>)

NOTE: Some major requirements will fulfill specific GEF requirements. Please see the curriculum requirements listed below for details on which GEFs you will need to select.

Code	Title	Hours
<b>General Education Foundations</b>		
F1 - Composition & Rhetoric		3-6
ENGL 101 & ENGL 102 or ENGL 103	Introduction to Composition and Rhetoric and Composition, Rhetoric, and Research Accelerated Academic Writing	
F2A/F2B - Science & Technology		4-6
F3 - Math & Quantitative Reasoning		3-4
F4 - Society & Connections		3
F5 - Human Inquiry & the Past		3
F6 - The Arts & Creativity		3
F7 - Global Studies & Diversity		3
F8 - Focus (may be satisfied by completion of a minor, double major, or dual degree)		9
Total Hours		31-37

Please note that not all of the GEF courses are offered at all campuses. Students should consult with their advisor or academic department regarding the GEF course offerings available at their campus.

## Departmental Requirements for the B.S. in Forensic Chemistry

Students must complete WVU General Education Foundations requirements, College B.S. requirements, major requirements, and electives to total a minimum of 120 hours. For complete details on these requirements, visit the B.S. Degrees tab on the Eberly College of Arts and Sciences (<http://catalog.wvu.edu/undergraduate/eberlycollegeofartsandsciences/#bachelorofsciencetext>) pages.

- **Capstone Requirement:** The university requires the successful completion of a Capstone course. Forensic Chemistry majors must complete FIS 406L.
- **Writing and Communication Skills Requirement:** The Forensic Chemistry Bachelor of Science is a **SpeakWrite Certified Program™**. SpeakWrite Certified programs incorporate and develop students' written, verbal, visual, and mediated communication skills across the curriculum.

- **Calculation of the GPA in the Major:** A minimum grade of C- or better in all courses applied to major requirements, including the STEM Foundations. If a course is repeated, all attempts will be included in the calculation of the GPA, unless the course is eligible for a D/F repeat.
- **Internship Requirement:** All students are required to successfully complete the FIS 386 internship course for a minimum of 3 hours of credit.

## Curriculum Requirements

Code	Title	Hours
	University Requirements	33
	ECAS B.S. Requirements	4
	Forensic Chemistry Major Requirements	83
Total Hours		120

## University Requirements

Code	Title	Hours
	General Education Foundations (GEF) 1, 2, 3, 4, 5, 6, 7, and 8 (31-37 Credits)	
	Outstanding GEF Requirements 1, 4, 5, 6, and 7	18
FIS 191	First-Year Seminar	1
	General Electives	14
Total Hours		33

## ECAS Bachelor of Science Requirements

Code	Title	Hours
<b>COLLEGE REQUIREMENTS</b>		<b>4</b>
	Global Studies & Diversity Requirement	
<b>MATHEMATICS REQUIREMENT</b>		
MATH 155 or MATH 153 & MATH 154	Calculus 1 Calculus 1a with Precalculus and Calculus 1b with Precalculus	
SCIENCE REQUIREMENT fulfilled by major requirements		
Total Hours		4

## Forensic Chemistry Major Requirements

Code	Title	Hours
<b>STEM FOUNDATIONS *</b>		<b>23</b>
BIOL 115 & 115L	Principles of Biology and Principles of Biology Laboratory	
BIOL 117	Introductory Physiology	
MATH 156	Calculus 2	
PHYS 101 & 101L & PHYS 102 & PHYS 102L or PHYS 111 & 111L & PHYS 112 & PHYS 112L	Introductory Physics 1 and Introductory Physics 1 Laboratory and Introductory Physics 2 and Introductory Physics 2 Laboratory General Physics 1 and General Physics 1 Laboratory and General Physics 2 and General Physics 2 Laboratory	
STAT 215	Introduction to Probability and Statistics	
<b>CORE CHEMISTRY COURSES</b>		<b>24</b>
CHEM 115 & 115L	Fundamentals of Chemistry 1 and Fundamentals of Chemistry 1 Laboratory	
CHEM 116 & 116L	Fundamentals of Chemistry 2 and Fundamentals of Chemistry 2 Laboratory	

CHEM 215 & 215L	Introductory Analytical Chemistry and Introductory Analytical Chemistry Laboratory	
CHEM 233 & 233L	Organic Chemistry 1 and Organic Chemistry 1 Laboratory	
CHEM 234 & 234L	Organic Chemistry 2 and Organic Chemistry 2 Laboratory	
CHEM 341 & 341L	Physical Chemistry: Brief Course and Physical Chemistry: Brief Course Laboratory	
or CHEM 348 & 348L	Physical Chemistry 2 and Physical Chemistry 2 Laboratory	
<b>CORE FORENSIC AND INVESTIGATIVE SCIENCE COURSES</b>		<b>25</b>
FIS 201	Introduction to Forensic Identification	
FIS 202	Crime Scene Investigation Overview	
FIS 314 & 314L	Introduction to Microscopy and Introduction to Microscopy Laboratory	
FIS 340 & 340L	Forensic Chemical Analysis and Forensic Chemical Analysis Laboratory	
FIS 385	Professional Internship Preparation	
FIS 386	Forensic Identification Internship	
FIS 404	Law and Evidence	
FIS 460 & 460L	Analysis of Seized Drugs and Analysis of Seized Drugs Laboratory	
FIS 480	Forensic Quality Assurance	
<b>UPPER-DIVISION ELECTIVES</b>		<b>8</b>
Select two of the following sequences:		
FIS 414 & 414L	Trace Evidence Examination and Trace Evidence Examination Laboratory	
FIS 451 & 451L	Arson and Explosives Analysis and Arson and Explosives Analysis Laboratory	
FIS 470 & 470L	Analytical Forensic Toxicology and Analytical Forensic Toxicology Laboratory	
<b>CAPSTONE EXPERIENCE</b>		<b>3</b>
FIS 406L	Capstone: Courtroom Testimony and Laboratory	
Total Hours		83

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STEM foundation courses are common to most STEM majors and excluded from the calculation of the percentage of upper-division courses

## SUGGESTED PLAN OF STUDY

### First Year

Fall	Hours	Spring	Hours
FIS 191		1 ENGL 101 (GEF 1)	3
BIOL 115 & 115L (GEF 2; B.S. First Area 1)		4 BIOL 117 & 117L (B.S. First Area 2; GEF 8)	4
CHEM 115 & 115L (B.S. Second Area 1; GEF 8)		4 CHEM 116 & 116L (B.S. Second Area 2; GEF 8)	4
FIS 201		3 MATH 156	4
MATH 155 (B.S. Math Requirement; GEF 3)		4	
		16	15

### Second Year

Fall	Hours	Spring	Hours
GEF 4		3 ENGL 102 (GEF 1)	3

CHEM 233 & 233L		4 CHEM 234 & 234L		4	
PHYS 101 or 111		4 FIS 202		3	
STAT 215		3 PHYS 102 or 112		4	
General Elective		1 General Elective		1	
		15			15
<b>Third Year</b>					
<b>Fall</b>	<b>Hours</b>	<b>Spring</b>	<b>Hours</b>	<b>Summer</b>	<b>Hours</b>
CHEM 215 & 215L		4 GEF 5		3 FIS 386	3
FIS 314		3 CHEM 341 & 341L		4	
FIS 340 & 340L		4 FIS 460		3	
FIS 385		1 FIS 460L		1	
FIS 480		2 General Elective		3	
		14			14
<b>Fourth Year</b>					
<b>Fall</b>	<b>Hours</b>	<b>Spring</b>	<b>Hours</b>		
GEF 6		3 GEF 7		3	
FIS 404		2 Forensic Chemistry Elective 2		4	
FIS 406L		3 General Elective		4	
Forensic Chemistry Elective 1		4 General Elective		4	
General Elective		1			
		13			15

Total credit hours: 120

## Degree Progress

- All majors must meet with a FIS adviser each semester.
- By the start of the third regular semester (Fall or Spring) in the major, students must be enrolled in or have successfully completed and with a C-.
- Beyond the fifth regular semester, all students must maintain a minimum GPA of 2.5 in all courses applied to major requirements with a minimum grade requirement of C- in all courses applied to major requirements.
- If students do not begin upper-level FIS courses in their third year, they must complete the foundational courses listed below by the end of their sixth regular semester.
- Students who do not meet major benchmarks may be removed from the major.

## UPPER LEVEL QUALIFICATION

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 PHYS 111 (<http://catalog.wvu.edu/search/?P=PHYS%20111>)/PHYS 112 (<http://catalog.wvu.edu/search/?P=PHYS%20112>) 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 alongside the deficient course, based on availability of seats and compatibility of scheduling.

- BIOL 117 & BIOL 117L
- CHEM 234 & CHEM 234L
- MATH 154 or MATH 155 (Forensic Biology and Forensic Examiner) or MATH 156 (Forensic Chemistry)
- PHYS 102 & PHYS 102L or PHYS 112 & PHYS 112L
- STAT 215 or STAT 312

## **CALCULATION OF GPA**

All students must maintain a minimum GPA of 2.5 in all courses applied to major requirements with a minimum grade requirement of C- in selected courses. Selected courses are: all courses applied to major requirements.

## **Major Learning Outcomes**

### **FORENSIC CHEMISTRY**

Upon graduation from the Forensic Chemistry major, students will be able to:

1. Apply scientific methodology and evaluate techniques in the collection, processing, analysis, and evaluation of forensic evidence.
2. Assess and defend data generated during forensic investigations
3. Present scientific data in written, verbal, and visual formats.
4. Demonstrate the professionalism and high ethical standards demanded by the justice system and the forensic science community.