MAJOR IN FORENSIC CHEMISTRY

Forensic Chemistry is a field in which many opportunities exist within public law enforcement agencies and private testing and instrumentation companies. There is a critical shortage of qualified professionals in the field. Graduates of this program will be well prepared for employment in the forensic field with minimal on-the-job training or to pursue a graduate degree.

The major in Forensic Chemistry requires the completion of all the required and ancillary courses that are listed below, as well as satisfying the university's Core Curriculum requirements. A student may repeat no more than two courses, including multiple attempts at the same course, required for the Forensic Chemistry major. This includes all foundation courses, as well as required courses for the major.

Students who wish to earn internship credit (CHEM 395) for work in a crime laboratory must have a GPA of 3.00 or higher, must have attained junior class rank, and must pass a background investigation.

The Forensic Chemistry major is offered in three separate tracks. These tracks provide the student with options to prepare for the specialized areas of forensic science in the professional work force or for graduate programs. Students are expected to declare their track of study by the end of their sophomore year.

For further information, please contact one of the following:

Mark Profili, M.S., Director
Science Complex 4301E
Phone: 410-704-2668
Email: mprofili@towson.edu

Kelly Elkins, Ph.D.
Science Complex 3301F
Phone: 410-704-6217
Email: kmelkins@towson.edu

Ellen Hondrogiannis, Ph.D.
Science Complex 3301D
Phone: 410-704-5043
Email: ehondrogiannis@towson.edu

Cynthia Zeller, Ph.D.
Science Complex 5301B
Phone: 410-704-2170
Email: czeller@towson.edu

Requirements

Repeat Policy

A student may repeat no more than two courses, including multiple attempts at the same course, required for the Forensic Chemistry major. This includes all foundation courses, as well as required courses for the major.

Courses Required of all Forensic Chemistry tracks

Code	Title	Units
CHEM 131 & 131L	GENERAL CHEMISTRY I LECTURE and GENERAL CHEMISTRY I LABORATORY	4
CHEM 132 & 132L	GENERAL CHEMISTRY II LECTURE and GENERAL CHEMISTRY II LABORATORY	4
CHEM 220 & 220L	ANALYTICAL CHEMISTRY [LECTURE] and ANALYTICAL CHEMISTRY [LAB]	5
CHEM 301	PROFESSIONAL ETHICS FOR SCIENTISTS	3
CHEM 331	ORGANIC CHEMISTRY I	5
CHEM 332	ORGANIC CHEMISTRY II	5
CHEM 351	BIOCHEMISTRY	3
FRSC 367	FORENSIC CHEMISTRY	3
FRSC 368	PROFESSIONAL PRACTICES IN FORENSIC SCIENCE	3
FRSC 440	FORENSIC SCIENCE, EMERGENCY MEDICINE, AND DEATH ANALYSIS	3
Ancillary Courses		
ANTH 357	INTRODUCTION TO FORENSIC CRIME ANALYSIS	3
ANTH 457	ADVANCED FORENSIC INVESTIGATION	3
BIOL 200 & 200L	BIOLOGY I: INTRODUCTION TO CELLULAR BIOLOGY AND GENETICS [LECTURE] and BIOLOGY I: INTRODUCTION TO CELLULAR BIOLOGY AND GENETICS [LAB]	4
BIOL 206 & 206L	BIOLOGY II: INTRODUCTION TO ECOLOGY AND EVOLUTION [LECTURE] and BIOLOGY II: INTRODUCTION TO ECOLOGY AND EVOLUTION [LAB]	4
CRMJ 254	INTRODUCTION TO CRIMINAL JUSTICE	3
CRMJ 384	ADVANCED CRIMINAL LAW	3
MATH 237	ELEMENTARY BIOSTATISTICS	4
MATH 273	CALCULUS I	4
Select one of the following:		8
PHYS 211 & PHYS 212	GENERAL PHYSICS I; NON CALCULUS-BASED and GENERAL PHYSICS II; NON CALCULUS-BASED	
PHYS 241 & PHYS 242	GENERAL PHYSICS I CALCULUS-BASED and GENERAL PHYSICS II CALCULUS-BASED	
Capstone Experience		
Select one of the following:		3
CHEM 395	INTERNSHIP IN CHEMISTRY	
CHEM 491	RESEARCH IN CHEMISTRY	
FRSC 401	FORENSIC SCIENCE CAPSTONE	
Total Units		**77**

General Forensic Science Track

This track is intended for students who are considering employment in a drug analysis, trace evidence analysis or DNA analysis laboratory, or to pursue a graduate degree in a non-specialized forensic master's program.

In addition to the University's Core Curriculum courses and the required and ancillary courses for all Forensic Chemistry tracks, the following courses are required for the General Forensic Science track:

Code	Title	Units
BIOL 309	GENETICS	4
BIOL 409	MOLECULAR BIOLOGY	4
CHEM 310	INSTRUMENTAL ANALYSIS	4
FRSC 363	CHEMISTRY OF DANGEROUS DRUGS	3
FRSC 467	FORENSIC ANALYTICAL CHEMISTRY	3
Total Units		**18**

Trace Evidence/Drug Analysis Track

This track is intended for students who desire a strong chemistry and instrumental analysis education and are considering a profession in a forensic chemistry laboratory or graduate program specializing in the analysis of trace evidence (fibers, paint, soil, flammables, explosives, etc.) or in the analysis of illegal drugs and toxicology.

In addition to the University's Core Curriculum courses and the required and ancillary courses of all Forensic Chemistry tracks, the following courses are required of the Trace Evidence/Drug Analysis track:

Code	Title	Units
CHEM 310	INSTRUMENTAL ANALYSIS	4
CHEM 345	PRINCIPLES OF PHYSICAL CHEMISTRY	3
CHEM 372	PHYSICAL CHEMISTRY LABORATORY	2
CHEM 480	CHEMICAL TOXICOLOGY	3
FRSC 363	CHEMISTRY OF DANGEROUS DRUGS	3
FRSC 467	FORENSIC ANALYTICAL CHEMISTRY	3
Total Units		**18**

DNA Track

This track is intended for students who desire a strong biochemistry and molecular biology education and are considering a profession in a forensic laboratory or graduate program specializing in body fluid and tissue analysis, and human identification using serology and DNA technology.

In addition to the University's Core Curriculum courses and the required and ancillary courses of all Forensic Chemistry tracks, the following courses are required of the DNA track:

Code	Title	Units
BIOL 309	GENETICS	4
BIOL 409	MOLECULAR BIOLOGY	4
BIOL 410	MOLECULAR BIOLOGY LABORATORY	2-3
or CHEM 356	BIOCHEMISTRY LAB	
FRSC 420	BODY FLUID ANALYSIS	4
FRSC 422	ADVANCED SEQUENCING METHODS	3
Total Units		**17-18**

Four-Year Plan of Study

General Track Sample Four-Year Plan

The selected course sequence below is an example of the simplest path to degree completion. Based on course schedules, student needs, and student choice, individual plans may vary. Students should consult with their adviser to make the most appropriate elective choices and to ensure that they have completed the required number of units (120) to graduate.

Freshman		
Term 1	**Units**	**Term 2**	**Units**
CHEM 131 & 131L (Core 7)	4	CHEM 132 & 132L (Core 8)	4
MATH 273 (Core 3)	4	MATH 237	4
Core 1 (or Core 2)	3	Core 2 (or Core 1)	3
Select one of the following:	4	Select one of the following:	4
PHYS 211		PHYS 212	
PHYS 241		PHYS 242	
	15		**15**
Sophomore			
Term 1	**Units**	**Term 2**	**Units**
BIOL 200 & 200L	4	BIOL 206 & 206L	4
CHEM 220 & 220L	5	CHEM 336	2
CHEM 334	3	CHEM 337	3
CRMJ 254 (Core 11)	3	CRMJ 384	3
Core 4	3	Core 5	3
	18		**15**
Junior			
Term 1	**Units**	**Term 2**	**Units**
ANTH 357	3	ANTH 457	3
CHEM 339	2	CHEM 310	4
CHEM 351	3	FRSC 368	3
FRSC 367	3	FRSC 440	3
Core 6	3	Core 10	3
	14		**16**
Senior			
Term 1	**Units**	**Term 2**	**Units**
BIOL 309	4	BIOL 409	4
FRSC 363	3	CHEM 301 (Core 9)	3
Core 13	3	FRSC 467	3
Core 14	3	Core 4	3
Select one of the following:	3	Core 12	3
CHEM 395			
CHEM 491			
FRSC 401			
	16		**16**
Total Units 125			

DNA Track Sample Four-Year Plan

The selected course sequence below is an example of the simplest path to degree completion. Based on course schedules, student needs, and student choice, individual plans may vary. Students should consult with their adviser to make the most appropriate elective choices and to ensure that they have completed the required number of units (120) to graduate.

Freshman

Term 1	Units	Term 2	Units
BIOL 200 & 200L	4	BIOL 206 & 206L	4
CHEM 131 & 131L (Core 7)	4	CHEM 132 & 132L (Core 8)	4
MATH 273 (Core 3)	4	MATH 237	4
Core 1 (or Core 2)	3	Core 2 (or Core 1)	3
	15		**15**

Sophomore

Term 1	Units	Term 2	Units
CHEM 220 & 220L	5	CHEM 336	2
CHEM 334	3	CHEM 337	3
CRMJ 254 (Core 11)	3	CRMJ 384	3
Select one of the following:	4	Core 5	3
PHYS 211		Select one of the following:	4
PHYS 241		PHYS 212	
		PHYS 242	
	15		**15**

Junior

Term 1	Units	Term 2	Units
ANTH 357	3	ANTH 457	3
BIOL 309	4	BIOL 409	4
CHEM 339	2	FRSC 368	3
FRSC 367	3	FRSC 440	3
Core 4	3	Core 6	3
	15		**16**

Senior

Term 1	Units	Term 2	Units
CHEM 351	3	CHEM 301 (Core 9)	3
FRSC 420	4	FRSC 422	3
Core 10	3	Core 13	3
Core 12	3	Core 14	3
Select one of the following:	3	Select one of the following:	2-3
CHEM 395		BIOL 410	
CHEM 491		CHEM 356	
FRSC 401			
	16		**14-15**

Total Units 121-122

Trace Evidence/Drug Analysis Track Sample Four-Year Plan

The selected course sequence below is an example of the simplest path to degree completion. Based on course schedules, student needs, and student choice, individual plans may vary. Students should consult with their adviser to make the most appropriate elective choices and to ensure that they have completed the required number of units (120) to graduate.

Freshman

Term 1	Units	Term 2	Units
BIOL 200 & 200L	4	BIOL 206 & 206L	4
CHEM 131 & 131L (Core 7)	4	CHEM 132 & 132L (Core 8)	4
MATH 273 (Core 3)	4	MATH 237	4
Core 1 (or Core 2)	3	Core 2 (or Core 1)	3
	15		**15**

Sophomore

Term 1	Units	Term 2	Units
CHEM 220 & 220L	5	CHEM 336	2
CHEM 334	3	CHEM 337	3
CRMJ 254 (Core 11)	3	CRMJ 384	3
Select one of the following:	4	Core 6	3
PHYS 211		Select one of the following:	4
PHYS 241		PHYS 212	
		PHYS 242	
	15		**15**

Junior

Term 1	Units	Term 2	Units
ANTH 357	3	ANTH 457	3
CHEM 339	2	CHEM 310	4
CHEM 351	3	FRSC 368	3
FRSC 367	3	FRSC 440	3
Core 4	3	Core 10	3
Core 5	3		
	17		**16**

Senior

Term 1	Units	Term 2	Units
CHEM 345	3	CHEM 301 (Core 9)	3
CHEM 480	3	CHEM 372	2
FRSC 363	3	FRSC 467	3
Core 12	3	Core 13	3
Select one of the following:	3	Core 14	3
CHEM 395			
CHEM 491			
FRSC 401			
	15		**14**

Total Units 122

Learning Outcomes

1. Apply the principles of crime scene investigation, evidence collection, preservation and chain of custody.
2. Demonstrate mastery of the tools of scientific inquiry in forensic analysis.
3. Understand the importance of ethics in forensic science.
4. Communicate analytical/research findings and present court testimony.
5. Present clear and persuasive written evidence of analytical findings.
6. Demonstrate proficiency in the use and knowledge of specific software programs relevant in the field of forensic chemistry.