

# BACHELOR OF SCIENCE IN APPLIED SCIENCE IN FORENSIC SCIENCE

## Forensic Science Program

Youngstown State University offers an undergraduate degree, the Bachelor of Science in Applied Science in Forensic Science. This is a multidisciplinary program drawing upon Criminal Justice, Forensic Science, Biological Sciences, Chemical Sciences, Sociology, and Anthropology. The program is housed in the Department of Chemical and Biological Sciences.

Forensic science can be broadly defined as the application of science to law. This program is designed to give students both a theoretical and practical background in the scientific, legal, and investigative aspects of forensic science. Graduates of the program are prepared for continued education in graduate programs or for immediate employment in forensic science-related facilities. Many careers in or related to forensic science require academic preparation beyond the undergraduate level. Students should be prepared to pursue advanced degrees within their discipline.

## Admission Policy

Students wishing to transfer into the forensic science program must have and maintain a cumulative GPA of at least 2.5. **Note: individuals with a felony, drug, and/or domestic violence conviction will experience difficulty gaining employment in the fields of forensic science and/or criminal justice.** Students with misdemeanor convictions or juvenile sex offense convictions should seek advice from an advisor.

## Internships

YSU's Forensic Science program requires a six-semester hour internship experience which will provide students with the opportunity to integrate academic studies with the daily operations of a forensic science related facility. Each semester hour requires approximately 45 on-site hours. Internships also foster the development of networking relationships with practitioners who can assist in procuring future employment. Certain criminal convictions may prohibit students from being eligible for an internship experience.

For more information, visit the Forensic Science Program. (<https://ysu.edu/academics/science-technology-engineering-mathematics/forensicsciencemajor/>)

A Bachelor of Science in Applied Science degree in Forensic Science requires a minimum of 120 semester hours. The program is designed to be rigorous and multi-disciplinary, and allows for fewer electives in lower level courses but an increased flexibility in upper-division coursework. Students must complete the following coursework within their first 3 semesters at YSU, and must maintain at least a 2.5 GPA in order to remain in the FS program:

- STEM 1520 or YSU 1500
- ENGL 1550
- CRJS 1500
- FSCI 1510
- CHEM 1515
- CHEM 1515L
- Two MATH courses, if applicable (may include MATH 1510, MATH 1510C, MATH 1511, MATH 1511C, MATH 1513, MATH 1570, MATH 1571)

## Professor

**Susan Ann Clutter**, M.F.S., Associate Professor

**Robert E. Wardle III**, M.S., Associate Professor

A minor is intended to contrast with or deepen a major or General Education. Forensic Science is an interdisciplinary major. Courses that are required for, and count toward, the Forensic Science major cannot be counted toward a minor.

COURSE	TITLE	S.H.
<b>FIRST YEAR REQUIREMENT -STUDENT SUCCESS</b>		
YSU 1500	Success Seminar	1-2
or SS 1500	Strong Start Success Seminar	
or HONR 1500	Intro to Honors	
<b>General Education Requirements</b>		
ENGL 1550	Writing 1	3-4
or ENGL 1549	Writing 1 with Support	
ENGL 1551	Writing 2	3
CMST 1545	Communication Foundations	3
Mathematics		
MATH 1571	Calculus 1 (required for major)	4
or MATH 1570	Applied Calculus 1	
Arts and Humanities (Select 2 courses)		
Social and Personal Awareness (Select 2 courses)		
Natural Science (2 courses; 1 with lab) <sup>met with BIOL 2601 and 2602</sup>		
BIOL 2601	General Biology 1: Molecules and Cells (required for major)	3
BIOL 2601L	General Biology I: Molecules and Cells Laboratory	1
BIOL 2602	General Biology 2: Organisms and Ecology (required for major)	3
BIOL 2602L	General Biology: Organisms and Ecology Laboratory	1
Social Sciences (2 courses below required for major)		
CRJS 1500	Introduction to Criminal Justice	3
ANTH 1500	Introduction to Anthropology (required for major)	3
<b>Core Requirements (64 s.h.)</b>		
<b>Chemistry</b>		
CHEM 1515	General Chemistry 1	3
CHEM 1515L	General Chemistry 1 Laboratory	1
CHEM 1516	General Chemistry 2	3
CHEM 1516L	General Chemistry 2 Laboratory	1
CHEM 3719	Organic Chemistry 1	3
CHEM 3719L	Organic Chemistry 1 Laboratory	1
CHEM 3720	Organic Chemistry 2	3
CHEM 3720L	Organic Chemistry 2 Laboratory	1
CHEM 2604	Quantitative Analysis	5
CHEM 2604L	Quantitative Analysis Laboratory	0
<b>Additional Biology</b>		
BIOL 3721	Genetics	3
<b>Physics</b>		
PHYS 1501 & 1501L	Fundamentals of Physics 1 and Fundamentals of Physics Laboratory 1	5
or PHYS 2610 & 2610L	General Physics 1 and General Physics Laboratory 1	
PHYS 1502 & 1502L	Fundamentals of Physics 2 and Fundamentals of Physics Laboratory 2	4
<b>Statistics</b>		
STAT 3717	Statistical Methods	4
<b>Criminal Justice and Forensic Sciences</b>		
FSCI 1510	Survey of Forensic Science	3
CRJS 2602	Criminal Courts	3
FSCI 3714	Forensic Science: Crime Scene Investigation	2

FSCI 3714L	Forensic Science CSI Lab	1
FSCI 3716	Forensic Science Evidence Analysis	2
FSCI 3716L	Forensic Science Evidence Analysis Laboratory	1
FSCI 3720	Forensic Fire and Explosive Investigation	3
FSCI 4852	Trace Evidence	3
or FSCI 4853	Forensic Firearms Examination	
or FSCI 4854	Death Investigation	
CRJS 4807	Criminal Justice Internship	6
or STEM 4890	STEM Internship	
FSCI 5814	Practice and Ethics in Forensic Science	3
<b>Concentrations (Pick One -Biology, Chemistry, Anthropology, or Flexible Option)</b>		<b>16</b>

**CHEMISTRY (Select at least 16 s.h.)**

CHEM 3729	Inorganic Chemistry	
CHEM 3739 & 3739L	Physical Chemistry 1 and Physical Chemistry 1 Laboratory	
CHEM 3740 & 3740L	Physical Chemistry 2 and Physical Chemistry 2 Laboratory	
CHEM 3764	Chemical Toxicology	
CHEM 3785 & 3785L	Biochemistry 1 and Biochemistry Laboratory	
CHEM 3786	Biochemistry 2	
CHEM 4891	Special Topics	
CHEM 5804 & 5804L	Chemical Instrumentation and Chemical Instrumentation Laboratory	
CHEM 5821	Intermediate Organic Chemistry	
CHEM 5822 & 5822L	Advanced Organic Laboratory and Advanced Organic Laboratory	

**BIOLOGY (Select at least 16 s.h.)**

BIOL 3702 & 3702L	Microbiology and Microbiology Laboratory	
BIOL 3703 & 3703L	Clinical Immunology and Clinical Immunology Laboratory	
BIOL 3705 & 3705L	Introduction to Human Gross Anatomy and Introduction to Human Gross Anatomy Laboratory	
BIOL 3711	Cell Biology: Fine Structure	
BIOL 3730 & 3730L	Human Physiology and Human Physiology Laboratory	
BIOL 4800 & 4800L	Bioinformatics and Bioinformatics Laboratory	
BIOL 4839	Selected Topics in Physiology	
CHEM 3785 & 3785L	Biochemistry 1 and Biochemistry Laboratory	
CHEM 3786	Biochemistry 2	
BIOL 4850	Problems in Biology	
BIOL 4890 & 4890L	Molecular Genetics and Molecular Genetics Laboratory	
BIOL 5827	Gene Manipulation	

**ANTHROPOLOGY (Select at least 16 s.h.)**

ANTH 2600	Human Osteology	
ANTH 3702	Archaeology	
ANTH 3703	Biological Anthropology	
ANTH 3778	Archaeological Techniques	
ANTH 3779	Fieldwork in Historical and Industrial Sites Archaeology	
ANTH 3780	Forensic Anthropology 1	
ANTH 4881	Forensic Anthropology 2	

BIOL 3705 & 3705L	Introduction to Human Gross Anatomy and Introduction to Human Gross Anatomy Laboratory	
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**Optional courses to meet 120 hours (16 hours). Students may take a flexible option of any 3700 or higher level courses to meet the degree requirements.**

FSCI 4850	Special Topics in Forensic Sciences	
FSCI 4853	Forensic Firearms Examination	
FSCI 4854	Death Investigation	
CSCI 4870	Biometrics	
CHEM 3719R	Organic Chemistry Recitation 1	
CHEM 3720R	Organic Chemistry Recitation 2	
PHLT 3731	Drug Use and Abuse	
PHLT 5810	Agents of Mass Casualty	
PHLT 5812	Crisis Management in Public Health	
ENST 3700 & 3700L	Environmental Chemistry and Environmental Chemistry Lab	
ENST 3730	Air Quality	
ENST 3751 & 3751L	Water Quality Analysis and Water Quality Analysis Lab	
ENST 3752	Soil Quality and Analysis	
ENST 3781	Environmental Sampling Methods	

**Total Semester Hours 120-122**

There may be other courses that qualify for upper division electives, but you must discuss these options with an academic advisor and get pre-approval.

**Year 1**

<b>Fall</b>		<b>S.H.</b>
YSU 1500	Success Seminar	1-2
or SS 1500	or Strong Start Success Seminar	
or HONR 1500	or Intro to Honors	
ENGL 1550	Writing 1	3-4
or ENGL 1549	or Writing 1 with Support	
FSCI 1510	Survey of Forensic Science	3
CRJS 1500	Introduction to Criminal Justice	3
CHEM 1515	General Chemistry 1	3
CHEM 1515L	General Chemistry 1 Laboratory	1

**Semester Hours 14-16**

**Spring**

ENGL 1551	Writing 2	3
CRJS 2602	Criminal Courts	3
ANTH 1500	Introduction to Anthropology	3
CHEM 1516	General Chemistry 2	3
CHEM 1516L	General Chemistry 2 Laboratory	1
Social and Personal Awareness		3

**Semester Hours 16**

**Year 2**

<b>Fall</b>		
CMST 1545	Communication Foundations	3
FSCI 3714	Forensic Science: Crime Scene Investigation	2
FSCI 3714L	Forensic Science CSI Lab	1
MATH 1571	Calculus 1	4
CHEM 3719	Organic Chemistry 1	3
CHEM 3719L	Organic Chemistry 1 Laboratory	1

**Semester Hours 14**

**Spring**

FSCI 3716	Forensic Science Evidence Analysis	2
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FSCI 3716L	Forensic Science Evidence Analysis Laboratory	1
FSCI 3720	Forensic Fire and Explosive Investigation	3
CHEM 3720	Organic Chemistry 2	3
CHEM 3720L	Organic Chemistry 2 Laboratory	1
Concentration Electives		4
<b>Semester Hours</b>		<b>14</b>
<b>Year 3</b>		
<b>Fall</b>		
BIOL 2601	General Biology 1: Molecules and Cells	3
BIOL 2601L	General Biology I: Molecules and Cells Laboratory	1
FSCI 4850	Special Topics in Forensic Sciences	3
STAT 3717	Statistical Methods	4
Concentration Electives		5
<b>Semester Hours</b>		<b>16</b>
<b>Spring</b>		
BIOL 2602	General Biology 2: Organisms and Ecology	3
BIOL 2602L	General Biology: Organisms and Ecology Laboratory	1
CHEM 2604	Quantitative Analysis	5
CHEM 2604L	Quantitative Analysis Laboratory	0
Arts and Humanities		3
Concentration Electives		4
<b>Semester Hours</b>		<b>16</b>
<b>Year 4</b>		
<b>Fall</b>		
CRJS 4807	Criminal Justice Internship	6
PHYS 1501	Fundamentals of Physics 1	4
PHYS 1501L	Fundamentals of Physics Laboratory 1	1
Social and Personal Awareness		3
Concentration Electives		3
<b>Semester Hours</b>		<b>17</b>
<b>Spring</b>		
FSCI 5814	Practice and Ethics in Forensic Science	3
BIOL 3721	Genetics	3
PHYS 1502	Fundamentals of Physics 2	3
PHYS 1502L	Fundamentals of Physics Laboratory 2	1
Arts & Humanities		3
<b>Semester Hours</b>		<b>13</b>
<b>Total Semester Hours</b>		<b>120-122</b>

Request a Graduation Evaluation after you have completed 80-85 s.h. from the BCHHS Advising/Deans Office, 2104 Cushwa Hall, 330-941-3221.

## Learning Outcomes

1. Students will demonstrate knowledge on the influence of the CJ system at the subsystem levels (policing, courts, and corrections).
2. Students can analyze scientific situations, and apply the scientific method within the CJ judicial system.
3. Students can explain biology principles and how they relate to forensic science.
4. Students can explain chemistry principles and how they relate to forensic science.
5. Students can explain basic physics and math principles, and how they relate to forensic science.

### FSCI 1510 Survey of Forensic Science 3 s.h.

An overview of the history, evolution, and current state of the forensic science discipline. Discussion of the scientific method and its applicability to forensic science, a description of the various sub-disciplines and areas of specialty that contribute to the field as a whole, and a summary of training, education, certification, accreditation, legal, and constitutional issues related to the discipline. There will also be discussion of the basic application of biological, physical, chemical, medical, technological, and behavioral sciences to questions of evidence and law. This course is designed to be accessible to those without a natural science background and provide a comprehensive introduction to those considering further study within the discipline.

**Gen Ed:** Natural Science.

### FSCI 3714 Forensic Science: Crime Scene Investigation 2 s.h.

An introduction to the legal and practical aspects of crime scene investigation. Emphasis on the value of physical evidence and the skills and tools needed to recognize, collect and preserve physical evidence found at a crime scene. Concurrent with: FSCI 3714L.

**Prereq.:** FSCI 1510 and sophomore standing.

### FSCI 3714L Forensic Science CSI Lab 1 s.h.

Laboratory section designed to teach the practical skills employed by criminalists collecting evidence at a crime scene. Students will gain experience using tools, techniques and procedures required to recognize and collect evidence by completing practical exercises.

**Prereq.:** FSCI 1510 and sophomore standing.

**Coreq.:** FSCI 3714.

### FSCI 3716 Forensic Science Evidence Analysis 2 s.h.

Serves as an introduction to the techniques, instrumentation and procedures used in the examination and analysis of physical evidence in a forensic laboratory setting and the legal aspects regarding the use of laboratory reports in the investigation process. Concurrent with: FSCI 3716L.

**Prereq.:** FSCI 3714, FSCI 3714L.

### FSCI 3716L Forensic Science Evidence Analysis Laboratory 1 s.h.

Laboratory section designed to familiarize students with the tools commonly used in the examination and analysis of physical evidence. Students will gain experience with the instrumentation, techniques, and procedures used for examining physical evidence through a variety of practical exercises.

**Prereq.:** FSCI 3714, FSCI 3714L.

**Coreq.:** FSCI 3716.

### FSCI 3720 Forensic Fire and Explosive Investigation 3 s.h.

Forensic Fire and Explosives Investigation. Principles of fire science including fire detection and investigation of both fire and explosion scenes. Special emphasis on concepts of fire progression, origin and cause determinations, arson investigation, accidental explosions, and bombings.

**Prereq.:** FSCI 3714 with grade of C or higher, or junior status, or permission of forensic coordinator.

### FSCI 4850 Special Topics in Forensic Sciences 3 s.h.

Contemporary issues in criminal justice. Topics are announced prior to enrollment.

**Prereq.:** Senior standing or permission of instructor.

### FSCI 4852 Trace Evidence 3 s.h.

Teaches search methods, recovery procedures, and laboratory analysis for hairs, fibers, and other types of trace evidence in criminal investigations and prosecutions. Emphasis is on major cases that hinged on trace evidence, and the legal and ethical future of trace evidence. Some laboratory exercises with microscopes are included.

**Prereq.:** FSCI 3714 or concurrent or permission from instructor.

### FSCI 4853 Forensic Firearms Examination 3 s.h.

This course features discussion on the forensic science involved in firearms examination, to include gun manufacturing, the physics of ballistics, gunpowder and gun primer residue analysis, serial number restoration, and shooting reconstruction. Legislation concerning handguns and other weapons in the US will also be covered.

**Prereq.:** FSCI 3714 or concurrent or permission from Instructor.

**FSCI 4854 Death Investigation 3 s.h.**

A broad overview exploring the various facets of medicolegal death investigation including discussion of history, standard procedures, methods and techniques, safety, scene documentation, cause and manner of death determination, autopsy, toxicological analysis, and other issues related to the discipline. Course content will include graphic images, descriptions, and discussion. May include depictions of a sexual nature, nudity, the aftermath of violent actions, and/or catastrophe.

**Prereq.:** Junior standing or permission of instructor.

**FSCI 5814 Practice and Ethics in Forensic Science 3 s.h.**

Overview of the forensic science discipline as it relates to the criminal justice system including discussion of legal aspects, constitutional considerations, expert testimony, the role of the expert witness, and ethical standards and dilemmas. Also includes discussion of current events and the evolution and future of the forensic sciences.

**Prereq.:** FSCI 3714 and FSCI 3714L.

**Gen Ed:** Capstone.