

FAYETTEVILLE STATE UNIVERSITY

College of Arts and Sciences
Department of Biological Sciences

Bachelor of Science in Forensic Science Program

CONCENTRATIONS

FORENSIC BIOLOGY AND FORENSIC CHEMISTRY



PROGRAM GUIDE

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Bachelor of Science in Forensic Science

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FAYETTEVILLE STATE UNIVERSITY
DEPARTMENT OF BIOLOGICAL SCIENCES

Bachelor of Science in Forensic Science
Program Guide

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INTRODUCTION

The study of forensic science engages students in the application of scientific principles and methods for the evaluation of evidence. The mission of the Bachelor of Science degree program in Forensic Science is to produce technically skilled and educated graduates who have a basic foundation in scientific and laboratory problem solving skills necessary for success in a modern crime laboratory, and who will contribute to the forensic science community. Students will receive preparation in areas such as DNA analysis, forensic biology, forensic chemistry, and toxicology. The program will also equip students with the knowledge and skills needed to prepare reports documenting their findings and laboratory techniques used, and to provide expert witness testimony on specific laboratory findings. Upon completion of the Forensic Science program, graduates will be prepared to function as forensic scientists and specialists, or for advanced study in forensic science, biomedical research, medicine, and law.

Forensic Science applies scientific methodologies to the criminal justice system. The field of forensic science has received extensive exposure in recent years and is now regarded as highly respected discipline among scientists and criminalists. Forensic science encompasses a wide array of disciplines including criminology, pathology, toxicology, etc. The educational background of professionals in this field is embedded heavily in the natural and behavioral sciences such as chemistry, biology, physics, sociology and criminal justice. An undergraduate degree in forensic science can emphasize forensic analysis from a biological or chemical approach. Forensic Biology puts emphasis on the measurements and procedures used in the examination of biological evidence and the importance of the information derived from the interpretations. In contrast, Forensic Chemistry primarily involves analysis of chemical samples as it relates to chemical purity and substance identification.

Successful completion of either concentration will lead to the granting of a Bachelor of Science degree in Forensic Science. Graduates of this program will be qualified to obtain entry-level positions in the selected areas of major, or for entry into graduate or professional schools.

EDUCATIONAL OBJECTIVES

The educational objectives of the Bachelor of Science degree program in Forensic Science are consistent with the mission of Fayetteville State University and the accreditation standards of the Forensic Science Education Programs Accreditation Commission (FEPAC) of the American Academy of Forensic Sciences (www.aafs.org). Students should be able to:

- Demonstrate the knowledge and an understanding on a range of concepts and issues in Forensic science.
- Show proficiency in assessing, evaluating, analyzing, and synthesizing scientific information and data interpretation from a variety of sample sources.

- Demonstrate the knowledge and techniques fundamental to the practice of forensic science.
- Demonstrate the understanding of ethical standards in the forensic science profession.
- Work cooperatively with others, while demonstrating an increasing understanding of how to be an independent learner.
- Student will be able to communicate forensics knowledge in written and oral forms.

These learning objectives will be measured through the successful completion of coursework, laboratory experiences, exams, papers and an internship/capstone as determined by the faculty responsible for teaching in the degree program.

MISSION STATEMENT OF THE FORENSIC SCIENCE PROGRAM

The mission of the Forensic Science program at Fayetteville State University is consistent with the mission and philosophy of FSU. The program provides students with a quality education through the basic liberal- arts tradition and specialized professional training in forensic science. The Forensic Science program educates and prepares students with the ability to provide quality analysis of scientific evidences through various scientific methods and principles applicable to criminal justice and the law. The B.S. Degree in Forensic Science provides students with an interdisciplinary course of study that prepares them for careers as forensic scientists, chemists, or biological scientists. In addition, the Forensic Science program serves as a solid foundation for matriculation into graduate or professional schools.

ORGANIZATION AND STRUCTURE OF THE CURRICULUM

The Bachelor of Science in Forensic Science consists of two concentrations: Forensic Biology and Forensic Chemistry. Forensic Biology concentration requires 123 semester credit hours of course work and Forensic Chemistry concentration requires 123 semester credit hours of course work. There are 39 credits in the University College Core which provides a strong liberal arts foundation, 50 credit hours in the Forensic Sciences core courses, 34 credit hours in the Forensic Biology concentration and 34 credit hours in Forensic Chemistry concentration.

PROGRAM LOCATION AND FACILITIES

The Forensic Science program is housed in the Science and Technology Building as part of the Department of Biological Sciences. These facilities plan to accommodate increased enrollment of the forensic science program and additional new programs that are currently being developed.

PROGRAM ADMISSIONS REQUIREMENTS

Admission requirements for the Forensic Science program

Admission to the Forensic Science is based upon the following;

- a. Following the university policy (<http://catalog.uncfsu.edu/undergraduate/academic-regulations/majors.htm>), students interested in pursuing forensic science as major are required to declare a major in the second semester of their freshman year. Therefore, students must submit the online “[Declaration of Major](#)” form to request admission to a degree program.
- b. Cumulative GPA of 2.5 (Overall GPA of 2.5 calculated on all transferable college courses attempted at all accredited institutions of higher education as used by FSU).

TRANSFER CREDIT

A maximum of 60 hours of transfer credits will be accepted towards the Forensic Science degree. No credit will be accepted for science and mathematics courses taken more than ten (10) years earlier.

The Forensic Science Program follows FSU policy for transfer student credits as follows;

The university will accept transfer credits in accordance with the North Carolina Comprehensive Articulation Agreement (CAA) relative to the General Education transfer core; graduates with the Associate in Arts, Associate in Fine Arts, and Associate in Science degree. Transfer credit for the Applied Science degree courses, general education core courses for non-graduates, and transfer courses not originated at North Carolina Community Colleges will be awarded on a course-by-course basis. See the links for transfer students and transfer credits details;

<http://www.uncfsu.edu/admissions/transfer-students>

<http://www.uncfsu.edu/admissions/acceptance-of-transfer-credits>

Additionally, higher level STEM and forensic science course(s) can be transferred from another higher academic learning institution on a course-by-course basis at the discretion of the academic advisor and/or Program Director.

ACADEMIC POLICIES AND PROCEDURES

Part-time students

The BSFS program welcomes part-time students to the program. Course schedules will be developed by students following consultation with the Program Director.

Grade Requirements

The minimum level of student competency in the Forensic Science program is established by the achievement of a grade of C or better in all required courses (Natural

Science core, concentration, and Forensic Science core). A student must maintain a cumulative GPA of at least 2.0 to be in good academic standing.

Background Requirements

Background check for a career in forensic science professions is a requirement.

Graduation Requirements

To qualify for graduation with a Bachelor of Science in Forensic Science, a student must successfully meet the following requirements;

- Successful completion of all courses outlined in the appropriate 4-year degree plan
- Cumulative GPA of 2.0 or higher in all majors' courses
- Overall GPA of 2.0 or higher

Capstone Experience

Capstone Course (FORS 460): Capstone course is used to measure students' overall performance. Written tests, presentations, writing assignments, lab work & skills, data analysis and oral presentations are components of the capstone course and are used for students' evaluation and PLOs.

CURRICULUM

TOTAL CREDIT HOURS:

FORENSIC BIOLOGY, 123 CREDITS

FORENSIC CHEMISTRY, 123 CREDITS

Existing Required Courses for Forensic Biology/Forensic Chemistry

Courses are numbered based on course level: 100-, 200-, 300- or 400- level courses. Course in the upper division of the major are numbered 300 or 400. Course descriptions include credit hours, lecture hours and lab hours per week.

UNIVERSITY COLLEGE CORE CURRICULUM, 39 CREDITS

Transitional Studies - University Studies, 2 Credits

Select one option from the following: (UNIV 101 And UNIV 102) Or UNIV 110
Or UNIV 111

Transitional Studies - Life Skills, 2 Credits

Select two credits from the following: FINC 100 Or GEOG 110 Or HEED 112 Or PEDU 101 Or PEDU 107 Or PEDU 112 Or PEDU 120 Or PEDU 122 Or PEDU 130 Or PEDU 132 Or PEDU 140

Communication Skills - Written Communication, 3 Credits

ENGL 110

Communication Skills - Oral Communication, 3 Credits

Select one from the following: BADM 215 Or SPEE 200

Information Literacy, 3 Credits

ENGL 120

Reasoning Skills - Critical Thinking, 3 Credits

PHIL 110 Or PHIL 220

Reasoning Skills - Quantitative Reasoning, 3 Credits

MATH 129

Scientific Literacy - Natural Sciences, 8 Credits

BIOL 150 And CHEM 141 And CHEM 142

Scientific Literacy - Social Sciences, 3 Credits

Select one from the following: CRJC 210 Or ECON 211 Or ECON 212 Or GEOG 210 Or HIST 212 Or POLI 200 Or POLI 210 Or POLI 220 Or PSYC 210 Or SOCI 210

Humanities and Creative Arts, 3 Credits

Select one from the following: ART 210 Or COMM 220 Or ENGL 220 Or ENGL 223 Or ENGL 240 Or ENGL 250 Or ENGL 253 Or HIST 210 Or HUMN 211 Or HUMN 212 Or MUSI 210 Or MUSI 225 Or MUSI 260 Or PHIL 210 Or RELI 215 Or THEA 203

Global Literacy, 3 Credits

Select one from the following: CHIN 110 Or CHIN 120 Or FREN 110 Or FREN 120 Or SPAN 110 Or SPAN 112 Or SPAN 120 Or SPAN 122 Or YORU 110 Or YORU 120

Ethics and Civic Engagement, 3 Credits

Select three credits from the following: BADM 220 Or CRJC 203 Or EDUC 211 Or ENGL 232 Or ENGL 233 Or ETCE 101 Or ETCE 102 Or ETCE 103 Or ETCE 200 Or GEOG 270 Or HCM 200 Or HIST 211 Or PHIL 120 Or PHIL 212 Or PNUR 210 Or POLI 150 Or SWRK 220

PROGRAM REQUIREMENTS, 84 CREDITS

FORENSIC SCIENCE COURSES, 50 CREDITS

BICH 411 And BIOL 200 And CHEM 161 And CHEM 162 And CHEM 223 And CHEM 224 And CHEM 225 And CHEM 226 And CRJC 202 And FORS 200 And FORS 300 And FORS 400 And FOR 410 And FORS 460 And MATH 130 And MATH 142 And STAT 202

FORENSIC BIOLOGY CONCENTRATION, 34 CREDITS

PHYS 111 AND PHYS 112 AND BIOL 330 AND FORS 325 AND FORS 431 AND FORS 445 AND FORS 450 AND ZOOL 200 AND ZOOL 310

FORENSIC CHEMISTRY CONCENTRATION, 34 CREDITS

CHEM 211 And CHEM 212 And CHEM 310 And CHEM 410 And BICH 421 And CHEM 431 And FORS 420 And FORS 430 And MATH 241 And PHYS 121 And PHYS 122

Bachelor of Science in Forensic Science, 123 Credits Biology Concentration

See Department of Biological Sciences for more information. Courses must be selected in consultation with an advisor.

Freshman Year

Fall Semester				Spring Semester			
UNIV	101	Freshman Seminar I ¹	1	UNIV	102	Freshman Seminar II ¹	1
CHEM	141	General Chemistry I ²	3	CHEM	161	General Chemistry II	3
CHEM	142	General Chemistry I Lab ²	1	CHEM	162	General Chemistry II Lab	1
ENGL	110	English Composition I ³	3	ENGL	120	English Composition II ⁶	3
MATH	129	Pre-Calculus I ⁴	3	MATH	130	Pre-Calculus II	3
BIOL	150	Principles of Biology I ²	4	ZOOL	200	General Zoology	4
PHIL	110	Critical Thinking ⁵	<u>3</u>			PEDU/HEED Elective ⁷	1
			18			PEDU/HEED Elective ⁷	<u>1</u>
							17

¹Fulfills University College Transitional Studies - University Studies requirement. UNIV 110 required for transfer students with fewer than 30 transfer credits.

²Fulfills University College Scientific Literacy - Natural Sciences requirement.

³Fulfills University College Communication Skills - Written Communication requirement.

⁴Fulfills University College Reasoning Skills - Quantitative Reasoning requirement.

⁵Fulfills University College Reasoning Skills - Critical Thinking requirement. Not required of Transfer Students with 60 or more transfer credits.

⁶Fulfills University College Information Literacy requirement.

⁷Fulfills University College Transitional Studies - Life Skills requirement.

Sophomore Year

Fall Semester				Spring Semester			
FORS	200	Introduction to Forensic Science	3	MATH	142	Calculus w/ Analytical Geometry I	4
BIOL	200	Cellular Biology	4			Humanities and Creative Arts ¹	3
CHEM	223	Organic Chemistry I	3	CHEM	225	Organic Chemistry II	4
CHEM	224	Organic Chemistry I Lab	1	CHEM	226	Organic Chemistry II Lab	1
PHYS	111	General Physics I ²	<u>4</u>	PHYS	112	General Physics II ²	<u>4</u>
			15				16

¹Fulfills University College Humanities and Creative Arts requirement.

²PHYS 121 and PHYS 122 may be substituted for PHYS 111 and PHYS 112.

Junior Year

Fall Semester				Spring Semester			
SPEE	200	Introduction to Speech ¹	3			Global Literacy ³	3
STAT	202	Basic Probability and Statistics	3	CRJC	202	Legal Aspects of Criminal Justice	3
BIOL	330	Microbiology/Immunology	4			Scientific Literacy - Social Sciences ⁴	3
CRJC	203	Criminal Justice Ethics ²	<u>3</u>	FORS	300	Forensic Professional Practice	3
			13	FORS	325	Molecular Biology	<u>3</u>
							15

¹Fulfills University College Communication Skills - Oral Communication requirement.

²Fulfills University College History/Ethics & Civic Engagement requirement.

³Fulfills University College Global Literacy requirements.

⁴Fulfills University College Scientific Literacy - Social Sciences requirement.

Senior Year

Fall Semester				Spring Semester			
FORS	400	Forensic Microscopy	4	FORS	460	Capstone ¹	4
ZOOL	310	Genetics	4	FORS	431	Population Genetics	3
BICH	411	Biochemistry	3	FORS	410	Technical Writing in For. Science	3
FORS	445	Forensic Serology	<u>4</u>	FORS	450	Forensic DNA Analysis	<u>4</u>
			15				14

¹Capstone course can be substituted with internship at an approved crime lab or a research project under the supervision of FSU faculty.

Bachelor of Science in Forensic Science, 123 Credits Chemistry Concentration

See Department of Biological Sciences for more information. Courses must be selected in consultation with an advisor.

Freshman Year

Fall Semester				Spring Semester			
UNIV	101	Freshman Seminar I ¹	1	UNIV	102	Freshman Seminar II ¹	1
ENGL	110	English Composition I ²	3	ENGL	120	English Composition II ⁷	3
MATH	129	Pre-Calculus I ³	3	MATH	130	Pre-Calculus II	3
CHEM	141	General Chemistry I ⁴	3	CHEM	161	General Chemistry II	3
CHEM	142	General Chemistry I Lab ⁴	1	CHEM	162	General Chemistry II Lab	1
PHIL	110	Critical Thinking ⁵	3			Humanities and Creative Arts ⁸	3
		PEDU/HEED Elective ⁶	<u>1</u>			PEDU/HEED Elective ⁶	<u>1</u>
15				15			

¹Fulfills University College Transitional Studies - University Studies requirement. UNIV 110 required for transfer students with fewer than 30 transfer credits.

²Fulfills University College Communication Skills - Written Communication requirement.

³Fulfills University College Reasoning Skills - Quantitative Reasoning requirement.

⁴Fulfills University College Scientific Literacy - Natural Sciences requirement.

⁵Fulfills University College Reasoning Skills - Critical Thinking requirement. Not required of Transfer Students with 60 or more transfer credits.

⁶Fulfills University College Transitional Studies - Life Skills requirement.

⁷Fulfills University College Information Literacy requirement.

⁸Fulfills University College Humanities and Creative Arts requirement.

Sophomore Year

Fall Semester				Spring Semester			
MATH	142	Calculus w/Analytic Geometry I	4	MATH	241	Calculus w/Analytic Geometry II	4
CHEM	223	Organic Chemistry I	3	CHEM	225	Organic Chemistry II	4
CHEM	224	Organic Chemistry I Lab	1	CHEM	226	Organic Chemistry II Lab	1
PHYS	121	College Physics I	4	PHYS	122	College Physics II	4
FORS	200	Introduction to Forensic Science	<u>3</u>	BIOL	150	Principles of Biology I	<u>4</u>
15				17			

Junior Year

Fall Semester				Spring Semester			
SPEE	200	Introduction to Speech ¹	3	FORS	300	Forensic Professional Practice	3
BIOL	200	Cell Biology	4	CRJC	202	Legal Aspects of Criminal Justice	3
CHEM	211	Analytical Chemistry	3	STAT	202	Basic Probability and Statistics	3
CHEM	212	Analytical Chemistry Lab	2	CHEM	310	Chemical Instrumentation	4
		Global Literacy ³	<u>3</u>	CRJC	203	Criminal Justice Ethics ²	<u>3</u>
15				16			

¹Fulfills University College Communication Skills - Oral Communication requirement.

²Fulfills University College History/Ethics & Civic Engagement requirement.

³Fulfills University College Global Literacy requirements.

Senior Year

Fall Semester				Spring Semester			
FORS	420	Forensic Chemistry I	4	FORS	430	Forensic Chemistry II	4
FORS	400	Forensic Microscopy	4	FORS	460	Capstone ²	4
		Scientific Literacy - Social Sciences ¹	3	FORS	410	Technical Writing in For. Science	3
CHEM	431	Qualitative Organic Analysis	3	BICH	411	Biochemistry I	3
CHEM	410	Seminar in Chemical Literature	1	BICH	421	Biochemistry Laboratory	1
15				15			

¹Fulfills University College Scientific Literacy - Social Sciences requirement.

²Capstone course can be substituted with internship at an approved crime lab or a research project under the supervision of FSU faculty.

COURSE DESCRIPTIONS

Bachelor of Science in Forensic Science with Concentrations in Biology or Chemistry

FORS 200 Introduction to Forensic Science (3-3-0):

This course introduces the basic principles and relationships between the applications of chemistry, biology, and physics to forensic science as they relate to the criminal investigative process. The course is designed to give students insight into the many areas of forensic science and to study the newest techniques used by forensic laboratories.

Prerequisite: CHEM 141 And CHEM 142 And CHEM 161 And CHEM 162 And BIOL 150 And PHYS 111 Or PHYS 121 (may be taken concurrently).

FORS 300 Forensic Professional Practice (3-3-0):

This course provides basic knowledge of quality assurance and quality control, professional certification, and membership in professional organizations. In addition, the ethical issues relating to pre-trial discovery procedures, courtroom testimony, and qualifications of expert witnesses will be presented. Lastly, the course will discuss professional development, ethical considerations for experimental designs, and technical writing.

Prerequisite: FORS 200 And CRJC 202 (may be taken concurrently)

BIOL 325/FORS 325 Molecular Biology (3-2-2)

An in-depth study of the structure, function, and biochemistry of proteins and nucleic acids. Isolation, purification and structural modification of DNA and protein in laboratory exercises will be utilized to provide an understanding of the various DNA/protein methodologies and their applicability to forensic science. This course is cross listed with BIOL 325.

Prerequisite: BIOL 200 And CHEM 223 And CHEM 224

FORS 400 Forensic Microscopy (4-3-2):

This course will familiarize students with the microscopy equipment common to most modern crime labs. The course will enable students to select mode-appropriate equipment and techniques and to make basic observations of the physical and optical properties of common evidential materials. This class is an introduction to microscopic analysis, identification, and characterization of materials, such as glass, hair, fiber, paint, and soil.

Prerequisite: FORS 200 And PHYS 112 Or PHYS 122

FORS 410 Technical Writing in Forensic Science (3-3-0)

This course provides students with a working knowledge of various types of technical and scientific communication, including writing proposals, instructions, and forensic reports for both specialist and nonspecialist. It aims to enable the students to present information professionally in clear, concise and appropriate format. It deals with ethical issues involved in professional technical writing. Formal elements of reports with library research are also emphasized.

Prerequisite: FORS 200 And FORS 300

FORS 420 Forensic Chemistry I (4-3-2)

Applications of spectroscopic methods to forensic science. Background and applications of ultraviolet/visible spectroscopy, Fourier-transfer infrared spectroscopy, fluorescence spectroscopy, and mass spectroscopy will be discussed. May only be taken by students majoring in forensic science with a concentration in chemistry.

Prerequisite: FORS 200 And FORS 300 And CHEM 223 And CHEM 224.

Corequisite: FORS 400

FORS 430 Forensic Chemistry II (4-3-2)

Applications of separation methods to forensic science. Techniques covered will include gas chromatography, liquid chromatography, and capillary electrophoresis. May only be taken by students majoring in forensic science with a concentration in chemistry.

Prerequisite: FORS 420

FORS 431/BIOL 431 Population Genetics (3-2-2)

A study of genetic and ecological forces that influence the structure of populations with two (2) hours of laboratory exercises and experimental studies. Students will evaluate the effects of random genetic drifts, mutations, natural selection, inbreeding, assortative mating, molecular evolution and quantitative/ecological genetics on populations. This course is cross listed with BIOL 431.

Prerequisite: ZOOL 310

FORS 445 Forensic Serology (4-2-4):

This course will introduce the concepts, theories, and principles used in the forensic identification of biological evidence, including laboratory analysis of physical properties for the identification, confirmation, and species origin of biological materials such as blood, fibers, hair, saliva, and semen, as well as immunological and microscopic techniques. The course applies methods that are used in forensic laboratories. May only be taken by students majoring in forensic science with a concentration in biology.

Prerequisite: BIOL 200 And FORS 200 And FORS 300 **Corequisite:** FORS 400

FORS 450 Forensic DNA Analysis (4-2-4):

DNA Analysis: This course will introduce the concepts, theories, and principles used in the forensic identification of biological evidence. The course will cover the characterization of body fluids including the determination of their human origin. Hands on laboratory techniques will be used to identify biological fluids for DNA extraction, quantitation, amplification, profiling, and interpretation. The course introduces laboratory methods, techniques, and instruments used in similar forensic laboratories. May only be taken by students majoring in forensic science with a concentration in biology.

Prerequisite: FORS 325 And FORS 445

FORS 460 Capstone (4-0-8):

This course will evaluate students' overall understanding and mastery of forensic science and criminal justice theories and applications of various laboratory techniques for evidence identification, application of analytical techniques, and communication skills. The course will enable students to select the most appropriate equipment and techniques

to make basic observations of physical evidence and test this evidence by using the appropriate equipment and techniques of evidential materials analysis.

Prerequisite: FORS 445 And FORS 420 **Corequisite:** FORS 410 And FORS 430 And FORS 431 And FORS 450