Course Information Form (CIF)

Course Code: SCI 108 (IAI LP 900L)

Course Title: Essentials of Forensic Science

Department: Natural Sciences
PCS Code: 1.1 - Baccalaureate/Transfer
CIP Code: 40.0501
Repeatability: 0

Effective Date: Summer 2026

Credit Hours

Catalog Notation: 3-3-4
Credit Hour Distribution:

Lecture: 3	Lab: 3	Clinical: 0	**Total: 4**

General Course Information

Catalog Description

Introduction to application of science to law with an overview of forensic chemistry, trace-evidence, forensic biology, and other sub-disciplines. Emphasis on techniques to process crime scenes and analyze physical evidence to help solve cases.

General Course Objectives

Introduce scientific concepts applied to criminal and civil law to fulfill the following goals: increase scientific literacy in a general population of students, increase an appreciation of and enjoyment for scientific endeavors among a general population of students, create an environment that illustrates the importance of careful data collection and recording to the successful crime investigation, and develop a strong understanding of the physical and biological fundamentals underpinning the practice of forensic science to crime scenes.

Minimum Placement Levels

English	Reading	Math
Placement out of ENG 099	Placement out of CCS 098	None

Prerequisites

None

Methods of Evaluation

3-4 exams, a lab midterm, a lab final, weekly laboratory write-ups, weekly team activities, and presentation(s).

Instructional Materials and Additional Supplies

Criminalistics: An Introduction to Forensic Science, Saferstein, Richard; Pearson.

Course Content

General Learning Outcomes (GLOs)

- Reasoning and Inquiry: Students will demonstrate the ability to solve problems using deductive reasoning and logic, quantitative reasoning, or the scientific method.

Course Segments and Student Learning Outcomes

Course Segment	Learning Outcomes	Lecture Hours	Lab Hours	Clinical Hours
Introduction	1. Define forensic science. 2. Recall major contributors to the development of forensic science; describe what forensic scientists and crime scene investigators do. 3. Demonstrate proper chain of custody. 4. Explain the different approaches espoused by the Frye and Daubert decisions to the admissibility of scientific evidence in the courtroom. 5. List the differences between a forensic scientist and crime scene investigator and others involved in a case.	3	2	0
The Crime Scene	1. Define physical evidence. 2. Discuss the responsibilities of officers at a crime scene. 3. Explain data collection at a crime scene and the proper techniques for conducting a systematic search of crime scenes for physical evidence. 4. Define chain of custody; explain the proper collection and packaging of the evidence. 5. Properly record a mock crime scene. 6. Use the course material to analyze a complex, integrated crime scene (during lab).	5	3	0
Physical Evidence	1. List common types of physical evidence found at crime scenes and how to collect and store each. 2. Explain the difference in identification and comparison of evidence. 3. Define and classify individual and class characteristics of evidence and their uses in criminal investigations. 4. Define and give an example of a reference sample.	3	6	0
Fingerprints	1. Identify the major fingerprint patterns. 2. Identify ridge characteristics in a fingerprint and explain when it has individual characteristics. 3. Classify fingerprints according to the Henry system. 4. Describe techniques for lifting visible, plastic, and latent fingerprints. 5. Describe what reference prints are and how to properly make them. 6. Develop, list, and dust fingerprints at a crime scene using a variety of chemical and physical techniques on both porous and non-porous surfaces.	3	3	0
Nature of Science	1. Discuss the nature of science, specifically related definitions (e.g. hypothesis, theory, law). 2. List several characteristics of science and describe what a model is in science. 3. Illustrate the tension between science being "durable" yet "tentative". 4. Explain the process of peer review and what role retractions play in science.	3	0	0

Course Segment	Learning Outcomes	Lecture Hours	Lab Hours	Clinical Hours
The Microscope	1. Identify the parts and types of light of a stereomicroscope and a compound microscope. 2. Define magnification and field of view. 3. Use the compound microscope and stereoscope to examine physical evidence. 4. Describe the use of microscopes in forensic science, including the use of comparison microscopes and scanning electron microscopy.	1	4	0
Trace Evidence: Hair, Fiber, and Paint	1. Identify the cuticle, cortex, and medulla of hair. 2. Distinguish between animal and human hair. 3. Explain the proper collection of hair. 4. List features of hair useful for comparison and which are for exclusionary purposes only. 5. Describe the proper collection of fibers and paint. 6. List feature of fibers and paint useful for comparison and which are for exclusionary purposes only. 7. Examine hair, textile fibers, blood cells, and other evidence by microscopy.	2	3	0
Physical Properties: Glass and Soil	1. Distinguish chemical and physical properties. 2. Use the metric system to convert metric prefixes. 3. Distinguish mass and weight. 4. Define and calculate density and explain its usefulness in forensic glass and soil analysis. 5. Define refractive index and explain its usefulness in forensic glass analysis. 6. Examine glass fractures to determine direction of impact for the projectile. 7. Describe the proper collection of glass evidence. 8. Compute the density of glass fragments. 9. Determine the relative refractive indices of several glass fragments. 10. List important forensic properties of soil. 11. Describe the proper collection of soil evidence. 12. Analyze physical properties of soil.	3	3	0
Chemistry Introduction and Inorganic Analysis	1. Describe the usefulness of trace element analysis in forensic science. 2. Identify elements based on their emission spectra. 3. Define matter, element, compounds, isotope, and radioactivity. 4. Identify the role that protons, neutrons, and electrons play in the atom. 5. Examine evidence with a UV light. 6. Explain how atoms emit light. 7. List several inorganic analytical techniques and state if they are presumptive, confirmatory, sensitive, and/or destructive.	3	3	0
Organic Analysis	1. Identify elements, compounds, and mixtures. 2. Explain the difference between the terms class characteristic, individual characteristic, presumptive test, and confirmatory test. 3. Define and identify presumptive and confirmatory tests for organic compounds. 4. Explain gas and thin layer chromatography and their uses in forensic science. 5. Describe the electromagnetic spectrum and the use of absorption spectroscopy in forensic science. 6. Explain mass spectrometry and its use in forensic science. 7. Identify techniques as sensitive and/or specific. 8. Presumptively identify over-the-counter drugs and ink dyes by thin layer chromatography. 9. Calculate Rf values. 10. Use the infrared spectroscopy instrument.	3	2	0

Course Segment	Learning Outcomes	Lecture Hours	Lab Hours	Clinical Hours
Drugs	1. Define psychological and physical dependence. 2. Name and classify the commonly abused drugs. 3. Describe the schedules of the Controlled Substances Act. 4. Describe laboratory and field tests for controlled substances. 5. Describe the proper collection of drug evidence. 6. Identify drugs and poisons by infrared spectroscopy and use qualitative analysis to analyze over-the-counter drugs.	1.5	2	0
Forensic Toxicology	1. List what factors influence BAC. 2. Describe field and lab tests for alcohol. 3. Define and give examples of a "false positive". 4. Describe the laboratory tests used to perform routine drug identification including: color tests, chromatographic techniques, spectroscopic techniques, and microscopic technique to identify marijuana.	1.5	1	0
Fire Investigation	1. List the components needed for a fire to occur. 2. Explain the collection and analysis of arson residues. 3. Detect arson accelerants by gas chromatography. 4. Describe how to tell if a fire is incendiary.	3	3	0
Blood Typing and Biochemistry	1. List blood types; explain agglutination. 2. Explain the difference between an antigen and antibody. 3. Identify the four major biomolecules and explain their use in the body. 4. Produce Punnett squares to explain hereditary patterns of blood types. 5. Define genotype and phenotype and relate the terms to blood typing. 6. Identify major biomolecules and their role in forensic crime scene investigation. 7. Use reagents to identify lipids, carbohydrates, proteins, and (simulated) blood types.	3	3	0
DNA Analysis	1. Summarize the parts of DNA and how DNA relates to genes and chromosomes. 2. Describe the basic concepts of base-pairing, double helices, and tandem repeats. 3. Explain electrophoresis and its use in forensic science. 4. Explain restriction fragment length polymorphism (RFLP), polymerase chain reaction (PCR), and short tandem repeats (STR) and their uses in forensic science. 5. Distinguish between mitochondrial and nuclear DNA. 6. Perform DNA extraction and DNA fingerprinting. 7. List some sources of DNA evidence, including types of cells that contain DNA.	3	3	0
Forensic Subfields	1. Discuss current topics in forensics such as the 2009 NAS report, new DNA technology, and other subfields. 2. Relate course topics to a field trip to the Champaign Police Department and/or Illinois Fire Service Institute. 3. Apply course topics in presentation(s) on various forensic case studies that involve the analysis of physical evidence and/or on areas where forensic science has been misapplied leading to wrongful convictions.	4	4	0

Total Contact Hours

Lecture Hours	Lab Hours	Clinical Hours
45	45	0