



AJ-124: INTRODUCTION TO FORENSICS FOR LAW ENFORCEMENT

Effective Term

Fall 2026

BOT Approval Date

03/20/2025

Discipline

AJ - Administration of Justice

Course Number

124

Course Title

Introduction to Forensics for Law Enforcement

Short Title

Forensics

Credit Status (CB 04)

D - Credit - Degree applicable

Units

Lecture Units

3.00

Total Units

3.00

Hours

Lecture Contact Hours

48-54

Out of Class Hours Lecture

96-108

Total Contact Hours

48 - 54

Total Out of Class Hours

96 - 108

Total Student Learning Hours

144 - 162

Distance Education

Yes

Distance Education

Distance Education Type

Both Fully Online and Hybrid Online

Fully Online Delivery Requirements:

a. Students must be notified via the college schedule of classes and the syllabus for the class if proctored tests are required for this course



b. Any planned face-to-face meetings, such as an orientation or study session, must be optional

c. The MSJC curriculum committee requires the use of accessible, asynchronous discussion as a component of every fully online course

Are you using publisher content?

No

Regular Substantive Interaction

Instructor-to-student, student-to-student, and student-to-content contact shall be distributed in a manner that will ensure regular substantive interaction (RSI) is maintained not only weekly but also for the duration of the course. Instructor interactions should be equivalent in time, quality and consistency to the engagement students would receive in a face-to-face course—for example, through announcements, discussion participation, personalized feedback, video messages, or other instructional communications. Instructors are expected to be responsive to student inquiries within a 24-72 hour time frame excluding holidays. RSI will be maintained through a variety of methods:

- **Orientation** - Students must be oriented to the online and face-to-face portions at the start of the course.
- **Announcements** - Announcements using the course management system must be posted at least weekly to keep students current on course events, due dates, materials, etc.
- **Discussion Forums** - Content-related discussion forums within the designated CMS will include appropriate instructor participation and will be initiated and maintained, with timely feedback provided. Instructors are required to monitor the discussions and related activities to provide guidance and direction. Open-ended discussion boards may be used to further learning and interaction.
- **MSJC Communication** – Instructor will use MSJC-administered communication tools (such as email or the designated CMS communication tools) to regularly communicate with and provide ease of access to students.
- **Timely Feedback** - Timely feedback on student work will be provided by the instructor, which may include comments and/or rubrics, within the Grades area of the designated CMS.
- **Scheduled Meetings** – Hybrid and synchronous courses will meet at regularly scheduled times. ADA Compliance - All course interactions and content must be designed with accessibility in mind and meet ADA requirements.

Catalog Description

This course introduces students to the application of scientific principles to solve criminal cases. The course addresses the techniques and procedures in the investigation of crimes and also the ethical issues associated with the collection and analysis of evidence. Content includes the analysis of fingerprinting, firearms, tool marks, impressions, hair and fibers, DNA, along with the role of crime scene investigators and forensic specialists.

Requisites

Recommended Preparation

Recommended Preparation (note that students can enroll in the class even if they haven't take the recommended course)

ENGL-C1000.

Codes

TOP Code (CB 03)

2105.40* - *Forensics, Evidence, and Investigation

CIP Code

43.0106 - Forensic Science and Technology.

Repeatability Code

No

Grading Option

Letter grade OR P/NP

Minimum Qualifications

Minimum Qualifications	And/Or
Administration of Justice	End

Learning Objectives

Learning Objectives

Learning Objective

1. Assess and validate the need for and importance of a preliminary crime scene investigation to include crime scene security, evidence identification, collection, processing, and preservation.
2. Examine and formulate an understanding of the implications that relevant U.S. Supreme Court case decisions might have in conducting a crime scene investigation and the admissibility of physical evidence in court.
3. Compare and contrast the various scientific tools (equipment/instruments) available to a crime scene technician and how they are used for specific evidence found at the crime scene.
4. Consider and explain how physical evidence is analyzed and presented in the courtroom by a forensic specialist and how the admissibility of evidence is determined.
5. Prepare and diagram how a crime scene should be drawn or sketched to include vital information such as locations of evidence found at the crime scene.
6. Categorize and determine the proper techniques for packaging common types of physical evidence.
7. Analyze how forensic science policy and practice is influenced by law, history, and contemporary politics in the local and national contexts and demonstrate an understanding of how bias, to include race, gender, sex, or culture, might impact forensic policy and practice.
8. Question and assess how forensic confirmation bias describes how an individual's beliefs, motives, and situational context can affect the way in which criminal evidence is collected and evaluated.

Learning Outcome Information

Course Learning Outcomes

Learning Outcome

1. Students will explain the goal of physical evidence in the criminal justice system.
2. Students will specify what the field of criminalistics encompasses.
3. Students will identify the capabilities of crime laboratories regarding the examination and analysis of various types of physical evidence.
4. Students will recognize the different types of physical evidence that could be found at a crime scene.
5. Students will demonstrate the ability to take accurate notes and write complete and accurate reports.
6. Students will be able to describe visible, plastic, and latent fingerprints and the techniques for developing each.
7. Students will develop an understanding of the scientific principles of crime scene investigation and reconstruction, including evidence collection and preservation.
8. Students will receive hands on training in a forensic laboratory methodology with respect to the analysis of physical evidence.
9. Students will demonstrate an understanding of the fundamentals of criminal law, the rules of evidence, chain of custody and the legal basis for the admissibility of scientific evidence in courts of law.

Content

Course Lecture Content

1. Introduction to Criminalistics
 - a. Definition and Scope of Forensic Science
 - b. American Academy of Forensic Science
 - c. The CSI Effect
 - d. Issues of Race and Gender in Forensic Science
 - e. History and Development of Forensic Science
 1. Mathieu Orfila (1787-1853)
 2. Alphonse Bertillon (1853-1914)
 3. Francis Galton (1822-1911)
 4. Leone Lattes (1887-1954)
 5. Calvin Goddard (1891-1955)

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6. Albert Osborn (1858-1946)
 7. Walter McCrone (1916-2002)
 8. Hans Gross (1847-1915)
 9. Edmond Locard
 - f. Locard's Exchange Principle
 - g. Crime Laboratories
 1. FBI
 2. DEA
 3. ATF
 - h. International Crime Labs
 1. Scotland Yard
 - i. Organization of a Crime Laboratory
 - j. Types of Crime Labs
 1. Federal
 2. State
 3. Local
 - k. Services of the Crime lab
 1. Physical Science Unit
 2. Biology Unit
 3. Firearms Unit
 4. Document Examination Unit
 5. Photography Unit
 6. Toxicology Unit
 7. Latent Print Unit
 8. Polygraph Unit
 9. Voiceprint Analysis Unit
 10. Crime Scene Investigation Unit
 - l. Functions of the Forensic Scientist
 - m. Other Forensic Science Services
 - n. Diversity and Equity in the Forensic Sciences
2. The Crime Scene
 - a. Processing the Crime Scene
 1. Physical Evidence
 - b. Securing the Crime Scene
 1. First Officer on Scene
 2. Detectives
 - a. Walk Through
 3. Coroner
 - c. Recording the Crime Scene
 1. Photography
 2. Video Recording
 3. 3D Laser Scanners
 4. Crime Scene Sketch
 - a. Rough Sketch
 - b. Final Sketch
 - d. Conducting a systematic Search for Evidence
 - e. Search Patterns
 1. Strip or Line
 2. Grid

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- 3. Spiral
 - 4. Wheel/Ray
 - 5. Quadrant
 - f. Locating Physical Evidence
 - g. Collecting and Packaging Physical Evidence
 - 1. Handling Evidence
 - 2. Packaging Evidence
 - 3. Biological Materials
 - 4. DNA Evidence
 - 5. Containers
 - 6. Item Packaging
 - h. Maintaining Chain of Custody
 - i. Obtaining Standard/Reference Samples
 - 1. Standard Sample
 - 2. Buccal Swab
 - 3. Substrate Control
 - j. Submitting Evidence to the Laboratory
 - k. Ensuring Crime Scene Safety
 - l. Legal Considerations at the Crime Scene
 - 1. The Fourth Amendment
 - 2. Mincey v. Arizona
 - 3. Michigan v. Tyler
 - 3. Physical Evidence
 - a. Common Types of Physical Evidence
 - 1. Blood, Semen, Saliva
 - 2. Documents
 - 3. Drugs
 - 4. Explosives
 - 5. Fibers, Hair
 - 6. Fingerprints
 - 7. Firearms
 - 8. Glass
 - 9. Impressions
 - 10. Organs and Physiological Organs
 - 11. Paint
 - 12. Petroleum Products
 - 13. Plastic Bags
 - 14. Plastic, Rubber, Polymers
 - 15. Powder Residue
 - 16. Serial Numbers
 - 17. Soil and Minerals
 - 18. Tool Marks
 - 19. Vehicle Lights
 - 20. Wood and Vegetative Matter
 - b. The Significance of Physical Evidence
 - 1. Identification
 - 2. Comparison
 - 3. Individual Characteristics
 - 4. Class Characteristics

- c. Product Rule
- d. Assessing the Significance of Physical Evidence
- e. Assessing the Value of Physical Evidence
- f. Assessing the Limitations of Physical Evidence
- g. Forensic Databases
 - 1. Fingerprint Databases
 - a. Automated Fingerprint Identification System (AFIS)
 - b. Integrated Automated Fingerprint Identification System (IAFIS)
 - 2. DNA Databases
 - a. Combined DNA Index System (CODIS)
 - b. Ethical Issues
 - c. Race and Gender Issues and Considerations
 - 3. Other Databases
 - a. International Forensic Automotive Paint Data Query
 - b. Shoeprint image capture and Retrieval System
 - c. Tread Mate Tire Track System
 - d. National Missing and Unidentified Persons System
 - h. Rapid DNA
- 4. Crime Scene Reconstruction - Blood Stain and Pattern Analysis
 - a. Crime Scene Reconstruction
 - 1. Principles of Crime Scene Reconstruction
 - 2. Personnel Involved in Reconstruction
 - b. General Feature of Bloodstain Formation
 - 1. Surface Texture
 - 2. Direction and Angle of Impact
 - 3. Satellite Spatter
 - 4. Impact Spatter
 - 5. Forward Spatter
 - 6. Back Spatter
 - c. Classifying Impact Spatter
 - 1. Low Velocity Spatter
 - 2. Medium Velocity Spatter
 - 3. High Velocity Spatter
 - d. Origin of Impact Patterns
 - 1. Area of Convergence
 - 2. Area of Origin
 - e. Bloodstain Spatter Patterns
 - 1. Gunshot Spatter
 - 2. Cast-Off Spatter
 - 3. Arterial Spray Spatter
 - 4. Expirated Blood Patterns
 - 5. Void Patterns
 - 6. Contact/Transfer Patterns
 - 7. Flows
 - 8. Pools
 - a. Skeletonization
 - 9. Drip
 - e. Documenting Bloodstain Pattern Evidence
 - f. Bloodstain Reconstruction

5. Death Investigation

- a. Role of the Forensic Pathologist
 - 1. Forensic Pathologist Defined
 - 2. Scene Investigation
- b. Role of the Coroner
- c. The Autopsy
 - 1. Autopsy Defined
 - 2. Evidence from Autopsy
 - 3. External Examination
 - 4. Internal Examination
 - 5. Toxicology
- d. Cause of Death
 - 1. Blunt Force Injury
 - 2. Sharp Force Injury
 - 3. Asphyxia
 - a. Petechiae
 - 4. Gunshot Wounds
- e. Manner of Death
 - 1. Homicide
 - 2. Suicide
 - 3. Accidental
 - 4. Natural Causes
 - 5. Undetermined
- f. Estimating Time of Death
 - 1. Algor Mortis
 - 2. Liver Mortis
 - 3. Rigor Mortis
 - 4. Potassium Eye Levels
 - 5. Stomach Contents
 - 6. Decomposition
- g. Role of the Forensic Anthropologist
- h. Forensic Anthropology
 - 1. Recovering Remains
 - 2. Processing Remains
 - 3. Determining Victim Characteristics
 - 4. Other Contributions of Forensic Anthropology
- i. Role of the Forensic Entomologist
 - 1. Defining Forensic Entomology
 - 2. Determining Time of Death
 - 3. Postmortem Interval
 - 4. Other Contributions of Forensic Entomology

6. Fingerprints

- a. History of Fingerprinting
 - 1. Alphonse Bertillon
 - 2. Portrait Parle'
 - 3. Anthropometry
- b. Early Use of Fingerprints
- c. Early Classifications of Fingerprints
- d. Fundamentals of Fingerprinting

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- 1. A Fingerprint is an Individual Characteristic
 - 2. A Fingerprint Remains Unchanged
 - 3. Fingerprints Have General Ridge Patterns
 - e. Adoption of Fingerprinting
 - f. Classifications of Fingerprints
 - 1. Ridge Characteristics
 - 2. Ridge Comparisons
 - h. Structure of the Skin
 - 1. Epidermis
 - 2. Dermis
 - i. Patterns
 - 1. Loops
 - 2. Whorls
 - 3. Arches
 - j. Automated Fingerprint Identification Systems
 - 1. AFIS
 - 2. IAFIS
 - 3. Livescan
 - e. Methods of Detecting Fingerprints
 - f. Locating Fingerprints
 - 1. Visible Print
 - 2. Plastic Print
 - 3. Latent Print
 - 4. Fingerprint Powders
 - 5. Iodine Fuming
 - 6. Ninhydrin
 - 7. Superglue
 - 8. Alternate Light Source
 - g. Preservation of Fingerprints
 - h. Digital Imaging
 - 1. Creating Digital Images
 - 2. Analyzing Digital Images
 - 7. Forensic Biometrics
 - a. Introduction to Biometrics
 - 1. Biometric Defined
 - 2. Biometric Matching
 - 3. Biometric Verification
 - b. Types of Forensic Biometrics
 - 1. Physiological Biometrics
 - 2. Behavioral Biometrics
 - c. Biometric Data
 - 1. Extraction Process
 - 2. Template Process
 - d. The Iris
 - 1. Iris and Retina
 - 2. How it Works
 - 3. Iris Codes
 - 4. Current Application
 - e. Facial Recognition

- f. Next Generation Systems

- 8. The Microscope

- a. Basics of the Microscope

- 1. Virtual Image
 - 2. Real Image
 - 3. Objective Lens
 - 4. Eyepiece Lens

- b. Compound Microscope

- 1. Parts of the Compound Microscope
 - 2. Transmitted Illumination
 - 3. Vertical or Reflected Illumination
 - 4. Field of View
 - 5. Depth of Focus

- c. Comparison Microscope

- 1. Side by Side Comparison

- d. Stereoscopic Microscope

- 1. Three-Dimensional View

- e. Polarizing Microscope

- 1. Uses Polarized Light to see Objects (Trace Evidence)

- f. Microspectrophotometer

- 1. Measures Chemical Compositions

- g. Scanning Electron Microscope (SEM)

- h. Forensic Palynology

- 1. Pollen and Spores as Evidence

- 9. Firearms, Tool Marks, Impressions

- a. Types of Firearms

- 1. Firearms Identification
 - 2. Single Shot
 - 3. Revolver
 - 4. Semiautomatic
 - 5. Fully Automatic
 - 6. Long Gun

- b. Bullet and Cartridge Comparisons

- 1. The Gun Barrel
 - 2. Grooves
 - 3. Rifling
 - 4. Bore
 - 5. Lands
 - 6. Caliber
 - 7. Gauge

- c. Comparing Bullet Markings

- d. Considerations in Bullet Comparison

- e. Cartridge Cases

- 1. Breechface
 - 2. Extractor
 - 3. Ejector
 - 4. Striations

- f. Automated Firearms Search Systems

- 1. DRUG-FIRE

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- 2. National Integrated Ballistics Information Network (NIBIN)
 - g. Gunpowder Residues
 - 1. Distance Determination
 - 2. Handguns
 - 3. Rifles
 - 4. Shotguns
 - h. Greiss Test
 - i. Primer Residues
 - 1. Detecting Primer Residues
 - 2. Tests for Primer Residues
 - 3. Swabbing
 - 4. SEM Testing
 - j. Serial Number Restoration
 - k. Tool Marks
 - 1. Comparing Tool Marks
 - 2. Collecting Tool Mark Evidence
 - l. Impressions
 - 1. Preserving Impressions
 - 2. Lifting Impressions
 - 3. Casting Impressions
 - 4. Comparing Impressions
 - 10. Matter, Light, Glass Examination
 - a. Physical Property
 - b. Chemical Property
 - c. The Nature of Matter
 - 1. Matter
 - 2. Element
 - 3. Periodic Table
 - 4. Compound
 - d. States of Matter
 - 1. Physical State
 - 2. Solid
 - 3. Liquid
 - 4. Gas
 - e. Physical Properties of Matter
 - 1. Basic Units of Measurements
 - 2. Metric Conversions
 - f. Metric Conversion
 - 1. Density
 - 2. Intensive Property
 - 3. Fahrenheit Scale
 - 4. Celsius Scale
 - g. Refractive Index
 - h. Theory of Light
 - 1. Wavelength
 - 2. Frequency
 - 3. Electromagnetic Spectrum
 - 4. X-Ray
 - 5. Laser

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- 6. Photon
 - i. Forensic Analysis of Glass
 - 1. Composition of Glass
 - a. Tempered Glass
 - b. Laminated Glass
 - 2. Comparing Glass Fragments
 - 3. Measuring and Comparing Density
 - 4. Determining and Comparing Refractive index
 - 5. Classification of Glass Samples
 - e. Glass Fractures
 - 1. Radial Fracture
 - 2. Concentric Fracture
 - f. Collection and Preservation of Glass Evidence
 - 11. Hairs and Fibers
 - a. Forensic Examination of Hair
 - b. Morphology of Hair
 - 1. Cuticle
 - 2. Cortex
 - 3. Medulla
 - c. Patterns
 - 1. Continuous
 - 2. Interrupted
 - 3. Fragmented
 - d. Identification of Hair
 - 1. Anagen Phase
 - 2. Catagen Phase
 - 3. Telogen Phase
 - e. Considerations in Hair Examinations
 - 1. Can the Body Area from Which a Hair Originated be Determined?
 - 2. Can the Racial Origin of Hair be Determined?
 - 3. Can the Sex and Age of a Person be Determined from Hair?
 - 4. Is it Possible to Determine if Hair was Forcibly Removed?
 - 5. Are Efforts Being Made to Individualize Human Hair?
 - 6. Is it Possible to Determine Whether Hair Came from a Deceased Person?
 - 7. Can DNA Individualize a Human Hair?
 - f. Collection and Preservation of Hair
 - g. Forensic Examination of Fibers
 - 1. Types of Fibers
 - 2. Natural
 - 3. Manufactured Fibers
 - h. Identification and Comparison of Manufactured Fibers
 - 1. Microscopic Examination
 - 2. Dye Composition
 - 3. Chemical Composition
 - i. Collection and Preservation of Fiber Evidence
 - 12. Drugs
 - a. Drug Dependence
 - 1. Psychological Dependence
 - 2. Physical Dependence

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- 3. Societal Aspects of Drugs
 - b. Types of Drugs
 - 1. Narcotics
 - 2. Opiates
 - 3. Synthetic Opiates
 - 4. Hallucinogens
 - 5. Marijuana
 - 6. Other Hallucinogens
 - 7. Depressants
 - 8. Stimulants
 - 9. Club Drugs
 - 10. Anabolic Steroids
 - c. Drug Control Laws
 - 1. Controlled Substances Act
 - d. Control Mechanisms and Penalties
 - 1. Schedule I
 - 2. Schedule II
 - 3. Schedule III
 - 4. Schedule IV
 - 5. Schedule V
 - e. Collection and Preservation of Drug Evidence
 - f. Forensic Drug Analysis
 - 1. The Analytical Process
 - 2. Screening
 - 3. Confirmation
 - 4. Quantitative
 - 5. Qualitative
 - 6. Color Tests
 - 7. Microcrystalline Tests
 - g. Chromatography
 - 1. Gas Chromatography
 - 2. Thin Layer Chromatography
 - h. Spectrophotometry
 - 1. Ultraviolet
 - 2. Visible
 - 3. Infrared
 - i. Mass Spectrometry
 - 13. Forensic Toxicology
 - a. Role of Forensic Toxicology
 - b. Toxicology of Alcohol
 - 1. Metabolism of Alcohol
 - 2. Absorption and Distribution
 - 3. Blood Alcohol Concentration
 - c. Testing for Intoxication
 - 1. Breath Testing for Alcohol
 - 2. Breath Test Instruments
 - 3. Considerations in Breath Tests
 - d. Field Sobriety Testing
 - 1. Horizontal Gaze Nystagmus

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- 2. Walk and Turn
 - 3. One Leg Stand
 - 4. Preliminary Breath Test (PAS) Device
 - e. Analysis of Blood for Alcohol
 - 1. Collection
 - 2. Preservation
 - 3. Anticoagulant
 - f. Alcohol and the Law
 - 1. Blood Alcohol Laws
 - 2. Constitutional Issues
 - g. The Role of the Toxicologist
 - 1. Toxicologist Defined
 - 2. Challenges
 - 3. Collection and Preservation of Evidence
 - 4. Techniques Used
 - h. Thin Layer Chromatography
 - i. Gas Chromatography
 - j. Immunoassay
 - k. The Drug Recognition Expert
 - 14. Metals, Paint, Soil
 - a. Forensic Analysis of Trace Elements
 - b. The Emission Spectrum of Elements
 - 1. Emissions Spectrum
 - 2. Continuous Spectrum
 - 3. Line Spectrum
 - c. Atomic Structure
 - 1. Proton
 - 2. Electron
 - 3. Neutron
 - 4. Nucleus
 - d. Isotopes and Radioactivity
 - 1. Atomic Mass
 - 2. Isotope
 - 3. Radioactivity
 - 4. Alpha Particle
 - 5. Beta Particle
 - 6. Gamma Ray
 - e. Forensic Analysis of Paint
 - 1. Composition of Paint
 - 2. Microscopic Examination of Paint
 - f. Collection and Preservation of Paint
 - g. Forensic Analysis of Soil
 - 1. Significance of Soil Evidence
 - 2. Forensic Examination of Soil
 - 3. Variations in Soil
 - h. Collection and Preservation of Soil Evidence
 - 15. Forensic Serology
 - a. The Nature of Blood Typing
 - 1. Deoxyribonucleic Acid (DNA)

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- 2. Plasma
 - 3. Erythrocyte
 - b. Antigens and Antibodies
 - 1. Serum
 - 2. Antigen
 - 3. Antibody
 - 4. Antibody
 - 5. Antiserum
 - 6. Agglutination
 - c. Blood Typing
 - 1. Serology
 - d. Forensic Characteristics of Bloodstains
 - 1. Hemoglobin
 - 2. Color Tests
 - 3. Luminol/Bluestar
 - 4. Microcrystalline Tests
 - 5. Precipitin Test
 - 6. Gel Diffusion
 - e. Principles of Heredity
 - 1. Genes and Chromosomes
 - 2. X Chromosomes
 - 3. Y Chromosomes
 - f. Forensic Characteristics of Semen
 - 1. Acid Phosphatase
 - 2. Microscopic Examination
 - 3. Prostate Specific Antigen
 - g. Collection and Preservation of Rape Evidence
 - h. DNA
16. DNA - The Indispensable Forensic Science Tool
- a. What is DNA
 - 1. Deoxyribonucleic Acid
 - b. Structure of DNA
 - 1. Chromosome
 - 2. Polymer
 - 3. Nucleotide
 - c. DNA at Work
 - 1. Proteins
 - 2. Amino Acids
 - d. Replication of DNA
 - 1. The Process of Replication
 - e. DNA Typing
 - 1. Tandem Repeats
 - 2. Short Tandem Repeats
 - 3. Primer
 - 4. Hybridization
 - 5. Multiplexing
 - 6. Typing with STRs
 - 7. Significance of DNA Typing
 - f. Combined DNA Index System (CODIS)

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- 1. Mitochondrial DNA
 - g. Collection and Preservation of Biological Evidence
 - h. Contamination of DNA Evidence
 - i. Ethical Issues
 - j. Race and Gender Issues With DNA
 - k. Touch DNA
17. Forensic Aspects of Fire and Explosion Investigation
- a. Forensic Investigation of Arson
 - 1. Modus Operandi
 - b. Chemistry of Fire
 - 1. Oxidation
 - 2. Energy
 - 3. Combustion
 - a. Exothermic
 - b. Heat of Combustion
 - c. Endothermic Reactions
 - 4. Heat
 - a. Ignition Temperature
 - b. Flash Point
 - c. Flammable Range
 - c. Speed of Reaction
 - 1. Spontaneous Combustion
 - 2. Glowing Combustion
 - d. Searching the Fire Scene
 - 1. Searching for Accelerants
 - 2. Locating the Fires Origin
 - e. Collection and Preservation of Arson Evidence
 - 1. Substrate Control
 - 2. Igniters and Other Evidence
 - f. Analysis of Flammable Residues
 - 1. The Headspace Technique
 - 2. Vapor Concentration
 - g. Explosions and Explosives
 - 1. Chemistry of Explosives
 - 2. Explosions
 - 3. Oxidizing Agent
 - h. Types of Explosives
 - 1. Deflagration
 - 2. Detonation
 - 3. Low Explosive
 - 4. Black Powder
 - 5. Safety Fuse
 - 6. Smokeless Powder
 - 7. High Explosives
 - 8. Primary Explosives
 - 9. Secondary Explosives
 - 10. Detonating Cord
 - i. Collection and Preservation of Explosive Evidence
18. Document Examination

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- a. Document Examiner
 - 1. Questioned Document
 - b. Handwriting Comparisons
 - 1. General Style
 - 2. Variations in Handwriting
 - 3. Changes to Handwriting Comparisons
 - c. Collection of Handwriting Exemplars
 - 1. Determining Authenticity
 - 2. Exemplar
 - 3. Natural Variations
 - 4. Obtaining a Writing Sample
 - d. Transcript Comparisons
 - 1. Photo
 - 2. Fax
 - 3. Printer
 - e. Alterations, Erasures, Obliterations
 - 1. Erasure
 - a. Infrared Luminescence
 - 2. Obliterations
 - a. Charred Documents
 - f. Ink and Paper Comparison
19. Computer Forensics
- a. How Does a Computer Work
 - 1. Hardware
 - a. Case/Chassis
 - b. Power Supply
 - c. Motherboard
 - d. System Bus
 - e. Memory
 - f. Central Processing Unit
 - g. Random Access Memory
 - h. Hard Drive
 - 2. Software
 - b. Storing and Retrieving Data
 - c. Processing the Electronic Crime Scene
 - 1. Documenting the Crime Scene
 - 2. Live Computer Acquisition
 - 3. Forensic Image Acquisition
 - d. Analysis of Electronic Data
 - 1. Visible Data
 - 2. Data Files
 - 3. Swap File
 - 4. Temporary File
 - 5. Latent Data
 - 6. Deleted Files
 - e. Forensic Analysis of Internet Data
 - 1. Internet Cache
 - 2. Internet Cookies
 - 3. Internet History

- 4. Bookmarks
- 5. Favorite Places
- 6. Email
- 7. Chat
- 8. Messaging
- f. Hacking
 - 1. Firewall
- g. Mobile Forensic
- 20. Mobile Device Forensics
 - a. What Makes a Mobile Device
 - 1. Broadband
 - 2. Analog
 - 3. Wi-Fi
 - 4. GSM/CDMA
 - b. Forensic Challenges
 - 1. Operating Systems
 - 2. Architecture
 - 3. Geolocation
 - 4. Global Positioning System (GPS)
 - c. Extracting Data
 - 1. Physical Extraction
 - 2. Logical Extraction
 - d. Mobile Device Architecture
 - 1. Secure Digital Cards (SD)
 - 2. Subscriber Identification Module Cards (SIM)
 - 3. File Systems
 - e. Analyzing Mobile Device Data
 - 1. Short Message Service (SMS)
 - f. Hybrid Crime Assessment: Digital Forensic Investigation

Methods of Instruction

Method

Discussion

Integration

Discussions will be guided by faculty to examine and evaluate selected topics in the study of criminal investigation. These selected topics will assist students in differentiating the unique investigative processes for specific crime types. For example, students may be asked to explain the different processes for developing latent fingerprints. Discussions may be accomplished in small or large groups, synchronous or asynchronous, using closed-captioned videos, accessible audio/visual media, journals, articles, or discussion board forums.

DE Adaptations for MOI

Discussions will be guided by faculty to examine and evaluate selected topics in criminalistics. Class participation in discussions will encourage additional comprehension of the course material. Additionally, discussions provide opportunities to exchange ideas and validate understanding of the content to include professional responsibility, ethical standards, and racial/cultural diversity as it relates to criminal investigations. Discussions will be administered through the regular use of the discussions area in the course management system (CMS), or through chat, conversations, or other group features. All online discussions will meet accessibility requirements and instructors will provide feedback weekly through the CMS.

Method

Observation and Demonstration

Integration

Students will be exposed to different forensic science equipment (tools) in order to increase their knowledge of available equipment for different crime scenes. The forensic equipment includes, but is not limited to; alternate light sources, evidence packaging materials, fingerprint chambers, latent fingerprinting materials, fuming chambers, comparison microscopes, 3D laser reconstruction scanners, plaster casting materials, computerized composite sketch system (Identi-Kit), digital cameras, digital video cameras, drone technology, and AI technology.

DE Adaptations for MOI

Online students will view accessible video (media) demonstrations of the forensic lab equipment to include accessible digital slide presentations. All articles, accessible video (media), website links, or other applicable information will be posted in the CMS for students to access. All information must meet accessibility guidelines.

Method

Lecture

Integration

Lectures in which criminalistics course content will be presented to students to illustrate, explain, and reinforce forensic science concepts to include identification, collection, processing, and analyzing of physical evidence. Course material may be presented in many formats; accessible audio/visual aids, printed materials, digital slide presentation, closed captioned video, digital pictures, and/or digital slides. For example, lectures can include an overview of the importance of digital photography, video, and sketches at major crime scenes.

DE Adaptations for MOI

Online courses will include lectures on criminal investigation course content. Lectures can be delivered synchronously through video conferencing tools or asynchronously through the course management system (CMS). Presentation materials such as accessible digital slide presentations, closed captioned videos, external links to articles, or other accessible content may be incorporated and made available through the CMS.

Method

Visiting Lecturers

Integration

Visiting lecturers (current or former practitioners) may speak and/or offer a presentation on a topic covered in the criminalistics course content. Guest speakers in the field of law enforcement, courts, corrections, coroner's office, criminology, forensics, forensic anthropology, or other content specialists may offer presentations face-to-face, through the course management system (CMS), or other video conferencing tools/platforms. Examples of presentation topics include an overview of crime scene investigation, evidence collection and preservation, the importance of interview and interrogations, and report preparation to include crime scene sketching and photography.

DE Adaptations for MOI

Visiting lecturers may speak and/or offer presentations on various topics covered in the criminal investigation course content. Examples may include crime scene evidence collection and processing, and/or race, bias, and inequity relating to interview and interrogations. Lectures may be conducted through an accessible video conferencing platform or through a pre-recorded presentation that can be uploaded and made available by using accessible tools to students in the CMS. Faculty can facilitate a debriefing discussion through the video conferencing platform's chat feature or through a discussion board function in the CMS.

Methods of Evaluation**Method**

Exams/Tests

Integration

Exams and/or tests will formatively cover the major content of the criminal investigation content. A combination of multiple choice, true/false, or short answer questions may be included. Exams/test will be evaluated based on a demonstration of identification, understanding, and application of various components related to crime scene investigation to include the role of investigators and case laws the impact search and seizure, and other related issues to include, but not limited to, race and gender as it relates to eyewitness identification or wrongful convictions. For example, exams/tests may be used to assess a student's ability to understand the legal aspects of DNA analysis.

DE Adaptations for MOE

Exams and/or tests administered fully online will be administered, graded, and evaluated through the CMS. Exams/tests will be evaluated based on the demonstration of identification, understanding, and application of major topics as described in the course content. Exams/tests will be multiple choice, true-false, fill in the blank, or short answer questions. Exams/tests will be graded (or evaluated if short answer questions) based on accuracy and completeness. Feedback for multiple choice, true-false, and fill in the blank will be immediate using the online grading system (grade book). Feedback for short answer questions will be within one week via the grade book, chat, or other accessible conferencing tools.

Method

Homework

Integration

Homework in the form of selected essay questions at the end of each textbook chapter to appraise comprehension of the course material. Example question: What is the CSI Effect and how does this relate to a criminal investigation? Homework will be evaluated on accuracy and completeness.

DE Adaptations for MOE

Students will complete homework assignments in the form of short essay questions found at the end of each chapter in the textbook. Assignments will be posted in the assignment area of the CMS. Students will be evaluated on their ability to research and assess the topic and their successful application of the course material in the responses. Questions will be posted in the assignments or discussions areas in the CMS. Students will upload completed assignments via the CMS for instructor review and grading. Feedback will be provided through the grade book, chat, or other accessible conferencing tools in the CMS.

Method

Research Projects

Integration

The class will be required to complete a research project examining a U.S. Supreme Court case (ruling) regarding search and seizure to evaluate the student's understanding of the course material. The research will include the student's analysis of the ruling and its impact on a criminal investigation, to include their ability to identify ethical issues resulting from the case. Example case: *Mincey v. Arizona* 437 U.S. 385 (1978). The project will be submitted for instructor review and grading and will be evaluated on content, accuracy, thoroughness, and completeness.

DE Adaptations for MOE

Group or individual projects will be assigned and submitted through the course management system (CMS). Students can communicate with peers and the instructor through discussion boards, chat, or other conferencing tools. The student will be evaluated on their writing skills as well as their adherence to the APA/MLA format in their completed research assignments. Students may also be required to present their results through the creation of digital slide presentation, written report, accessible video, or live video conference and the presentations may be made available to the entire class (with student approval) through the CMS. Research projects will be submitted via the CMS to allow for feedback and grading by the instructor. Feedback will be provided within two weeks of the due date, via comments within the assignments area along with a corresponding rubric.

Method

Role-playing/Simulation

Integration

Students will examine and process a mock crime scene depicting a criminal incident (homicide). Students will take notes on the scenario content and in teams (or individually) process the crime scene to include identifying, collecting, packaging, and documenting

any physical evidence. In addition, students will photograph and sketch the crime scene. Evaluation will be based on the ability to accurately complete the crime scene investigative steps and thoroughly document the incident.

DE Adaptations for MOE

Online students will view accessible closed captioned video scenarios depicting a criminal incident (homicide) scene. Students will take notes on the scenario content and in groups (or individually) will describe the crime scene process to include identifying, collecting, packaging, and documenting any physical evidence. In addition, students will sketch the crime scene. Evaluation will be based on the ability to accurately complete the crime scene investigative steps and thoroughly document the incident. Students will upload completed assignments via the CMS for instructor review and grading. Feedback will be provided through the grade book, chat, or other accessible conferencing tools in the CMS.

Method

Papers

Integration

Papers/reports will be assigned to gauge the comprehension of course materials or a specific topic. Paper/reports serve as exercises in which students apply learned concepts related to the application of forensic science in criminal investigations. For example, students will complete a two-to-three-page paper on Locard's Exchange Principle. The paper will be evaluated on accuracy, completeness, and the understanding of how this principle applies to physical evidence and criminal investigations.

DE Adaptations for MOE

Papers/reports (case studies) administered in an online format will use the course management system (CMS) functions to facilitate student submissions. Evaluation feedback of reports will be provided for students in a timely manner using the gradebook, live stream or video conferencing tools, inbox messaging, or other functions available through the CMS. Reports will be evaluated based on the following criteria: demonstration of organization and clarity, formatting, accuracy, investigative steps, understanding and application of legal concepts, and completeness. All report submissions and feedback must meet accessibility guidelines. All instructor/student communication must conform to accessibility and confidentiality guidelines.

Assignments**Assignment Type**

Writing

In-class and/or outside of class

Outside of class

Formative or Summative

Summative

Assignment

Write a two or three page paper on, "The Use of Familial DNA in Criminal Investigations." Define both DNA and Familial DNA and their application to criminal investigations. List the privacy or ethical issues of using third party companies such as 23andMe, AncestryDNA, or LivingDNA in obtaining a persons DNA for use in a criminal investigation. As part of this assignment consider any ethical or bias issues to include race, gender, culture, medical etc. The research paper is to be cited and formatted using the APA style guidelines.

How assignment will be adapted in online format

This assignment will be assigned, submitted, and graded through the course management system (CMS). Online courses should make the course material, including assignment instructions, supplemental resources and materials, website links, articles, etc., available to students through the CMS. Students will submit the assignment through the assignments area in CMS and will be evaluated on content, accuracy, and completeness. Students will receive instructor feedback through the grade book, messaging, or other conferencing tools within two weeks from the due date. All materials must meet accessibility guidelines.

Assignment Type

Writing

In-class and/or outside of class

Outside of class

Formative or Summative

Summative

Assignment

It is firmly ingrained in our system of law that “searches conducted outside the judicial process, without prior approval by judge or magistrate, are considered unreasonable under the Fourth Amendment, subject only to a few specifically established and well delineated exceptions. This brief statement emphasizes the preference in this country for obtaining warrants prior to conducting searches. Nonetheless, the courts have outlined a few “established and well-delineated” exceptions to the warrant requirement of the Fourth Amendment. However, one exception to the warrant requirement which the Supreme Court has expressly and repeatedly refused to recognize is a general “murder scene” exception.

Write a three-to-five-page research paper on the U.S. Supreme Court Case *Mincey v. Arizona* 437 U.S. 385 (1978) outlining the issue and facts of the case, the holding of the Court, the rationale for the Court’s decision, and your opinion of the case. As part of this research consider other equally important questions; (1) what does the Fourth Amendment say about searches; (2) what is a search warrant; (3) what are the exceptions to the warrant requirement; (4) what are considered “emergency” or “exigent” circumstances; (5) what impact does this case have on criminal investigations? The research paper is to be cited and formatted using the APA style guidelines.

How assignment will be adapted in online format

This assignment will be assigned, submitted, and graded through the course management system (CMS). Online courses should make the course material, including assignment instructions, supplemental resources and materials, website links, articles, etc., available to students through the CMS. Students will submit the assignment through the assignments area in CMS and will be evaluated on content, accuracy, and completeness. Students will receive instructor feedback through the grade book, messaging, or other conferencing tools within two weeks from the due date. All materials must meet accessibility guidelines.

Assignment Type

Other

In-class and/or outside of class

In-class

Outside of class

Formative or Summative

Formative

Assignment

Review the discussion board content/information on major crime scene investigations focusing on blood evidence. Then, respond to the following discussion question: What are the main types of blood spatter patterns and describe each. Additionally, include what the crime scene technician might learn from each pattern.

How assignment will be adapted in online format

Using the CMS, students will respond to a discussion board prompt (or question) regarding a specific topic relating to criminalistics. Students will also respond to other students’ posts. Students will submit their posts using the discussions area within the CMS and will receive instructor feedback through the grade book, messaging, or other form of communication. Discussions will be evaluated on their content, relevance, and accuracy.

Assignment Type

Writing

In-class and/or outside of class

Outside of class

Formative or Summative

Summative

Assignment

In 1954, Sam Sheppard's wife Marilyn was found murdered in their home. Sheppard was convicted of the killing and sentenced to life in prison, but he maintained his innocence throughout the trial and during his incarceration. After a lengthy appeals process, in 1964 he was released from prison, and during a 1966 retrial, he was found not guilty. Afterward, Sheppard turned to alcohol and died of liver failure on April 6, 1970. The 1963 television series *The Fugitive* and the 1993 movie of the same name were inspired by Sheppard's case.

Write a three-page case study on, "The Sam Sheppard Murder Case." Identify and document the evidentiary and constitutional issues associated with this case. What were the issues for the prosecution? What were the issues for the defense? What do you think, was Sam Sheppard guilty? The research paper is to be cited and formatted using the APA style guidelines.

How assignment will be adapted in online format

This assignment will be assigned, submitted, and graded through the course management system (CMS). Online courses should make the course material, including assignment instructions, supplemental resources and materials, website links, articles, etc., available to students through the CMS. Students will submit the assignment through the assignments area in CMS and will be evaluated on content, accuracy, and completeness. Students will receive instructor feedback through the grade book, messaging, or other conferencing tools within two weeks from the due date. All materials must meet accessibility guidelines.

Assignment Type

Reading

In-class and/or outside of class

In-class

Outside of class

Formative or Summative

Formative

Assignment

Read and analyze the portion of the chapter three covering "Forensic Databases." Then, individually or in small groups, be prepared to analyze and discuss each type of database to include fingerprint databases, DNA databases, genealogy databases, ballistic databases, automotive paint databases, and firearm databases. Additionally, note any constitutional, ethical, or bias issues surrounding these databases to include race, gender, or culture.

How assignment will be adapted in online format

The reading assignment and subsequent discussions will be assigned, submitted, and graded through the course management system (CMS). Online courses should make the course material, including assignment instructions, supplemental resources and materials, website links, articles, etc., available to students through the CMS. Students will submit the assignment through the assignments area in CMS and will be evaluated on content, accuracy, and completeness. Students will receive instructor feedback through the grade book, messaging, or other conferencing tools within one week of the due date. All materials must meet accessibility guidelines.

Course Materials**Textbooks**

Spencer, J. (2024). *Introduction to Forensic Science: The Science of Criminalistics* 1st Edition CRC Press. ISBN: 9781032025197.

Saferstein, R. Roy, T. (2023). *Criminalistics: An Introduction to Forensic Science* 13th Edition Pearson Publishing. ISBN: 9780135218310.

Class Size Information

Class Size

40

Class Size Category

A - Lecture/discussion 40

Diversity and Inclusion

Course Design and Materials: Course will incorporate diverse perspectives, authors, and examples that reflect a variety of cultures, identities, and lived experiences. Instructional materials will be reviewed regularly to ensure representation, inclusivity, and alignment with equity-minded practices across disciplines.

Inclusive Learning Environment: Instructors will establish classroom norms and policies that promote respect, civil discourse, and belonging in both online and face-to-face classes. Clear expectations for communication and engagement will support a learning space where all students feel valued and heard.

Accessible Instruction: Course content will be delivered using accessible design. Materials will follow accessibility guidelines within the CMS, including captioned media, readable document formats, and multiple means of engagement to support diverse learning.

Equitable Teaching Practices: Instructors will use transparent and grading criteria, varied assessment methods, and timely feedback to promote fairness and student success. Opportunities for revision, reflection, and multiple demonstrations of learning may be incorporated when appropriate to the discipline.

Culturally Responsive Pedagogies: Instructional strategies will encourage critical thinking about diverse perspectives and systems of power relevant to the course content. Faculty will foster opportunities for students to connect course material to real-world contexts.

Ongoing Reflection and Improvement: Faculty will engage in continuous professional development related to IDEAA principles and reflect on course practices using metacognition to identify opportunities for increased equity, inclusion, and accessibility.

Explain how diversity and inclusion(e.g., gender, culture/race, sexuality, etc.) is infused into the course.

The course revision includes additional language and content related to diversity and inclusion within the course materials and in the discussion areas; specifically, as it pertains to race, gender identity, sexual orientation, and cultural differences. Language has been included in the course to be inclusive of these items through awareness of audience and differences when researching case laws, processing of crime scenes, evidence collection, interview and interrogations, and courtroom testimony. Recognizing the importance of representing diverse voices, the curriculum emphasizes the inclusion of all applicable perspectives in discussions and research, as outlined in the course materials. The class involves students of all genders and races and encourages class participation from all students. In this course, students will learn the theoretical approach to criminal investigations as well as real-world applications. One of the objectives is to “examine ethical and legal issues involving crime scene investigation such as Fourth Amendment concerns”, to include how race or cultural bias impacts due process for underrepresented groups, e.g., minorities, low socioeconomic status, gender, etc. Students will also examine sensitive legal issues and form individual conclusions as to the equity of justice.

Describe how assignments, instruction, evaluation, course content, and interactions are contextualized for diverse learners promoting an equitable course.

This course is structured to ensure equitable access and participation for diverse learners. Students have equal opportunities to all learning resources as well as one on one capabilities via accessible video conferencing platforms with the professor. Discussion boards are designed to facilitate interactions in two formats: student-to-student and student-to-professor, providing all students with equal opportunities for both engagement and support. To accommodate different learning preferences and accessibility needs, various media formats, including accessible video are incorporated into the curriculum. Live accessible video lectures are also supplemented with recorded sessions for students unable to attend live, promoting inclusivity and flexibility. Students will participate in class via discussions in asynchronous discussions using accessible CMS video conferencing platforms. For discussions and other exercises, students can submit in one of two formats: written or via recorded video using Canvas Studio within the CMS. All digital slide presentations will be uploaded on to Canvas for student use. Exams and/ or tests are administered fully online. They will be evaluated through CMS. The format may include multiple choice, short answer, essay, or other formats. Exams/ tests will be evaluated based on the demonstration of identification and understanding of the applications of major topics and described in the course content. This is in alignment with the learning objectives. All exams/ tests must meet accessibility guidelines. Instructor feedback will be provided via CMS, within 2 weeks. The class has been revised with the focus on accessibility. The course has been revised with a focus on accessibility, with the most current texts being used to promote students' academic pursuits. Through instructor-to-student and student-to-student engagement, students are encouraged to reflect on equitable treatment of each other and their communities.

Interactions

Explain how the course will incorporate student-to-student interaction.

This course (AJ-124) incorporates student-to-student interaction through collaborative learning activities such as discussions, hands-on exercises, case studies, and projects. Students will participate in small group discussions to analyze rules of evidence and their application to current issues in forensic science, fostering peer learning and diverse perspectives. Collaborative projects may involve case studies where students work together to examine procedural and evidentiary issues in criminalistics that impact the success of cases, encouraging the sharing of varied insights. Online discussion forums will allow students to respond to each other's ideas, promoting critical thinking and respectful dialogue outside the classroom. Peer review sessions will enable students to give and receive feedback on assignments, enhancing their analytical skills and understanding of course material.

Explain how the course will incorporate instructor-to-student interaction.

This course (AJ-124) incorporates instructor-to-student interaction through regular lectures, feedback, and communication. The instructor will provide interactive lectures, encouraging questions and discussions to examine complex theories in forensic science. Student support hours will offer students opportunities for one-on-one discussions with the instructor, addressing individual learning needs and interests (students can also schedule meetings). Timely and constructive feedback on assignments will guide students in their understanding of criminalistics, policy and application. The instructor will facilitate classroom and online discussions, posing thought-provoking questions and engaging with student responses to deepen the learning experience. Regular announcements and check-ins will keep students informed and connected to the course.

Explain how the course will incorporate student-to-content interaction.

Student-to-content interaction will be fostered through a variety of instructional methods, learning materials and activities that promote active engagement with the course content. Students will research and read key source documents such as the Federal Rules of Evidence, U.S. Supreme Court cases, and other related guides. Interactive assignments, such as analyzing DNA or fingerprints, will enable students to apply forensic concepts to real-world situations. Multimedia resources, including videos, podcasts, and online simulations, will provide diverse ways to explore issues in forensic science. Regular quizzes and reflective essays will prompt students to think critically about the material and assess their understanding.

Explain how the course will incorporate student-to-self interaction (metacognitive).

This course (AJ-124) will encourage student-to-self interaction by promoting metacognitive activities that help students reflect on their learning processes and personal development. Metacognition involves not only understanding the content but also understanding one's own thinking processes and strategies for learning. Reflective articles or case studies will be assigned, where students critically examine their evolving understanding of forensic science and the accuracy and admissibility of evidence, and their own opinions about the accuracy and admissibility of evidence. Self-assessment exercises will enable students to identify their strengths and areas for improvement, setting personal learning goals. Students may be asked to write reflective papers on how both historical developments and current trends in technology have influenced their thoughts on the identification, collection, and processing of evidence in criminal cases, possibly impacting their communities, and connecting course content to their personal experiences. Class discussions will often include prompts that encourage students to consider how their identities and backgrounds shape their perspectives on these issues. Ultimately, the goal of this metacognitive approach is to empower students to become more aware of their own learning processes and to develop strategies for effective learning and critical thinking that extend outside of the classroom.

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