Forensic Science (Two Semesters)

In this course students will learn the scientific protocols for analyzing a crime scene, how to use chemical and physical separation methods to isolate and identify materials, how to analyze biological evidence and the criminal use of tools including impressions from firearms tool marks arson and explosive evidence. Labs and case studies will help students understand how these techniques are applied to real crime scenes.

Semester One

Introduction to Forensic Science and Criminal Justice

Essential Questions
1. How have scientific discoveries influenced the development of forensics as it applies to the law?
2. What different specialties and techniques are used in a crime lab to process evidence and report findings?
3. What are the responsibilities of the Forensic Crime Lab and Forensic Scientist?

What to Expect
- Introduction to Forensic Science and Criminal Justice Discussion
- Deductive Reasoning Lab
- Portfolio: Introduction
- Case Study: St. Valentine's Day Massacre
- Introduction to Forensic Science and Criminal Justice Test

Crime Scene Investigations

Essential Questions
1. How should a crime scene be secured, assessed, and examined?
2. How is crime scene evidence collected and documented?
3. What are the responsibilities of the responding officer, crime scene technician and the investigator?
4. What are the various search patterns used at a crime scene when searching for evidence?

What to Expect
- Wayne Williams Probability Assignment
- Case Study: Donald and Marsha Levine
- Portfolio: Crime Scene Report
- Canine Caper Lab
- Crime Scene Investigations Test

Microscopes

Essential Questions
1. What are the parts of a microscope?
2. Are some types of microscopes better than others for certain types of evidence analysis?
3. When is a microspectrophotometer used in Forensic Science?
4. Why are microscopes important to Forensic Science?

**Human Remains Identification**

*Essential Questions*

1. How are human remains identified?
2. What clues might investigators find that indicate a homicide rather than a natural or accidental death?
3. How can an investigator estimate the time of death?
4. What are the phases of decomposition in human remains?

**What to Expect**

- Human Remains Discussion
- Case Study: Green Beret Murders
- Human Remains Lab
- Human Remains Identification Portfolio
- Human Remains Test

**Autopsy and the Role of the Medical Examiner**

*Essential Questions*

1. What is autopsy and why is it used in death investigations?
2. What are the five manners of death?
3. What is the medical examiner's role in death determinations?
4. How can causes of death be identified?
5. What is required in an autopsy report?

**What to Expect**

- Virtual Autopsy Lab
- Case Study: Conrad Murray trial in the death of Michael Jackson
- Portfolio: Autopsy Report Assignment
- Coroner Discussion
- Autopsy and the Role of the Medical Examiner Test

**Forensic Anthropology**

*Essential Questions*

1. What is Forensic Anthropology and why is it important?
2. How do Forensic Anthropologists differentiate between human and animal remains?
3. What information can a Forensic Anthropologist gather from remains?

**What to Expect**
Forensic Entomology

**Essential Questions**

1. What is Entomology and how does it apply to Forensic Science?
2. What information can a Forensic Entomologist determine from the crime scene and victim's body?
3. What insects are commonly found in a corpse?
4. How can time of death be calculated using entomological data?
5. How can insects provide information about toxins in the body?

**What to Expect**

- Forensic Entomology Discussion
- Forensic Entomology Lab
- Case Study: Sylvia Hunt
- Forensic Entomology Portfolio
- Forensic Entomology Test

Analysis of Organic Materials

**Essential Questions**

1. How are organic materials of evidence analyzed?
2. What are the various types of chromatography and why are they so important to the field of Forensics?
3. How can Spectrophotometry be used to identify unknown samples?
4. What evidence can be detected with Mass Spectrometry?

**What to Expect**

- Chromatography Lab
- Organic Materials Analysis Discussion
- Case Study: William Sybers
- Organic Materials Analysis Portfolio
- Analysis of Organic Materials Test

**Semester Two**

Analysis of Hair, Fiber and Botanical Materials

**Essential Questions**

- What are the parts of a hair and how does it grow?
- How is hair evidence collected and analyzed?
- What are the different types of fibers typically found in a crime scene?
- How is fiber evidence collected and analyzed?
- What botanical remains are typically found in a crime scene and how are they analyzed?

What to Expect
- Hair and Fiber Discussion
- Case Study: James Anagnos
- Murder at the Farm Lab
- Portfolio: Little Red Riding Hood
- Analysis of Hair, Fiber and Botanical Materials Test

Forensic Toxicology
**Essential Questions**
1. What is the role of the toxicologist in a forensic investigation?
2. How are drugs analyzed in a forensic laboratory and what do the results mean?
3. What laws govern the use and distribution of drugs?
4. How is alcohol metabolized in the body?
5. What is the legal limit of alcohol?
6. What are classifications and names of the drugs most commonly abused?

What to Expect
- Toxicology Discussion
- Toxicology Lab: N-Squad
- Portfolio: Toxin Report
- Case Study: Kristin Rossum Case
- Toxicology Test

Forensic Serology
**Essential Questions**
1. In what ways does serological evidence help solve a crime?
2. What type of information can be determined from a drop of blood?
3. How is blood typing done?
4. What information can we get from blood stain patterns?
5. How is blood analyzed in the Forensic lab?
6. How is paternity established through blood testing?

What To Expect
- Case Study: Lindy Chamberlain
- Portfolio: Bloodstain Pattern Analysis
- Serology Discussion
- Blood Spatter Lab
DNA Analysis

Essential Questions
1. How is DNA evidence analyzed?
2. What makes DNA evidence unique?
3. How can old or degraded samples be analyzed for DNA?
4. How are DNA profiles stored?

What To Expect
- DNA and Criminal Behaviors Discussion
- Case Study: Hawley Crippen Case
- DNA Analysis Lab
- DNA Analysis Portfolio
- DNA Analysis Test

Fingerprints

Essential Questions
1. Why are fingerprints unique to each individual?
2. How are fingerprints classified and stored in AFIS?
3. How are fingerprints collected and stored?

What To Expect
- Fingerprint Discussion
- Fingerprint Lab
- Case Study: Shirley McKie
- Fingerprint Portfolio
- Fingerprint Test

Forensic Properties of Glass and Soil Evidence

Essential Questions
1. What are the various types of evidence and how do they differ?
2. What types of crimes involve glass and soil?
3. In what ways do glass and soil evidence aid in solving a crime?
4. How are glass and soil evidence collected and preserved?

What to Expect
- Glass Discussion
- Density Gradient Column Lab
- Joseph Corbett, Jr. Case Study
- Soil Analysis Portfolio
- Forensic Properties of Glass and Soil Test

Firearms, Ballistics, Tool Marks and Arson

Essential Questions
1. How can a weapon be linked to a crime or individual?
2. How are tool marks analyzed?
3. What do investigators look for to determine if a fire was accidental or arson?
4. How are explosives classified?

What to Expect
- Arson and Explosives Portfolio
- 2nd Amendment Discussion
- Bullet Comparison Microscope Lab
- President John Fitzgerald Kennedy Case Study
- Module Test

Handwriting Analysis and Computer Forensics

**Essential Questions**
1. Is handwriting class or individual evidence?
2. How can ransom notes or suicide letters be helpful to forensics scientists?
3. What security measures are taken to prevent counterfeiting?
4. What type of documents can be forged?
5. What is Computer or Digital Forensics?
6. How can incriminating data be found on a computer?

What to Expect
- Case Study: JonBenet Ramsey and the Ransom Note
- Handwriting Analysis Lab
- Analysis of Ransom Note Portfolio
- Computer Forensics and Ethics Discussion
- Handwriting Analysis and Computer Forensics Test