

**The Department's Educational Philosophy**

We believe that students should be exposed to the process of scientific inquiry so they can acquire and interpret scientific knowledge, and begin to realize the wider applicability of scientific problem-solving methods. By making the laboratory the focal point of learning, we seek to foster students' appreciation for the experience of doing science.

**Guiding Principles**

- Students must be able to collect and analyze data and formulate hypotheses.
- Inductive and deductive problem-solving skills are central to science education.
- An effective program in science addresses the limitations of data and conclusions.
- Students should be able to use or design a strategy for testing scientific concepts.
- A comprehensive science program will emphasize the delicate checks and balances in man's abiotic and biotic environments and the stresses upon these ecosystems, which could affect the destiny of the world.
- Science is integrally related to mathematics.
- An effective science program builds students' ability to communicate accurately and precisely.
- An effective science program stresses both cooperative and independent learning.

## **FORENSICS: COURSE #457**

**Course Frequency:** Semester course, 6 times per 6-day cycle

**Credits Offered:** Two and a half

**Prerequisites:** Biology, Chemistry, and/or Department Recommendation

### **Background to the Curriculum**

This course was developed to teach students the basic scientific principles involved in solving crimes. Over the past decade, fueled by shows such as *Bones*, *Criminal Minds*, and the multiple *C.S.I.* series, student interest in forensics has grown dramatically. The course will cover the historical use of forensics to solve crimes, famous cases, famous forensic scientists, and how the fields of forensics differ from the way they are presented in the media. Critical thinking, application of scientific evidence, and using the scientific method will be central themes that run throughout the course.

### **Core Topics/Questions/Concepts/Skills**

History of Forensics, The Criminal Justice System, Types of Evidence, Fingerprinting, Biometrics, Hair and Fiber Evidence, Drug and Toxin Evidence, Trace Evidence, Applications of Analytical Chemistry, Blood Properties, DNA Analysis, Ballistics, Human Remains, and Forensic Entomology.

Student research topics (some examples): The O.J. Simpson Trial, The Case Against Dr. Sam Sheppard, Dr. Henry Lee, Edmond Locard, Dr. Michael Baden

### **Course-End Learning Objectives**

*Students will:*

#### **Introduction to Forensics**

- 1] Explain how the field of forensics developed through the application of scientific method to criminal case.
- 2] Describe how probability and statistics determines the probative value of evidence.

#### **Fingerprinting**

- 1] Be able to isolate and analyze fingerprints based on pattern and minutia.
- 2] Explain how technology has changed fingerprint analysis.

### **Hair and Fiber Evidence**

- 1] Describe how some hair and fiber evidence can be individualized while other evidence is only class evidence with some probative value.

### **Drugs, Toxins, and Trace Evidence**

- 1] Describe how unknown substances can be analyzed to determine their chemical composition as compared to a control.
- 2] Explain how toxic substances are processed by the body.

### **Blood and DNA Evidence**

- 1] Explain how analysis of body fluids has changed over the past century.
- 2] Describe how DNA evidence is analyzed using PCR, RFLP, and STR techniques.

### **Ballistics**

- 1] Explain how ballistic evidence is used for crime scene reconstruction.

### **Entomology and Human Remains**

- 1] Describe how insect populations on a corpse are used for crime scene reconstruction.
- 2] Explain how skeletal remains are used for identifying a victim.

### Assessment

- Labs and Lab Practicals
- Content Quizzes
- “Forensics in the News” Assignment: Making Connections between the curriculum and current criminal investigations

### Materials and Resources

Deslich, Barbara and John Funkhouser. “Top Shelf Forensics.” J. Weston Walch (2003).

Deslich, Barbara and John Funkhouser. “Forensic Science for High School.” Kendall/Hunt Publishing Co. (2006).

Evans, Colin. “The Casebook of Forensic Detection.” John Wiley & Sons, Inc (1996).

Genge, N.E. “The Forensic Casebook.” Ballantine Books (2002).

Ramsland, Katherine. “The Forensic Science of CSI.” Berkley Boulevard Books (2001).

**\* Numerous audio-visual, web sites, and lab materials supplement the material taught in this course.**