

Forensic Chemistry 1037 Syllabus Fall 2017

D. Silberstein, Instructor

Text:

Criminalistics: An Introduction to Forensic Science by Richard Saferstein, 11th edition; Pearson Publications, 2014.

Additional Materials:

Videos: "Cold Case JFK," PBS Nova, 2014; "Iceman Murder Mystery," PBS Nova, 2012; "Manhunt: Boston Bombers," PBS Nova, 2013.

Selected scientific and legal documents.

Time devoted to each Topic

Semester of 30 75 minute lectures that will be divided as following. Some sessions will include quizzes and the viewing of documentaries, lab activities and demonstrations.

Please note that the number "1" will represent an entire lecture of 75 minutes

Outline:

1. History and Development of Forensic Science: (1.5)
 - A] Scientific Method
 - B] Organization of a Crime Lab
 - C] Services of the Crime Lab
 - D] The importance of Sherlock Holmes to the field of Forensic Science

2. The Crime Scene: (3.5)
 - A] Processing the Crime Scene
 - B] Legal Issues at the Crime Scene
 - C] The role of the first officer on the scene
 - D] The role of the lead detective and how his team of experts is chosen
 - E] The types of Physical Evidence
 - F] How physical Evidence is collected and processed at the crime scene

3. Basic Introduction to Chemistry (6)
 - A] The Nature of Matter and of Energy:
 - B] Atoms, Elements, Molecules, Compounds
 - C] The subatomic world
 - D] Understanding the Periodic Table of Elements
 - E] How and why elements bond; Ionic and Covalent
 - F] What is energy and how it reacts with matter
 - G] The electro-magnetic spectrum
 - H] Wavelengths and Frequencies
 - I] The tools of the Forensic Chemist

4. Forensic Serology (2)

- A] The Nature of Blood
- B] Forensic Characteristics of Bloodstains
- C] Blood types and the Principles of Heredity

5. DNA (2)

- A] What is the chemistry of; a nucleus, a chromosome, a gene, a nucleotide?
- B] Mitosis and Meiosis; how they provide each human with a specific genetic finger print
- C] How DNA is replicated in the lab
- D] Gel Electrophoresis
- E] The CODIS database

MID-YEAR EXAM (1)

6. Drugs and Alcohol (4)

- A] What is a Drug?
- B] The four major groups of drugs
- C] Federal penalties
- D] Collection of drugs at a crime scene
- E] Chemical analysis of drugs in the Lab; Spectroscopy and presumptive color exams
- F] How Alcohol disrupts human metabolism
- G] The Field Sobriety Exam
- H] The cost of drugs to our society; crime and violence, productivity in the work place, overcrowding in the prison system, why drugs should be decriminalized or not

7. Hair, Fibers, Glass and Paint (2)

- A] The Morphology of Hair
- B] The Identification of Hair
- C] Types of Fibers; natural and man-made Polymers
- D] The chemical analysis of paint in the Lab
- E] Known vs. Unknown Glass and the methods used to identify them in the Lab

8. Firearms, Bullets and Ballistics (4)

- A] The History of Explosives and their chemical make up
- B] The development of fire arms
- C] The differences between Manual and Automatic weapons
- D] The Rifled Barrel and how that creates individual impressions on a bullet
- E] How weapons and bullets are examined in the Lab
- F] Gun Shot Residue and bullet swipe

9. Fingerprints (2)

- A] The history of Fingerprints
- B] How Friction Ridges arise
- C] How prints are collected and preserved

- D] How Chemistry helps make invisible prints visible
- E] How prints are examined and used to identify individuals

Review for final exam (2)

Learning Objectives

- Understand the nature of both legal and scientific evidence, and how each are evaluated.
- Understand the relationship between science and the law.
- Understand how physical science is used to answer specific questions of importance to legal proceedings (e.g. how DNA evidence is use to identify an individual).
- Understand the legal and ethical principles that guide the collection, analysis and dissemination of evidence.

Course Requirements and Assessment

Student Assessment: There will be a minimum of four in class quizzes worth 20%

A midyear exam and a final exam each worth 30%

Class participation worth 10%

10% for providing written reviews of three video documentaries.** The students will be aware that on their midyr exam and on the final exam there will also be a written component based on these documentaries. The ICE MAN MURDER MYSTERY will make up 15% of the mid year grade while The Kennedy Asassination Video and The BOSTON BOMBING documentary will also be worth 15% of the final exam grade.