COURSE OF STUDY
COLLEGE LEVEL SUPA FORENSIC SCIENCE

Mary Villani

Fall 2006

Week Of	Topic
Sept. 4	**1.Organization and Introduction to Forensic Science** **2. The History and Development of Forensic Science** **3. Landmark Cases** **4. Tests of Admissibility** • **Frye Test** • **Daubert Test** **5. Federal Rules of Evidence**
Sept 11	**1. Locard's Exchange Principle** **2. The Functions of the Forensic Scientist** **3. Forensic Specialists** **4. Lab: Dancing Men**
Sept. 18	**1. Physical Evidence** **2. Types of Physical Evidence** **3. The Significance of Physical Evidence** **4. The Collection and Preservation of Physical Evidence** **5. Case studies** **6. Lab: Production and Examination of Physical Evidence**
Sept.25	**1. Lab: Crime Scene Investigation** **2. Processing the Crime Scene** **3. The Legal Considerations at the Crime Scene** **4. Aspects of Evidence Collection** **5. Preservation of Physical Evidence** **6. Rough and Smooth Sketches** **7. Analysis of Physical Evidence** • **chromatography** • **spectrophotometry**

- **mass spectrophotometry**
- **GC/Mass spectrophotometry**

8. **Establishing a Chain of Custody**
9. **The Admissibility of Evidence**
10. **The Role of the Expert Witness**
11. **The organization of the crime lab**

Oct. 2

1. **The History of Fingerprinting**
2. **The Fundamental Principals of Fingerprints**
3. **Lab: Rolling Fingerprints and Classification of Prints**

   ***** To be continued into single periods of the following week.**

Oct. 9

1. **The Classification of Fingerprints**
2. **Automated Fingerprint Identification Systems**
3. **Digital Imaging for Fingerprint Enhancement**
4. **Methods of Detecting, Preserving and Developing Fingerprints**
5. **Labs:**

   a) Rolling and Classification of Prints

   ***** To be continued from week before**

   b) Dusting and Lifting of Latent Prints

   ***** To be continued into single period classes of the following week.**

Oct.16

1. **Lab: Dusting and Lifting of Latent Prints**

   To be continued from week before
2. **Ear prints**
3. **Lab: The Chemical Development of Latent Print Prints**

   ***** To be continued into single period classes during the following week**

Oct. 23

1. **Lab: The Chemical Development of Latent Prints (continued)**
2. **The Identification and Matching of Fingerprints**
3. **Brain Fingerprinting**
4. **The Morphology of Hair**
5. **Hair as Physical Evidence**
6. **Collection of Hair Evidence**

7. Tools Used for the Microscopic Examination of Hair

. Compound Microscope
. Stereomicroscope
. Polarizing Microscope
. Microspectrophotometer
. The Scanning Electron Microscope

8. Identification and Comparison of Hair
9. Lab: Examination and Comparison of Human Hair

***** To be continued into single period classes during the following**

Oct. 30

1. Lab: Examination and Comparison of Human Hair (continued)
2. Lab: Hair Scale Preparation and Examination
3. Lab: Animal Hair Examination and Unknowns

***** To be continued into single period classes of the following week**

Nov. 6

1. Lab: Animal Hair Examination and Unknowns (continued)
2. Comparison of human and mammalian hair
3. Fibers as Physical Evidence
4. Wayne Williams Case
5. Lab: Microscopic Examination of Fibers

Nov.13

1. Lab: Synthesizing and Dying Nylon Fibers (single period)
2. Collecting, Preserving and Analyzing Paint Evidence
3. Auto Accidents
4. Hit and Run Accidents
5. The Collection and Preservation of Glass Evidence
6. Lab: Tire Impressions and Casts

Nov. 20

1.The Chemistry of Fire
2. Acclerants
3. Point of Origin
4. Arson Investigations
5. The Collection and Preservation of Arson Evidence

6. Arson Explosions
7. Analysis of Flammable Residues
8. Lab: Hunt for Serial Arsonists

Nov. 27

1. The Psychological Profiles of Killers
- **a. Profiles of Serial Arsonists**
- **b. Profiles of Mass Murderers**
- **c. Profiles of Child Abusers**

2. Psychic Sleuthing
5. Lab: Who Shot JFK?

Dec. 4

1. Opposing Viewpoints - Who Shot JFK?
- **a. JFK and the Mob**
- **b. JKF and Cuba**
- **c. The U.S. in the 1960s**
- **d. The science behind the crime**
  - **Neutron Activation**
  - **Acoustical Evidence**
  - **NMR (MRI)**
  - **Virtopsy**
  - **Ballistic Evidence**

2. The Murder of RFK
3. The Murder of Martin Luther King

Dec. 11

1. The Collection and Preservation of Firearm Evidence
2. Bullet Comparisons
3. Cartridge Cases
4. Shot Pattern Analysis
5. Gunpowder Residue Analysis
6. Primer Residues on Hands
7. Distance Determination
8. Computerized Ballistics
9. Test fire weapons for court purposes
10. Serial Number Restoration (Demo)

Dec. 18

1. The Coroner vs. The Medical Examiner
2. Pathologist vs. the Forensic Pathologist
3.The Medical Autopsy vs. The Forensic Autopsy
4. Establishing the Cause of Death
5. Establishing the Circumstances of Death
6. Establishing the Time of Death
7. Stages of Decomposition
- **. Rigor Mortis**
- **. Livor Mortis**
- **. Algor Mortis**

. Potassium Levels in Ocular fluid

8. **Lab: The Science of Murder**
9. **Lab: Confessions of a Medical Examiner**

Dec. 25 **WINTER RECESS**

Jan. 1

1. **Unnatural Deaths: Case Studies**
2. **Unsolved Mysteries**
3. **Lab: The Best of the Forensic Autopsy**
4. **Bioterrorism**
5. **Chemical Terrorism**

Jan. 8

1. **Forensic Entomology**
2. **Insect Life Cycles**
3. **Time Required for Stage Development**
4. **Stages of Decomposition**
5. **Succession**
4. **Climate and Weather Conditions**
3. **Using Insects to Solve Crime**
    - **Establishing the Time of Death**
    - **Establishing the Circumstances Surrounding the Crime**
    - **Determining Post-Mortem Interval (PMI)**
    - **Maggots and Drugs and Poisons**
6. **Case Studies: Insects at the Crime Scene**
7. **Lab: Maggots and Murder**

Jan. 15 **Mid-year Exams**

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Spring 2007

Week of	Topic
Jan. 29	1. Review of Mid-year Exam 2. Animal versus Human Skeletal Remains 3. Forensic Anthropology 4.Determining the Origin of Bones 5. Aging Skeletal Remains 6. Race Determination 7. Gender Determination 8. Lab: Foot Impressions and Casts
Feb. 5	1.Grouping Sub grouping and Individualizing Skeletal Remains 2. Skeletal Injuries 3. Production of Foot Casts and Foot Impressions 4. Lab: Snow Prints (weather permitting) 5. Lab: Skeletal Measurements
Feb. 12	1. Skeletal Measurements continued 2.Skeletal Remains and the Cause of Unnatural Deaths 3. Forensic Imaging 4. Facial Reconstruction and the Forensic Artist 5. Lab: The Mystery of Anastasia Romanoff
Feb. 19	MID-WINTER BREAK
Feb. 26	1. Forensic Odontology 2. Mammalian and Human Teeth 3. Characteristics of Teeth 4. Teeth Alignment 5. Dental Records 6. Dental Casts 7. Dental Comparisons 8. Analysis of Bite Marks 9. Case Studies

	10. Guest speakers (double period)
March 5	**1. The Structure of DNA** **2. How DNA Works** **3. DNA Replication** **4. Recombinant DNA : Cutting and Splicing DNA** **5. The Collection and Preservation of Biological Evidence for DNA Analysis** **6DNA Typing** **7. Nuclear DNA versus Mitochondrial DNA** **8. Mitochondrial DNA and Missing Persons/MIA's** **9. DNA at the Crime Scene** **10.DNA Landmark Cases** **11.The Combined DNA Index System** **12. DNA Testing and the Judicial System** **13. Distance Learning with John Jay College** **14. The Ethics of DNA Testing** **15. DNA Testing and Rights of Privacy** **16. Lab: Murder Rape and DNA**
March 12	**1. DNA Profiling Paper Simulation (RFLP)** **2. DNA Isolation and Extraction** **3. Lab: DNA Spooling**
March 19	**1. Qualitative Testing for the Presence of DNA** **2. Casting and Loading Gels Practice** **3. Lab: Adding Restriction Enzymes and Dyes to Samples**
March 26	**1. Electrophoresis** **2. Southern Blotting** **3. Hybridization** **4. Lab: Loading Wells and Electrophoresis**
April 2 - 10	**SPRING RECESS**
April 11	**1. Observation and Analysis of RFLP test results** **2. PCR Testing** **3. Plant DNA versus Human DNA** **4. Lab: Isolation of Squamous Cell DNA (double period)** **5. Preparation of PCR tubes (single period)** **6. Amplification of DNA in Thermal Cycler (teacher)**

April 18

1. The Human Genome Project
2. Case Studies – using DNA typing by PCR
3. PCR Testing for Forensic Investigations versus PCR Testing for Genetic research

April 25

1. PCR Testing in the Forensic Science Lab Versus PCR Testing in the classroom
2. Lab: Preparation of Cast Gels (single period)
3. Lab: Loading DNA Samples, Electrophoresis and Staining of Gels (double period)+

April 24

1. Observation of Lab Results
2. Human Mitochondrial DNA
3. Forensic Investigations With Mitochondrial DNA Technology – Case Studies
3. Lab: DNA Isolation from Hair Sheaths (double period)
5. Lab: Preparation of PCR tubes (single period)
6. Amplification of DNA in Thermal Cycler (teacher)

April 30

1. Lab: Preparation of Cast Gels (one period)
2. Lab: Loading, Electrophoresis and staining gels (double period)+

May 7

1. Observations of Lab Results
2. Forensic toxicology
3. Drugs
4. Drug Dependence
5. Narcotic Drugs
6. Hallucinogens
7. Depressants
8. Stimulants
9. Anabolic Steroids
10. Prescription Drugs
11. Drug Identification
12. Examination of Organs and Tissues
13. Extraction of Drugs from Organs, Tissues and Body Fluids
14. Preservation of Drug Evidence
15. Drug Testing

- **Thin Layer**
- **Gas chromatography**
- **Liquid chromatography**
- **Immunoassay**

15. Lab: Aspirin Determination with Spectrophotometry (one single and one double period)+

May 14

1. Lab: Determination of Lipstick Dyes by Thin Layer Chromatography
2. Dirty Money: Gas chromatographic- Mass Spectrometric Analysis of Currency Contamination
3. Cocaine and Dollar Bills
4. Alcohol
3. The Role of the Toxicologist
4. How to Measure Toxicity
5. How to Measure Absorption and Rates of Absorption
6. Computing a Blood Alcohol Concentration Estimate
7. DWI
8. Post Mortem BAC
9. Determination of BAC

May 21

1. Blood Morphology and Blood Chemistry
2. Blood Stain Patterns
3. Species Test
4. The Grouping, Sub grouping and Individualization of Blood Stains
4. Lab: Blood Typing – Who Done It?
5. Lab: Restoring Bloody Shoe Prints

May 28

1. Document Examination
2. Print and Script
3. Typewritten Comparisons
4. Photocopier, Printer, Fax Examination
5. Ink Examination and Extraction
6. Alterations Erasures and Obliterations
7. Lab: Document Examination
8. Lab: Handwriting Comparisons
9. Lab Separation of Ink Dyes Using Thin Layer Chromatography
10. Term Papers due

June 4	**1. The Forensic Psychiatrist versus The Document Examination Lab** **2. Forged Documents and the Law** **3. Counter fit Money and the Law** **4. TIPS Web Quest Project due**
June 11	**1. Legal Procedures – Discovery, Jury Selection, Shadow Juries, Insanity Pleas** **2. Trials of the Century** **3. Mock Trials** **4. Lab: Mock Trial Presentations**
June 29	**Shadow Program**