Justice Studies Department
San Jose State University
Fall 2007
Class hours MW 1330-1445
Room: MH 520
TA: Kimberly Clabaugh- KCLABAUGH@yahoo.com

Instructor: Dr. Steven Lee
Office Hrs: MW 1445-1645
Set appointment via email
to avoid waiting in line
email: Steven.Lee@sjsu.edu

JS 113: Introduction to Forensic Sciences

Course Description:

This course is designed to introduce students to the basics of forensic science. Students will be introduced to the scientific concepts, methods, practices and analytical instrumentation utilized by forensic scientists for the recognition, collection, preservation, identification, comparison, analysis and documentation of physical evidence. Evidence interpretation and court testimony, professional requirements, standards, training, ethics, and quality assurance will also be covered.

Course Text and materials:

Required Text: Criminalistics: An Introduction to Forensic Science (College Version), ***9/E***, **Copyright 2007,** RE. Saferstein, Ph.D., ISBN: 0132216558, Prentice Hall, 672 pp.
http://vig.prenhall.com/catalog/academic/product/0,1144,0132216558,00.html

Required reading and internet materials:

Journal articles and other readings will be accessible at the SJSU library, on reserve or will be accessible on line. Citations and URLs for on line materials will be provided in assignments. CA Dept of Justice Physical Evidence Bulletins: http://www.cci.ca.gov/Reference/peb/peb.html and other forensic science web sites will be required reading.
Additional supplementary readings and assignments may include sites from the following web pages and others to be provided:

1. American Academy of Forensic Sciences: www.aafs.org
2. California Association of Criminalists: www.cacnews.org and the CAC Code of Ethics
3. National Criminal Justice Reference Service: http://www.ncjrs.gov/
4. Houston PD Crime Laboratory Investigation: hpdlabinvestigation.org
5. American Society of Crime Laboratory Directors/Laboratory Accreditation Board – Legacy: http://www.ascld-lab.org/legacy/indexlegacy.html
6. Zeno's Forensic Page: http://forensic.to/forensic.html
7. Reddy's Forensic Page: http://www.forensicpage.com/
8. Scott Carpenter's Page: http://www.tncrimlaw.com/forensic/fsbindx.htm, http://www.tncrimlaw.com/forensic/
9. Crime Scene Investigator network page: http://www.crime-scene-investigator.net/
10. Criminal Justice Megalinks website: http://faculty.ncwc.edu/toconnor/linklist.htm
11. DNA Resources: http://www.dnaresource.com/, Presidents DNA Initiative web page: www.dna.gov, Scientific Working Group on DNA Analysis Methods:
12. Firearms info: www.firearmsid.com, Scientific Working Group for Firearms and Toolmarks; http://www.swggun.org/
13. Fingerprints: SWGFAST; www.swgfast.org, Int'l Assoc. for ID: www.theiai.org
14. Microscopy; Molecular Expressions, Exploring the world of optics and microscopy, http://www.micro.magnet.fsu.edu/index.html,
15. International Association of Bloodstain Pattern Analysis: http://www.iabpa.org/
16. Scientific Working Groups: http://www.fbi.gov/hq/lab/fsc/backissu/july2000/swgroups.htm, http://en.wikipedia.org/wiki/Scientific_Working_Group

Supplementary Texts (Optional)- Course material may include citations from the following:
Forensic Science Handbook Volume III, 1/e Richard Saferstein ***©1993 / ISBN:*** *0133253902*
Forensic Science Handbook, Volume II, 1/e Richard Saferstein, Bill Bliss, Arlington, VA ©1988 / ISBN: 0133268772
Techniques of Crime Scene Investigation, Seventh Edition. 2004 Barry Fisher. ISBN084931691X, 544 pages. CRC Press
Evidence and Crime Scene Reconstruction (Expanded 6th edition - April 2002), National Crime Investigation and Training Joe Rynearson, Jerry Chisolm and Jim Weigand http://www.ncit.com
Forensic Science: An Introduction to Scientific and Investigative Techniques.Second Edition 2005*. Stuart H. James and Jon J. Nordby eds., ISBN: 0849327474, CRC Press*
Henry Lee's Crime Scene Handbook. **2001**. Henry Lee. PhD. ISBN 0-12-440830-3, 418pp. Academic Press.
Forensic DNA Typing: Biology and Technology Behind STR Markers John Butler PhD. **2005**. ISBN: 0-12-147952-8, 688pp. Academic Press
Forensic Firearms Evidence" handbook. 1995. Lucian Haag. Workbook.
*Experiments and Practical Exercises in Bloodstain Pattern Analysis.***1998.** Laber, T and Epstein B. 1998 5th printing. Minnesota BCA.
Practical Crime Scene Processing and Investigation. 2004. Ross M Gardner. **ISBN: 0849320437. CRC Press.**
Bloodstain Pattern Analysis: With an Introduction to Crime Scene Reconstruction. 2001. Second Edition. Tom Bevel; Ross M Gardner ISBN: 0849309506. CRC Press.
Practical Homicide Investigation: Tactics, Procedures, and Forensic Techniques, Third Edition. 1996. Vernon J. Geberth. ISBN: 0849381568**. CRC Press.**

Course Format:
The course will include **lectures by the instructor, assistants and guest lectures** from crime laboratory forensic scientists. **Discussions, videos, small-group hands-on activities, and laboratories** will also be included throughout the semester. If possible, on-line chats and field trips (to a crime laboratory) or a video of a crime laboratory will be shown (TBA).

Course requirements:
Exams: Three exams will be given in this course. Exams will be cumulative and will include all material covered up to the date of the exam. Exams may include multiple choice, matching, true/false, short answer, diagrams, drawings and sketches, short essay and/or long essay.
Exam 1: Wed. 09/26 Exam 2: Wed. 11/7 Final: Monday, December 17 1215-1430

Quizzes- a minimum of 5 worth 10 points each- Total points = 50points
Quizzes on assigned readings, laboratories, small group activities and other assigned materials will be given during the semester. These will generally be multiple choice, matching, true/false and short answer but may also include essay questions.

Laboratory Reports with 5 take home report questions on each report
Three laboratory reports will be required. Each will be worth 30 points. See below for details on the format and grading criteria.

Labs- Currently Scheduled Laboratories and Activities

1) Measurements, Searching and Documentation of Crime Scenes
2) Fingerprints
3) Microscopy
4) Impressions Evidence- Shoeprint casting
5) Biological Analysis- Three parts
Pt 1. Serology
Pt 2. DNA
Pt 3. PCR/STRs/CE

Other activities that should also be entered into your notebook

6) Organic Analysis- TLC
7) Controlled Substances- Comparisons to exemplars
8) Questioned documents activity
9) Moot court

Grading

Quizzes	50 points
Exam 1	100 points
Exam 2	100 points
Final exam	100 points
Lab reports	150 points
Total required	500 points

A total of 10 points may be granted for small group assignments and other assignments during the semester. Each assignment will be worth 1-2 points each. These extra credit points may be used to augment your final point total.

Laboratory Reports- 150 points

There will be at least 5 hands-on activities held throughout the semester. ***These will include: measurements and documentation, microscopy, fingerprints, shoeprints and biological evidence.,*** Written reports for each of the activities will be required (see general guidelines for reports below). During the semester, at least 1 report from each crime scene team will be collected and reviewed. At the end of the semester on all reports entered in notebooks will be collected. Participation in the crime scenes will also be considered in the grades.

Guidelines for Reports: All reports must contain the following sections: Abstract, Introduction, Materials and Methods, Results, Discussion with Conclusions, References, and Appendices with raw data. All pages must be numbered, initialed and dated and all materials must be firmly secured in the notebooks using a tape seal that has been initialed and dated.
Each report is worth 10 points. Reports will be graded using both administrative and technical criteria. Details of format and grading of the reports will be provided at the first crime scene session. Grading in general includes the following considerations

- ***Administrative Criteria- Approximately 1 point each per crime scene report***
  - Is the notebook bound (not spiral and no pages removed/loose) and are all crime scenes included?
  - Is the chain of custody completed for any evidence transfers and documented appropriately? Are proper citations and acknowledgements documented for other individual's work (e.g. citations/references/teammates whole names)? Is the evidence, properly sealed and stored where indicated?

- Is the documentation complete? Do the reports include notes, sketches and photographs? Are all pages numbered, dated and initialed? Is all data properly and securely inserted into the notebooks?
- Where assigned, do the reports address the questions provided?
- Are the reports organized with all sections? Is the writing clear and legible?

- ***Technical and Scientific Criteria- Approximately 1 point each per crime scene report***
  - Are data tabulated/summarized and analyzed accurately?
  - Does the data support the statements in the reports?
  - Are the statements within the report and between team members consistent? If not, are discrepancies explained?
  - Is the technical detail provided sufficient for court and would the CSI be able to reconstruct the "crime scene" years from now, based on the documentation?
  - Are additional external references/citations utilized (those not provided in the class)?

Grading Policies

Make-up exams will not generally be permitted. However, under extraordinary circumstances, with proper documentation and approval by the instructor, a 15 page single-spaced term paper of an instructor assigned topic, may substitute for 1 exam.

	From	To
A+	483.5	500
A	467	483.4
A-	450	466.9
B+	433.5	449.9
B	417	433.4
B-	400	416.9
C+	383.5	399.9
C	367	383.4
C-	350	366.9
D+	333.5	349.9
D+	317	333.4
D-	300	316.9
F	<300	

Instructor

Professor Lee holds an MS from NYU and PhD from University of California, Berkeley in Molecular Biology. Lee holds several concurrent positions including a consulting position as Director of R&D at MiraiBio Inc. a small biotech company in Alameda, CA, Visiting Scholar at UC Berkeley, and holds adjunct professor appointments in Biological Sciences at San Francisco State University and Chemistry at Florida International University. He was formerly the Director of R&D at CA Dept of Justice DNA Laboratory from 1994-2000 where he served as an expert witness in DNA and conducted DNA training courses. He is a full member of the American Association for the Advancement of Science, American Academy of Forensic Sciences, the California Association of Criminalists and is an American Society of Crime Laboratory Directors Laboratory Accreditation Board certified inspector. He also served on the FBI Technical Working Group on DNA Analysis Methods group from 1994-2000. He has taught courses in molecular biology at SFSU (1996-1998), Forensic genetics at UC Davis (1997), and most recently forensic DNA Typing of STRs at FIU (2003).

Tentative Course Schedule:

Dates	Topics	Saferstein
Week 1:	**Introduction and Overview of Forensic Science**	**Chap 1 (C1)**
08/27	Handouts-Syllabus- Reading material Introductions: Your background, TA backgrounds, my background Course Description, requirements, grading etc. Set up small student groups ***Assignment- Sign in- send an email to the Course TA*** ***Ms. Kimberly Clabaugh from your team captains with all student emails included in the carbon copy (cc) and cc a copy to steven.lee@sjsu.edu*** ***Read Saferstein Chapter 1 and 2*** **Introduction to Criminalistics**	
08/29	**Definition and Scope of Forensic Science.** History and Development of Forensic Science. The Organization of a Crime Laboratory. Services of the Crime Laboratory. The Functions of the Forensic Scientist. Forensic Science Services	
Lab 1	***Laboratory 1: Measurements and documentation- Part I***	
Week 2:	**The Crime Scene- and Physical Evidence**	**C2 and 3**
09/03	**Labor Day Holiday- No class**	
09/05	Processing the Crime Scene. Legal Considerations	C2
	Overview of Criminalistics	
	Physical Evidence	**C3**
	Common Types of Physical Evidence. The Significance of Physical Evidence.	
Lab 1	***Laboratory 1: Measurements and documentation- Part II***	
Week 3:	**Microscopy and Laboratory 2**	**C7**
09/10	**No Class- Holiday**	
09/12	.The Microscope – Light, compound, comparison, IR, SEM	
	Initial Examination- Characterization and Identification	**C7**
	The Compound Microscope. The Comparison Microscope. The Stereoscopic Microscope. The Polarizing Microscope. The Microspectrophotometer. The Scanning Electron Microscope (SEM).	
Lab 2	***Laboratory 2: Microscopy***	
	And Report for Lab1 due- Bring your laboratory notebooks for spot checks and review for feedback.	
Week 4:	**Fingerprints**	**C14**
09/17	History of Fingerprinting. Fundamental Principles of Fingerprints. Classification of Fingerprints. Automated Fingerprint Identification Systems. Methods of Detecting Fingerprints. Preservation of Developed Prints. Digital Imaging for Fingerprint Enhancement.	
09/19	**Laboratory 3**	
Lab 3	***Laboratory 3: Fingerprint Laboratory***	
	And Report for Lab2 due- Bring your laboratory notebooks for spot checks and review for feedback.	

Week 6:	**Review for Exam 1 and Exam 1**	
09/24	**Glass and Soil**	**C4**
	The Metric System. Physical Properties. Comparing Glass Fragments. Glass Fractures. Collection and Preservation of Glass Evidence. Forensic Characteristics of Soil. Collection and Preservation of Soil Evidence.	
	Review for Exam 1: C 1, 2, 3, 4, 7 and 14- Student led reviews	
09/26	**Exam 1: C1, 2, 3, 4, 7, and 14**	
Week 7:	**Exam 1 and Video**	
10/1	**Organic Analysis**	**C5**
	Elements and Compounds. Selecting an Analytical Technique. Chromatography. Spectrometry. Mass Spectrometry (MS).	
Lab activity	**In class Laboratory TLC of Inks**	
10/03	**Video- To Be announced**	
	Video - Note: Lee will be at the International Human Identification Meeting Questions on the video will be handed out and answers are required from each team	
Week 8:	**Chemical Foundations: Inorganic Analyses**	**C6**
10/08	Inorganic Analysis	**C6**
	Evidence in the Assassination of President Kennedy. The Emission Spectrum of Elements. Atomic Absorption Spec. The Origin of Emission and Absorption Spectra. Neutron Activation Analysis. X-Ray Diffraction	
10/10	Drugs and Forensic Toxicology	C9, C10
	Drug Dependence. Narcotic Drugs. Hallucinogens. Depressants. Stimulants. Club Drugs. Anabolic Steroids. Drug-Control Laws. Drug Identification. Collection and Preservation of Drug Evidence. Toxicology of Alcohol. The Role of the Toxicologist. Techniques Used in Toxicology. The Significance of Toxicological Findings. The Drug RecogExpert.	
Lab activity	**In class Laboratory Comparisons of different contolled substances**	
Week 9:	**Laboratory 4 Impression Evidence**	**C15**
10/15	Impression Evidence Lecture/Lab	C15
	Bullet Comparisons. Cartridge Cases. Automated Firearm Search Systems. Gunpowder Residues. Primer Residues on the Hands. Serial Number Restoration. Collection and Preservation of Firearm Evidence. Tool Marks. Other Impressions.	
10/17	**Laboratory Impression Evidence- Laboratory 4**	**Handouts**
Lab 4.	***Impression Evidence***	
Week 10:	**Trace evidence: Hairs, Fibers, and Paint- Arson and Explsion**	**C8, C11**
10/22	Morphology, Identification & Comparison of Hair. Types of Fibers.	**C8**
	Identification and Comparison of Man-Made Fibers. Forensic Examination of Paint. Collection and Preservation of trace evidence.	
10/24	Arson and Explosion	**C11**
	The Chemistry of Fire. Searching the Fire Scene. Collection and Preservation of Arson Evidence. Analysis of Flammable Residues. Types of Explosives. Collection and Analysis of Explosives.	

Lab activity ***Trace evidence examination using compound microscopy***

Week 11: **Biological Foundations and Laboratory 5A- Biological analysis Pt I. Serology**

10/29 **Biological Foundations- Intro to Serology** **C12**
The Nature of Blood. Forensic Characterization of Bloodstains. Stain Patterns of Blood. Principles of Heredity. Forensic Characterization of Semen. Collection of Rape Evidence.

10/31 **Laboratory 5A – Serology – Presumptive Testing for biological fluids**

Week 12 **Biological Foundations-continued** **C13**

11/05 **Review for Exam 2** **C5,6,8,9,10,11 15**

11/07 **Exam 2** **C5,6,8,9,10,11 15**

Week 13 **Intro to Deoxyribonucleic Acid and Laboratory 5B- Forensic Biology Laboratory- DNA** **C12,C13**

11/12 Intro to Deoxyribonucleic Acid: Central Dogma- DNA extraction **C13**
Quantification, Genetic Code, Chromosomes, Synthesis, Restriction Enzyme, DNA Profiling (RFLP Analysis), hybridization and C13
fragment analysis, PCR and Short Tandem Repeats

11/14 **Laboratory 5B-Forensic Biology lab- DNA extractions- quantification, gel electrophoresis** C12/C13

Week 14: **DNA continued and Questioned documents** **C13,**

11/19 STRs, Mitochondrial DNA, Y Chromosome testing, **C13**
Medical Benefits, Legal and Ethical Considerations
DNA Databases
CODIS, forensic phenotype profiling, familial searching,
Universal Databases?

11/21 **Laboratory 5C Forensic Biology laboratory- PCR/STRs**

Week 15 **Questioned Documents and Computer Forensics**

11/26 Questioned Documents **C16**
Handwriting Comparisons. Collection of Handwriting Exemplars. Typewriting Comparisons. Photocopier, Printer, and Fax Examination. Alterations, Erasures, and Obliterations. Other Document Problems. Voice Examination.

11/28 Use of Computers in Forensic Science **C17**
Investigation of Computer-Related Crime
See Casey 2004- Digital Evidence and Computer Crime

Lab activity **Questioned Documents**

Week 16 **Legal and Ethical Issues in Forensic Science, Court Testimony**

12/3 **Ethical Issues in Forensic Science:**
Selected readings and cases
FBI Madrid Fingerprinting Errors
Houston PD crime laboratory investigation
Innocence Project

12/5 Countering Chaos: Logic, Ethics, and the Criminal Justice System
Considerations in evidence interpretation
Lessons from- Court Testimony

Activity ***Moot Court (time permitting)***

12/10 Student Led Final Review- Last day of class

12/10 ALL LAB REPORTS DUE

Late lab reports will have 20 points deducted per day late

Comprehensive Final Exam- All chapters are included

Final Exam: Monday December 17 1215-1430

Required Materials- "CSI Kits"

Start to collect the following individually and with your team mates

Note- You may purchase these from the forensic science student group- contact Kimberly Clabaugh- KCLABAUGH@yahoo.com

For each person:

1. Bound notebook with page numbers- Spiral notebooks are not as good as pages can easily be torn our. If you need to use a spiral notebook, be sure every page is numbered.
2. Tape measure
3. Rulers and protractors (with metric and inches)
4. Graph paper (10 sheets/person)
5. Permanent sharpie markers (at least 2- black or blue)
6. Pens (ball points)
7. Manila envelopes (30 – 8x11", 50 coin envelopes)
8. Paper bags (2/person)
9. Plastic ziplock bags (2/person)
10. Q tips (20/person)

For each team

11. Clear packing tape with dispenser
12. 35 mm camera with 3 rolls of film or Digital Camera
13. Rope or Twine
14. Pill boxes (various sizes)
15. String
16. Labels
17. Tweezers
18. Scissors
19. Toothpicks

I will provide access to

Knife
Gloves (latex)
Masks (painters)
Etoh wash bottles
Cleaning solutions
Lab coveralls/booties
Water bottles

Academic Integrity

Academic integrity is essential to the mission of San José State University. As such, students are expected to perform their own work (except when collaboration is expressly permitted by the course instructor) without the use of any outside resources. Students are not permitted to use old tests, quizzes when preparing for exams, nor may they consult with students who have already taken the exam. When practiced, academic integrity ensures that all students are fairly graded. Violations to the Academic Integrity Policy undermine the educational process and will not be tolerated. It also demonstrates a lack of respect for oneself, fellow students and the course instructor and can ruin the university's reputation and the value of the degrees it offers.

We all share the obligation to maintain an environment which practices academic integrity. ***Violators of the Academic Integrity Policy will be subject to failing this course and being reported to the Office of Judicial Affairs for disciplinary action which could result in suspension or expulsion from San José State University.*** The policy on academic integrity can be found at: http://sa.sjsu.edu/judicial_affairs/students/academic_integrity.html.

CHEATING:

At SJSU, cheating is the act of obtaining or attempting to obtain credit for academic work through the use of any dishonest, deceptive, or fraudulent means. Cheating at SJSU includes but is not limited to:

Copying in part or in whole, from another's test or other evaluation instrument; Submitting work previously graded in another course unless this has been approved by the course instructor or by departmental policy. Submitting work simultaneously presented in two courses, unless this has been approved by both course instructors or by departmental policy. Altering or interfering with grading or grading instructions; Sitting for an examination by a surrogate, or as a surrogate; any other act committed by a student in the course of his or her academic work which defrauds or misrepresents, including aiding or abetting in any of the actions defined above.

PLAGIARISM:

At SJSU plagiarism is the act of representing the work of another as one's own (without giving appropriate credit) regardless of how that work was obtained, and submitting it to fulfill academic requirements. Plagiarism at SJSU includes but is not limited to:

The act of incorporating the ideas, words, sentences, paragraphs, or parts thereof, or the specific substances of another's work, without giving appropriate credit, and representing the product as one's own work; and representing another's artistic/scholarly works such as musical compositions, computer programs, photographs, painting, drawing, sculptures, or similar works as one's own.

All students are required to take the on-line tutorial and quiz on plagiarism:

Go to: http://tutorials.sjlibrary.org/plagiarism/index.htm Take the quiz and print out your results Due 1 February 2006

Campus policy in compliance with the Americans with Disabilities Act:

"If you need course adaptations or accommodations because of a disability, or if you need special arrangements in case the building must be evacuated, please make an appointment with me as soon as possible, or see me during office hours. Presidential Directive 97-03 requires that students with disabilities register with DRC to establish a record of their disability."