The Real CSI (GE Area B1)[1]

Metropolitan University Scholar's Experience (MUSE) Seminar
MUSE/JS 12B
Dr. Steven B. Lee

Class Basics

Room number: Clark Hall 135 (1st class meeting- Location may be moved in the future)
Class Time: Mon. and Wed. 1330-1445

How to Contact your Professor- *Best way to contact me is by email.*

Instructor: Dr. Steven Lee
Office Hrs: Mon and Wed. 1445-1645- ***Please set by email appointment to avoid conflicts.***
Room MacQuarrie Hall 521.
Email: **steven.lee@sjsu.edu**
Phone: 408-924-2948

In addition to my specifically posted office hours, I am available by email arrangement. Please come to see me in my office.

How to Contact your Peer Mentor

Director Dr. Jill Steinberg
Office Royce Hall Lounge
355 S 8th Street
Phone 408-924-2198
Student Timothy Coldiron
Email: **tlcoldiron@yahoo.com**
Hours Tuesdays 6:00-8:00pm
Office: Peer Mentor Center- Royce Hall

Introduction to MUSE[2]

The Metropolitan University Scholars' Experience (MUSE) is designed to help make your transition into college a success by helping you to develop the skills and attitude needed for the intellectual engagement and challenge of in-depth university-level study. Discovery, research, critical thinking, written work, attention to the rich cultural diversity of the campus, and active discussion will be key parts of this MUSE course. Enrollment in MUSE courses is limited to a small number of students because these courses are intended to be highly interactive and allow you to easily interact with your professor and fellow students. MUSE courses explore topics and issues from an interdisciplinary focus to show how interesting and important ideas can be viewed from different perspectives.

The Real CSI Course Description:

Develop your skills in the science of crime scene investigation through hands-on learning exercises. Basics of crime scene investigation and forensic science will be covered in this introductory course. Learn the appropriate methods for processing, securing, and isolating a crime scene. Topics include recording the scene, searching for evidence, decision-making about

[1] Some formatting, text and content for this greensheet have been obtained with the author's permission from Geology 10B by Dr. June Oberdorfer (http://www.geosun.sjsu.edu/~june/june/geol10B/index.htm).

[2] Descriptions of MUSE were taken directly from the SJSU MUSE greensheet template in Area B1 http://www.sjsu.edu/muse/docs/greensheet_b1.pdf).

what evidence is appropriate and necessary to collect, procedures for collecting physical evidence, and maintaining the chain of custody to avoid contamination. Scientific concepts, methods, practices and analytical instrumentation utilized by forensic scientists for the recognition, collection, preservation, identification, comparison, analysis and documentation of physical evidence will also be covered. Hands-on activities will include: securing the scene, searching for physical evidence, documenting the scene, taking accurate measurements, and collection and interpretation of physical evidence such as fingerprints, blood spatter, shoeprints and DNA. Court testimony, professional requirements, standards, training, ethics, and quality assurance will also be covered. The interface of science and law will be discussed using case examples, current events, news, and magazine and journal research articles.

Learning Objectives and Activities for this Course
This course qualifies as an Area B1 (Physical Sciences) course in your General Education requirements. It is designed to enable you to achieve the following learning outcomes. Examples of activities that meet these objectives are listed in the right hand column.

Student Learning Outcomes: Following are the Student Learning Objectives related to subject matter content for this course:

- Learn how to use MLK Jr. Library, online databases, and the Internet to find reliable forensic science and crime scene investigation information.
- Examine the science of crime scene investigation.
- Learn the basics of searching, securing, recording and reconstructing crime scenes.
- Develop skills in applying the scientific method to CSI.

GE Area B1 Goals (see table at the end of the document)
The following physical science GE Area B1 topics will be covered with examples of course content.

- Laws of thermodynamics will be discussed in arson and explosives investigation.
- Structure of matte will be covered in sections on organic and inorganic Analyses (Carbon and non-carbon containing evidence for drug investigation)
- Interaction of matter and energy will be presented in the sections on the firing a gun.
- Behavior of physical systems through time will be covered through the discussions on evaluation and typing of biological forensic evidence from exhumed bodies, missing soldiers and ancient bones.
- Systems of classification will be covered in discussions on differences between class and individual characteristics
- Physical processes of the natural environment will be presented through discussions on degradation of forensic evidence due to evaporation or mold.

Course Text and materials:
Required Text:
CRIME LAB: A Guide for Nonscientists, 2nd. Ed. 2005. ISBN 978-0-9658286-4-2 Calico Press. http://www.calicopress.com/

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.

Supplementary Texts (Optional)- Course material may include citations from the following:
Criminalistics: An Introduction to Forensic Science (College Version), ***8/E*, Copyright 2004, published 6-18-2003,** RE. Saferstein, Ph.D., ISBN: 0-13-111852-8, Prentice Hall, 608 pp. http://vig.prenhall.com/catalog/academic/product/0,4096,0131118528,00.html
Forensics for Dummies. 2004. *Lyle, DP. ISBN 0-7645-5580-4. Wiley Publishing. 402 pp.*
Top Shclf Forensics. 2003. Deslich, B and J Funkhouser. ISBN 0-8251-4627-5. J Weston Walch Publisher. *www.walsh.com*. 147 pp.
Techniques of Crime Scene Investigation, 2003. Seventh Edition. Barry A. J. Fisher. ISBN: 084931691X. CRC Press LLC. 544 pp.
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
Forensic Science: An Introduction to Scientific and Investigative Techniques. 2003*. Stuart H. James and Jon J. Nordby eds., ISBN: 0849312469, 698pp. 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 **2005**. John Butler PhD. ISBN: 0-12-147952-8 660 pp. 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.

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 at least one crime laboratory) will be scheduled (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. Exams are worth 50 points each. The final is worth 100 points. Total for exams and final=200 points.
Exam 1: 25 Sept 2006 Exam 2: 30 Oct 2006 Final: TBA

Quizzes
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. There will be a total of 5 quizzes. Total = 50 points

Hands-on Crime scene Exercises and Participation
Three hands-on crime scene exercises will be required. Each will be worth 50 points. The format and grading of the laboratory reports will be provided at the first laboratory session.

Bound notebooks are required for all 3 laboratory reports. Participation in the crime scene exercises will be graded and will be worth 50 points total. Total = 200 points

Grading

Exams and Quizzes=50%, Crime scene reports and summaries: 40%, Participation 10%

Quizzes	50 points
Exam 1	50 points
Exam 2	50 points
Final exam	100 points
Crime Scene Reports	150 points
MUSE summaries	50 points
Participation points	50 points
Total required	500 points

No late work will be accepted or in-class assignments or exams rescheduled except by prior consent from the instructor or with a written medical excuse. If you have a problem with a given assignment or exam, speak to me before the due date or exam time, not afterwards.

You are responsible for understanding the policies and procedures about add/drops, academic renewal, withdrawal, etc. found at http://sa.sjsu.edu/student_conduct.

Extra Credit

A total of 20 points may be granted for small group assignments and other assignments during the semester. These may include attending seminars and providing a brief summary of the seminar (no more than 150 words). Each assignment will be worth 1-2 points each. These extra credit points may be used to augment your final point total.

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).

Academic Integrity

Academic integrity statement (from the Office of Student Conduct and Ethical Development): "Your own commitment to learning, as evidenced by your enrollment at San José State University, and the University's Academic Integrity Policy requires you to be honest in all your academic course work. Faculty members are required to report all infractions to the Office of Student Conduct and Ethical Development. The policy on academic integrity can be found at http://sa.sjsu.edu/student_conduct."

Additional information on 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 Student Conduct & Ethical Development 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/student_conduct

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. See Office of Student Conduct and Ethical Development at http://sa.sjsu.edu/student_conduct.

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
You must complete this tutorial and print out your report at the end to hand in to the instructor.

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 requesting accommodations must register with DRC to establish a record of their disability."

Possible MUSE Class Activities

Some Possible MUSE Class activities- To be mutually chosen by students and Timothy Coldiron <tlcoldiron@yahoo.com>

- Undergraduate advising
  - Guest speaker: Gisela Peoples
- Counseling/Academic center presentation (MUSE project)
  - Guest speaker: Wiggsy, Director of Counseling Services
- SJSU website exploration
  - How to register for classes
  - Start planning now
    - Where to find major/minor class requirements
    - Where to find the degree progress report
  - Quick library tour
- Helpful Hints for college
  - Networking
    - Peer Mentor program
    - SPARC
    - Research Assistant
    - Etc…
  - Looking ahead
    - Grad School requirements
    - Etc…
  - Time management
  - How to take notes

DON'T KID YOURSELF ABOUT WHAT YOU WANT TO DO FOR THE REST OF YOUR LIFE!

Tentative Course Schedule:

Dates	Topics	Readings
Week 1:	**Introduction and Overview of the Course**	**Handouts &Ch 1**
23 Aug	Handouts-Syllabus- Reading material Introductions: Your background, peer mentor backgrounds, my background Course Description, requirements, grading etc. Set up small student groups. What criminalists face at a crime scene; how evidence is collected; who has what job and how they all interact.	
Skills	Having a Conversation with the Text How to contact your peer mentor How to read a greensheet. How to get an email account (and orientation to places on campus where you can log on). http://www.sjsu.edu/computing/email/ **Assignment 1. Visit On-line tutorial and sign up for MUSE workshops** http://tutorials.sjlibrary.org/plagiarism/index.htm and complete quiz. Bring in hard copy by 31 August. Sign up for MUSE workshops on the MUSE webpage	
Week 2	**The Crime Scene**	**Handouts & Ch 1 & 2**
28 Aug	**Processing the Crime Scene. Legal Considerations** **Overview of Criminalistics**	
30 Aug	**Physical Evidence** Common Types of Physical Evidence. The Significance of Physical Evidence. Class vs. Individual Characteristics	
Skills	Being Proactive- **(Classroom version of Seven Habits… Covey 1989)** How to read effectively. How to take notes effectively. How to search on line library resources at SJSU: http://slisweb.sjsu.edu/resources/liborientation.htm How to find course readings.	
Week 3:	**The Crime Scene Continued**	Handouts &**Ch 2, 3**
4 September	**Holiday**	
6 September	**Crime Scene Measurements- Hands-on exercise 1** Interpreting blood spatter patterns; sketching the scene and reconstructing events. Jigsaw fits and other matches; packaging and cataloging of evidence; chain of custody issues.	
Skills	**Begin with the end in mind- How will your teammates remember you?** How to use WebCT for online discussions. How to consult with instructor outside of class. Ingredients for a productive class discussion- Synergizing…	
Week 4	**Intro to Physical Evidence continued and Perishable evidence**	**Ch 4**
11 Sept	**Physical Evidence Revisited- Class vs Individual Shoe Characteristics**	
13 Sept	**Crime Scene Measurements Revisited** Serology and sexual assault evidence; rape kit processing.	

Skills	**Putting First Things First- Study habits.** How to use WebCT for online discussions. How to consult with instructor outside of class.

Week 5	**Fingerprints and Exam Review**	**Handouts**
18 Sept.	**Crime Scene Fingerprinting exercise** **Instructor Exam 1 review**	
20 Sept.	Student led reviews	
Skills	**Putting First Things First- Study habits II. Review of student review ideas.**	

Week 6	**Exam 1**
25 Sept.	Exam 1
27 Sept.	Introduction to Organic and Inorganic Evidence

Week 7	**Organic and Inorganic Evidence**	**Ch 6**
2 Oct.	**Instrumentation used in Forensic Analyses**	
4 Oct.	**Examples of analytical results** Chromatographic separation and Spectrophotometric (light measuring) determination of the identity and quantity of chemical substances from crime scenes.	

Week 8	**The Microscope – and other instruments**	**Ch 6 & 7**
9 Oct.	**Initial Examination- Characterization and Identification** The examination and testing of microscopic particles of hair, paint and glass; the Shroud of Turin as an example of a trace evidence case; how the polarizing light microscope works.	
11 Oct.	**Video on Forensics- Lee at Human ID meeting** **How the scientific instruments work; gas chromatography/mass spectrometry, How IR and UV spectra are put to use; how some evidence in the O.J. Simpson trial was unfortunately presented.**	

Week 9	**Glass and Soil**	**Ch 7**
16 Oct	**The Metric System. Physical Properties. Comparing Glass Fragments. Glass Fractures. Collection and Preservation of Glass Evidence.**	
18 Oct	**CSI : Glass Exercise – Reconstruction of a shooting incident** **Forensic Characteristics of Soil. Collection and Preservation of Soil Evidence.** CSI Soil Exercise	

Week 10	**Reviews for Exam 2**
23 Oct	Microscopy, Glass and Soil exercises revisited
25 Oct	Instructor led reviews

Week 11	**Exam 2**
30 Oct	Student Led Reviews
1 Nov	Exam 2

Week 12	**Impression Evidence**	**Ch 11**
6 Nov	Impression Evidence Lecture/Lab	
8 Nov	How firearms are examined and bullets matched. How toolmarks are compared; the NIBIN and IBIS systems; Photo Essay: Teeth and Jaws. Footprint evidence **Crime Scene Exercise- Reconstruction part 2.**	
Week 13	**Trace: Hairs, Fibers, and Paint**	**Ch 5**
13 Nov	Trace evidence collection; looking for clues in the clothing of suspects and victims. Forensic Examination of Paint. Collection and Preservation of trace evidence	
15 Nov	**Crime Scene Exercise- Reconstruction part 2 follow up**	
Week 14	**Biological Evidence and Questioned Documents**	**Ch 8&9**
20 Nov	**Biological Forensics- Searching for Stains, Serology and DNA typing**	
22 Nov	Crime Scene Exercise- DNA role playing	
Week 15	**Forensic DNA typing, DNA and Crime**	
27 Nov	Introduction to DNA and methods used to study it	
29 Nov	PCR and STRs	
Week 16	**Ethics of CSI**	
4 Dec	Ethics, court testimony and admissibility	
6 Dec	Student led reviews for final exam	

Other Helpful Hints for Success- (Taken from Matters of Life and Death MUSE/Phil 29C, Sec 9 (Area C2) Professor Janet D. Stemwedel- http://www.stemwedel.org/MUSE/LD_greensheet.html)

Read the assigned readings before class. Some of this reading will be hard! Keep track of questions you have as you do the reading. After you have finished reading a selection, jot down the points that seem to be most important in that selection and the points that are most puzzling. Be ready to discuss the reading in class, even (especially!) if you think you might not understand it completely.

Participate in class discussions. Work with the class to figure out what the readings mean, how they bear on questions of crime scene investigation and forensic science, and why these questions matter. Participation is not just a matter of reporting what the reading says, nor of simply voicing your own opinion. Rather, we will be examining all our assumptions. Participation will involve helping to identify assumptions made by the authors, your classmates, your instructor, and yourself. This requires good listening skills as well as good speaking skills!

Professor's Teaching Philosophy
A seminar is a joint effort of the students and the seminar leader. Your responsibility as a seminar participant is not only to learn, but also to help everyone in the seminar, including the seminar leader, to learn.

For other expectations about classroom behavior; see Academic Senate Policy S90-5 on Student Rights and Responsibilities :http://www.sjsu.edu/senate/s90-5.htm

MUSE Seminar Program
Table of Student Learning Objectives and Related Activities
Instructor Steven Lee
Course Title: The Real CSI
Area B1

GE or MUSE Requirement	**Brief Description of How the Requirement will be Met**
Student Learning Objectives	
To use methods of science and knowledge derived from current scientific inquiry in life or physical science to question existing explanations. [GE]	A hands-on experiment or discussion will be designed and conducted by students to ask the following questions: Is the physics of blood spatter found on the victim consistent with a contact shot? Does the active ingredient in the super glue fingerprinting development, cyanoacrylate, have a higher affinity (or attraction) to water, salts or oils? Does DNA typing result in an absolute match when comparing identical twins?
To demonstrate ways in which science influences and is influenced by complex societies, including political and moral issues. [GE]	Seminars and discussions on ethics, law and science including DNA fingerprinting of all arrestees in California. Comparisons of the US and UK DNA databases. Students will be asked to discuss the risk/benefits of DNA databases.
To recognize methods of science, in which quantitative, analytical reasoning techniques are used. [GE]	Throughout the course, exercises will be conducted to develop students knowledge and practice using the scientific method. Exercises are structured like a case: For example, you have found a small partial bloody fingerprint already processed with different chemicals. One question (already addressed in the literature) is whether or not analysis of DNA is possible following chemical fingerprint processing. Teams are asked to conduct the following: Formulate a hypothesis and conduct a literature search to locate articles on the topic (Defining the question and learning to conduct literature searches is pivotal to any science). Design an experiment including controls to test their hypothesis and Predict possible outcomes followed by team discussions, questions and reports. Using the same type of approach students will be asked to interpret data such as the output from different spectrophotometer (light measuring) instruments to determine the identity and quantity of chemical substances from crime scenes. They will be asked to compare the spectrophotometer output from unknowns to known substances. They will gain an appreciation of the qualitative and quantitative aspects of the analytical techniques.

	The recognition and comparison of both class and individual characteristics of blood from the crime scene compared to the suspect's blood will also be analyzed with electropherograms of forensic DNA..
To understand the learning process and their responsibility and role in it. [MUSE]	Students are expected to be prepared for class and participate in class discussions and crime scene activities. They will work in teams and be accountable to their own peers that will assist them in developing their understanding of their responsibility. Peer Mentor will work individually with students who need help understanding the learning process and their role in it.
To know what it means to be a member of a metropolitan university community. [MUSE]	Students are required to attend at least two MUSE workshops during the semester, and will participate in extra-curricular activities together. For each MUSE workshop students will be required to write a summary. In the first few weeks of the course, we will discuss successful strategies for studying, note-taking, and working in teams. In our hands-on exercises, students will also be trained to conduct literature searched to lay a foundation to understand a subject. Critical thinking will be encouraged through these hands-on CSI activities. For example, in the CSI Measurements activity on accuracy and precision, students measure the diagonal of tiles on the floor using different rulers. They are then asked to calculate mean for each team. We compare measurements which vary within and among teams. They are they asked to discuss sources of error and then to design an experiment to test their hypotheses.
Content	
Diversity: Issues of diversity shall be incorporated in an appropriate manner. [GE and MUSE]	Diversity of experience, talents, resources, skills, knowledge, backgrounds, cultures, gender, sexual orientation etc. may influence the way in which one perceives any event including those at a crime scene. Understanding that there is value in the diversity of views will be emphasized throughout the course
Writing: The minimum writing requirement is 1500 words in a language and style appropriate to the discipline. [GE]	Students are required to write three crime scene reports using the scientific method. These will be a minimum of 500 words each for a total of 1500 words. In addition, students will be required to write a summary/reflection on their MUSE experience. The CSI reports will be evaluated using the following criteria: 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)?

Demonstrate how scientists focus on laws of thermodynamics; structure of matter; interaction of matter and energy; behavior of physical systems through time; systems of classification; and physical processes of the natural environment. [GE]	**Activities in the course will include virtual and actual observations using a microscope to observe evidence in order to "link" the evidence to the suspect. The types of evidence that may be used include trace evidence such as hair and fibers or the microscopic details used to compare questioned documents to exemplars. The structures and functions of living organisms will be covered in discussions on the kinds of samples that may yield DNA. These discussions are conducted in teams to develop lists of different organisms and the types of samples from them that could be used in a forensic DNA case. Lists include blood, hair, saliva, semen, feces, sweat, vomit, organs, bone, teeth, hair etc. from humans but also evidence from animals (a famous case of cat hair being used to link a suspect to a crime scene) and plants (e.g. the use of annular rings in cross sections of spring and summer wood to determine the timing of an event). An understanding of basic chemistry at the atomic level will be covered in discussions of the analytical tools for controlled substance analyses using GC/MS. Understanding of genetics, the basis for variation and evolution will also be covered in sections on forensic genetics. DNA polymorphisms, methods used to study variation and an appreciation of population genetics will be covered.**