San José State University
Department of Justice Studies
FS167, Forensic Molecular Biology, Spring 2015

Contact Information

Instructor:	Jeremiah Garrido
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Office Hours:	Tues / Wed @ 8:00pm - 8:30pm
Class Days/Time:	Tuesday Lecture (6pm-8pm) / Wed Laboratory (6pm-8pm)
Classroom:	Lecture - MacQuarrie Hall 426 / Lab - MacQuarrie Hall 526
Prerequisites:	Bio 1A, Chem 1A, Chem 1 B: all with C or Better.

Faculty Web Page and MYSJSU Messaging

Course materials such as syllabus, handouts, notes, assignment instructions, etc. will distributed weekly via email or MySJSU. You are responsible for regularly checking with the messaging system through MySJSU (or other communication system as indicated by the instructor) to learn any updates.

Course Description

History, scientific concepts, methods, practices, instrumentation, interpretation, statistics and court issues of forensic DNA analysis via lectures, hands-on activities/laboratories, and videos. Collection, documentation and preservation of biological evidence, bioethics, QA, validation, admissibility and training will also be covered. Prerequisites: Bio 1A, Chem 1A, Chem 1 B: all with C or Better.

Course Goals and Learning Objectives

Course Learning Outcomes (CLO)

Upon successful completion of this course, students will be able to:

CLO1. Demonstrate an understanding of how to identify and sample biological evidence for DNA analysis – including the importance of evidence collection at the crime scene and how surfaces, materials and sources relate to sampling strategies – refresher on screening the biological evidence for source attribution
CLO2. Explain the scientific principles behind DNA analysis techniques (DNA extraction, quantification, instrument analysis, analysis of STRs and Y STRs data, and the statistical assessment of both types of DNA profiles)
CLO3.Apply the DNA analysis protocols, how to use the forms for each type of analysis, and how to write consultation reports that reflect test findings
CLO4. Demonstrate an understanding of the laboratory techniques for conducting confirmatory testing and DNA analysis
CLO5. Demonstrate how forensic DNA testimony is given at the deposition level
CLO6. Explain how a forensic DNA laboratory functions, including the accreditation requirements

Required Texts/Readings

Textbooks

Fundamentals of Forensic DNA Typing. John Butler 2010. ISBN 9780123749994. Academic Press

Forensic Biology Laboratory Protocols. Steven Lee. Crime laboratory protocols (publicly available). Protocols will be handed out and utilized for laboratory and hands-on exercises.

Other reading and Internet materials:

Outlines, Journal articles and other readings will be accessible at the SJSU library, on reserve or will be accessible online. Citations and URLs for on line materials will be provided in assignments and on the greensheet.

Library Liaison

Dr. Nyle Monday. Phone: (408) 808-2041 Email: Nyle.Monday@sjsu.edu

Course Requirements and Assignments

Course requirements:

Exams - 350 points:

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.
The final will be comprehensive. Exam 1 and exam 2 are both worth 100 points. The final is worth 150points. (LO1, LO2, LO3, LO4, LO5 and LO6)

Quizzes and Small Group Activities - 100 points:

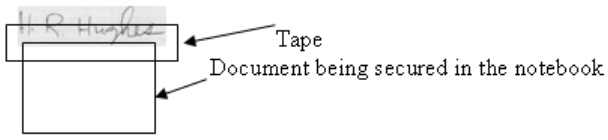
Quizzes on assigned readings, small group activities and other assigned materials will be given during the semester. These will generally be multiple choice, matching, true/false and short answer but may also include essay questions. (LO1, LO2, LO3, LO4, LO5 and LO6)

Hands-on Laboratory Assignments/Reports - 50 points:
Laboratories will be held throughout the semester. These will include: Proper collection methods, Microscopy/Presumptive tests, DNA Extractions, Quantification of DNA, multiplex PCR amplification of STRs (autosomal and Y), capillary electrophoresis, computer Short Tandem Repeats (STR) data analysis, and moot court testimony. 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 team will be collected and reviewed. At the end of the semester all laboratory reports entered in notebooks will be collected. Participation will also be considered in the grades. (LO2, LO3, LO4).

Guidelines for Laboratory Reports:

All reports must contain the following sections: Abstract, Introduction, Materials and Methods, Results, Discussion with Conclusions, References, and Appendices with raw data. In general, documentation of all the activities should be complete enough so that an independent scientist could repeat all of the steps and understand the critical reasoning and analytical interpretation of the data and conclusions of your reports. All pages must be numbered.

Documents are to be taped and then signed over the tape such that half of the signature is on the tape and half is on the notebook.



Report Grading:

Reports will be graded using both administrative and technical criteria. Details of format and grading of the reports will be provided at the first laboratory.
Grading in general includes the following considerations:

Administrative Criteria:

- 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:

- 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:

Quizzes/Activities	100 points;
Exam 1	100 points;
Exam 2 **(Paper /Writing Assignment)**	100 points;
Laboratory notebooks	50 points;
Final exam	150 points;
Total required	500 points.

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.

Grading Scale (plus/minus)

From - *To*	*Grade*
483.5-500	A plus
467-483.4	A
450-466.9	A minus
433.5-449.9	B plus
417-433.4	B
400-416.9	B minus
383.5-399.9	C plus
367-383.4	C
< 383.4	F

This course must be passed with a C or better as a CSU graduation requirement.

Classroom Protocol

Class participation is expected. You will be evaluated in part based upon your contributions to class discussions. It is essential that you come prepared to participate so keep up with the reading and plan to speak up.
Attendance is imperative for success in this class. Labs will be conducted during class time, so if you cannot make it to class, you will miss the lab and lose the associated points. Labs involve a lot of prep work and set up, and cannot be made up.
Cell phone and laptop use is not permitted during class. Users will be asked to leave.

University Policies

Dropping and Adding

Students are responsible for understanding the policies and procedures about add/drop, grade forgiveness, etc. Refer to the current semester's Catalog Policies section at http://info.sjsu.edu/static/catalog/policies.html. Add/drop deadlines can be found on the current academic year calendars document on the Academic Calendars webpage at http://www.sjsu.edu/provost/services/academic_calendars/. The Late Drop Policy is available at http://www.sjsu.edu/aars/policies/latedrops/policy/**.** Students should be aware of the current deadlines and penalties for dropping classes.

Information about the latest changes and news is available at the Advising Hub at http://www.sjsu.edu/advising/.

Consent for Recording of Class and Public Sharing of Instructor Material

University Policy S12-7, http://www.sjsu.edu/senate/docs/S12-7.pdf, requires students to obtain instructor's permission to record the course.

- "Common courtesy and professional behavior dictate that you notify someone when you are recording him/her. You must obtain the instructor's permission to make audio or video recordings in this class. Such permission allows the recordings to be used for your private, study purposes only. The recordings are the intellectual property of the instructor; you have not been given any rights to reproduce or distribute the material."
    - It is suggested that the greensheet include the instructor's process for granting permission, whether in writing or orally and whether for the whole semester or on a class by class basis.
    - In classes where active participation of students or guests may be on the recording, permission of those students or guests should be obtained as well.

- "Course material developed by the instructor is the intellectual property of the instructor and cannot be shared publicly without his/her approval. You may not publicly share or upload instructor generated material for this course such as exam questions, lecture notes, or homework solutions without instructor consent."

Academic integrity

Your commitment as a student to learning is evidenced by your enrollment at San Jose State University. The University Academic Integrity Policy S07-2 at http://www.sjsu.edu/senate/docs/S07-2.pdf 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 Student Conduct and Ethical Development website is available at http://www.sjsu.edu/studentconduct/.

Instances of academic dishonesty will not be tolerated. Cheating on exams or plagiarism (presenting the work of another as your own, or the use of another person's ideas without giving proper credit) will result in a failing grade and sanctions by the University. For this class, all assignments are to be completed by the individual student unless otherwise specified. If you would like to include your assignment or any material you have submitted, or plan to submit for another class, please note that SJSU's Academic Integrity Policy S07-2 requires approval of instructors.

Campus Policy in Compliance with the American Disabilities Act

If you need course adaptations or accommodations because of a disability, or if you need to make 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 at http://www.sjsu.edu/president/docs/directives/PD_1997-03.pdf requires that students with disabilities requesting accommodations must register with the Accessible Education Center (AEC) at http://www.sjsu.edu/aec to establish a record of their disability.

In 2013, the Disability Resource Center changed its name to be known as the Accessible Education Center, to incorporate a philosophy of accessible education for students with disabilities. The new name change reflects the broad scope of attention and support to SJSU students with disabilities and the University's continued advocacy and commitment to increasing accessibility and inclusivity on campus.

Accommodation of Religious Creed
In compliance with Education code, Section 89320, it is the official policy of the Justice Studies Department of San Jose State University to permit any student to undergo a test or examination, without penalty, at a time when that activity would not violate the student's religious creed, unless administering the examination at an alternative time would impose an undue hardship that could not reasonably have been avoided. Requests to accommodate a student's religious creed by scheduling tests or examinations at alternative times should be submitted directly to the faculty member responsible for administering the examination by the second week of the semester.
Reasonable common sense, judgment and the pursuit of mutual goodwill should result in the positive resolution of scheduling conflicts. The regular campus appeals process applies if a mutually satisfactory arrangement cannot be achieved.

Student Technology Resources

Computer labs for student use are available in the Academic Success Center at http://www.sjsu.edu/at/asc/ located on the 1st floor of Clark Hall and in the Associated Students Lab on the 2nd floor of the Student Union. Additional computer labs may be available in your department/college. Computers are also available in the Martin Luther King Library.
A wide variety of audio-visual equipment is available for student checkout from Media Services located in IRC 112. These items include DV and HD digital camcorders; digital still cameras; video, slide and overhead projectors; DVD, CD, and audiotape players; sound systems, wireless microphones, projection screens and monitors.

SJSU Peer Connections

Peer Connections, a campus-wide resource for mentoring and tutoring, strives to inspire students to develop their potential as independent learners while they learn to successfully navigate through their university experience. You are encouraged to take advantage of their services which include course-content based tutoring, enhanced study and time management skills, more effective critical thinking strategies, decision making and problem-solving abilities, and campus resource referrals.

In addition to offering small group, individual, and drop-in tutoring for a number of undergraduate courses, consultation with mentors is available on a drop-in or by appointment basis. Workshops are offered on a wide variety of topics including preparing for the Writing Skills Test (WST), improving your learning and memory, alleviating procrastination, surviving your first semester at SJSU, and other related topics. A computer lab and study space are also available for student use in Room 600 of Student Services Center (SSC).

Peer Connections is located in three locations: SSC, Room 600 (10th Street Garage on the corner of 10th and San Fernando Street), at the 1st floor entrance of Clark Hall, and in the Living Learning Center (LLC) in Campus Village Housing Building B. Visit Peer Connections website at http://peerconnections.sjsu.edu for more information.

SJSU Writing Center

The SJSU Writing Center is located in Clark Hall, Suite 126. All Writing Specialists have gone through a rigorous hiring process, and they are well trained to assist all students at all levels within all disciplines to become better writers. In addition to one-on-one tutoring services, the Writing Center also offers workshops every semester on a variety of writing topics. To make an appointment or to refer to the numerous online resources offered through the Writing Center, visit the Writing Center website at http://www.sjsu.edu/writingcenter. For additional resources and updated information, follow the Writing Center on Twitter and become a fan of the SJSU Writing Center on Facebook. (Note: You need to have a QR Reader to scan this code.)

SJSU Counseling Services

The SJSU Counseling Services is located on the corner of 7th Street and San Fernando Street, in Room 201, Administration Building. Professional psychologists, social workers, and counselors are available to provide consultations on issues of student mental health, campus climate or psychological and academic issues on an individual, couple, or group basis. To schedule an appointment or learn more information, visit Counseling Services website at http://www.sjsu.edu/counseling.

CASA Student Success Center

The Student Success Center in the College of Applied Sciences and Arts (CASA) provides advising for undergraduate students majoring or wanting to major in programs offered in CASA Departments and Schools.

All CASA students and students who would like to be in CASA are invited to stop by the Center for general education advising, help with changing majors, academic policy related questions, meeting with peer advisors, and/or attending various regularly scheduled presentations and workshops. Looking for academic advice or maybe just some tips about how to navigate your way around SJSU? Check out the CASA Student Success Center! It's also a great place to study, and you can check out laptops.

Location: MacQuarrie Hall (MH) 533 - top floor of MacQuarrie Hall. Contact information: 408.924.2910. Website: http://www.sjsu.edu/casa/ssc/.
more information.

Learning Assistance Resource Center

The Learning Assistance Resource Center (LARC) is located in Room 600 in the Student Services Center. It is designed to assist students in the development of their full academic potential and to motivate them to become self-directed learners. The center provides support services, such as skills assessment, individual or group tutorials, subject advising, learning assistance, summer academic preparation and basic skills development. The LARC website is located at http:/www.sjsu.edu/larc.

FSS Peer Mentors

The Forensic Science Students Peer Mentor Center is located on the 5th floor of MacQuarrie Hall. The purpose of the FSS Peer Mentor Group is to provide a forum to assist forensic science students in navigating the major, understanding requirements and prerequisites, and making wise choices in their college careers. FSS Peer Mentors may also offer limited tutoring, and facilitate educational and professional opportunities. Peer Mentor services are free and available to active members of the FSS. Contact sjsu.fss@gmail.com for more information.

Justice Studies Reading and Writing Philosophy

The Department of Justice Studies is committed to scholarly excellence. Therefore, the Department promotes academic, critical, and creative engagement with language (i.e., reading and writing) throughout its curriculum. A sustained and intensive exploration of language prepares students to think critically and to act meaningfully in interrelated areas of their lives–personal, professional, economic, social, political, ethical, and cultural. Graduates of the Department of Justice Studies leave San José State University prepared to enter a range of careers and for advanced study in a variety of fields; they are prepared to more effectively identify and ameliorate injustice in their personal, professional and civic lives. Indeed, the impact of literacy is evident not only within the span of a specific course, semester, or academic program but also over the span of a lifetime.

FS167 Forensic Molecular Biology (Lec/Lab), Fall 2015 Course Schedule

The schedule is subject to change with fair notice and notice will be provided via email.

Week	Date	Topics, Readings, Assignments, Deadlines
1	08/25	Overview of Forensic DNA typing and History of Forensic DNA Readings Butler Chapter 1. Outlines Course Description, requirements, grading etc. Set up small student groups. Brettell, T.A., Butler, J.M., Almirall, J.R. (2011) Forensic science. Anal. Chem. 83: 4539-4556. Lee, SB. (2006) Forensic DNA Typing. McGraw-Hill Yearbook of Science and Technology. McGraw-Hill Readings from www.dna.gov.
	08/26	Lab: Read Safety and laboratory format and grading handout. Laboratory Orientation
2	09/01	Introduction to Physical Evidence. Common Types of Physical Evidence. - The Significance of Physical Evidence. Locard's Exchange Principle- Class vs Individual Characteristics. Laboratory: Measurement and Errors: Measurements Impact angle calculations
	09/02	Lab: Guest speaker
3	09/08	Basics of Biological Physical Evidence - Introduction to Detection and Screening methods. Presumptive versus confirmatory tests. Reading Butler Chapter 3. *Visit www.dna.gov at: http://www.dna.gov/basics/evidence_collection.* Read all sub pages (all blue sub links in each of the sections): Crime Scene Integrity, Chain of Custody, Contamination of Evidence, Evidence Transportation and Storage, Sources and Locations of DNA Evidence.
	09/09	Lab: Crime Scene Exercise / Bloodborne pathogen training
4	09/15	Biochemistry of Biological Physical Evidence. Blood, saliva and semen. Laboratory : 1. Sampling and handling biological physical evidence. 2. Visual and microscopic examinations. 3. Chemical enhancement reagents and tests. Readings: References at http://www.fbi.gov/hq/lab/fsc/backissu/july1999/ponce.htm Cox, M. (1991) A Study of the Sensitivity and Specificity of Four Presumptive Tests for Blood. Journal of Forensic Science 36(5):1503 -1511.

	09/16	Lab: Visual Exam/Screening of evidence items for biological material.
5	09/22	Collection and preservation of Biological Evidence Review types of biological evidence, collection methods for different types of evidence and comparison of forensic biological evidence versus clinical samples. ***Required reading on training at: http://www.dna.gov/training/*** Take both training courses on what every law enforcement officer should know about DNA evidence- Selected pages will be assigned. ***Link for DNA Sample Handling at: http://www.cacnews.org/training/DNA_Sample_Handling.pdf*** **Kobilinsky, L. (1992)** Recovery and Stability of DNA in Samples of Forensic Science Significance. Forensic Sci. Rev. 4:67. **Gialamas, D and Stockwell, D. (1995)** Forensic Biology Sample Collection and Handling Techniques. A Look at Methods Utilized by California Crime Labs CAC Newsletter. Summer 1995
	09/23	Lab: Collection and preservation of biological evidence- continued. Proper methods of collection. Special collection guidelines for Biological Evidence. Laboratory comparison of collection methods and kits. Chain of custody and storage.
6	09/29	Biochemistry of DNA and Human Genetics.DNA Structure, Function and Replication, Cell Biology, Chromosomes, Genes and Forensic DNA markers DNA Biology- The Scientific Basis for DNA typing. Reading Butler Chapter 2, Chapter 19 and **DNA/RNA structure at: http://www.blc.arizona.edu/Molecular_Graphics/DNA_Structure/DNA_Tutorial.html.** **Genetic Code, DNA Structure, Function and Replication.** **Cell Biology, Chromosomes, Genes and DNA markers.** Basic Human Genetics- *A tribute to Mom and Dad.* Inheritance of DNA – Mendelian Genetics DNA variation and DNA Methods.
	09/30	Lab: DNA extractions - Phenol chloroform vs. other extractions. Chelex, FTA, Silica based, Prepfiler. Differential extraction of male vs. female DNA from sexual assault evidence.
7	10/06	Methods used in Forensic DNA: DNA extractions and quantification Reading Chapter. DNA extractions- Types and amount of samples required for DNA typing. DNA Extraction and Quantification or How do they get DNA? Overview of Typing- Methods used to isolate DNA and Quantify DNA. How much DNA do they need? DNA from a Cougar- Whos' DNA is it? Human or Non-human?
	10/07	Lab: Quantification of DNA: quantitative PCR laboratory.
8	10/13	Exam 1 covering Butler C1-C4&19. Methods used to assess DNA variation.
	10/14	Lab: Journal Article Selection for Article Review (Exam 2)

9	10/20	Restriction Fragment Length Polymorphisms, Polymerase Chain Reaction, Dideoxy sequencing, Denaturing High Performance Liquid Chromatography (dHPLC), Single Nucleotide Polymorphism, Detection using array-based tech. Evaluating DNA variation or Does size matter? Introduction to RFLP vs PCR
	10/21	Lab: PCR Introduction continued. Role of positive controls, negative controls.
10	10/27	Introduction to Polymerase Chain Reaction – Who wants to be a DNA billionaire? Introduction to Polymerase Chain Reaction at: http://www.pcrlinks.com/generalities/introduction.htm Introduction to Polymerase Chain Reaction at: http://www.accessexcellence.org/RC/VL/GG/polymerase.html
	10/28	Lab: PCR amplification. The power of controls: positive controls, negative controls.
11	11/03	Introduction to Short Tandem Repeats Web Link for STR at: http://www.cstl.nist.gov/biotech/strbase Budowle B, Shea B, Niezgoda S, Chakraborty R. 2001. CODIS STRSTR loci data from 41 sample populations. J Forensic Sci.ence 46(3):453 -489. Walsh et al. 1996 NAR. 24:2807 -2812, Levinson et al. 1987. Mol Biol Evol. 4:203 -221, Brinkmann. 1998 Am J Hum Genet 62:1408, Henke et al. Am J Hum Genet 64:1473.
	11/04	Lab: 310 CE Orientation / Set-up of Instrument / Running Evidence Samples
12	11/10	**Short Tandem Repeats- Repeat Slippage- The bad zipper.** Repeat Slippage, Mutation rates, Chromosomal abnormalities and consequences on Forensic STR results.Reading:Moxon ER and Wills C. DNA Microsatellites: agents of evolution? Scientific American January: 72 -77, 1999.
	11/11	No Lab (Veterans Day)
13	11/17	Designating True alleles versus artifacts. Capillary Electrophoresis. Data collection (instrumentation) and Interpretation Reading Butler Chapters 12-15. **DNA separation methods- Gels vs Capillaries.** STR detection methods - Introduction to Fluorescence.***Introduction to Fluorescence techniques at: http://probes.invitrogen.com/handbook/sections/0001.html*** **Understanding STR results Readings C18-19.**
	11/18	**Lab: Processing DNA data (preliminary data interpretation and controls) / Genemapper ID Software.**

14	11/24	**Understanding STR results, Forensic Issues& DNA Databases** Statistics of single source samples and mixtures Readings Butler C7, 19-21 Computer laboratory: Troubleshooting STR results-forensic issues. Degraded DNA, PCR inhibition, contamination, mixed samples and Interpretation. SWGDAM STRSTR Interpretation Guidelines at http://www.fbi.gov/hq/lab/fsc/backissu/july2000/strig.htm Combined DNA Index System- Value of DNA databases. Levels of CODIS, Privacy Issues, QC, Searching, sample collection. Combined DNA Index system at: http://www.fbi.gov/hq/lab/html/codis1.htm Assignments- Required Readings: Spencer C. 2004. Genetic Testimony: Questions about Interpreting DNA Profiles. Why are DNA Profiles interpreted in terms of probabilities? How Are DNA Profile Probabilities Calculated and Presented? Is a Person's DNA Profile Unique? If a Defendant's Profile Matches That of the Crime Scene Sample, Does That Prove the Defendant's Guilt? Population Stats - Genetics- Hardy-Weinberg Equilibrium
	11/25	No Lab (Thanksgiving)

15	12/01	DNA Databases- Privacy and Ethics. ***Assignments- Required Reading:*** **Bieber F, Brenner CH, and Lazer D. 2006.** Finding Criminals through DNA of their Relatives. Science. 312(5778):1315 -1316. ***Report of the National Task Force on Privacy, Technology, and Criminal Justice Information at: http://www.ojp.usdoj.gov/bjs/pub/pdf/rntfptcj.pdf.*** ***Ethical Legal and Social Issues Raised by the Human Genome Project Research at:*** ***http://www.ornl.gov/sci/techresources/Human_Genome/elsi/elsi.shtml.*** Ethical, Legal and Social Implications of Genetic Testing at: http://www.genome.gov/page.cfm?pageID=12010621. **The "new" genetic markers- mtDNA and Y chromosome markers Butler C8-11.** Mitochondrial DNA: Inheritance, heteroplasmy, ancient DNA, Armed Forces DNA Identification laboratory applications.Laboratory: Mitochondrial DNA sequencing laboratory or Y STR amplifications. Y chromosome markers. Reading Butler C 8 and 9. Quality Control, Validation, Admissibility, and Training Standards Required readings below on Validation and Ethics. Reading Butler Ch 16, and Appendices IV&V Scientific and Technical Working Groups on DNA AnalysisMethods. DNA Advisory Board (DAB), Validation and Accreditation. Required Reading: 1. Holt CL, Buoncristiani M, Wallin JM, Nguyen T, Lazaruk KD, Walsh PS. 2002. TWGDAM validation of AmpFlSTR™. PCR amplification kits for forensic DNA casework. J Forensic Sci. 47(1):66 –96. Required Reading: 2. ***CAC Code of Ethics at http://www.cacnews.org/membership/handbook.shtml*** Frye, Daubert and Federal Rules of Evidence at http://www.forensic-evidence.com/site/EVID/EL00003_4.html***STR admissibility information at http://denverda.org/DNA/DNA_INDEX.htm*** **Legal/ethical considerations of DNA typing and Future of Forensic DNA in C 11.** Innocence Project- Uses of DNA in exonerating the innocent ***Exonerating the wrongfully convicted through post conviction DNA testing at: http://www.innocenceproject.org*** **Convicted by Juries, Exonerated by Science-** Case studies at http://www.ncjrs.org/pdffiles/dnaevid.pdf ***Future of DNA typing- Forensic Phenotype Profiling.*** Future of DNA Testing: Inferring population of Origin from DNA.
	12/02	Lab: Moot Court-Presentation of DNA Data /Mock Cases
16	12/08	Review for final exam **(FINAL TBD)** / Submission of Lab Notebooks