FS/BI 444 & FS544-Forensic Biology
Fall 2014 T R 10:00-11:20 (Lecture); WSC 120
Dr. Joan Kuh (email joan.kuh@chaminade.edu, office phone 739-4642)
Office Hours: 10AM-12noon M and 3PM-5PM R in WSC 102 or by appointment

Description

This course focuses on the identification, isolation, analysis and interpretation of biological evidence recovered under a number of forensic scenarios including crime scenes, mass disasters and war crimes. After covering serological and immunological techniques used in forensic labs, the remainder of the course will focus on forensic DNA-based approaches. These approaches entail the biology of genetic markers including restriction fragment length polymorphisms (RFLPs), autosomal and Y-chromosome short tandem repeats (STRs) and mitochondrial single nucleotide polymorphisms (SNPs). Technologies to detect and analyze these markers will also be discussed in great detail. Population genetics and statistical analysis key to the interpretation of forensic DNA results will be presented. Through the journal paper assignments, students will become familiar in finding and critically reading published peer-reviewed science articles in the area of forensic biology.

BI/FS444L

Registration in BI/FS444L on Tuesday afternoons from 2:30-5:20 in Henry Hall 02 *is required.*

Texts (Required)

Fundamentals of Forensic DNA Typing by John M. Butler. Academic Press, 2009.

Text (Recommended)

Forensic Biology by Richard Li. CRC Press, 2008. [last year's required text]
An Introduction to Forensic Genetics by Goodwin, Linacre and Hadi. (2nd ed.) Wiley-Blackwell, 2011

Supplemental Readings

I do share materials from mass media and other sources that apply to our topic in this course.

Grading

Grades will be based on two midterm exams (2 @ 100 points), a cumulative final exam (150 points), three summaries of individual journal papers (25 points each) and one homework worth 25 points. Currently, grades for the course will be based on a 90-80-70 scale for an A, B and C.
Information on the format for the journal paper summaries is below.

Student Learning Objectives:

Students, at the end of this course, should be able to

1. Describe proper collection and analysis of biological evidence from a crime scene;
2. Distinguish between and define biochemical/serological terms and assays;
3. Distinguish between presumptive and confirmatory tests for each type of biological fluid or tissue;
4. List the structural features of eukaryotic DNA and how these features are important in its isolation and analysis;
5. Describe the organization of the human genome;
6. Describe the different DNA sequence types found in the human genome (VNTR, STR, mtDNA, Y-STR and SNP) that facilitate the identification of individuals;
7. Describe extraction, separation and analytical tests for each of the sequence types in objective 6;
8. Calculate and interpret a DNA profile frequency;
9. Understand the basic tenets of genetics that leads to objective 8 as demonstrated by solving simple genetic problems;
10. Relate the importance and challenges of forensic biological techniques to the identification of victims in mass disasters;
11. Describe the Innocence Project and its mission and importance to the U.S. justice system.

Attendance

I simply ask that you make every effort to attend class on a regular basis. Attendance to exams is mandatory, unless you have a valid note (written excuse dated on that day from a doctor). I will be taking attendance. Excessive unexcused absences (>6) will lead to an academic withdrawal request from me.

Tentative Schedule

Date	Topic	Reading	Assignment
Aug 26	Introduction	Chapter 1	
Aug 28	Sources of DNA Evidence	Ch. 4	
Sep 02	Identification of Body Fluids	Ch. 4	
Sep 04	Serology & Serological Techniques	Ch. 3 & supplemental	
Sep 09	Serological Techniques & Blood Typing	Ch. 3 & supplemental	
Sep 11	Protein Profiling	Ch. 3 & supplemental	Summary #1 due
Sep 16	Review		
Sep 18	**Midterm I**	**Chap 1, 3 & 4 (JB)**	
Sep 23	DNA & Human Genome	Chap 2 (JB)	
Sep 25	DNA Extraction & Quantitation	Ch.5&6 (JB)	
Sep 30	PCR & Electrophoresis	Ch. 7 (JB)	
Oct 02	Detection Methods	Ch. 9 (JB)	
Oct 07	DNA Markers & Analysis VNTR & STR	Ch. 8 (JB)	
Oct 09	DNA Markers & Analysis VNTR & STR	continued	
Oct 14	Real World Issues w/STRs	Ch. 13&14 (JB)	
Oct 16	SNPS and other markers	Ch.15&16 (JB)	
Oct 21	SNPs and other markers	continued	
Oct 23	Non-human typing; Genetics	Ch 15 (JB)	Summary #2 due
Oct 28	**Midterm 2**		
Oct 30	Genetics	Ch. 2 (JB)	
Nov 04	Genetics & Statistics	Ch. 2 & 11 (JB)	
Nov 06	Genetics & Statistics	continued	HW handout
Nov 11	**HOLIDAY**		
Nov 13	Databases	Ch. 12 (JB)	
Nov 18	CODIS	Chapter 12 (JB)	HPD Guest Speakers
Nov 20	Applications of DNA Typing	Chapter 17 (JB)	Homework Due
Nov 25	Applications continued	continued	
Nov 27	**THANKSGIVING HOLIDAY**		
Dec 02	Innocence Project	supplemental	Guest Speakers; Summary #3 due
Dec 04	Review for FINAL		
Dec 08	**Monday-FINAL 8:30AM-10:30AM Cumulative**		

*Add-drop deadline is Wednesday, September 03

*Last day to withdraw is Friday, November 07

Journal Paper Reports & Student Presentations

As part of your grade in FS 444, you are expected to read and report on three research articles from peer reviewed journals. The articles must meet the following criteria: (1) must be from a peer-reviewed journal; (2) must be published; (3) be of a moderate length, a minimum of 4 pages, no longer than 20 pages; (4) an inquiry-based article, NOT a review article; (5) relatively recent as in the last five years. Exceptions to these requirements will be made for the case study report. These can come from mass media and other REPUTABLE sources. The schedule and topic for each report is as follows:

Summary #	Due Date	Topic
1	09/11/2014	New approach to the identification or analysis of body fluids
2	10/23/2014	Novel DNA source or extraction method, or technique in DNA analysis/genotyping
3	12/02/2014	Case Study in Forensic Biology

Each report is worth 25 points. The grading rubric for the reports is: 10 points for finding a suitable paper (suitable as in pertinent to forensic science field). 15 points will be distributed among the analysis of the paper using the five questions below as a guideline. Submit reports with a copy of the paper to me.

The format for the report is

1. What is the hypothesis/topic of the research article, e.g. is there a particular problem in the area of forensic DNA analysis that the authors are trying to address?
2. What are the techniques used?
3. Were the researchers successful in addressing the problem/hypothesis?
4. How have the authors contributed to the general body of knowledge in forensic science?
5. What other work or further research is warranted after this study? What were the shortcomings of the research or paper (if any)?

Report can be anywhere from 2-4 pages (double-spaced). Include the authors, source and title of paper on your report. Please do not copy wording from the article; rather you need to summarize in your own words. NO ELECTRONIC SUBMISSIONS please! Reports are due ***in class*** on the due date. Reports handed in up to 24 hours later will be regarded as late and their marks will be docked 10% of the possible points (one letter grade). After 24 hours, no reports will be accepted.

Where to find articles:

There are a number of forensic science journals available through Sullivan Library to which any CUH student or faculty has free online access to articles. Search the journals database with the term "forensic" to find these journals. Then as you click on a journal, there is a "search for keywords" function for that journal.

Also, PubMed Central is a NIH database containing only free articles (available to the public without fee). [at http://www.ncbi.nlm.nih.gov/sites/entrez?db=pmc].

If you have any doubts/questions about a suitable paper, please see me.

Plagiarism:

Do not copy work from another student, either on campus or elsewhere. Do not copy verbatim from the article. Cite the source(s) of information used in the report (the text, news article, etc). This is really important to me. . . .