CLFS 619D – Forensic Chemistry

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Text (required): Forensic Chemistry, Suzanne Bell, © 2006, Pearson-Prentice Hall, ISBN 0-13-147835-4, Additional resources will be provided (e.g. research papers, video clips, etc.).

Course Goals:
Participation in this course will
1. Familiarize the student with the methodologies involved in analyzing forensic samples.
2. Provide a background in statistical analysis of data
3. Allow students to assess forensic methodologies utilized in the popular media

Learning outcomes:
Students will be able to
1. Understand how spectroscopic and analytical methods are used to analyze forensic samples
2. Determine the accuracy and reproducibility of methods studied in this course
3. Learn the strengths and weaknesses of the methods studied in this course

Content:
1. Introduction (Readings, discussion, video examples)
   a. Science vs. Law
   b. Forensic science and popular culture
2. Statistics (Reading, discussion, tutorials)
   a. Accuracy & Precision
   b. Reliability
   c. Quality control
   d. Legal issues
3. Spectroscopy (Wiki Assignments, weekly “mini” tutorials & class discussions)
   a. Atomic Spectroscopy
   b. Microspectrophotometry
   c. Electrophoresis
   d. Microscopy
   e. Chromatography
   f. Immunoassays
4. Analysis of Forensic Samples (Individual papers, case studies, weekly tutorials, analysis of actual cases)
   a. Drug Analysis
   b. Combustion & Arson
   c. Inks, Pains, & Pigments
   d. Polymers & Fibers

**Student Assessment**

*Participation in discussions (20%)*
Includes assigned case studies, topical discussions (e.g. analysis of forensic used in television), and primary literature analysis.

*Development of a content based Wiki page (25%)* See description below.

*Paper (25%)* See description below.

*Individual project (25%)* See description below.

*Group dynamics (5%)*
Each person will be assessed by their group members for (1) participation in projects, (2) promptness in completing their project, and (3) overall group “citizenship”.

*(note that the assignment specifics are subject to changes during the course development stage)*

**Group Wikis**
Students in the class will be split into 6 groups of 3-4 students per groups, depending on course enrollment. Each group will become a class expert in one of the 6 content areas:
- Atomic Spectroscopy
- Microspectrophotometry
- Electrophoresis
- Microscopy
- Chromatography
- Immunoassays

Each group will create a Wiki document that explores the use of these techniques in forensic analysis. The Wikis must contain the following content areas:
- Background: What information can be obtained from this form of spectroscopy?
- Practical suggestions for experimental use. For example, does it work best for hydrophobic samples? What approximate concentrations are needed for analysis?
- A discussion of accuracy, reproducibility, and quality control issues.

Each student in the group must submit material of all content areas. A Wiki is an editable document, so each group member should be editing and adding content.

*Students will have 3 weeks to complete this project and the instructor will assess the pages weekly, providing suggestions for improvement and correcting any scientific inaccuracies.*

**Research Paper**
The students now have the Wiki pages as a resource for their research papers. Each student will write a short paper (5-7 pages) following these guidelines:

1. Choose one of the following areas:
   a. Forensic Drug Analysis (Ch. 7-8)
   b. Combustion & Arson (Ch. 9-10)
c. Inks, Pains, & Pigments (Ch. 11-12)
   d. Polymers & Fibers (Ch. 13-14)

2. Describe how the forms of spectroscopy are used to analyze samples in your chosen area.
3. Describe a case where one of the forms of spectroscopy was used.

Students will have 4 weeks to complete this paper. An outline will be due after 2 weeks to assess the progress of the student.

Final Project
Students will have a choice of two different projects:
   1. Critical analysis of a popular television crime show that utilizes forensic science (the instructor will provide a choice of available episodes via an online site like hulu.com). The student must evaluate both the use of the technique and the information garnered from that technique.
   2. Complete an outline for a screenplay or teleplay for a crime how and utilize at least three of the techniques to either prove the guilt or exonerate the character.

I will provide more guidelines of these projects (e.g. page length and logistics) during the development of the course.

Grading Scale

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<tr>
<th>Percentage</th>
<th>Grade</th>
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<td>90 – 100%</td>
<td>A</td>
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<td>80 – 89%</td>
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<td>70 – 79%</td>
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<td>D</td>
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<td>≤ 59%</td>
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