

12-90
UWUCC - App 3/5/13
Senate info - 3/26/13

Undergraduate Distance Education Review Form

(Required for all courses taught by distance education for more than one-third of teaching contact hours.)

Existing and Special Topics Course

Course: CHEM 105 - The Forensic Chemistry of CSI

Instructor(s) of Record: Justin Fair

Phone: (724) 357-4477

Email: jfair@iup.edu

Step Two: Departmental/Dean Approval

Recommendation: Positive (The objectives of this course can be met via distance education)

Negative

Justin Fair 2/12/13

Signature of Department Designee

Date

Endorsed:

Dave Luff 2/19/13

Signature of College Dean

Date

Forward form and supporting materials to Liberal Studies Office for consideration by the University-wide Undergraduate Curriculum Committee. Dual-level courses also require review by the University-wide Graduate Committee for graduate-level section.

Step Three: University-wide Undergraduate Curriculum Committee Approval

Recommendation: Positive (The objectives of this course can be met via distance education)

Negative

Gail Schriest 3/5/13

Signature of Committee Co-Chair

Date

Forward form and supporting materials to the Provost within 30 calendar days after received by committee.

Step Four: Provost Approval

Approved as distance education course

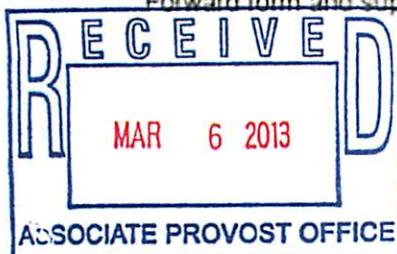
Rejected as distance education course

Thomas S. Moberg (w) 3/7/13

Signature of Provost

Date

Forward form and supporting materials to Associate Provost.



Liberal Studies
FEB 19 2013
Received

Distance Education Proposal for CHEM 105: The Forensic Chemistry of CSI

A1. How is the instructor qualified in the distance education delivery method as well as the discipline?

I hold a Ph.D. in Chemistry from the University of Connecticut and have been a professor in the Chemistry Department at IUP since 2009. My main teaching responsibilities include College Chemistry II and Organic Chemistry. Prior to attaining my Ph.D., I was a Nuclear Medical Science Officer as member of a quick reaction force for the U.S. Army. In this role I oversaw the collection of evidence as well as performed chemical tests on suspect chemical, biological, radiological, nuclear, and explosive reagents/weapons. These experiences provide a practical experience in evidence collection, chemical testing methods, and interagency relationships with local emergency responders and their state/federal counterparts.

All of the lectures and laboratories I teach utilize a hybrid approach and have a strong on-line presence. I have a large amount of experience not only posting information and material in a LMS, but also have developed an adaptive online homework system for organic chemistry within Moodle. These developments led to a Center for Teaching Excellence award in my second year of teaching. I have attended all of the Moodle workshops developed by IT services and plan to use Moodle 2.3 for this course.

A2. How will each objective of the course be met using distance education technology?

Objective 1: *Apply the basic concepts of chemistry to topics in forensic science including: examining a crime scene and collecting evidence, forensic analysis of drugs, fibers, glass, arson and other types of evidence.*

Students will read chapters 1-5 and 9-11 of the Girard text, *Criminalistics: Forensic Science, Crime, and Terrorism* (available at the IUP bookstore and multiple online distributors) as well as review the LMS course content. The LMS course content will be made available in Lesson format that includes voice over PowerPoint slides, written notes, videos, and content style multiple choice questions. Lessons will be chunked into 15-20 minute portions in accordance with effective online learning practices. This material presents an introduction to chemical forensics to lay a basic foundation to application of methods, materials, and processes involved in evidence collection and processing. An example course lesson can be found as attachment #1. At the conclusion of each topic (chapter), students will then complete 4-8 review problems as homework. Thus, the homework will include 2-6 questions of simple recall questions such as fill-in-the-blank or true/false as well as 1-2 objective questions requiring an analysis, problem solving structure and short essay answers (attachment #2).

To promote reflection, discussion, and student–student interaction, I will ask students to either watch a short video or read a short passage on a topic centered on the current topic. After reflection on the particular topic, they will explain their stance on each topic with provided guided questions. An example is included as attachment #3. A rubric will be supplied to assist with the discussions direction and appropriate reflective depth. The class of 25-30 students will be split into groups of 4-6 student groups to promote a more personal and connected discussion (named appropriately as Brass, Hodges, Finn, Russell, Sanders, and Stokes).

In connection with the Indiana Borough Police Department, short videos will be produced this Spring 2013 that 1) demonstrate the contents of available forensic evidence collection kits, 2) their use in

processing a crime scene, and 3) example crime scene data obtainable from each. These videos will be posted on the LMS and used to give a more realistic context to the course and assist in Objective 3 of the course. Students will use the course material in conjunction with these videos to construct a fictional crime scene. In their small group, students will need to use 5 of the 8 forensic kits illustrated in the videos to describe the crime scene and inherent evidence collection in the form of a 3 page report to the "district attorney." The use of Google Docs will assist in the group collaboration. Upon completion of their report, each group will solve another group's crime. While doing so, they must analyze how the evidence was collected to ensure its usefulness (as not all collected evidence gives results due to contamination, limited samples, or improperly collected. This feeds into Objective #3.). This activity will test student's ability to apply these concepts and principles to solve problems in the analysis of forensic evidence while allowing creativity and originality. Turnitin will be used for both the crime scene report and the final solving of the crime. Attachment #4 contains the directions to this exercise.

Finally, two one-hour exams and a final exam will determine whether students have learned the concepts and principles of crime scene investigations, rules of evidence and analysis of forensic evidence. Exams will consist of open answer, multiple choice, true/false, and fill-in-the-blank. An example test can be found as attachment #5.

Objective 2: Describe chemical concepts, apply chemical rules and solve chemical problems related to the characteristics of matter, the periodic table, scientific measurements, basic atomic theory and electron structure, ionic and covalent compounds, basic reactions, solutions, structure of covalent compounds and organic chemistry.

Students will read chapters 5-6 and 15 of the Bishop text, *An Introduction to Chemistry: Atoms First* (available free of charge online and available in PDF format on the LMS course page) as well as review the LMS course content. It should be noted that the Girard Text also offers many of the basic chemical concepts such as density, yet these concepts are best served there as they allow for a direct application for its use. Thus, the Bishop text is meant to supplement some of the more basic atomic theory and general organic chemical knowledge. The material will be distributed to the student in the same manner as Objective 1. Thus, the LMS course content will be made available in Lesson format that includes voice over PowerPoint slides, written notes, videos, and content style multiple choice questions. Lessons will be chunked into 15-20 minute portions in accordance with effective online learning practices. At the conclusion of each topic (chapter), students will then complete 4-8 review problems as homework. Thus, the homework will include 2-6 questions simple recall questions such as fill-in-the-blank or true/false as well as 1-2 objective questions requiring an analysis, problem solving structure and short essay answers. Attachments #1 and #2 illustrate this delivery method.

The crime scene report activity will undoubtedly include material covered in both Objectives 1 and 2 and will use the physical properties of elements and compounds to elucidate the ability for sample collection, evaluation, and analysis.

The two one-hour exams and a final exam will also contain elements from Objective 1 and 2 and determine whether students have learned the concepts and principles of crime scene investigations, rules of evidence and analysis of forensic evidence. Exams will consist of open answer, multiple choice, true/false, and fill-in-the-blank. An example test can be found as attachment #5.

Objective 3: Describe how forensic science is portrayed in fiction, compare that to the forensic science presented in the text and analyze how this is related to the CSI effect.

Students will read chapters 1, 2, 3, 5, and 9 of *Investigating CSI: An Unauthorized Look Inside the Crime Labs of Las Vegas, Miami, and New York* and select a work of fiction to critically review the way forensic science is portrayed in the media as compared to how it works in the real world. They will then examine how this comparison is linked to the "CSI Effect". The CSI effect is the belief that watching TV shows such as CSI raises the expectations that jurors and the public have about the value and impact of forensic evidence on criminal trials and investigations. Guidelines for the report can be found as attachment #6. This objective will be uploaded by the student in PDF form onto the LMS in three parts. The first part will identify the work of fiction and ask for instructor approval. The second part will also be uploaded to the LMS and require the student to identify a minimum of two types of forensic evidence. The third and final assignment will be a final 3-5 page report. Instructor feedback for all three assignments will be annotated using Adobe Acrobat Pro according to the rubric found in attachment #6. Turnitin will be utilized in assessing the final report.

A3. How will the instructor-student and student-student, if applicable, interaction take place?

Students can send emails at any time and I will be available for "video office hours" through Skype at predetermined days and times, which will vary according to the semester in which the course is taught (I will create a new course-specific account to maintain privacy). Note that I will not be requiring students to have video-chat capabilities, but those that do can reach me in this manner. Students will also be encouraged to call my office phone if they have pressing questions/concerns.

Student-student interaction will take place via the message board on the LMS. Students will be required to reply to both my and each other's posts regarding outside readings as part of their grade and students will be encouraged to use the message board to ask questions and help each other study as much possible. Of course, I will be monitoring all posts and any inappropriate posing will be dealt with accordingly.

A4. How will student achievement be evaluated?

Two one-hour exams and a final exam are to be administered through the LMS and will count for 300 points of 600 possible course points (50% of the course). Online homework will be provided via the LMS and contain approximately 10 questions per chapter. Homework will comprise 50 points (~8%) of the total course points. Forum postings will be graded according to the attached rubric and account for 50 points (~8%) of the total course points.

The forum topics will be centered on current forensic topics. A typical topic will require the understanding of tools used in forensic investigations and their implications on society (*i.e.* CCTV as a forensic tool and the implications of a Big Brother).

A formal report on a work of forensic fiction that includes a central discussion of the CSI effect (100 points or 1/6th of the course grade).

Application of the course concepts will be evaluated by means of a group exercise. The student will creatively conjure a crime scene that incorporates five of the field kits commonly found in forensic chemistry along with class information with the aim of demonstrating the application and forensic data

obtainable from each field kit (60 points, corresponding to 10% of the class). After students have handed in their crime scene, they will be anonymously handed back at random and each student will solve the "crime". Again an understanding of the data these kits contain will be critical to solving the crime scene. The final report will include not only who committed the crime, but also examine how they came to the conclusion using the evidence provided.

In Summary:

| Graded Item | Points |
|--|--------------|
| Exam 1: | 100 |
| Exam 2: | 100 |
| Final Exam: | 100 |
| Online Homework (10 Assignments): | 50 (5 each) |
| Creation of Crime Scene: | 60 |
| Solving the Crime Scene: | 40 |
| Report on a Fiction Book/Video: | 100 |
| Forum Postings of Hot Topics (5 Topics): | 50 (10 each) |
| Total: | 600 |

A5. How will academic honesty on tests and assignments be addressed?

The two one-hour exams and final will be timed, and each question on the exams and objective quizzes will be pulled from one of a few very-similar questions associated with the problem through random selection of like question banks. This will make it highly unlikely that two students will have the same exam, but all exams will be similar and have the same level of difficulty.

For writing assignments, I will use Turnitin to check for plagiarism and if an assignment's material seems questionable, I will Google certain passages to ascertain whether or not the work is original.

CHEMISTRY 105: The Forensic Chemistry of CSI
Distance Education Syllabus
Indiana University of Pennsylvania

Instructor:

Dr. Justin Fair
Chemistry Department
Weyandt 138
Phone: 357-4477
E-mail: j.fair@iup.edu
Website: www.thefairlaboratory.com

Office Hours (Skype):

M: 9:00-10:00 am
T: 9:00-10:00 am
W: 1:00-2:00 pm
Th: 9:00-10:00 am
F: 1:00-2:00 pm

Or by Appointment

Course Description: For students who would like to learn about forensic chemistry and the basic science needed to understand it. Chemical concepts on the level of an introductory chemistry course and their applications to forensic science will be explored in detail. Topics will include the forensic analysis of drugs, fibers, glass, arson, questioned documents, and other types of physical evidence. Other topics will include how forensic science is portrayed in novels, movies, computer games and TV and the methods used in forensic evidence collection at a crime scene.

Course Material:

Textbook:

Criminalistics: Forensic Science, Crime, and Terrorism, Second Edition, J. Girard, Jones & Bartlett, Sudbury, MA (2011).

Optional Texts:

An Introduction to Chemistry, M. Bishop, (Atoms-first version)

http://preparatorychemistry.com/Bishop_Atoms_First.htm

Investigating CSI: An Unauthorized Look Inside the Crime Labs of Las Vegas, Miami and New York, Donn Cortez, Editor, BenBella Books, Dallas, TX (2006).

Other Materials: You will need a computer with access to the internet that has the following programs installed windows medial player (or video player that plays wma files), Adobe reader, and internet explorer.

Course Objectives:

1. Apply the basic concepts of chemistry to understand topics in forensic science including: examining a crime scene and collecting evidence, forensic analysis of drugs, fibers, glass, fingerprints, arson and other types of evidence.
2. Describe chemical concepts, apply chemical rules and solve chemical problems related to the characteristics of matter, the periodic table, scientific measurements, basic atomic theory and electron structure, ionic and covalent compounds, basic reactions, solutions, structure of covalent compounds and organic chemistry.
3. Describe how forensic science is portrayed in fiction, compare that to the forensic science presented in the text and analyze how this is related to the CSI effect.

Detailed lists of learning objectives for each chapter in Girard's and Bishop's text will be provided during the semester on the course web page.

Course Overview:

- Investigating the Crime Scene (Girard, Chapter 1)
- Investigating and Processing Physical Evidence (Girard, Chapter 2)
- Physical Properties: Forensic Characterization of Soil (Girard, Chapter 3)
- Forensic Analysis of Glass (Girard, Chapter 5)
- The Microscope and Forensic Identification of Hair, Fibers, and Paint (Girard, Chapter 4)
- Inorganic Analysis: Forensic Determination of Metals and Gunshot Residue (Girard, Chapter 9)
- Ionic & Covalent Compounds (Bishop, Chapter 5 & 6.1-6.2)
- Organic Chemistry (Bishop, Chapter 15)
- Arson (Girard, Chapter 10)
- Drugs of Abuse (Girard, Chapter 11)

Course Grade:

The course grade is determined as follows:

| Graded Item | Points |
|---|--------------|
| Exam 1: (Girard Chapters 1&2) | 100 |
| Exam 2: (Girard Chapters 3,4,5&9) | 100 |
| Final Exam: (Bishop Chapters 5,6&15, Girard Chapters 10&11) | 100 |
| Online Homework (10 Assignments): | 50 (5 each) |
| Creation of a Crime Scene: | 60 |
| Solving the Crime Scene: | 40 |
| Written Report on a Fiction Book/Video: | 100 |
| Forum Postings of Hot Topics (5 Topics): | 50 (10 each) |
| Total: | 600 |

The following scale will be used:

A: 90% and over, B: 80%-89.9%, C: 70-79.9%, D: 60-69.9%, F: below 60%.

Office Hours:

I regularly check my email and you are welcome to email me at anytime on any day. In addition, I will be available for video conferencing via Skype chat (usernames to be distributed via Moodle once the class roster is finalized) and I will regularly be reading and responding to questions on the course message board.

Exams:

Two one-hour exams and a final exam will be given during the course. Exams are not cumulative. There will be no make-up exams given during the course. Be sure to annotate exam dates in your personal calendar.

Homework problems:

There will be a limited number of homework problems consisting of mainly true/false and fill-in-the-blank questions. Each homework assignment will also include 1-2 short answer essay questions.

These essay questions will be solved by providing a problem strategy. If there are multiple parts to the question (a, b, c, d, etc.) you will need to provide a strategy for all parts of the problem.

A problem strategy is a written record of your thoughts, ideas, calculations, etc. as you attempt to answer the question or solve the problem. You can use the format of the worked examples in the text as examples of what you should provide as a problem strategy or the examples provided by the instructor. You do not necessarily need to obtain the correct answer. However, you must provide a clear narrative or summary of your method for answering each assigned problem. A simple list of brief answers is not acceptable. Also merely citing the pages, tables or figures in the text of the class notes that apply to the question is not acceptable. You must describe how you used that information to answer the question or solved the problem.

Activities:

There are two types of activities in this course. First, there will be an opportunity for forum posts on 5 topics throughout the course. Each forum topic will involve an initial post followed by a response of another class member's posting that elicits discussion.

Secondly, you will create a crime scene using the tools and materials covered in this course. This activity is considered the capstone event for this course. A report will be filed with the "district attorney's" office with the evidence you have collected. After the crime scene report is handed in, your group will receive a separate report from the district attorney's office. Your group will solve the crime and explain how you came to your conclusion.

Student Report on Forensic Fiction:

With the approval of the instructor, each student will select a different work or episode of fiction (book, video or other media) that includes some elements of forensic science, preferably forensic chemistry. The student will report their selection to the instructor one week after the first exam. This first assignment should contain a bibliographic citation or description of the work of fiction and a paragraph giving at least two reasons of why the student selected it. Then one week after the second exam, the student will submit a 1/2 page outline or rough draft of the report that includes a synopsis of the story and a list of the forensic evidence in it. The final written report will then be turned in by no later than the last day of final exam week. The report should be between 3-5 pages and include the following elements:

1. The title, publisher, location and year the work was produced.
2. A short synopsis, why you selected it and your opinion of the quality of the work.
3. The types of forensic evidence included and how this evidence is linked to the topics presented in the required texts and/or in lectures.
4. How this work is related in at least two ways to the "CSI effect" (Examples of the CSI Effect include the requirement of physical evidence by juries for conviction, the time required and difficulty of doing forensic science, the increased knowledge about how forensic analysis can be circumvented).

Academic Integrity Policy (selected statements from the policy in the IUP Catalog):

"Charges of academic integrity violations may be brought by a faculty member or by an administrator. Students who observe or become aware of a violation of academic integrity by another student are strongly encouraged to report it to a university official." "Academic dishonesty includes, but is not limited to: Using unauthorized materials or devices, such as crib notes, during examinations or quizzes. Plagiarizing papers, theses, dissertations, essays, reports, speeches and oral presentations, take-home examinations, computer projects, or other academic exercises by misrepresenting or passing off the

ideas, words, formulas, or data of another as one's own. Using the same paper or work more than once without authorization of the faculty member to whom the work is being submitted."

CHEM 105: The Forensic Chemistry of CSI Syllabus of Record

I. Catalog Description

The Forensic Chemistry of *CSI*

(3c-01-3cr)

Designed for students who would like to learn about forensic chemistry and the basic science needed to understand it. Chemical concepts, on the level of an introductory chemistry course and their applications to forensic science will be explored in detail. Topics will include the forensic analysis of drugs, fibers, glass, arson, and other types of physical evidence. Other topics will include how forensic science is portrayed in novels, movies, computer games and TV and the methods used in forensic evidence collection at a crime scene. This course cannot be used to fulfill the requirements for a CHEM major or minor.

II. Course Objectives: Upon completion of this course, students will be able to:

Objective 1:

Apply the basic concepts of chemistry to topics in forensic science including: examining a crime scene and collecting evidence, forensic analysis of drugs, fibers, glass, arson and other types of evidence.

Expected Student Learning Outcomes 1 & 2:

Informed and Empowered Learners.

Rationale:

Exams, in-class activities and assigned problems will determine whether students have learned the concepts and principles of crime scene investigations, rules of evidence and analysis of forensic evidence. The exams, in-class activities and assigned problems will also test student's ability to apply these concepts and principles to solve problems in the analysis of forensic evidence.

Objective 2:

Describe chemical concepts, apply chemical rules and solve chemical problems related to the characteristics of matter, the periodic table, scientific measurements, basic atomic theory and electron structure, ionic and covalent compounds, basic reactions, solutions, structure of covalent compounds and organic chemistry.

Expected Student Learning Outcomes 1 & 2:

Informed and Empowered Learners

Rationale:

Exams, in-class activities and assigned problems will determine whether students have learned the basic concepts and principles of chemistry that are directly related to the topics in forensic science presented in the course. The exams, in-class activities and assigned problems will also test student's chemistry problem solving skills.

Objective 3:

Describe how forensic science is portrayed in fiction, compare that to the forensic science presented in the text and analyze how this is related to the CSI effect.

Expected Student Learning Outcomes 2 & 3:

Empowered and Responsible Learners.

Rationale: In class activities where CSI episodes are shown and the fiction report assignment will have students critically review the way forensic science is portrayed in the media as compared to how it works in the real world. They will then examine how this comparison is linked to the "CSI Effect". The CSI effect is the belief that watching TV shows such as CSI raises the expectations that jurors and the public have about the value and impact of forensic evidence on criminal trials and investigations.

III. Detailed Course Outline: (1 hour = 50 minutes or one “academic hour”)

- 1. Introduction to Forensic Science and Investigating *CSI* (1.5 hours) (1.5)**
 - a. Forensic Science: fact and fiction
 - b. The *CSI* Effect
- 2. Investigating the Crime Scene (4.0 hours) (5.5)**
 - a. Securing & documenting the crime scene
 - b. Collection, preservation, inventory and transportation of evidence
 - c. Chain of custody and legal dimensions of evidence
- 3. Investigating and Processing Physical Evidence (4.5 hours) (10.0)**
 - a. The modern crime lab and functions of a forensic scientist
 - b. Characteristics of physical evidence
 - c. Crime scene reconstruction
- 4. Physical Properties: Forensic Characterization of Soil (3.0 hours) (13.0)**
 - a. Physical and chemical properties of substances
 - b. The metric system, measurements and conversion factors
 - c. Accuracy, precision and significant figures
 - d. Forensic characteristics of soil
- 5. Exam #1 (1.5 hours) (14.5)**
- 6. Forensic Analysis of Glass (2.5 hours) (17.0)**
 - a. Types of glass
 - b. Physical and optical properties of glass
 - c. Glass fractures
- 7. The Microscope and Forensic Identification of Hair and Fibers (4.0 hours) (21.0)**
 - a. Types of microscopes
 - b. Forensic applications of microscopy: hair
 - c. Forensic applications of microscopy: fibers
- 8. Inorganic Analysis: Forensic Determination of Metals and Gunshot Residue (4.5 hours) (25.5)**
 - a. Atomic Theory and Structure
 - b. Electron Structure and Orbitals
 - c. Electron Configurations
 - d. Atomic Spectroscopy and forensic determination of metals
 - e. Gunpowder residues
- 9. Exam #2 (1.5 hours) (27.0)**
- 10. Ionic, Covalent and Organic Compounds (6 hours) (33.0)**
 - a. Names and formulas of ionic and covalent compounds
 - b. Lewis structures of covalent compounds, VSEPR, polar bonds
 - c. Introduction to organic chemistry and functional groups
- 11. Arson (5.0 hours) (38.0)**
 - a. The chemistry of fire, combustion and factors that influence its intensity
 - b. Hydrocarbon accelerants
 - c. Determining the origin and cause of a fire
 - d. Indicators of arson and collection of evidence
 - e. Analysis of flammable residue
- 12. Drugs of Abuse (4.0 hours) (42.0)**
 - a. History of drug regulation and drug dependence
 - b. Narcotics, hallucinogens, depressants, stimulants, inhalants, club drugs and steroids

- c. Identification of drugs using presumptive and confirmatory tests
- d. Poisons

13. Final Exam and Course Wrap Up (2.0 hours)

(44.0)

IV. Evaluation Methods:

| | |
|--|-------------------|
| Exams | 300 points |
| Assigned exercises (problem strategies) | 60 points |
| Report on a fiction book, video or computer game | 70 points |
| In-class activities (worksheets, demonstrations, etc.) | 60 points |
| <u>Class Participation (Good Questioner Points)</u> | <u>10 points</u> |
| Total | 500 points |

The exams will consist of a section of multiple choice, short-answer questions and word problem/short essay questions. There are 4 exams, including the final, each worth 100 points. The top three exams scores will be used to determine the final grade. The exercises and in-class activities will parallel the types of questions used on exams. The fiction report will focus on linking specific aspects of the forensic science to fictional portrayals of forensic science in books, TV movies or computer games. Examples possible sources for the fiction report are given in the bibliography. The final exam period will include a comprehensive exam covering all topics presented during the semester. Good questioner points: students will be given 2 points for each event judged eligible up to a maximum of 5 events for the semester for a total of 10 points. These can be obtained by asking a question in class, coming to office hours, asking a question by e-mail, by telephone, etc. The eligibility of questions are judged by the instructor but are generally not accepted for ones such as “What is the homework assignment?” or “Can you give me the answer for question 1?”

V. Example Grading Scale: The MAXIMUM percentages that will be used to determine the final grade are:

| | | |
|--------------|---|------------------|
| 100-90% | A | (500-450 points) |
| 89-80% | B | (449-400 points) |
| 79-70% | C | (399-350 points) |
| 69-60% | D | (349-300 points) |
| 59% or lower | F | (299-0 points) |

VI. Attendance Policy:

The attendance policy for this course will be consistent with the Undergraduate Course Attendance Policy in the IUP Catalog.

VII. Required & Supplementary Textbook(s):

- 1. Required Text:** *Criminalistics: Forensic Science, Crime and Terrorism, Second Edition* James E. Girard, Jones & Bartlett, Sudbury, MA (2011). This is a chemistry oriented non-science majors textbook that covers a wide variety of forensic science topics.
- 2. Supplementary Text:** *An Introduction to Chemistry*, M. Bishop, (Atoms First Edition) Chiral Publishing Company: <http://preparatorychemistry.com/>. This is a self-published web-based Text, which is used to provide additional material on chemistry topics such as

classification of matter, atomic structure, scientific measurements, chemical compounds and organic chemistry.

3. Supplementary Non-textbook Reading: *Investigating CSI: An Unauthorized Look Inside the Crime Labs of Las Vegas, Miami and New York*, Donn Cortez, Editor, BenBella Books, Dallas, TX (2006). This book contains a variety of essays about the characters and production of the *CSI* TV series, the differences between TV and real life crime scene investigation, the impact of *CSI* series on popular culture and synopses of *CSI* episodes. This book was selected to support the forensic fiction report.

VIII. Special Resource Requirements:

None

IX. Bibliography:

1. *Body of Evidence* by Patricia Cornwell, Pocket Books (2004)
2. *Bones*, Season 1-7 (2005-2012)
3. *Criminalistics: An Introduction to Forensic Science*, R. Saferstein, 10th ed., Prentice-Hall, Upper Saddle River (2011)
4. *CSI: 3 Dimensions of Murder and CSI 4: Hard Evidence*, Ubisoft (2006-2007)
5. *CSI: Crime Scene Investigations*, Season 1-12 (2000-2012)
6. *CSI: Miami*, Season 1-10 (2002-2012)
7. *CSI: NY*, Season 1-8 (2003-2012)
8. *Deja Dead* by Kathy Reichs. Pocket Star Books (1998)
9. *Forensic Science: Fundamentals & Investigations* Anthony J. Bertino, Cengage Learning, Mason OH (2008).
10. *Introduction to Forensic Science & Criminalistics*, R. E. Gaensslen, Howard A Harris and Henry Lee, McGraw-Hill, New York (2008)
11. *Investigating Chemistry*, Matthew Johl, 2nd Edition. W. H. Freeman: New York (2009)
12. *Media and Criminal Justice: The CSI Effect*, Dennis J. Stevens, Jones and Bartlett, New York (2011)
13. *NCIS*, Season 1-9 (2003-2012)
14. *Sherlock Holmes: The Complete Novels and Stories*, by Sir Arthur Conan Doyle, Bantam Classics (1986)
15. *The Bone Collector* by Jeffrey Deaver, Coronet Books (1997)
16. *The CSI: NY Virtual Experience in Second Life*,
http://www.cbs.com/primetime/csi_ny/second_life

Attachment #1

Example Lesson – The Microscope and Forensic Identification of Hair and Fibers.

The Microscope and Forensic Identification of Hair & Fibers

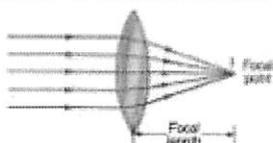


Magnification of Images

- A microscope is an optical instrument that uses a lens or a combination of lenses to magnify and resolve the fine details of an object.
- The magnified image seen by looking through a lens is known as a *virtual image*, whereas an image viewed directly is known as a *real image*.
- The magnification provided by a lens comes from the process of refraction: light rays bend as they pass through through the lens.



Focal Point & Focal Length



- The point at which parallel rays are converged to an image is the **focal point** of the lens.
- The distance of this point from the lens is the **focal length**.

A Simple Magnifier



See also Figure 4-2

- Object O is placed close to the lens, the rays from it bend but do not intersect.
- The observer's eye follows rays back to the point of **apparent origin** (I).
- The virtual image (I) appears bigger than the object (O).
- Moving the lens closer to the eye increases magnification.

Terms in Microscopy

- Magnification:**
 - How much the image is being increased
 - Depends on the refractive index, curvature and thickness of the lens
- Field of View:**
 - Everything that is visible through the eyepiece
 - When you increase magnification, you decrease field of view



Terms in Microscopy

- Depth of Focus:**
 - The thickness of the specimen that can be seen clearly
 - Can be used to determine layering of objects
 - Decreases at higher magnification
- Resolution:**
 - Ability to distinguish objects close together
 - Increases with numerical aperture; wavelength of radiation and refractive index



Example Problem

Which of the following does NOT decrease as magnification increases and explain why?

- (A) depth of field
- (B) field of view
- (C) resolution

The Microscope and Forensic Identification of Hair & Fibers



Types of Microscopes

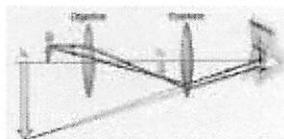
- Compound Microscope
- Comparison Microscope
- Stereoscopic Microscope
- Polarizing Microscope
- Scanning Electron Microscopes
- Microspectrophotometers

Compound Microscope



- Lenses: Ocular and objective (with mirror)
- Body tube or head: hollow tube that holds the objective and eyepiece lenses
- Stage: platform that supports the specimen
- Condenser: focuses light from the illuminator through center of stage

The Compound Microscope



See also Figure 4-4

- Rays from the object (O) pass first through the objective lens forming a real, slightly enlarged, inverted image (I₁).
- The second lens (eyepiece) acts as a simple magnifier to create an even bigger image (I₂).

Compound Microscope

- A compound microscope has at least two lenses:
 - Objective (lower) lens: produces a magnified and inverted version of the object
 - Ocular (smaller) lens: produces a larger virtual image in the viewer's brain
- Magnifying power = power of the objective lens x power of the ocular lens (5 x 10 = 50).
- Working distance = distance between the objective lens and the stage.

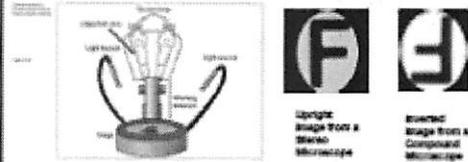
Comparison Microscopes



- Are used to compare two specimens
- Consist of two compound microscopes connected by an optical bridge
- Provide a single eyepiece through which the examiner sees both images side by side
- Can be lighted from below the stage or via a vertical or reflected illumination system

Stereoscopic Microscope

- The most commonly used microscope in crime labs.
- Two separate monocular microscopes each with its own set of lenses and prisms that create an upright image.



Stereoscopic Microscope

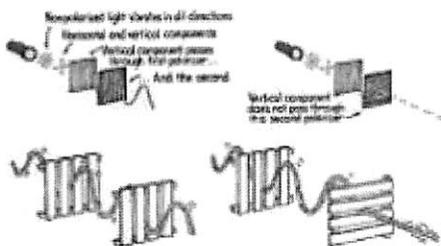
- Produce a three-dimensional image with a right-side-up, frontward orientation.
- The upright image is due to two prisms between the ocular and objective lenses.
- Offers a large working distance for bulky items.
- Relatively low magnification (10x-125x).
- Can be lighted from below or above.

Polarizing Microscopes

- Polarizing microscopes
 - Include two polarizing filters, a polarizer lens (fixed below the specimen), and an analyzer lens (fixed above the specimen)
 - The stage with the sample is rotated to determine how the polarized light interacts with the sample

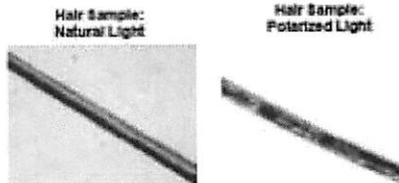


Polarized Light



Polarizing Microscopes

This can provide information about the shape, color, and size of minerals and it is used to identify hair, human-made fibers and paint.



Microspectrophotometers

- Optical microscopes have been attached to spectrophotometers.
- The lamp emits radiation that passed through the sample.
- Light is separated according to its wavelength and the spectrum formed is observed with a detector.

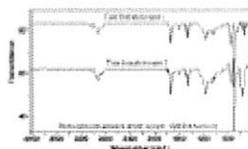


Infrared (IR) Spectrophotometry

- Probes molecular vibrations
 - absorption occurs when the frequency of the IR wave matches the vibrational frequency of a bond in the molecule
- Most molecules have numerous vibrations
 - bond stretching
 - bond bending
- Molecules with different structures have distinctively different IR spectra; therefore it is equivalent to a "fingerprint" of that substance.

Example: Photocopier Toner Analysis

- Analysis must be performed non-destructively
 - can't remove toner from paper
 - physical size of specimen is very small
 - Use microscope to find sample
 - Use FT-IR to analyze the toner

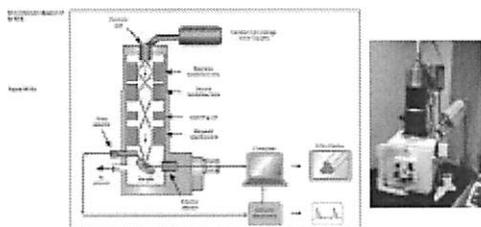


Scanning Electron Microscope

- Can magnify 100,000X
- Has a depth of focus more than 300X that of an optical microscope
- Uses electrons rather than light
- Offer much greater resolution than with a light microscope

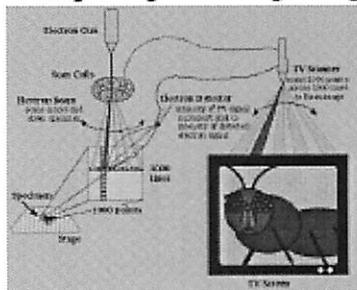


Scanning Electron Microscope



Scanning Electron Microscope

Putting it all together—making the image:

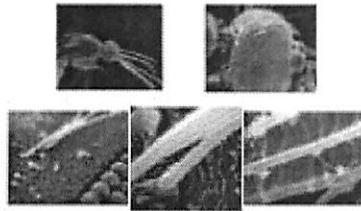


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Scanning Electron Microscope



The SEM shows very detailed 3-dimensional images created without light waves.

Example Problem

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Identify which type of microscope is being described below.

1. This microscope allows you to view two objects simultaneously, side-by-side such as a hair or fiber from a suspect and from a reference sample.
2. This type of microscope allows you to view the object in three dimensions as an upright image and is often used to initially examine hair and fiber samples.

Hair and Fibers as Evidence

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- Resists chemical decomposition.
- Retains their structural features over long periods of time.
- Humans lose about 100 hairs per day so they transfer often. Fibers are also light and easy to transfer.
- An hair sample cannot result in definitive identification of a person unless it has DNA attached. Fibers have only class characteristics.

Collecting Hair and Fiber Evidence

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- Collect hair and fiber evidence by using
 - Wide, transparent sticky tape
 - Lint roller
 - Evidence vacuum cleaner



- If hair or fibers must be removed from an object
 - Use clean forceps
 - fold fiber into a small sheet of paper
 - store in paper bag

Collection of Hair Evidence

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- Questioned hairs must be accompanied compared with an adequate number of control samples
 - from victim
 - from suspects
 - From animals
- Representative control samples
 - 50 full-length hairs from all areas of scalp
 - 24 full-length pubic hairs

Example Problem

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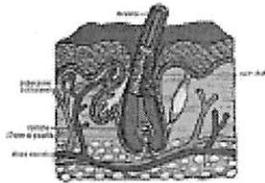
F
I
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R
S

Which is NOT recommended as a BEST method for collecting hair or fiber evidence and why?

- (A) sticky tape
- (B) lint roller
- (C) gloved fingers
- (D) evidence vacuum

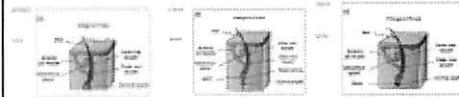
The Composition of Hair

- Hair is composed primarily of the protein keratin, which makes hair resistant to physical change.
- Each strand grows out of a follicle.



Hair Growth

- Hair growth stages (Remember ACT):
 - Anagenic: hair follicle is actively producing the hair; follicle is attached to root (10-1000 days)
 - Catagenic: transition stage in which the root is pushed out of the follicle (14-21 days)
 - Telogenic: hair naturally becomes loose and falls out (100 days)

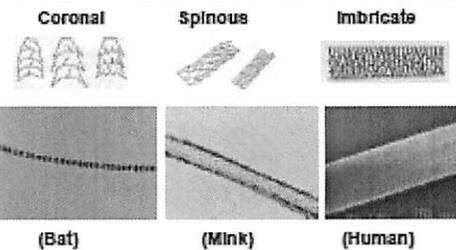


Forensic Analysis of Hair

- The following questions apply to hair evidence:
 - Is the hair human or animal?
 - Does it match the hair of the suspect?
 - Does it have a follicle for DNA testing?



Cuticle Structure



Medulla Patterns



- Medullary Index (medulla/shaft diameter)
 - human hair generally $< 1/3$
 - animal hair $\geq 1/2$
- Medullary Shape
 - human \Rightarrow normally cylindrical
 - Animal \Rightarrow varies by species

The Microscope and Forensic Identification of Hair & Fibers



"It's just a formality, but I'll also need a lock of your hair for DNA analysis."

The Structure of Hair



Structure of a hair:

- Cuticle: scales of hardened, flattened, keratinized tissue which point away from root
- Cortex: array of spindle-shaped cells parallel to length of hair embedded with pigment
- Medulla: rows of dark-colored cells organized in a pattern specific to the animal species
- Cortical fusi: air spaces

Animal vs Human Hairs

- Distinguish between animal and human using
 - Diameter (70-120 micrometers)
 - Pigment distribution (denser toward cuticle)
 - Cuticle (imbricate)
 - Medulla (amorphous)
 - Root shape (bulbous)

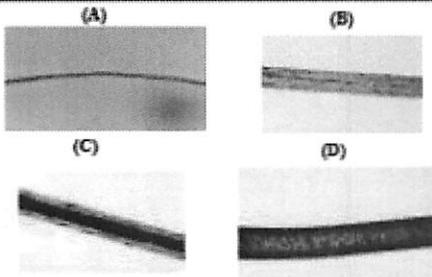


(Human)



(Human)

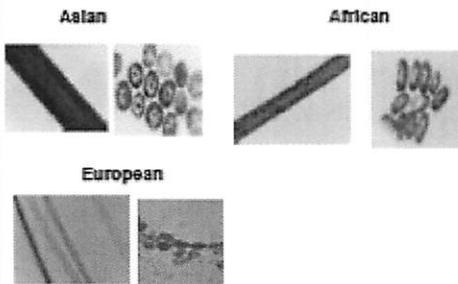
Example Problem: Is It Animal or Human?



Forensic Analysis of Human Hair

- Assess the hair color, length, and diameter
- Examine cuticle, medulla and cortex
- Distribution, shape & color intensity of pigment
 - dyed hair has color in cuticle & cortex
 - bleaching removes pigment, gives yellow tint
- Determine the body area of origin (head, pubic, limbs, face, chest, underarm)
- Pests, diseases or contaminants
- Can determine presence of drugs by chemical analysis

Human Hair As Class Evidence



Human Hair As Class Evidence

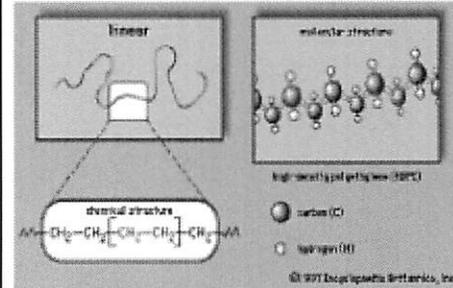
- Can sometimes determine body area of origin.
- Can determine shed vs. forcibly removed.
- Can sometimes be used to determine race.

| Race | Diameter | Cross Section | Pigment | Cuticle | Undulation (waviness) |
|----------|-----------|---------------|--------------------|---------|-----------------------|
| African | 60-90 um | Flat | Dense, clumped | | Prevalent |
| European | 70-100 um | Oval | Evenly distributed | Medium | Uncommon |
| Asian | 90-120 um | Round | Dense Auburn | Thick | Never |

Fibers as Evidence

- Most fibers do not degrade over time.
- Fibers are easily transferred from one object or person to another.
- Fibers provide evidence of association between a suspect and a crime scene.
- Most fiber evidence can only be placed within a class.

Fibers are Polymers



Identification of Fabrics & Fibers

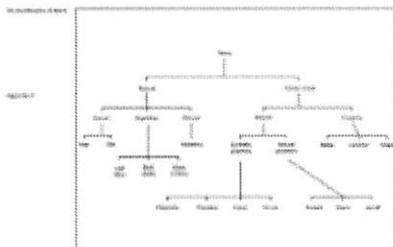
- Fiber classification
- Chemical identity of fiber and dyes
- Type of thread or yarn used
- Weave of fabric
- Logo or manufacturer identification

Sources of Fibers

- plants (cotton, hemp, etc.)
- animal (wool, silk, etc.)
- mineral (asbestos, fiberglass, etc.)
- man-made (nylon, polyester, etc.)



Classification of Fibers

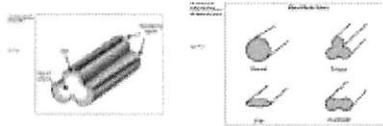


Synthetic Fibers

- A wide variety of synthetic fibers have replaced natural fibers in fabrics, garments, and rugs.
- Synthetic fibers may be made from natural materials that are not normally fiber-like.
- There are three types of synthetic fibers:
 - Cellulose based: produced from cellulose-containing raw materials (rayon)
 - Synthetic: produced from chemicals made from refined petroleum or natural gas (nylon)
 - Inorganic: produced from metals, glass or ceramics (fiberglass)

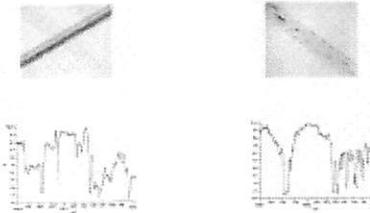
Analysis of Fibers

- Step 1: Natural vs synthetic, use a comparison microscope
 - Examine the color, diameter, cross-section shape, pitting or striations, etc.
 - Synthetic fibers have smooth surfaces, uniform size & shape

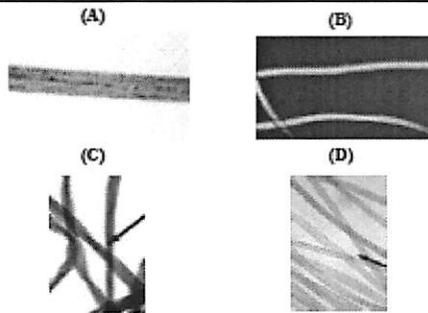


Analysis of Fibers

- Step 2: chemical composition of synthetics
 - Use IR spectroscopy, refractive index or polarized light to identify types of synthetic fiber



Example Problem: Is It Hair or Fiber? Is it Natural or Synthetic?



Manufacture of Synthetic Fibers

- Melted or dissolved polymer is forced through fine holes of a spinnerette
 - Similar to a bathroom showerhead
- polymer molecules are aligned parallel to the length of the filament.
- Shape of holes in spinneret determine cross-sectional shape of the polymer

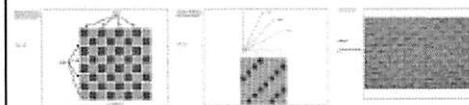
Fibers: Thread and Yarn

- Thread and yarn are bundles of fibers woven to create fabrics. Classified as
 - Filament: continuous length of fiber
 - Spun: short lengths of fibers that are twisted or spun together
- Physical properties of thread and yarn include its texture, number of twists per inch, number of fibers per strand, blend of fibers, color, and pilling characteristics.



Fibers: Thread and Yarn

- Woven fabrics consist of intertwining of two sets of yarns that are woven on a loom.
- Weave patterns can be used to classify fabrics.
- Basic weaves are plain, twill, and satin.



The Microscope and Forensic Identification of Hair & Fibers

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The Microscope and Forensic Identification of Hair & Fibers

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Attachment #2

Example Topic (Chapter) Homework

Topic 3 Homework. Physical Properties: Forensic Characterization of Soil

Using the following word bank, provide the correct word to complete the statement for questions 1-5:

| | | | | | |
|------------------------|-------------|----------------------------|-------|------------|--------------------|
| Chemical | Physical | SI | Meter | Kilogram | Cubic meter |
| Kilometer | 2.2 pounds | 1.09 meters | Mass | Zero (0) | 212 Degrees |
| Electronic thermometer | | Optical thermometer | | 0.098 g/mL | Decomposed Organic |
| Inorganic Particles | | Color, mineralogy, texture | | Smallest | 2,000 |
| Gradient | Most, Least | Sink to the bottom | | 100 yards | |

1. The **chemical** properties of a substance are those properties that can be observed when the substance reacts or combines with another substance so as to change its chemical composition.
2. The basic SI unit for volume is the **cubic meter**.
3. The top layer of soil, the O horizon, is mostly **decomposed organic** matter.
4. A separation of soil components can be done by using a(n) **gradient** tube.
5. To establish the variation in soil at the crime scene, the investigator should collect reference soil samples within a(n) **100 yard** radius of the scene.
6. (True or False) The density of water increases as it is being heated.

7. The district attorney wants to know if a metal object recovered from a crime scene is iron or aluminum. You weigh the object and find that it weighs 540 g. you take a 500-mL graduated cylinder and fill it with water until it reads 100 mL. When you carefully submerge the metal object into the graduated cylinder, the level of the water rises to 300 mL.

- a) What is the density of the object? Be sure to explain your calculations and include units in each.
2.7 g/mL.

The volume of the water raised from 100 mL to 300 mL giving a 200 mL change in volume. Thus, object displaced a volume of 200 mL and weighs 540 grams. To find density (units g/mL) you divide the weight of an object by the volume the object displaces. Therefore the density of the object is equal to 540 g / 200 mL, or 2.7 g/mL.

- b) Is the metal object iron or aluminum? Be sure to explain how you came to this conclusion using the data collected/calculated. If you used data or values not in this problem, be sure to state where and why you used them.

Aluminum

Table 3-6 of the Girard text contains a listing of the densities of various metals to include both of the possible answers, iron and aluminum. Seeing that the calculated value of the metal is 2.7 g/mL and that there is only one metal, aluminum, with that same density, it must be aluminum. It should be noted that iron has a density of 2.8 g/mL. Although this is very close to 2.7 g/mL, a careful procedure and analysis informs us and the district attorney that the sample is indeed aluminum and not iron.

Attachment #3

Forum Activity #5 – Alcohol Sensing Flashlight

Initial Posting: Watch the following 2 minute report of an alcohol detector that has been incorporated into a flashlight and reflect on what you “feel” and “know” about such devices. After reflecting, post your thoughts to the forum. Be sure to include the following:

- What are your views on the use of such instruments in the detection of alcohol use?
- Do you believe this device will help to deter drunk driving more readily than a field sobriety test?
- Can this device act as a presumptive or a confirmatory test for alcohol when comparing this device to other chemical tests?

Peer Response: Once you have posted your initial forum (above), comment on at least one other posting from a member of your group to assist in the generation of a discussion.



[Click here to play video.](#)

Example Grading Rubric

| | Needs Development 2 points | Satisfactory 8 points | Exemplary 10 points |
|------------------------------|---|---|--|
| Punctuality | Both the initial post and the peer response are completed on the due date. | Both initial post and peer responses are completed one day prior to the due date and time. | Initial post is posted within the first 3 days of the forum week, allowing adequate time for peer reflection and response. |
| Focus and Quality | Post is unfocused and adds few ideas to the discussion. | Post is focused, purposeful, and reflects clear insight into the topic. Original and practical ideas are presented for the discussion | Post has depth, utilizes literature to make arguments, and/or presents new perspectives on the topic. |
| Assignment Completion | Initial post and/or feedback to peers are incomplete and do not address all points of the assignment. | Both initial post and feedback to peers are complete and address all points of the assignment. | Responds beyond the required number of posts. Responses generate discussion. Takes time to respond to peers who have received no feedback. |

No points will be awarded for not completing the forum by the due date.

Attachment #4

Guidelines for the Creation of a Fictional Crime Scene and Solving the Fictional Crime Scene.

As a group you will create a crime scene that will produce a 4-5 page report to the district attorney's office. This exercise will be used as your capstone experience for the class. You are encouraged to use your creativity to inspire your group members. Your crime can involve anything but must include at least 5 of the evidence collection kits discussed in class or that are a part of the "kit videos" located on Moodle. Your report will document such evidence collection as castings, finger prints, crime scene sketches, photos, blood splatter evidence, and hair and fiber analysis. Evidence can also include items realized after warrants are issued and searches are completed. The report must include how items were collected. Not all evidence found has to be admissible. The report will not solve the case, but must provide enough evidence and suspects that the case can be reasonable analyzed.

After completing the creation of the crime scene, the instructor will provide your group a crime scene to solve. The 2 page report will detail how the case was solved to include the evidence used to make the final assessment. A description of the potential suspects and how they were eliminated or fingered for the crime should be included. If evidence was not used, a reasoning of why will need to be included. A clear rationale is needed if the case goes cold and is not readily solvable.

Google Docs and your group's message board will enable your small group to collaborate. The creation of the crime scene is due by Wednesday of the 3rd week of class. The final report solving the crime is due the same day as the final exam.

Attachment #5

Ten Example Exam Questions

Chemistry 105

Exam 1

Preview Exam 1 (19 June)

Question 1

Marks: 1

If the chain of custody is broken, what is the potential consequence?

Choose one answer.

- A. There is no consequence.
- B. The first responder to the scene is at fault.
- C. The evidence may be excluded at trial.
- D. None of the above.

Question 2

Marks: 1

Which of the following is an exception to the Fourth Amendment?

Choose one answer.

- A. Consent searches
- B. Plain view
- C. Open fields
- D. All of the above

Question 3

Marks: 1

Explain the three methods of crime scene sketching, including the use of fixed points.

Answer:

Question 4

Marks: 1

True or False? Firearms should always be stored in plastic bags.

Answer:

- True False

Question 5

Marks: 1

Anyone who enters a crime scene has the potential to _____ the scene.

Answer:

Question 6

Marks: 1

List four types of evidence that may be retrieved by the medical examiner from a deceased victim.

Answer:

Question 7

Marks: 1

What is the first priority with collection of evidence from a firearm?

Choose one answer.

- A. Rendering the weapon safe
- B. Securing fingerprints from the weapon
- C. Permanently marking on the gun to tag it
- D. All of the above

Question 8

Marks: 1

True or False? Physical evidence is only collected from the victim of a crime.

Answer:

- True False

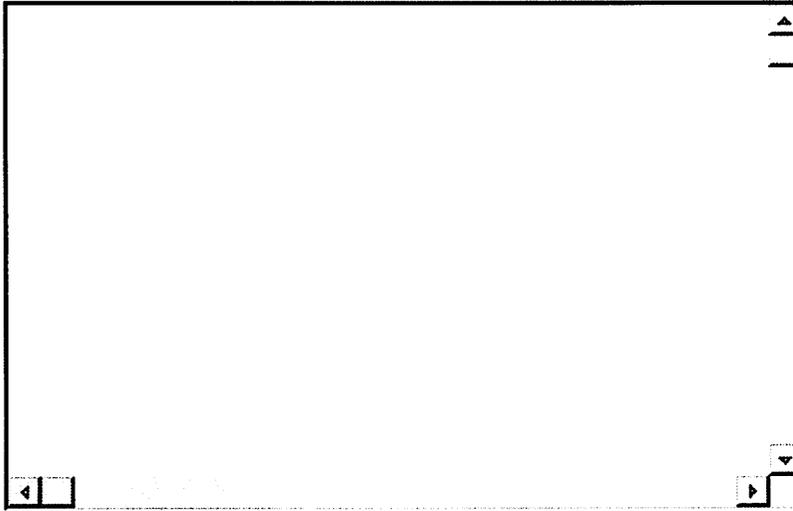
Question 9

Marks: 1

1. The sketch below was made by Officer Frank Murphy who was the first responder to an apparent death by stabbing at 975 Oakland Avenue, Indiana, PA at 2:00 PM on February 10, 2009.

(A) Not including the information above, list two important elements that are missing from the crime scene sketch below.

Answer:



Question 10

Marks: 1

Sites away from the crime scene where subsequent criminal activity took place are known as

Answer:

Attachment #6

Guidelines for Report on a Fiction Book, Video, Computer Game or other Media Source

Each student will select a single work or episode of fiction (book, video or other media) that includes elements of forensic science. This will be done in three stages and revised versions of the first two assignments can be used as parts of the final report.

Assignment #1 (5 points): You must get approval of your fiction selection using this assignment. You must provide the full title, author or source, a one-paragraph explanation of why you chose it and at least one paragraph synopsis of the plot. This can be written in any style or form you want and uploaded as a PDF file by the date specified.

Assignment #2 (5 points): You must submit a summary of at least two types of forensic evidence that were connected to the crime and how and/or why this evidence is linked to the material we learned in class or is presented in the text or lecture notes. You should cite specific pages in the text or portions of the class notes that apply to each type of evidence. This can be written in any style or form you want and uploaded as a PDF file by the date specified.

Assignment #3 (50 points), the final written report will be uploaded as a PDF file by the date specified. The final report should be 3-5 pages and should include each one of the "Focus & Content" and "Style & Mechanics" items listed below. These items will be graded on a 0-5 scale where 5=excellent, 4=very good, 3=good, 2=fair, 1=poor, 0=not included.

To locate episodes of forensic TV shows and movies on broadcast or cable TV, you can use the following web sites: <http://www.zap2it.com> or <http://www.locatetv.com/>. These sites often have brief episode guides. You can find a limited number of recent episodes to watch free on most TV network web sites for each show. These also provide episode guides and special features. You can also search for recent episodes on Hulu: <http://www.hulu.com>. You can also use Netflix or iTunes to rent or purchase episodes of forensic TV shows and movies.

Focus & Content

- An explanation of the reasons why you selected this work of forensic fiction. (5 points)
- A short synopsis of the plot or story. To do this you should describe the initial crime; summarize the major steps in the investigation and the resolution or closing. (10 points)
- Your opinions of the quality of the work. To do this you can describe your opinions of any two of the following: the acting, the believability of the plot, how well the story fits the concept of the show or the characters, the costumes, music or sound effects, special effects, sets and locations, editing of the storylines or other aspects of the work. (5 points)
- Describe at least two types of forensic evidence that were connected to the crime and how this evidence is linked or related to the material we learned about in class or is presented in the text book and/or in lectures. You should cite specific pages in the text or portions of the class notes that apply to each type of evidence. (10 points)
- How this work is related to at least one aspect of the "CSI effect". For example, the requirement of physical evidence by juries, the time and difficulty of doing forensic analysis, the increased knowledge of the public and criminal about how forensic science works, etc. (5 points)

Style & Mechanics

- ❑ The report is neat in appearance with the title and bibliographic information at the top of the first page or on a cover sheet that includes the student's name, the title, publisher or source and year the work was produced and the date the paper was submitted. (5 points)
- ❑ The summary is not plagiarized and does not follow the wording in any book, Internet article or other source. If these sources are used the copied or paraphrased passages MUST BE enclosed with quotation marks and a citation of the source included in parenthesis at the end of the quote. At the end of the paper, a bibliographic citation must be listed for each source. (5 points)
- ❑ The paper is word-processed and either printed on 8 1/2 x 11 inch paper or sent as an MS Word document. There should be no spelling or grammatical errors, the paper should have 1" standard margins and the text should be in 12-point font. (5 points)

Example References:

1. http://en.wikipedia.org/wiki/CSI_Effect access on 01/01/2009 (web site reference)
2. *Investigating Chemistry: A Forensic Science Perspective*, Matthew Johl, W. H. Freeman, New York (2006). (book reference)
3. CSI: NY Season 7, Episode 15, title: *Vigilante*, original air date: 02/18/2011. (TVshow reference).

CHEM 105: Grading Checklist for Fiction Report

The final report (40 points) should be no longer than 3-5 pages and include at least one paragraph that addresses the "Focus & Content" the items listed below. These items will be graded on a 0-5 scale where 5=excellent, 4=very good, 3=good, 2=fair, 1=poor, 0=not included.

Focus & Content

- ❑ An explanation of the reasons why you selected this work of forensic fiction. (5 points)
- ❑ A short synopsis of the plot or story. To do this you should describe the initial crime; summarize the major steps in the investigation and the resolution or closing. (10 points)
- ❑ Your opinions of the quality of the work. To do this you can describe your opinions of any two of the following: the acting, the believability of the plot, how well the story fits the concept of the show or the characters, the costumes, music or sound effects, special effects, sets and locations, editing of the storylines or other aspects of the work. (5 points)
- ❑ Describe at least two types of forensic evidence that were connected to the crime and how this evidence is linked to the material presented in the required text and/or in lectures with specific references to class notes or pages in the text. (10 points)
- ❑ How this work is related to at least one aspect of the "CSI effect" (the requirement of physical evidence by juries, the time and difficulty of doing forensic analysis, the increased knowledge of the public and criminal about how forensic science works, etc.) (5 points)

Style & Mechanics

- ❑ The report is neat in appearance with the title and bibliographic information at the top of the first page or on a cover sheet (the student's name, the title, publisher or source and year the work was produced and the date the paper was submitted). (5 points)
- ❑ The summary is not plagiarized and does not follow the wording in any book, Internet article or other source to any great degree. If these sources are used the copied or paraphrased passages MUST BE enclosed with quotation marks and a citation of the source included in parenthesis at the end of the quote: (Johl, p. 265 or wikipedia.org). At the end of the paper, a bibliographic citation must be listed for each source. (5 points)

- The paper is word-processed, saved as a PDF document, and uploaded to the LMS. There should be no spelling or grammatical errors, the paper should have 1" standard margins and the text should be in 12-point font, time new roman, left justified. (5 points)

Letter of support from the Criminology Department for the distance education proposal.

Justin Fair

From: John A Lewis [mfyj@iup.edu]
Sent: Thursday 31 January 2013 1:11 AM
To: j.fair@iup.edu
Subject: Support of CHEM 105 course

Justin,

I have talked with the CRIM department chair, Randy Martin, and we concur that CHEM 105 currently is the top lecture non-lab recommended to the 1000+ CRIM undergraduates. The material, as taught by John, not only highlighted, but emphasized the importance of the natural sciences as they relate to criminology and policing. We also believe that if the course is offered online over the winter and/or summer, our students will not be reluctant to schedule CHEM 105. Our only recommendation, based on previous scheduling of CHEM 105, is if CHEM

105 and the newly proposed BIOL 107 only can be offered during either the fall or spring semester, that the two classes not be offered in the same semester.

Sincerely,

John A. Lewis
Criminology UG Adviser