



Chaminade University OF HONOLULU

Henry Hall Laboratory 6

FS 625L Trace Evidence Laboratory Fall 2014

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- Lecture:** Tuesdays and Thursdays, 1430 - 1720 hours
- Office Hours:** M & W, 1100 – 1200 hours and T & Th, 1130 – 1230 hours
Any other time by appointment

COURSE DESCRIPTION

Micro analysis of transfer evidence is best described as a holistic approach to the application of microscopical and microspectrophotometric techniques to the observation, collection, and analysis of micrometer sized materials. Physical transfer evidence has three main and distinct uses in investigations: 1) investigative leads, 2) associative evidence, and 3) event reconstruction. Dr. Paul Leland Kirk said it best in the preface of his book, *Crime Investigation (1953)*:

Wherever he steps, whatever he touches, whatever he leaves, even unconsciously, will serve as silent evidence against him. Not only his fingerprints or his footprints, but his hair, the fibres from his clothes, the glass he breaks, the tool mark he leaves, the paint he scratches, the blood or semen he deposits or collects – all these and more bear mute witness against him. This is evidence that does not forget. It is not confused by the excitement of the moment. It is not absent because human witnesses are. *It is factual evidence.* Physical evidence cannot be wrong; it cannot perjure itself; it cannot be wholly absent. Only its interpretation can err. Only human failure to find it, study and understand it, can diminish its value. (Italic emphasis in the original.)

Microscopical analyses and evaluation of transfer evidence for characteristic and individualistic attributes presents formidable challenges in the forensic sciences. These attributes include the necessity to observe and analyze small, microscopic sized items for the purposes of identification and discrimination of source attribution (common origin) when dealing with different samples. The demands placed on the forensic scientist to establish inference of source is more stringent than those demands required by most other scientific

disciplines, which deal mostly with the identification of materials and not the inference of source.

MEASURABLE LEARNING OUTCOMES

Reasoning

- ④ Collect and properly analyze and interpret data from analytical procedures. Solve problems based on obtained information and critical thinking. Use modern microanalytical techniques to solve qualitative and quantitative analytical problems.
- ④ Use acquired data to solve appropriate problems related to analysis of various materials.
- ④ Interpret analytical data and relate the information to identification of different materials.
- ④ Formulate accurate opinions to present and defend in courts of law and other public venue.

Knowledge

- ✍ Outline the theory and operation of various advanced microanalytical instruments; Synthesize related scientific literature.
- ✍ Describe physical and chemical principles involved in micro analysis.

Practical skills

- ✍ Apply knowledge of microscopy and related microspectroscopical instrumentation to the analysis of various materials encountered in forensic science and pursue research in analysis of various types of transfer evidence.
- ✍ Explain the importance about accuracy and reliability of the results
- ✍ Apply statistical methods to obtained data as a test of accuracy and reliability; maintain accurate record and documentations for all procedures carried out in the microanalysis laboratory.
- ✍ Explain the principles of objective and unbiased interpretation of data and recognize the misuse or improper or inaccurate use of data.

Communication

- ✍ Present scientific facts and opinions in a clear and logical oral and written manner;
- ✍ Describe analytical procedures and results using discussion, written assignments, and exams.

REQUIRED TEXTS (free eBooks available through Sullivan Family Library)

- 1) Petraco, Nicholas and Thomas A. Kubic, Color Atlas and Manual of Microscopy for Criminalists, Chemists, and Conservators, CRC Press, Taylor & Francis Group, Boca-Raton, Florida, (2004).
- 2) Robertson, James and Michael Grieve, Forensic Examination of Fibres, 2nd ed, , CRC Press, Taylor & Francis Group, Boca-Raton, Florida, (1999).
- 3) Robertson, James, Forensic Examination of Human Hair, CRC Press, Taylor & Francis Group, Boca-Raton, Florida, (1999).
- 4) Caddy, Brian, Forensic Examination of Glass and Paint: analysis and interpretation, CRC Press, Taylor & Francis Group, Boca-Raton, Florida, (2001).

5) Inman, Keith and Norah Rudin, Principles and Practice of Criminalistics: The Profession of Forensic Science, CRC Press, Taylor & Francis Group, Boca Raton, Florida, (2001).

A list of suggested reading materials will be distributed.

Internet Resources: Molecular Expressions (<http://micro.magnet.fsu.edu>).

Class Handouts: I will supply numerous handouts.

Manufacturer's Literature: Application and product literature is a valuable resource.

EVALUATION OF STUDENT PERFORMANCE

Grading:

The final course grade is comprehensive and contributed by laboratory experiments and a final exam. During all exams, other than a scientific calculator, absolutely no electronic devices are allowed, this includes cell phones. You must silence your cellphone prior to the start of a exam. If your cell phone rings during any quiz or exam, you will be required to immediately turn in you exam and exit the room.

| FS 625L Activity | Reference | Points |
|---|--------------------|--------|
| Week 1 - no lab, administrative addition of 2 nd section | | |
| Week 2 - Introduction to Trace Evidence examinations | Video | |
| Week 3 - Introduction to the microscope | 1-ch 1 | 25 |
| Week 4 - Sample preparation | 1-ch 2 | 25 |
| Week 5 - Human hair examinations | 1-ch 5 3-ch 2 | 50 |
| Week 6 - Animal hair examinations | 1-ch 6 | 50 |
| Week 7 - Refractive index measurements | 1-ch 3, handout | 50 |
| Week 8 - Glass examinations | 1-ch 2,3 4-ch 3 | 50 |
| Week 9 - Micrometry and ocular calibration | 1-3, handout | 50 |
| Week 9 - Synthetic fiber examinations | 1-ch 7 2-1,7 | 50 |
| Week 10 - Natural fiber examinations | 1-ch 8 | 50 |
| Week 11 - Textile examinations | 1-ch 9 2-ch 2 | 50 |
| Week 12 - Paint examinations | 1-ch 10 4-ch 8 | 50 |
| Week 13 - Soil examinations | 1-ch 11 | 50 |
| Week 14 - Introduction to FT-IR microspectroscopy | Handout | 25 |
| Week 15 - Introduction to UV-visible microspectrophotometry | Handout | 25 |
| Final Exam (Oral Practical) | | 200 |

| Grading Scale | | |
|---------------|---|----------------|
| 100% - 90% | A | 800-720 points |
| 89% - 80% | B | 719-640 points |
| 79% - 70% | C | 639-560 points |
| <69% | F | < 639 points |

The course grade depends solely on each student's individual performance, rather than any other personal reason. If the student misses a quiz due to an emergency, a make-up quiz or equivalent assignment must be requested in writing within one calendar week and must be accompanied by an official document and statement to prove the emergency; otherwise there will be no make-up quiz and the grade will be zero. There is no compromise of the grade for a verifiable emergency (medical or other) situation. All students must attend the final exam. Missing the final exam will lead to either a failing grade or an incomplete, but only due to an emergency. No make-up final exam will be given.

Student Success:

In addition to attending lectures and performing laboratory experiments, students are expected to spend a considerable amount of time every week studying for this course. Students are encouraged to study in small, well organized groups. Peer-based teaching has proven to be a very valuable experience that results in a deeper understanding of course materials, which is reflected in higher individual performance and retention of course content.

Cheating:

Each student is expected to complete the laboratory work independently. Submission of identical lab report or sharing data is treated as cheating. Cheating on an exam, homework or laboratory assignment will result in a zero for that particular assignment, or lead to a stricter penalty based on official University policy.

Statement of University Policy on Plagiarism:

Plagiarism is the presentation of someone else's ideas, words, or artistic, scientific, or technical work as one's own creation. Using the ideas or work of another is permissible only when the original author is identified. Paraphrasing and summarizing, as well as direct quotation all require proper citation to the original source.

Plagiarism may be intentional or unintentional. Lack of dishonest intent does not necessarily absolve a student of responsibility for plagiarism.

It is the student's responsibility to recognize the difference between statements that are common knowledge (which do not require documentation) and restatements of the ideas of others. Paraphrase, summary, and direct quotation are acceptable forms of restatement, as long as the source is cited.

Class Project:

A collaborative class project to develop a training manual for micro analysis of different types of transfer evidence, which encompasses each student's individual literature review and annotated bibliography. The training manuals will live in the laboratory and each student will receive a copy of the completed class project.

REMINDERS OF IMPORTANT UNIVERSITY-WIDE POLICIES

The following policies are summarized from the Student Handbook. Please remember, it is your responsibility as a student to review these and the other policies that your Handbook contains.

Attendance:

Students are expected to attend all classes. The University assumes you are mature enough to be responsible for your own behavior. Any absence of two weeks or more will be reported to the Office of the Associate Provost and the Registrar. You should notify me when illness prevents you from attending class and make arrangements to complete missed

assignments. Notification may be done by calling me, or by leaving word at the Faculty Services (735-4739). Depending on your circumstances, I may modify deadlines of course requirements. Anyone who stops attending a course without officially withdrawing may receive a failing grade. Students with three or more unexcused absences will lose one letter grade.

Classroom Deportment

- You are expected to be punctual; unexcused tardiness will be considered an absence.
- Smoking and alcoholic beverages are prohibited in all classrooms, whether or not class is in session.
- No pets are allowed in class. Exceptions will be made in the case of a seeing-eye dog.
- Personal audiovisual equipment not pertinent to the class is prohibited during class.
- Follow the University's "dress code" requiring footwear and appropriate shirts to be worn during all classes, as well as in the library, cafeteria, and administrative offices.

Academic Honesty:

Students are responsible for promoting academic honesty at Chaminade by not participating in or facilitating others' participation in any act of academic dishonesty, and by reporting incidences of academic dishonesty (such as theft of tests, records, and other confidential materials, altering grades, and/or plagiarism) to their instructors.

Freedom of Expression:

Students are free to take reasoned exception to the views offered in particular courses of study. They may be required to know thoroughly the specific bodies of knowledge or interpretations or theories set by the professor, but are free to reserve personal judgment as to the truth or falsity of them.

Students are expected to maintain the standards of academic performance articulated in course syllabi, supplemental readings, assignments, and Academic and Student Affairs policies. The instructor is considered the normal and competent judge of academic work. Students have an appeals process in the rare cases of unjust grading and evaluation by the procedure detailed in the Academic Grievance section of the Student Handbook.

ADA Accommodations:

In compliance with Section 504 of the Rehabilitation Act of 1973, the Americans with Disabilities Act (ADA) of 1990, and the ADA Amendments Act (2008), Chaminade University of Honolulu offers accommodations for individuals with disabilities. If you would like to determine if you qualify for ADA accommodations, please contact the Counseling Center at (808) 735-4845. Once your documentation is submitted, the assessments will be reviewed and the student will be notified.

If one qualifies for ADA accommodations an ADA contract will be signed by the student. Please remember that once you have signed an ADA agreement, you need to contact the ADA coordinator each semester (including summer sessions) to identify which instructors you want notified of your accommodations. This is to ensure your privacy. Faculty will be informed of the accommodations you are to receive but not the nature of your disability. From the time that appropriate documentation is received by the ADA Coordinator, please allow 2 to 3 weeks to process your paperwork. Processing time may vary pending the volume of requests received. You can find more information at

http://www.chaminade.edu/student_life/sss/counseling_services.php