Chem 107 - Forensic Chemistry
Lecture and Laboratory Syllabus
Section 003, Fall 2008

Instructor: Dr. Bettie Obi Johnson

Lecture Time: Monday, Wednesday, Friday 10:00 – 10:50 am, Bradley 207

Lab Time: Monday & Wednesday: 11:00 – 12:30 pm, Bradley 208

Spring Schedule: Classes begin August 21 and end December 5. Final Exams are December 8 – 16. The last day to drop a course is October 3.

Office Location: Bradley 224

Instructor's Office Hours: MWF, 9:00 – 9:50 am, MTWTHF, 12:30 – 1:30 pm or by appointment or anytime you can find me in my office (Brad 224) or in the labs (Bradley 208 or Brad 205). If you need help anytime, please don't hesitate to stop by.

Contact Information: The best way to contact me is by email: obijohns@gwm.sc.edu
You can also call my office phone at 803-313-7020

Course Description: Chemistry 107 is an introductory course designed to provide a fundamental understanding of the chemistry and technology involved in modern crime scene investigations. The collection, preservation, and analysis of physical evidence from crime scenes will be explored. Actual forensic case histories will be presented and analyzed to bring a real-world understanding to the material covered. In the laboratory, the students will gain hands-on experience with the techniques discussed in lecture.

Learning Outcomes: By the end of this course, students will specifically be able to:

1. Understand the importance of forensic science in the criminal justice system and know the major contributors to its development.
2. Understand how different types of scientific evidence are collected, preserved, transported, examined in the laboratory, and presented in court.
3. Define and distinguish physical and chemical properties of matter and know how to use the basic units of the metric system.
4. Define and understand how density and refractive index are measured and used to compare glass fragments.
5. Be able to classify a fingerprint, identify its ridge characteristics, collect visible fingerprints, develop latent prints, and know how the automated fingerprint ID system is used to match prints.
6. Identify and know the uses of a compound microscope, comparison microscope, stereoscope, and electron microscope in Forensics.
7. Know the commonly used instruments in a forensics laboratory, understand what type of samples are tested with each, what information each provides, and the basics of how each works.

8. Use the periodic table to predict atomic structure and understand how elements are identified in an evidence sample.
9. Be able to identify the likely source of a hair or fiber sample using its observed characteristics.
10. Know the commonly abused drugs, how they are classified, and the laboratory tests used to identify them.
11. Know the conditions necessary to initiate combustion, the signs of an accelerant-initiated fire, and the laboratory procedures used to detect fire and explosive residues.
12. Explain the procedures for matching a bullet to a gun, determining how far a weapon was fired from a target, and identifying whether or not an individual fired a weapon.
13. Describe how an evidence stain is identified as blood and how the blood is typed and tested to match with a suspect.
14. Understand the basic structure of DNA and the test methods used to profile and match crime scene evidence with a suspect.

Course Texts and Supplies:

Criminalistics: An Introduction to Forensic Science, 9th edition, by Richard Saferstein, 2007, ISBN 0-13-221655-8.

Basic Laboratory Exercises for Forensic Science, by Richard Saferstein, 2007, ISBN 0-13-221627-2

Safety goggles available from the USCL bookstore. These are for your personal protection and should be brought to lab each period.

Laboratory Notebook (bound composition book)

Attendance Policy:

Classroom and laboratory attendance are mandatory in this course. You need to arrive on time to class every day. Arriving more than 10 minutes late will automatically count as an absence for the day. If a student misses more than 4 lectures and 2 labs, they will receive a deduction of a letter grade for the course. Failure to attend class when an exam is given will result in an automatic grade of "0" on the test. If an emergency arises, you must contact me within 24 hours to get permission to take a makeup exam. Missed labs may not be made up. If you miss lab, you will receive a "0" for the work missed.

Homework:

Reading assignments prior to our covering the material in class will help you to understand the lectures better. You are also responsible for homework problems. If you need extra help in completing these, please get help from the Academic Success Center in Medford Library or see me between classes or during office hours. It is your responsibility to complete the homework and make sure you understand all the material covered.

Chem 107 - Forensic Chemistry
Lecture and Laboratory Syllabus
Section 003, Fall 2008

Tests/Exams There will be 4 exams covering lecture topics, reading assignments, laboratory experiments, and assigned homework. Each test typically has 25 questions. There may also be a few extra credit questions on each test. Failure to show up for an exam will result in an automatic grade of "0" on the test. If an emergency arises, you must contact me within 24 hours to get permission to take a makeup exam.

Final Exam The final exam is a comprehensive exam over all of the material covered in the course. There are 50 questions on the final exam, most of which are based on questions from the 4 tests. If any material is covered after the last test, it will also be included on the final exam.

Laboratory: Attendance in the laboratory is required and no make-ups will be provided. If you miss a lab, you will receive a "0" on that lab. Your grades for each lab will be based on successful and accurate completion of the experiments and lab reports. The laboratory is an essential and required component of this course. A failing lab grade will result in automatic failure of the course.

Grading: Your final grade in this course will be based on the following:

4 Tests (15% each)	60%
Comprehensive Final Exam	20%
Laboratory	15%
Attendance	5%

The laboratory is an essential and required component of this course. **A failing grade for the lab will automatically result in failure of the course.**

Grade Scale:

93 – 100	**A**	**73 – 77**	**C**
88 – 92	**B+**	**68 – 72**	**D+**
83 – 87	**B**	**60 – 67**	**D**
78 – 82	**C+**	**Below 60**	**F**

Academic Integrity: Each student is expected to adhere to the Academic Integrity Policy, available on line at **http://www.sc.edu/academicintegrity/**. Each student should adhere steadfastly to truthfulness and avoid dishonesty, fraud, or deceit of any type in connection with any academic program. Any student who violates this rule or who knowingly assists another to violate this rule shall be subject to discipline. Cheating will not be tolerated in this course. Anyone who copies or plagiarizes another student's work or who allows another student to copy or plagiarize their work will receive a failing grade and will be reported to the academic dean for appropriate discipline.

Chem 107 - Forensic Chemistry
Lecture and Laboratory Syllabus
Section 003, Fall 2008

University of South Carolina Lancaster General Education Goals

General education is the set of fundamental skills (reading, writing, reasoning, and oral communication), the knowledge, and the capacity for thought needed to pursue further learning, to succeed in chosen fields, and to assume the responsibilities of informed and enlightened citizenship.

From a broad commitment to equity, USC Lancaster

- seeks to make education accessible, affordable, and convenient
- encourages teaching innovation and adaptation
- encourages participatory student learning
- provides a supportive educational climate that actively and positively
- addresses intellectual and cultural diversity, and
- responds affirmatively to the needs of its students

USC Lancaster works to help its pre-baccalaureate students attain skills and attributes in the areas of communication, critical thinking, cultural literacy, and personal development. Students in the two-year occupational programs focus on those areas most appropriate to their professional education program.

Communication Skills

USC Lancaster helps its students read effectively and attain a basic familiarity with the basic texts of Western and other cultures. In the area of writing skills, USC Lancaster students work to develop the ability to write effectively for both academic and professional audiences. In addition, USC Lancaster helps its students learn to listen critically and speak effectively before a group.

Critical Thinking

USC Lancaster helps its students acquire analytical reasoning abilities and exercise informed value judgments. USC Lancaster students also work to develop mathematical and/ or computational skills.

Cultural Literacy

USC Lancaster strives to give its students an understanding of the history and culture of Western civilization as well as provide some exposure to other cultures. USC Lancaster also recognizes the centrality of science and technology to modern culture; therefore, USC Lancaster students also are offered opportunities to increase their understanding and familiarity in these crucial subject areas.

Student Development

USC Lancaster supports the intellectual, personal, physical, and social development of students, in recognition of the critical interdependency of all these areas. By providing opportunities for productive interaction with students, faculty, and staff, USC Lancaster helps students develop a spirit of curiosity, integrity, and confidence in planning and pursuing academic, career, and personal goals.

Chem 107 - Forensic Chemistry
Lecture and Laboratory Syllabus
Section 003, Fall 2008

Lecture Schedule

Sunday	Monday	**Tuesday**	Wednesday	**Thursday**	Friday	Saturday
17	18 Registration	19 Registration	20	Aug 21	Aug 22 Review Syllabus	23
24	Aug 25 Ch. 1: Intro	Aug 26	Aug 27 Ch. 2: The Crime Scene	Aug 28	Aug 29 Ch. 2: The Crime Scene	30
31	Sep 1 **Labor Day, no class**	Sep 2	Sep 3 Ch. 3: Physical Evidence	Sep 4	Sep 5 Ch. 3: Physical Evidence	6
7	Sep 8 Ch. 4 Glass and Soil	Sep 9	Sep 10 Ch. 4 Glass and Soil	Sep 11	Sep 12 Ch. 4 Glass and Soil	13
14	Sep 15 **Test #1 (Ch. 1,2,3,4)**	Sep 16	Sep 17 Ch. 14: Fingerprints	Sep 18	Sep 19 Ch. 14: Fingerprints	20
21	Sep 22 Ch. 14: Fingerprints	Sep 23	Sep 24 Ch. 7: The microscope	Sep 25	Sep 26 Ch. 7: The microscope	27
28	Sep 29 Ch. 5: Organic Analysis	Sep 30	Oct 1 Ch. 5: Organic Analysis	Oct 2	Oct 3 Ch. 5: Organic Analysis **Drop Date**	4
5	Oct 6 **Test #2 (Ch. 14, 7, 5)**	Oct 7	Oct 8 Ch. 6: Inorganic Analysis	Oct 9 **Fall Break, no classes**	Oct 10 **Fall Break, no classes**	11
12	Oct 13 Ch. 6: Inorganic Analysis	Oct 14	Oct 15 Ch. 6: Inorganic Analysis	Oct 16	Oct 17 Ch. 8: Hairs, Fibers, and Paint	18

Chem 107 - Forensic Chemistry
Lecture and Laboratory Syllabus
Section 003, Fall 2008

Lecture Schedule (cont'd)

Sunday	Monday	**Tuesday**	Wednesday	**Thursday**	Friday	Saturday
19	Oct 20 Ch. 8: Hairs, Fibers, and Paint	Oct 21	Oct 22 Ch. 8: Hairs, Fibers, and Paint	Oct 23	Oct 24 Ch. 9: Drugs	25
26	Oct 27 Ch. 9: Drugs	Oct 28	Oct 29 Ch. 11: Arson & Explosions	Oct 30	Oct 31 Ch. 11: Arson & Explosions	1
2	Nov 3 **Test #3 (Ch. 6,8,9,11)**	Nov 4 **Election day, no classes**	Nov 5 Ch. 15: Firearms and Toolmarks	Nov 6	Nov 7 Ch. 15: Firearms and Toolmarks	8
9	Nov 10 Ch. 15: Firearms and Toolmarks	Nov 11	Nov 12 Ch. 12: Forensic Serology	Nov 13	Nov 14 Ch. 12: Forensic Serology	15
16	Nov 17 Ch. 12: Forensic Serology	Nov 18	Nov 19 Ch. 13: DNA	Nov 20	Nov 21 Ch. 13: DNA	22
23	Nov 24 Ch. 13: DNA	Nov 25	Nov 26 **Thanksgiving Break, no classes**	Nov 27 **Thanksgiving Break, no classes**	Nov 28 **Thanksgiving Break, no classes**	29
30	Dec 1 **Test #4 (Ch. 15, 12, 13)**	Dec 2	Dec 3 Review for Final Exam	Dec 4	Dec 5 Review for Final Exam **Last day of classes**	6 **Reading Day**
7 **Final Exam Week, Dec 8 - 16 →**	Dec 8	Dec 9	Dec 10	Dec 11	Dec 12 **10:00 – 12:30** **Comprehensive Final Exam**	13
14	Dec 15	Dec 16	Dec 17	Dec 18	Dec 19 **Grades due**	20

Chem 107 - Forensic Chemistry
Lecture and Laboratory Syllabus
Section 003, Fall 2008

Lab Schedule for Monday, Wednesday 11-12:30pm Chem 107 Lab

Week #	Date	Experiment #	Title
1	Aug 25, 27	ix 1	Laboratory Safety Overview Locard's Exchange Principle
2	Sep 1, 3	3	Crime Scene Sketching
3	Sep 8, 10	Handout	Density Determination by Flotation Review for Test #1
4	Sep 15, 17	5	Fingerprinting: Comparison and Classification, Developing Latent Fingerprints
5	Sep 22, 24	Handout	Chemical Methods for Developing Latent Fingerprints,
6	Sep 29,Oct 1	13 Handout	The Microscope ID of an Unknown Pill by Infrared Spectroscopy
7	Oct 6, 8	8 Handout	Handwriting Comparison /ID of Ink by TLC Flame Test of the Elements and Metals in Fireworks
8	Oct 13, 15	Handout	The Case of the Drowned Businessman: Analysis of Phosphate in Water by UV/Vis Spectrophotometry
9	Oct 20, 22	7	Forensic Hair Analysis
10	Oct 27, 29	Handout	Mystery of the Missing Medicine – GC/MS Analysis of an Unknown Drug Sample
11	Nov 3, 5	Handout	SPME / GC Analysis of Blood Alcohol Level
12	Nov 10, 12	Handout	Forensic Footwear and Tire Track Evidence
13	Nov 17, 19	Handout	Blood Typing and Bloodstain Evidence
14	Nov 24	Handout	DNA Profiling
15	Dec 1, 3		DNA Profiling (cont'd)

Keep a copy of these schedules in your notebook and pay attention to the material that is coming up. You should read the book sections prior to our covering them in class. That way, if you have questions as we cover the material you can have them answered during class. Also, remember to read the laboratory exercises and complete any pre-lab assignments before coming to lab. This will help you to work more safely and efficiently. **Ten points will be deducted for pre-lab assignments not completed before lab.**