FORS 6446
Forensic Toxicology
Spring Semester 2017
4 credit hours

Professor: Dr. Madeleine Swortwood
Office: CFS 224
Office Phone: (936) 294-4319
Office Hours: M/W 10:30 am –12:30 pm
or by appointment

Lecture Hours: M/W 9:00– 10:20 am
Lab Hours: W 1:00 - 4:50 pm.
Classroom / Lab: CFS 104 / CFS 219
Email: swortwoodm@shsu.edu

Textbook: Principles of Forensic Toxicology, Ed. Barry Levine. Any edition acceptable.

Course description

This is a one-semester laboratory course on forensic toxicology. Forensic toxicology involves the study of drugs and poisons for medico-legal purposes. The course will introduce the three major disciplines: postmortem forensic toxicology, human performance toxicology and forensic drug testing. Students will develop an understanding of drug origins, history, forms, physico-chemical characteristics, pharmacology and effects of important drug classes, including central nervous system (CNS) stimulants, CNS depressants, opioids (natural and synthetic narcotic analgesics), cannabinoids, and other drugs of interest. Topics will focus on sample handling, sample pre-treatment, isolation of drugs from matrices using solid phase and liquid-liquid extraction, and identification using instrumental techniques. Students will apply chemical and toxicological theory into practical applications. During the course, students will develop independent learning skills and improve their ability to critically evaluate scientific data.

Course Objectives

1. Familiarize the student with the most frequently encountered substances in forensic toxicology.
2. Introduce the student to the three major disciplines of forensic toxicology.
3. Develop an understanding of the uses, effects and pharmacology and toxicology of drugs of abuse.
4. Apply important chemical and physical properties of drugs to explain how drugs are extracted or isolated from non-biological and biological evidence including blood, urine and human tissues.
5. Apply important chemical and physical properties of drugs to explain how drugs are distributed throughout the body.

6. Apply knowledge of chemical and physical properties of drugs to explain how drugs are differentiated and analyzed qualitatively and quantitatively.
7. Compare and contrast different drugs within the same classification and discuss the relative advantages and disadvantages of analytical approaches.
8. Understand and apply advanced evidence handling concepts.
9. Apply knowledge of methods and techniques to detect substances such as benzodiazepines, barbiturates, narcotics, cocaine, methamphetamine, cannabinoids and other abused drugs in the laboratory.
10. Provide hands-on laboratory experience with immunoassay, liquid-liquid and solid phase extraction techniques in combination with instrumental analysis.
11. Complete a laboratory-based proficiency test involving the examination of biological and non-biological evidence containing unknown drugs.

Attendance Policy
Class attendance requirements will be followed in accordance with Academic Policy Statement 800401.

If a student is absent, it is their responsibility to obtain the class material and remain current with information distributed during class. Occasionally changes in schedule may be announced in class. *These changes apply to all students, even those who were absent from class.* One letter grade may, at the discretion of the instructor, be deducted from students' final grade if they miss more than four classes. There will be no distinctions between "excused" and "unexcused" absences. Students are expected to be on time to class. After the beginning of the class, late students may be counted as absent.

Grading Policy

Final grades will be based upon the following scale: 90 and above: "A"; 80-89: "B"; <79: "C". Students should not count on a curve of the final grade. The instructor reserves the right to modify the grading scheme to accommodate for a missed test or final examination in extenuating circumstances. The instructor also reserves the right to assign a final exam grade of 0% should she deem the absence was not properly handled or was unjustified. Appeals will be handled in accord with University Policy Statement 900823, Academic Grievance Procedures for Students.

Make up exams
If a student is absent from the laboratory he/she may not be given an opportunity to make up the laboratory exercise, even if prior notice has been given the instructor. No make-ups will be given for the final exam unless arrangements have been made with the instructor prior to the exam date.

Examinations and Assignments

There will be one final examination on Wednesday May 9th 9:30-11:30 AM in accordance with university policy. There will be three (or four) tests throughout the semester, as time permits. The instructor and students collectively decide the schedule of tests throughout semester to maximize class time and assess student learning at the most appropriate interval. The final examination and the tests may be composed of multiple choice questions and/or true-false questions, fill in the blank questions, or short answer questions. The final examination and tests may be composed of any combination of the aforementioned question types. The tests and assignments will help prepare the student for the final examination. The tests will be conducted in class and will be *non-comprehensive* in nature. That is, they will cover only a specific topic or topics.

In addition to the written examination there will be a final laboratory-based proficiency test. This proficiency test will consist of one or more pieces of biological or non-biological evidence. Evidence will be analyzed to determine the presence of drugs of forensic interest. Students will be required to apply their acquired knowledge to process this evidence and analyze it using techniques that are widely accepted by the scientific community.

Assignments consist of lab reports and a written paper. Additional assignments may include but are not limited to information retrieval, presentation of material from the scientific literature and problem-based questions that will require the student to apply the acquired knowledge from class to forensic issues. **Laboratory instruction will commence on Wednesday, January 31st, 2018.**

Lab reports will summarize data and address pertinent questions. Successful completion of lab reports will require the student to apply advanced knowledge acquired in class to forensic laboratory techniques. Assignments are due at the beginning of class on the due date. The instructor reserves the right to refuse late work, but will make reasonable accommodations for students who experience unfortunate circumstances.

Students will write a 2500 word report on an *assigned drug/toxicology topic*. This research paper must be fully referenced and cite published studies in the peer reviewed scientific literature. Students are expected to make full use of library resources to retrieve articles from the peer-reviewed scientific literature. **This written assignment must be submitted no later than noon on Wednesday, April 25th, 2018.** Only hardcopy submission is acceptable because students must attach all cited/bibliographical articles to the final report. These articles will be returned to the student at the end of semester.

The total combined weight of the lab reports will be 20% of the final grade. The written paper contributes 10% and the combined performance on the tests throughout the semester contributes 30% towards the final grade. The laboratory-based proficiency test will account for 10% of the final grade and the remaining 30% will be based on the performance in the final examination.

	Number	Scope	Timeframe	Weighted %
Lab Reports	Variable	Non-comprehensive	Throughout term	20%
Written Paper	1	Defined	April 25, 2018	10%
Tests	3-4	Non-comprehensive	Variable	30%
Lab Proficiency Test	1	Comprehensive	End of term	10%
Final Examination	1	Comprehensive	May 9, 2018	30%

Material for the final exam and tests may come from class material, supplemental reading material or class discussion that was not covered in the reading material. *In other words, attendance and active participation in class is extremely important in order to complete the course successfully and receive a good grade.*

Deadlines for assignments, lab reports and other important announcements such as test times and locations will be announced in class or by email. As a result, students *must* read their SHSU email in order to remain current.

Tentative Lecture/Laboratory Schedule

Week	Lecture	Laboratory
1 (January 17)	Introduction	**-**
2 (January 22, 24)	Postmortem	-
3 (January 29, 31)	Human Performance	I: Qualitative Drug ID
4 (February 5, 7)	Drug Classification	II: PCP Quantification
5 (February 12, 14)	Extraction EXAM 1	III: Alkaline SPE
6 (February 19, 21)	**AAFS**	**AAFS**
7 (February 26, 28)	Pharmacology Workplace	IV: BAN Alternative Matrix
8 (March 5, 7)	Immunoassay Derivatization	V: LLE Blood
9 (March 12, 14)	**Spring Recess**	**Spring Recess**
10 (March 19, 21)	Method Validation	VI: Procedure Validation
11 (March 26, 28)	EXAM 2 Cocaine	VI: Procedure Validation
12 (April 2, 4)	Opioids Cannabinoids	VII: Poppy seeds/Urine opiates
13 (April 9, 11)	Methamphetamine	VIII: ELISA
14 (April 16, 18)	Depressants	**Lab Practical**
15 (April 23, 25)	Alcohol	**Lab Practical**
16 (April 30, May 2)	EXAM 3	**Lab Practical**
17 (May 9)	**FINAL EXAM**	**-**

The schedule of topics may be modified at the discretion of the instructor.

Student Academic Policies

Laptop computers, tablets or similar devices are not permitted in the classroom without prior approval. **In this graduate-level class, students are provided detailed lecture notes and are expected to actively engage in interactive classroom learning and discussion.** Students will refrain from behavior in the classroom that intentionally or unintentionally disrupts the learning process and thus impedes the mission of the university.

Inappropriate behavior in the classroom shall result in a directive to leave class and the student shall be counted as absent. Students are not to read any material that is unrelated to the course during class. Students failing to abide by these rules will be expelled from the classroom.

In order to ensure safety, students must strictly adhere to the directives of the instructor during the laboratory exercises. Equipment, chemicals or reagents must not be removed from the laboratory under any circumstances. Unauthorized removal of chemicals or drugs from the laboratory, or activity that could compromise the safety of others will result in serious disciplinary action.

Policies concerning Attendance, Academic Honesty, Disabled Student and Services for Disabled Students, and Absences on Religious Holy days may be found at: http://www.shsu.edu/dept/academic-affairs/aps/aps-students.html

Use of Telephones and Text Messagers in Academic Classrooms and Facilities

http://www.shsu.edu/dept/academic-affairs/aps/aps-curriculum.html

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