

# FORS 6094 Advanced Instrumental Analysis Fall Semester 2017 3 Credit Hours

Professor: Dr. Madeleine Swortwood Office: CFS 224 Office Phone: (936) 294-4319 Email: <u>swortwoodm@shsu.edu</u> **Class Time:** Mondays 1 – 4:50 p.m. **Classroom:** Engineering Bldg. 210C

## Office Hours (CFS 224):

Tuesday/Thursday: 10:30 a.m. – 12:30 p.m. \*Other times by appointment\*

Office hours are subject to change. I am always available at other times by appointment. I am happy to respond to questions by email.

## **Course Material**

All materials will be provided by instructor; there is no textbook for this course.

## **Course Description**

This is a special topics course offered within the Forensic Science department. This practical course will build upon Forensic Instrumental Analysis and Forensic Toxicology with the primary focus on advanced analytical techniques, particularly liquid chromatography – mass spectrometry (LC-MS). Students must have basic knowledge of organic chemistry, chromatography, and analytical chemistry. The principles of liquid chromatography and mass spectrometry will be emphasized in this course. Analytical method development and method validation will also be covered in detail.

An advanced knowledge of the scientific literature and the ability to integrate analytical instrumental theory into practical applications and research is required. From this course, students will improve their analytical and technical skills.

## **Course Objectives**

- 1. Students will be able to discuss advanced principles and theories of advanced analytical techniques, particularly liquid chromatography and tandem mass spectrometry as they relate to forensic applications of analytical instrumentation.
- 2. Students will recognize the importance of method development and method validation in forensic science and apply those concepts to laboratory experiments.
- 3. Students will interpret data and design laboratory experiments within the Agilent MassHunter platform.

## **Attendance Policy**

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

## Grading Policy

	Торіс	Weighted Total
Assignments	1) Qualitative Analysis	40% (10% each)
	2) Quantitative Analysis	
	3) Method Development	
	4) Method Validation	
Midterm Exam (10/9)	LC-MS	30%
Final Exam (12/6)	Method development &	30%
	validation	

Final grades will be based upon the following scale: ≥90 = 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 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 accordance with University Policy Statement 900823, Academic Grievance Procedures for Students.

#### Make-up Exams

There are no make-up exams for this course unless approved by the instructor.

Date	Торіс
8/28	Introduction; Review of LC-MS Principles
9/4	No lecture (Labor Day)
9/11	No lecture (SOFT Conference); Assignment (Qual)
9/18	QQQ Principles
9/25	Hardware & Software Overview
10/2	Troubleshooting & Maintenance; Assignment (Quant)
10/9	MIDTERM EXAM
10/16	QQQ Optimization
10/23	No lecture; Assignment (Method Development)
10/30	Method Development
11/6	Data Acquisition
11/13	Method Validation
11/20	No lecture; Assignment (Method Validation)
11/27	Method Validation
12/6	FINAL EXAM (time TBA)

#### Tentative Schedule of Lectures & Lab Demonstrations

#### **Examinations and Assignments**

There will be one written final examination, in accordance with university policy. The final examination is comprehensive in that the material in the second half of the course builds upon key concepts from the first half of the course. The written exams will be comprised of multiple-choice questions, true-false questions, fill in the blank questions, and/or short answer questions. The exams may be composed of any combination of the aforementioned question types.

Assignments as outlined above will be announced in class and online. 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. Additional assignments will be given as needed and will be announced in class and online.

#### **Student Academic Policies**

Policies concerning Attendance, Academic Honesty, Disabled Students, and Absences on Religious Holy days may be found at: <a href="http://www.shsu.edu/dept/academic-affairs/aps/aps-students.html">www.shsu.edu/dept/academic-affairs/aps/aps-students.html</a> Use of Telephones and Text Messagers in Academic Classrooms and Facilities <a href="http://www.shsu.edu/dept/academic-affairs/aps/aps-curriculum.html">www.shsu.edu/dept/academic-affairs/aps/aps-students.html</a>

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