

Syllabus Dr. T.G. Chasteen



Syllabus Chemistry 440 Instrumental Analytical Chemistry Fall 2007

Text:

- Required: Principles of Instrumental Analysis, 6th ed.; Skoog, Holler, and Crouch. (Thompson/Brooks/Cole Publishing: ISBN # 0495012017)
- Suggested Library resource: Handbook for Authors, American Chemical Society, **T11.A4 1978**

Class Meets in Chemistry/Forensic Science Room 121 TTh 9:30 - 11 am

Lab Meets in Chemistry Forensic Science Room 309

Dr. Tom Chasteen's Office Hours (Chemistry Forensic Science Building Room 317E): 9:00am - 10:00am and 11am to noon MWF; 8:00am-9:30am Tuesday and 8:30-9:30am Thursday and 11am to noon Tuesday and Thursday; E-mail Office hours **almost anytime**

Chapter	Title	Comments
1	Introduction	And also make sure your computer account works
4	Computers and Instrumental Labs	Pages 80-83; 87.25-89.4; 90.4-end
5	Signals and Noise	Pages 113.75-120.45; Leave out the equations
6	Introduction to Spectrometric Methods	Lots of nomenclature here. Pages 132-135.85; 144.25-end; Equations 6-2, 6-20; 6-21; 6-30 through 6-34.
7	Components of Optical Instruments	Pages 164-171.75; 175.9-204.6

8-9	Atomic Absorption Spectroscopy	Historically, THE metals detection instrument
10	Inductively Coupled Plasma	Pages 254-269.75
13-14	UV/VIS Spectrometry	Equation 13-1; Table 13-1; Pages 348.8-366; 367-370.4
16	IR Spectrometry	Pages 438.85-444.3
15	Molecular Luminescence	Pages 399-404.45; 410.25-417.8; 422.6-end
30	Capillary Electrophoresis	Pages 867-882.4 (especially: CZE, CITP, and CIEF)
28	High Performance Liquid Chromatography	Pages 816-828.6; 839.25-844.5
27	GC and GC/MS	Separate then detect! (exclude 27A-1, -2 and -3; Start at 27B)
11, 20	Molecular Mass Spectrometry	Chapter 11: Pages 281-294.25 then Chapter 20: Pages 550-558.75; 563.8-570; 577.9-end

There will be three 80 minute long tests, and a two hour final:

- **The first test date is Thursday, September 13, 2007.**
- **The second test date is Thursday October 11, 2007.**
- **The third test date is Thursday, November 15, 2007.**
- **The Final is scheduled for Tuesday, December 11, 2007 @ 8 am to 10 am. This is a two hour final.**

(The scheduled test dates are not negotiable but may be changed by the instructor.)

The grades in this class will be assigned in the following way:

- greater than 89.5% = final grade of A
- 79.5 to 89.5 B
- 69.5 to 79.5 C

- 59.5 to 69.5 D
- less than 59.5 F

Three 80 minute tests = 40%

The final = 20%

Lab reports = 25% (if two or more labs are not submitted the whole lab grade will be zero)

Class participation, forum postings, and attendance = 15%

Excessive absences, tardiness, or leaving early will adversely affect your grade in the course.



Attendance Policy

Attendance is required. Since this is a Tuesday/Thursday class, two unexcused absences are allowed. Any tests missed because of unexcused absences will result in a grade of zero for that test. Excused absences include medical problems (with documentation from a doctor), death in the family, excused absences while conducting official Sam Houston State University business, or absences approved by the instructor before the time of the absence. After the third unexcused absence the instructor will lower the student's final grade. Tardiness, or leaving early will adversely affect your grade in the course.



Required Calculator

To limit the use of memory-intensive calculators that can store text, formulae, and chemical nomenclature, you are required to use a Texas Instruments TI30 model calculator in this course **during in class tests**. There are multiple different TI30 models and all of them will work but **I suggest the TI30Xa**. Other calculators like TI Models TI34 and TI36 don't meet this requirement.



Purpose of This Course

The purpose of this 4 semester hour chemistry course is to provide a broad introduction to modern, analytical instrumental methods of chemical analysis.



Course Description

CHM 440 INSTRUMENTAL ANALYTICAL CHEMISTRY

Spectrophotometry, separation techniques and mass spectrometry are discussed. Specific topics include the

computer's use in the modern laboratory, ultraviolet and visible absorption, atomic absorption, flame emission, and inductively coupled plasma spectroscopy, infrared absorption, and gas and liquid chromatography. Instruments for these techniques are used in the laboratory work. Prerequisites: A minimum grade of C in CHM 238, and 239 and a minimum grade of C or concurrent enrollment in CHM 448. **Fall. Credit 4.**



Online Assignments

Note that the Blackboard server is routinely backed up in the middle of the night. When this occurs, Blackboard will not be available to you for as long as 1.5 hours. The time of the backup is somewhere around 3 am but may change. Before you arrange your schedule to routinely complete your online assignments in these wee hours, e-mail the SHSU help desk (helpdesk@shsu.edu) and ask them specifically "At what time is the Blackboard server NOT AVAILABLE because of maintenance or backup procedures?" then make your plans accordingly.



Missed Tests

There are no make-ups for unexcused absences on tests or the final. If you miss an exam for an unexcused absence then your grade on that exam is zero.

Excused absences included sickness that involves a doctor or health clinic visit, death in the immediate family, and emergency situations like fires or automobile accidents.

If you have an excused absence and can't attend a test, when you supply documentation for your absence a make-up exam will be scheduled. It is your responsibility to contact me as soon as possible after the missed test to begin this process. If you do not supply that documentation before the next scheduled test then the missed test grade becomes zero. In other words, excused absences require documentation.

If you miss a test or are going to miss a test it is in your best interest to contact me by phone (936) 294-1553 or e-mail as soon as you can.



Student Absences on Religious Holidays

An institution of higher education shall excuse a student from attending classes or other required activities, including

examinations, for the observance of a religious holy day, including travel for that purpose. A student whose absence is excused under this subsection may not be penalized for that absence and shall be allowed to take an examination or complete an assignment from which the student is excused within a reasonable time after the absence. A student who plans to miss a class or required activity to observe a religious holy day should inform the professor in writing prior to planned absence.



Students with Disabilities

Services to Students with Disabilities

It is the policy of Sam Houston State University that no otherwise qualified disabled individual shall, solely by reason of his/her disability, be excluded from the participation in, be denied the benefits of, or be subjected to discrimination under any academic, Student Life program or activity. Students with disabilities may request academic assistance when needed from a Committee for Continuing Academic Assistance for Disabled Students by visiting the director of the Counseling Center, located in the annex of the Lee Drain Building across the sidewalk from Farrington Building, or call (936) 294-1720 (For additional information see the University Catalog). For assistance other than academic, the student with disabilities should contact the department from which assistance is needed, such as University Police for parking, the Registrar's Office for registration, etc. If problems are not resolved on the departmental level, contact the Interim Coordinator, Americans with Disabilities Act, or call (936) 294-1015. Students with disabilities may benefit by using CCTV's and voice-activated reading machines available in the Counseling Center. Hours of operation are Monday - Friday, 8:00 a.m. to 5:00 p.m. For further information, contact the Counseling Center staff at (936) 294-1720. CCTV and a voice-activated reading machine are also available in the library.

Americans with Disabilities Act

SHSU adheres to all applicable federal, state, and local laws, regulations, and guidelines with respect to providing reasonable accommodations for students with disabilities. If you have a disability that may affect adversely your work in this class, then I

encourage you to register with the SHSU Counseling Center and to talk with me about how I can best help you.

All disclosures of disabilities will be kept strictly confidential.

NOTE: no accommodation can be made until you register with the Counseling Center.



E-mail Forwarding

If you'd like to use an off campus e-mail address (for instance, Hotmail or Lycos) that's fine but you must have your student-address e-mail forwarded automatically because my general e-mail announcements automatically go to your student (stdabxxx@shsu.edu) account. E-mail forwarding can be easily configured here: ww2.shsu.edu/mail03wp/ . You are utterly, totally, and completely responsible for successfully accomplishing this forwarding process.

Netscape or Internet Explorer are required to use Blackboard. AOL's browser is not supported by Blackboard.



Academic Honesty

The Faculty Handbook states that the University expects all students to engage in all academic pursuits in a manner that is above reproach. Students are expected to maintain complete honesty and integrity in the academic experiences both in and out of the classroom. Any student found guilty of dishonesty in any phase of academic work will be subject to disciplinary action. Furthermore, the University and its official representatives may initiate disciplinary proceedings against a student accused of any form of academic dishonesty including, but not limited to, cheating on an examination or other academic work which is to be submitted, plagiarism, collusion and the abuse of resource materials.



Graduate Student Requirements

Student who take this course for graduate credit have additional requirements beyond those of undergraduate students.

First and foremost graduate students who are taking this course for credit must print and sign the document found in Bb CHM440>Course Documents>Graduate Credit Form. This must be done the first day of class.

The student's final course grade must be an A or B for graduate credit.

Graduate students have additional/different questions on the in-class tests and final exam than those on undergraduate tests, although the number of tests will be the same. The additional material is designed to test graduate students at a more advanced level over the material covered in the class.

Additional laboratory requirements:

Literature Summaries

Two (2) brief literature summaries/abstracts from recent (< 5 years old) peer-reviewed journals are required as an appendix for each lab including the group labs (see NGL reference librarian for a reference book that will detail which journals are peer-reviewed and which not). This is written in the form of an abstract based on literature papers read along with the lab. The paper must describe the application of the technique employed in the lab experiment for that week.

Do not restate the paper's abstract for your summary; you must write your own. You must read at least the paper's introduction, the results, and the discussion. This must involve a journal citation which is made up of the names of the authors, the journal title, year, vol. number and page numbers (see format below). Put this at the top of your abstract (on the same page).

Also, you **MUST** include in your appendix **a copy of the first page** of each journal article referenced. this can be a photocopy for hard copy journals or printed for on-line sources.

Examples of analytical/forensic chemistry journals that are your primary sources include but are not limited to:

- Analytica Chimica Acta
- Analytical Chemistry
- Environmental Science and Technology
- Forensic Science International

- Journal of Chromatography
- Journal of Forensic Sciences
- Journal of Spectroscopy

Here is the format for journal citations:

Zhang, L. and T.G. Chasteen, Amending Cultures of Selenium Resistant Bacteria with Dimethyl Selenone, *Applied Organometallic Chemistry*, 1994, **8**, 501-508.

For papers in press:

Schaller, D., Hilder, E. F. and P. R. Haddad, Separation of antidepressants by capillary electrophoresis with in-line solid-phase extraction using a novel monolithic adsorbent, *Analytica Chimica Acta*, **in press**.