

## **CHEM 3405 – Instrumental Analysis Lecture Spring 2022 (MWF 10:00 – 10:50 am)**

**Instructor:** Dr. J. SHAO

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**Office Hours:** 9:00 am – 12:00 pm (TR)

**Textbook:** (1) *Required:* Skoog, D. A.; Holler, F. J.; Crouch, S. R. *Principles of Instrumental Analysis*, 7<sup>th</sup> Ed., Cengage Learning, 2018. (2) *Supplemental:* Granger II, R. M.; Yochum, H. M.; Granger, J. N.; Sienerth, K. D. *Instrumental Analysis*, 1<sup>st</sup> Ed., Oxford University Press, 2016.

**Prerequisites:** CHEM 3305 and concurrent enrollment of CHEM3405-21A

**Grading Procedure:**

4 One-hour Exams @ 100 pts each	400 (57.1%)
4 Pop Quizzes @ 25 pts each	100 (14.3%)
4 Paper Reviews @ 25 pts each	100 (14.3%)
Final ACS Test @ 100 pts	100 (14.3%)

**Grading Scale:**

Final grade will be given by the combination of lecture (60%) and lab (40%).  
Grade will be assigned as follows: **A:  $\geq 90\%$ ; B: 80 – 89%; C: 70 – 79%; D: 55 – 69% and F:  $< 55\%$ .**

**General Education Statement:**

Students in this course must demonstrate their competency in reading, writing, and some fundamental math skills through satisfactory completion of all assignments.

**Course Content:**

This class provides the basic knowledge of instrumental analysis. You will learn these techniques: Separation (GC, HPLC, SFC and CE), spectroscopy (AAS, AES, UV-visible, FT-IR and MS) and electrochemistry (Potentiometry, Coulometry and Voltammetry). Four research papers related with the instrumental analysis will be assigned and reviewed by students using the knowledge learned in the course.

## Academic Dishonesty:

Cheating on any exam, quiz or lab report will be regarded as academic dishonesty and will be subject to a final course grade of “F”.

### Tentative Lecture Schedule (changes may be made)

Date(s)	Chapter	Topic
Jan. 10 – 12	26	An Introduction to Chromatographic Separations
Jan. 14	27	Gas Chromatography
Jan. 17	No Class	MLK Holiday
Jan. 19 – 24	28	High-Performance Liquid Chromatography
Jan. 26 – 28	30	Capillary Electrophoresis and Capillary Electrochromatography
<b>Jan. 31</b>	<b>TEST 1</b>	<b>Chapters 26 – 28, 30</b>
Feb. 02 – 09	6	An Introduction to Spectrometric Methods
Feb. 11 – 16	7	Components of Optical Instruments
Feb. 18 – 21	8	An Introduction to Optical Atomic Spectrometry
Feb. 23 – 25	9	Atomic Absorption and Atomic Fluorescence Spectrometry
Feb. 28 – Mar. 02	10	Atomic Emission Spectrometry
<b>Mar. 04</b>	<b>TEST 2</b>	<b>Chapters 6 - 10</b>
Mar. 07 – 11	13	An Introduction to UV-visible Molecular Absorption Spectrometry
Mar. 14 – 18	No Class	Spring Break
Mar. 21 – 23	14	Applications of UV-visible Molecular Absorption Spectrometry
Mar. 25 – 28	15	Molecular Luminescence
Mar. 30 – Apr. 01	16	An Introduction to Infrared Spectrometry
Apr. 04 – 06	17	Application of Infrared Spectrometry
<b>Apr. 08</b>	<b>TEST 3</b>	<b>Chapters 13, 14, 15, 16, 17</b>
Apr. 11 – 13	20	Molecular Mass Spectrometry
Apr. 14 – 15	No Class	Easter Break Holiday
Apr. 18 – 22	22	Introduction to Electroanalytical Chemistry
Apr. 25 – 27	23 - 25	Potentiometry, Coulometry and Voltammetry
<b>Apr. 29</b>	<b>TEST 4</b>	<b>Chapters 20, 22-25</b>
<b>May 04</b>	<b>FINALS*</b>	<b>10:30 am – 12:30 pm; Bolin-311</b>

\*ACS final for Instrumental Analysis will be used.

Classes begin.....	January 10, 2022
Martin Luther King’s Birthday - No classes.....	January 17, 2022
Change of Schedule or Late Registration.....	January 10-13, 2022
Deadline for May graduates to file for graduation.....	February 14, 2022
Spring break.....	March 14-18, 2022
Last day of drop for “W”, 4:00 pm .....	March 21, 2022
Holiday break .....	April 14-15, 2022
Last day of classes.....	April 29, 2022
Final examinations.....	May 02-05, 2022
Commencement.....	May 07, 2022

**Student Resources:**

[https://msutexas.edu/academics/scienceandmath/student\\_resources.php](https://msutexas.edu/academics/scienceandmath/student_resources.php)

**Campus-Carry Rules:**

*Senate Bill 11 passed by the 84th Texas Legislature allows licensed handgun holders to carry concealed handguns on campus, effective August 1, 2016. Area excluded from concealed carry are appropriately marked, in accordance with state law. For more information regarding campus carry, please refer to the University's webpage at <http://mwsu.edu/campus-carry/rules-policies>.*