CHEM 5570.002
Advanced Analytical Chemistry
Fall 2022 Course Syllabus

CHEM 5570 Graduate Analytical Core: 3 hours. The goal of this course is to emphasize the instrumental and theory of instrumentation within the field of analytical chemistry. The topics of the course include statistical treatment of data, electronics, chemical equilibrium, mass spectrometry, spectroscopy, and general instrumental analysis. (*Notice: CHEM 5570 requires extensive calculations, and requires the background to perform such calculations*)

Instructor: Dr. Guido F. Verbeck
Department of Chemistry
University of North Texas
Office: SRB 276
Phone: 369-8423
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Class Schedule: MWF 9:00-9:50, Chemistry 253
Office Hours: Monday, Wednesday, Friday: 8:00-9:00am HH 004

Introduction to Instrumentation
August 29- Introduction to Analytical Instrumentation
September 5- Design and Fabrication/ Basic Electronics and Vacuum
12- Basic Stats/ Advanced Stats and Data Collection

Spectroscopy
September 19- Introduction to Optics; Optics and Symmetry
26- Symmetry and Introduction to Spectroscopy
October 3- Rotational Spectroscopy; Vibrational Spectroscopy
10- Electronic Spectroscopy; Photoelectron and Laser Spectroscopy

Separations
October 17 Introduction to Separations
24 Ion Exchange Chromatography
31 Gas Chromatography/ Liquid Chromatography
November 7- Electrophoresis/ Microfluidics

Mass Spectrometry
November 14- Introduction to Mass Spectrometry and Ion Optics
21- Time-of-Flight; Sector and Quadrupole Mass Selectors
28- Penning and Paul Ion Traps
December 5- Ion Sources (MALDI, FAB, ESI, EI,Cl) and Detector

Final Exam
December 14- 8:00AM-10AM CHEM 253
Required Readings:

Suggested Readings **

**Note: The Suggested Readings will be on hold at the library and in my office.**
Tests and Quizzes:
4 Tests will be given at announced times for 100 pts. each. Each Test will be an Out-of-Class Exam, due at the beginning of class exactly one week after delivery. Late exams will not be accepted!

Grading:
The course grade is the sum of the exams out of 400 total points.

Grading Scale:

<table>
<thead>
<tr>
<th>Final percent Average</th>
<th>Letter Grade</th>
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<tbody>
<tr>
<td>90.0 – 100.0 %</td>
<td>A</td>
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<tr>
<td>80.0 - 89.0 %</td>
<td>B</td>
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<td>70.0 - 79.0 %</td>
<td>C</td>
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<tr>
<td>60.0 - 69.0 %</td>
<td>D</td>
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<tr>
<td>Below 60.0 %</td>
<td>F</td>
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Attendance Policy:
Class attendance is highly recommended and will be monitored periodically. Students who miss the class are responsible for all the missed class materials that may not be addressed by the instructor in a subsequent class.

Note:
I reserve the right to make changes/modifications of the syllabus if needed.

Additional Information:
1. According to University policy, the grade of I (incomplete) cannot be given as a substitute for a failing grade in a course.

2. Statement of ADA Compliance: The chemistry department cooperates with the Office of Disability Accommodations to make reasonable accommodations for qualified students with disabilities. If applicable, please present your request along with an official written verification from the ODA before the end of the first week of classes.