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  
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gverbeck@unt.edu

Class Schedule: MWF 9:00-9:50, Chemistry 253  
Office Hours: Monday, Wednesday: 8:00-9:00am SRB 276

Introduction to Instrumentation
August 26- Introduction to Analytical Instrumentation  
September 4- Design and Fabrication  
9- Basic Electronics and Vacuum  
16- Basic Stats  
23- Advanced Stats and Data Collection

Spectroscopy
October 2- Introduction to Optics; Optics and Symmetry  
7- Symmetry and Introduction to Spectroscopy  
14- Rotational Spectroscopy; Vibrational Spectroscopy  
21- Electronic Spectroscopy; Photoelectron and Laser Spectroscopy

Mass Spectrometry
October 28- Introduction to Mass Spectrometry and Ion Optics  
November 4- Elemental Composition and the Molecular Ion; Ion Fragmentation  
11- Time-of-Flight; Sector and Quadrupole Mass Selectors  
18- Penning and Paul Ion Traps  
25- Ion Sources (MALDI, FAB, ESI, EI,CI) and Detectors
Required Readings:

Suggested Readings **

**Note: The Suggested Readings will be on hold at the library and in my office.**
Tests and Quizzes:

3 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 300 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>
</tr>
<tr>
<td>80.0 - 89.0 %</td>
<td>B</td>
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<tr>
<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.