Spring 2013
Chem 434 - Instrumental Analysis
Black Hills State University
MWF 1:00-1:50 BSB 129

Instructor: Dr. Micheal Zehfus
Office: BSB 108
Phone 642-6028
Campus P.O. Box 9088
Office Hours: Posted on door
Email: Michael.Zehfus@bhsu.edu

Text and material:
Principles of Instrumental Analysis, 6th ed. Skoog, Holler, & Nieman, Thomson/Brooks/Cole (5th ed will work if you can find it!)
A Short Guide to Writing about Chemistry Davis, Tyson & Pechenik Peason Education 2010
-Additional class material may be obtained on the Chemistry Web page: (www.bhsu.edu/artssciences/chemistry) look under Class Pages

Note: there are Web pages to support this text at: www.thomsonedu.com/chemistry/skoog

Catalog Description:
Theory and application of modern instrumental methods to chemical analysis

Prerequisites and/or Corequisites:
Prerequisite: Chem 230 or 332
Corequisite: Chem 434L

Course Objectives:
To gain a working knowledge of many of the instrumental analysis methods used in a modern chemistry lab. Course material will expose student both to the physical explanation of the phenomena being observed, and to the practical aspect of the various kinds of instruments. Where possible, practical, hands-on lab experiences will be provided to help the students understand the material

Attendance:
I expect you to show up for all classes, but I will not take attendance. While attendance at class will not directly effect your grade, I tend to be more helpful to a person who regularly attends class.

If you have a conflict with an exam, please notify me before the exam so we can resolve the problem. If you have to miss an exam due to illness or other emergency, please let me know within 24 hours so we can reschedule.

Instructor’s Assumptions:
Students must have completed a full year of General Chemistry as well as one semester of Analytical Chemistry and have credit in College Algebra.
ADA Statement:
Reasonable accommodations, as arranged through the Disabilities Services Coordinator, will be provided students with documented disabilities. Contact the BHSU Disabilities Services Coordinator, Mike McNeil, at 605-642-6099, (Woodburn 134), fax number 605-642-6095 or via email at mike.mcneil@bhsu.edu for more information. Additional information can also be found at http://www.bhsu.edu/StudentLife/Learning/DisabilityServices/tabid/162/Default.aspx

Academic Freedom Statement:
Under Board of Regents and University policy student academic performance may be evaluated solely on an academic basis, not on opinions or conduct in matters unrelated to academic standards. Students should be free to take reasoned exception to the data or views offered in any course of study and to reserve judgment about matters of opinion, but they are responsible for learning the content of any course of study for which they are enrolled. Students who believe that an academic evaluation reflects prejudiced or capricious consideration of student opinions or conduct unrelated to academic standards should contact the chair of the department in which the course is being taught to initiate a review of the evaluation.

Academic Dishonesty:
A student who, in connection with his or her studies, disrupts a class, plagiarizes, cheats, or otherwise violates reasonable standards of academic behavior may, at my discretion, have his or her enrollment canceled and/or be given a reduced or failing grade. For more information on specific acts that can constitute academic dishonesty, see your student handbook.

Institutional Writing Intensive Requirement:
This course is designed to fulfill Black Hills State University Writing Intensive Requirement.

Course Outline:

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<th>Week</th>
<th>Date</th>
<th>Sections of text covered</th>
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<td>1/11</td>
<td>Chapter 1 - Introduction</td>
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<td>1</td>
<td>14, 16, 18</td>
<td>Chapter 5 - Signals and Noise &amp; Chapter 6 - Introduction to Spectrometric Methods</td>
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<td>2</td>
<td>23, 25</td>
<td>Chapters 6 &amp; 7 - Components of Optical Instruments</td>
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<td>3</td>
<td>28, 30, 2/1</td>
<td>Chapter 8 - Introduction to Optical Atomic Spectrometry</td>
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<td>4</td>
<td>4, 6,</td>
<td>Chapter 9 - Atomic Absorption &amp; Chapter 10- Atomic Emission- lite</td>
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<td>2/8</td>
<td>Test</td>
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<tr>
<td>5</td>
<td>11, 13, 15</td>
<td>Chapter 13 - Introduction of UV/Vis Chapter 14 - Application of UV/Vis</td>
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<td>6</td>
<td>20, 22</td>
<td>Chapter 15 - Luminescence</td>
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<td>7</td>
<td>25, 27, 3/1</td>
<td>Chapters 15 &amp; 16 Introduction to IR spectroscopy</td>
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<td>4, 6, 8</td>
<td>Spring Break</td>
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<td>8</td>
<td>11, 13</td>
<td>Chapters 17 &amp; 18 Raman (lite)</td>
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<td>3/15</td>
<td>Test Yes, I know, the Friday after spring break :(</td>
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<td>9</td>
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<td>Chapter 19 Nuclear Magnetic Resonance Spectroscopy</td>
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<td>Chapter 19 NMR</td>
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<td>Chapter 21 Surface Characterization</td>
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<td>8, 10, 12</td>
<td>Chapter 20 Molecular Mass Spectrometry</td>
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<td>13</td>
<td>15, 17</td>
<td>Chapter 27 Gas Chromatography</td>
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<td>14</td>
<td>22, 24, 26</td>
<td>Chapter 28 High Performance Liquid Chromatography</td>
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<td>Final</td>
<td>4/29-5/3</td>
<td>Final Exams -See BHSU Master Schedule for exact time</td>
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Evaluation:

I. Exams

Three hour exams are shown on the above schedule. Each hour exam is worth 100 points. The final will be worth 200 points. I use the following grading scheme:

- A  88-100%
- B  78-87%
- C  63-77%
- D  50-62%
- F  <50%

This may change if necessary.

The student has the option of having separate grades for lecture (Chem 434) and lab (Chem 434L) or averaging the grades together for a single overall grade that will be given in both courses. The overall average grade will be calculated as:

\[
\text{Average grade} = \frac{\text{Lecture average } \times 3 + \text{Lab average } \times 1}{4}
\]

I will automatically use the grading system that gives the student the higher GPA. If this is not satisfactory, please contact Dr. Zehfus before finals week.

II. Writing

As part of the writing intensive institutional graduation requirement, this course will involve several writing assignments. The writing assignments will be worth a total of 150 points. The exact nature and schedule of these assignments will be given at a latter date. In general the writing assignment will be based on some aspect of the lab or lecture. Each writing assignment will go through at least 2 drafts. The I will make comments and corrections, but will not grade the first draft. The second draft will be graded.