Semester/Year:

Lecture Hours: 2  
Lab Hours: 6  
Credit Hours: 4

Class Time: 1:00-4:50 p.m.  
Days: Tuesday & Thursday  
Room: 307

Instructor’s Name: Dr. Eric Mechalke

Instructor's Contact Information: Call any time. Be sure to leave voice mail

Office Phone: (307) 268-2450  
Email: mechalke@caspercollege.edu

Office Hours: Mondays 10:00-10:50 a.m., 12-1pm, Tuesdays 11-11:50 a.m. Wednesdays 10-10:50 a.m., and Thursday: 10-10:50 a.m.

Course Description: The study and the practice of the principles and techniques of quantitative isolation and determination of some of the elements and their compounds. The applications and limitations of the theories and operations of analytical chemistry and the solutions of problems of all types are a major part of the two weekly class periods.

Statement of Prerequisites: CHEM 1035 or permission of the instructor

Goal: Provide the student with a sound physical understanding of analytical chemistry principles and to show how these principles are applied in chemistry, life sciences and related disciplines. Prepare the student for further study in chemistry

Outcomes: A working understanding of techniques used in most chemical analysis. Knowledge of statistics used in chemical analysis. The ability to solve complex chemical equilibrium problems. Learn the basics of spectroscopic techniques, some electronalytical methods, and problem solving skills.

Course Objectives: Train students to be competent analytical chemists.

Methodology: Lecture will meet for two hours a week. Students should plan on spending six hours a week in the laboratory doing the analysis. A small amount of lecture time may be used to go over various issues with the laboratory for that week. Likewise, some laboratory time may be used to cover lecture topics. Students are required to keep a laboratory notebook in which the laboratory reports are kept. Each student will also be required to have a USB drive in which laboratory data will be tabulated and handed in. Also various computer projects will be given.

Evaluation Criteria: Laboratory reports are written in a bound notebook with pen. Recording data anywhere besides the notebook will result in lost points or the student being withdrawn from the class. Laboratory reports along with the quality of results and various computer projects will make
up 50% of the total grade. The other 50% will come from weekly quizzes (18%), exams (25%) and a final paper (7%). Examination will cover both lecture material and laboratory. A missed examination will result in a score of zero. No make up examinations will be allowed, unless extreme circumstances exist and prior notification is received in advance of the examination. If a make up examination is allowed it MUST be completed before the next regularly scheduled class. Calculators are permitted for all examinations, and sharing is not allowed. A straight curve will be followed in assigning final grades, which is provided below. These numbers will not be raised under any circumstances, and for that reason, they provide appropriate targets for desired grades.

<table>
<thead>
<tr>
<th>Grade</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>90-100%</td>
</tr>
<tr>
<td>B</td>
<td>80-89%</td>
</tr>
<tr>
<td>C</td>
<td>70-79%</td>
</tr>
<tr>
<td>D</td>
<td>60-69%</td>
</tr>
<tr>
<td>F</td>
<td>0-59%</td>
</tr>
</tbody>
</table>

Any student who is either absent for more than two weeks or who misses a scheduled examination may be subject to withdrawal.

**Casper College may collect samples of student work demonstrating achievement of the above outcomes. Any personally identifying information will be removed from student work.**

**Required Text, Readings, and Materials:** Quantitative Chemical Analysis 8th ed. Harris. A scientific calculator is required

**Class Policies: Last Date to Change to Audit Status or to Withdraw with a W Grade:** 4-16-15

**Student Rights and Responsibilities:** Please refer to the Casper College Student Conduct and Judicial Code for information concerning your rights and responsibilities as a Casper College Student.

**Chain of Command:** If you have any problems with this class, you should first contact the instructor to attempt to solve the problem. If you are not satisfied with the solution offered by the instructor, you should then take the matter through the appropriate chain of command starting with the Department Head/Program Director, the Dean, and lastly the Vice President for Academic Affairs.

**Academic Dishonesty:** (Cheating & Plagiarism) Casper College demands intellectual honesty. Proven plagiarism or any form of dishonesty associated with the academic process can result in the offender failing the course in which the offense was committed or expulsion from school. See the Casper College Student Code of Conduct for more information on this topic.

**Official Means of Communication:** Casper College faculty and staff will employ the student’s assigned Casper College email account as a primary method of communication. Students are responsible to check their account regularly. This is also, where you will find course evaluation links during course evaluation periods.

**ADA Accommodations Policy:** If you need academic accommodations because of a disability, please inform me as soon as possible. See me privately after class, or during my office hours. To request academic accommodations, students must first consult with the college’s Disability Services Counselor located in the Gateway Building, Room 344, (307) 268-2557, bheuer@caspercollege.edu. The Disability Services Counselor is responsible for reviewing documentation provided by students requesting accommodations, determining eligibility for accommodations, and helping students request and use appropriate accommodations.
<table>
<thead>
<tr>
<th>Week</th>
<th>Tentative Assignment Schedule:</th>
</tr>
</thead>
</table>
| January 20   | Quiz 1  
Calibration of Volumetric Glassware,  
January 22<sup>nd</sup>  
Due 1/29 |
| January 27   | Quiz 2  
Standard AgNO₃ Chloride analysis  
January 29<sup>th</sup>  
Due:2/5 |
| February 3   | Quiz 3  
February 5<sup>th</sup> |
| February 10  | Quiz 4  
Standard Acid and Base  
February 12<sup>th</sup>  
February 20<sup>th</sup> |
| February 17  | Exam 1  
February 19<sup>th</sup> |
| February 24  | Quiz 5  
Analysis of Carbonates  
February 26<sup>th</sup>  
February 26<sup>th</sup> |
| March 3      | Quiz 6  
March 5<sup>th</sup> |
| March 10     | Quiz 7  
March 12<sup>th</sup> |
| March 17     | Spring Break |
| March 24     | Potentiometric Titration of an Unknown Acid  
March 20<sup>th</sup> |
| March 24     | Exam 2  
Analysis of an Acid-Base Titration Curve: The Gran Plot  
March 26<sup>th</sup>  
March 26<sup>th</sup> |
| March 31     | Quiz 8  
Spectrophotometric Determination of Iron in Vitamin Tablets  
April 2<sup>nd</sup>  
April 9<sup>th</sup> |
| April 7      | Quiz 9  
Microscale Measurement of Fe in Foods by Standard Addition  
April 10<sup>th</sup>  
April 16<sup>th</sup> |
| April 14     | Quiz 10  
Chloride analysis with Ag Electrochemical cell  
April 16<sup>th</sup>  
May 1<sup>st</sup> |
| April 21     | Gravimetric Determination Of Calcium  
May 7<sup>th</sup> |
| April 28     | Exam 3  
Quinine in Tonic Water By Fluorescence Spectrometry  
May 1<sup>st</sup>  
May 5<sup>th</sup> |
| May 5        | Field Trip  
May 6<sup>th</sup> |
| May 12       | Final Paper  
TBA |
## Tentative Course Content:

<table>
<thead>
<tr>
<th>Topic</th>
<th>Chapter</th>
<th>Assigned Reading</th>
<th>Exercises</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Analytical Process</td>
<td>0</td>
<td>1-12</td>
<td>1-6</td>
</tr>
<tr>
<td>Chemical Measurements</td>
<td>1</td>
<td>13-28</td>
<td>A, B, C, D, E, 4, 12, 13, 15, 19, 21, 23, 28, 30, 31, 32, 34, 36, 37, 38, 39, 40, 41, 42,</td>
</tr>
<tr>
<td>Tools of the Trade</td>
<td>2</td>
<td>29-50</td>
<td>B, C, D, 1, 3, 7, 8, 9, 10, 14, 15, 16, 24,</td>
</tr>
<tr>
<td>Experimental Error</td>
<td>3</td>
<td>51-67</td>
<td>A, B, D, 1, 2, 3, 4, 7.9, 10, 11, 12, 13, 15, 18, 21,</td>
</tr>
<tr>
<td>Statistics</td>
<td>4</td>
<td>68-95</td>
<td>A, E, F, 1, 8, 10, 24, 25, 29, 30,</td>
</tr>
<tr>
<td>Chemical Equilibrium</td>
<td>6</td>
<td>117-141</td>
<td>A, B, C, D, E, F, 1, 2, 3, 5, 6, 7, 8, 9, 11, 12, 13, 14, 15, 16, 28, 29, 31, 35, 36, 38, 40, 41, 44, 48</td>
</tr>
<tr>
<td>Activity and the systematic Treatment of Equilibrium</td>
<td>7</td>
<td>142-161</td>
<td>A, G, 1, 2, 16, 19, 21</td>
</tr>
<tr>
<td>Monoproitic Acid Base</td>
<td>8</td>
<td>162-184</td>
<td>A, B, C, D, 1, 2, 3, 5, 6, 13, 26, 27, 33, 36, 38</td>
</tr>
<tr>
<td>Polyprotic Acid-Base</td>
<td>9</td>
<td>185-204</td>
<td>A, B, 2, 9, 13, 14, 15, 16, 24, 28, 35, 37, 38, 39</td>
</tr>
<tr>
<td>Acid-Base Titrations</td>
<td>10</td>
<td>205-235</td>
<td>A, B, I, J, 1, 2, 3, 4, 5, 12, 13, 14, 15, 19, 36, 39,</td>
</tr>
<tr>
<td>QA &amp; Calibration Methods</td>
<td>5</td>
<td>96-116</td>
<td>A, B, 1, 2, 3, 4, 6, 7, 10, 14,</td>
</tr>
<tr>
<td>Fundamentals of Spectrophotometry</td>
<td>17</td>
<td>393-418</td>
<td>TBA</td>
</tr>
<tr>
<td>Fundamentals of electrochemistry</td>
<td>13-14</td>
<td>279-307</td>
<td>TBA</td>
</tr>
</tbody>
</table>