Chemistry 340 Syllabus
Fall 2017

Instructor
Dr. Erin Wilson
Hoyt 368
946-6290  wilsonee@westminster.edu

Office Hours
T, Th 11-12
W 1-2 pm
Others by appointment

Class Meeting  TTh 9:20-10:50 a.m.

Required Text
Skoog, Holler, and Crouch.  Principles of Instrumental Analysis.  6th ed.  2007.  ISBN: 978-0-495-01201-6 (Older editions can be used.)

Useful Resource

Course Description (from the catalog)
A study of modern instrumentation used in the investigation of chemical systems.  The theory, design, and application of spectroscopic, electrochemical, and surface analysis techniques are discussed. Basic electronics and the relationship between signal and noise are also discussed.
Prerequisites: CHE 230 and PHY 152.

Student Outcomes
• To become familiar with the principles of operation of various spectroscopic, chromatographic, electrochemical, and surface analysis instrumental techniques.
• To understand appropriate techniques and protocols for use with particular sample matrices and analytes.
• To become more familiar with the literature of analytical chemistry.
• To become more familiar with the language of analytical chemistry.
• To observe advanced instrumentation in use at research institutions and/or industry.
• To explore the effects of instrumental parameters on analytical results.
• To design and build an instrument and characterize it based on its analytical figures of merit.

Attendance Policy
• Due to the emphasis on group work and peer learning, attendance to all class meetings is mandatory. Missing four class meetings will result in a failing grade for the course.
• Students will not be permitted to make up an exam unless permission is granted from the instructor prior to the scheduled exam time.
• Late work will not be accepted for any reason. In the case of an illness or family emergency, the average on the other homework assignments will be entered as the grade for the missed assignment.

Academic Integrity
The college has implemented an Academic Integrity Policy (AIP) which will be strongly enforced. Violations of the AIP include cheating, misconduct, plagiarism, and providing false information. Academic dishonesty will not be tolerated. The first citation for academic dishonesty will result in a zero grade for the specific assignment. The second citation will result in a failing grade for the course. All citations for academic dishonesty will be reported to the Dean of the College, in accordance with college policy. Details of the AIP can be found in the Westminster College Undergraduate Catalog.

Homework & In-Class Work
Homework and reading assignments will be assigned regularly. These may come from the text, handouts, or books on reserve. In-class group work will be used regularly to supplement lectures.

Articles
A journal article that corresponds to the weekly topic will be posted each Thursday. Students will be expected to read and answer questions associated with the article. The article will be discussed the following Tuesday in a “journal club”
format in small groups. Grades will be based on individual and team quiz scores (IFAT methodology). Article quizzes may not be made up, but a student’s lowest quiz score can be dropped.

**Instrumental Project**

Working in pairs, students will design and build a visible spectrophotometer. In addition, the students will characterize the instrument’s analytical figures of merit for a specific analyte. Results of the project will be communicated via a web site that the students create. Web sites will be showcased in a presentation to faculty and peers. Details will be provided on a separate handout.

**Exams**

Exams will be mostly free-response exams using a combination of content mastery, applications and extensions, and article questions.

**Extra Credit**

Extra credit can be obtained by reading and summarizing a peer-reviewed, analytical journal article. The article must be approved by the instructor for relevance to the course. Alternatively, extra credit may be obtained by attending a monthly meeting of the SSP (Spectroscopy Society of Pittsburgh), the SACP (Society for Analytical Chemists of Pittsburgh), or another approved professional society meeting and summarizing the technical talk. In both cases, the summary must include how the article/presentation relates to course material. Students submitting extra credit may be asked to discuss the article/presentation in class. A total of three extra credit assignments (each worth up to 0.75%) may be submitted.

**Grading System**

<table>
<thead>
<tr>
<th>Grade Scale</th>
<th>Point Distribution</th>
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<tbody>
<tr>
<td>Assignments</td>
<td>15%</td>
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<tr>
<td>Articles</td>
<td>15%</td>
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<tr>
<td>Instrumental Project</td>
<td>20%</td>
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<tr>
<td>Midterm Exams</td>
<td>30%</td>
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<tr>
<td>Final Exam</td>
<td>20%</td>
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<tr>
<td>Total</td>
<td>100%</td>
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**340 Tentative Topic Schedule**

| Week 1 – Intro to Instruments, AFoMs | Week 8 – Mass Spectrometry |
| Week 2 – Advanced Spectroscopy | Week 9 – Advanced E-chem |
| Week 3 – Advanced Spectroscopy | Week 10 – Advanced E-chem |
| Week 4 – Advanced Spectroscopy | Week 11 – Surface Analysis |
| Week 5 – Advanced Chromatography | Week 12 – Surface Analysis |
| Week 6 – Advanced Chromatography | Week 13 – Sensors |
| Week 7 – Microfluidics | Week 14 – Students’ choice |

**Important Dates**

- TBA – Field Trip to MRL
- Thurs. Oct. 5th – Exam 1
- Thurs. Nov. 16th – Exam 2
- Wed. Dec. 13th – Final Exam (8-10:30 am)