Note: The syllabus is a living document. JNU and the instructor reserve the right to amend as needed.

Lecturer: Ozeas S. Costa Jr., PhD

Time: Monday through Friday (6/29/2015-7/31/2015)

Teaching hours: 50 hours

Location: Management School

Office: Management School 518

Office Hours: By Appointment

Email: costa.47@osu.edu

Course Description

This course constitutes an introduction to the scope, methodology, and application of modern chemistry. It is designed for science majors, engineers, and pre-health professionals. It emphasizes the fundamental principles and theories of chemistry. Topics include the theories of atomic structure; stoichiometry; properties of gases, liquids, solids, and solutions; periodicity of the properties of elements; chemical bonding; equilibrium; kinetics, thermodynamics; acid-base reactions; electrochemistry, coordination chemistry, and nuclear chemistry. Laboratories provide an introduction to basic techniques used in experimental chemistry and will let you see first-hand chemical principles and processes in action. It will also give you experience with some of the methods scientists use to do chemical research. Many experiments use a computer interface to provide experience in modern methods of data collection and to allow thorough analysis of experimental results. Proper laboratory procedures, chemical safety rules, and environmentally sound methods of chemical disposal and waste minimization are important components of the course. Experiments are selected to provide illustration and reinforcement of course topics, including manual and automated titrations, basic chromatography, stoichiometry, thermodynamics, and colorimetry.
Required Textbook


Assessment

Your final grade will be based on the following components:

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Weekly Labs</td>
<td>20%</td>
</tr>
<tr>
<td>Daily Quizzes</td>
<td>20%</td>
</tr>
<tr>
<td>Class Exercises</td>
<td>10%</td>
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<tr>
<td>Midterm Exam</td>
<td>20%</td>
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<tr>
<td>Final Exam</td>
<td>30%</td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>100%</strong></td>
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Grading Scale

<table>
<thead>
<tr>
<th>Grade</th>
<th>Range</th>
</tr>
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<tbody>
<tr>
<td>A</td>
<td>92-100</td>
</tr>
<tr>
<td>A-</td>
<td>90-91</td>
</tr>
<tr>
<td>B+</td>
<td>87-89</td>
</tr>
<tr>
<td>B</td>
<td>84-86</td>
</tr>
<tr>
<td>B-</td>
<td>81-83</td>
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<tr>
<td>C+</td>
<td>78-80</td>
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<tr>
<td>C</td>
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<td>D+</td>
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<tr>
<td>D</td>
<td>61-65</td>
</tr>
<tr>
<td>F</td>
<td>0-60</td>
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</tbody>
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Course delivery format

The course is delivered using the “flipped classroom” concept where course content is introduced to students through activities done online (outside of class) and “homework” (i.e., concept engagement through discussion, hands-on lab activities and exercises) takes place in the classroom with the help of the instructor. In this method, students are required to perform assigned readings, watch short lecture videos, and take assessment quizzes at home BEFORE each class. This way, they will be prepared for classroom interactions where we will practice the concepts learned outside of class using group exercises and hands-on activities. For more on the “flipped classroom” concept, visit: [https://carmenwiki.osu.edu/display/10081/Understanding+the+Flipped+Classroom](https://carmenwiki.osu.edu/display/10081/Understanding+the+Flipped+Classroom). Because of the way the course is structured, attendance at lectures is essential for students to engage and apply the content learned outside of class, as well as for checking their understanding of the content. Exercises conducted in our class meetings will also count towards course grades so missing these exercises will negatively affect your final grade. If you have missed/will be missing a class for an acceptable reason, please let me know in person, ideally prior to the class you miss. In addition, missing a class will not excuse you from completing the class exercises and the out-of-class assignments so, if you miss a class, it is your responsibility to obtain notes from a classmate and contact the instructor in order to complete all the assignments by the last day of class.
Out-of-class (online) course components
The following will be available to students through an online platform:
• PDF handouts of lecture slides
• Short lecture videos (available through iTunesU)
• A resource library (additional resources: videos, reading articles, and websites)
• Daily quizzes – 20% of final grade

In-class course components
During our daily face-to-face meetings we will:
• Review the major topics from the assigned readings and video tutorials
• Hands-on practice using inquire-based group exercises (10% of final grade) and lab activities (20% of final grade)

Class Schedule
Week 1 (June 29 – July 3)
Lecture 1: Introduction – Keys to the Study of Chemistry (Chapter 1)
Lecture 2: Components of Matter – Atoms, Molecules, and Ions (Chapter 2)
Lecture 3: Chemical Reactions and Stoichiometry (Chapter 3)
Lecture 4: Reactions in Aqueous Solutions (Chapter 4)
Lab 1: Separation of the Components of a Mixture (Pre-Lab) + Investigate a Chemical Reaction

Week 2 (July 6 – 10)
Lecture 5: Gas Laws and the Kinetic-Molecular Theory (Chapter 5)
Lecture 6: Thermochemistry (Chapter 6)
Lecture 7: Electronic Structure of Atoms (Chapter 7)
Lecture 8: Periodic Properties of Elements (Chapter 8)
Lab 2: Determining the Molar Mass of an Acid (Pre-Lab) + Calorimetry and Hess’s Law

Week 3 (July 13 – 17)
Lecture 9: Basic Concepts of Chemical Bonding (Chapter 9)
Lecture 10: Molecular Geometry (Chapter 10)
Lecture 11: Molecular Bonding Theories (Chapter 11)
Mid Exam (Chapters 1 to 11)
Lab 3: Molecular Geometry – Draw Lewis structures (Pre-Lab) + Bonding and Polarity – the VSEPR Model

Week 4 (July 20 – 24)
Lecture 12: Liquids and Intermolecular Forces (Chapter 12)
Lecture 13: Solids and Modern Materials (Chapter 12)
Lecture 14: Properties of Solutions (Chapter 13)
Lecture 15: Chemical Kinetics (Chapter 16)
Lab 4: Structure of Solids (Pre-Lab) + A Kinetic Study of the "Breathalyzer" Reaction
Week 5 (July 27 – 31)
Lecture 16: Chemical Equilibrium (Chapter 17)
Lecture 17: Acid-Base Equilibria (Chapter 18)
Lecture 18: Final Exam Review Session
Lab 5: Halogen Oxidation-Reduction Reactions (Pre-Lab) + Spectrophotometric Determination of $K_C$
Final Exam (Chapters 1 to 13 and 16 to 18)

Academic Honesty
Jinan University defines academic misconduct as any act by a student that misrepresents the students’ own academic work or that compromises the academic work of another scholastic misconduct includes (but is not limited to) cheating on assignments or examinations; plagiarizing, i.e. misrepresenting as one’s own work any work done by another; submitting the same paper, or substantially similar papers, to meet the requirements of more than one course without the approval and consent of the instructors concerned; sabotaging another’s work within these general definitions, however, Instructors determine what constitutes academic misconduct in the courses they teach. Students found guilty of academic misconduct in any portion of the academic work face penalties ranging from lowering of their course grade to awarding a grade of F for the entire course.