



Dr. Megan E. Rudock

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Course Description:

This 4-hour lecture + lab course, which satisfies a Division V and quantitative reasoning requirement for graduation, will allow students to gain an understanding of the chemical principles underlying many important scientific discoveries and phenomena that affect our day-to-day lives. Special attention will be paid to major scientific discoveries and their historical, political, environmental, social, religious, and ethical implications. Students will see first-hand that Chemistry is at the heart of nearly everything we encounter in our daily lives through the investigation of Environmental, Medicinal and Bio-Chemistry. Environmental Sustainability, based in chemistry and general science will also be a key topic in this course. The laboratory component of this course will include hands-on experiments and videos that further support the curriculum.

Course Objectives:

- Learn Scientific literature research skills and evaluate publications for credibility
- Evaluate the appearance of chemicals and chemistry in the news and sensational claims made by the media for accuracy, comparing new articles with scientific articles
- Gain an appreciation for general chemistry principles that guide the work around us
- Understand the importance of chemistry (and science) in developing sustainable environmental and agricultural practices
- Gain confidence in a chemistry lab and learn/practice good laboratory techniques and safety
- Use chemistry to investigate real world problems, understand the scientific principles involved and develop solutions to the issues in question

Course Materials

We will be using *Conceptual Chemistry* 5th Ed. by John Suchocki as a reference for this course. A hard copy of this book is optional, however EVERY student must obtain access to the Ebook and online tool *Mastering Chemistry* (Course Code: CHM108SP18) for weekly “quizzes” due Tuesday nights by midnight. Students will also be provided with access to readings and various other resources online via the Sakai site for this course. Students are expected to check this site regularly for course materials.

Students will be doing a novel project during the second half of the semester and will need to purchase ONE of the 4 novel choices. These options will be provided as we progress through the semester.

Lecture Schedule:

The class meets Monday, Wednesday and Friday from 11:00 – 11:50AM. Class attendance is **required**, as a portion of course and grade is based on class participation and discussion. The topics to be covered in this class, along with a tentative timetable (subject to change), are briefly summarized below.

Evaluation / Grading Scheme:

Class Participation and Attendance	50 points
Element/Compound Poster	75 points
Novel Project with Book Review	100 points
Research Project with Video	125 points
Weekly Online Quizzes	150 points

Midterm Exam (Wed, March 14 th)	150 points
Laboratory	200 points
Final Exam (Wed, May 9 th @ 2PM)	150 points

Tentative Schedule:

CHM 108 Course Outline				CHM 108 Lab Outline		
17-Jan	W	UNIT I: Introduction to Chemistry, Basic Building Blocks (origins and phases of matter, atomic theory, periodic table, moles, bonding, chemical equations, stoichiometry)	Welcome and Intro to the Course	Chapters 1 – 6		
19-Jan	F		Week 1: Origins of Matter, Phases of Matter, Atomic Structure/Theory and the Periodic Table (Readings: Mendeleev)			
22-Jan	M				23-Jan	Lab 1: Intro to Lab: Lab Safety, Excel Activity
24-Jan	W					
26-Jan	F		Week 2: Periodic Table, Chemical Bonding and Lewis Structures. Molecular Shapes			
29-Jan	M				30-Jan	Lab 2: Examining Food Dyes in Gatorade (Red, Blue and Purple Gatorade and Spec20s)
31-Jan	W					
2-Feb	F		Week 3: Analysis of the Chemical Reaction. Law of Conservation of Mass, Stoichiometry			
5-Feb	M				6-Feb	Lab 3: Green Chemistry: Making a Household Surface Cleaner
7-Feb	W					
9-Feb	F					
12-Feb	M	UNIT II: Environmental Chemistry (atmosphere, ozone, Chapman Cycle, global warming, lithosphere, biosphere, hydrosphere, ocean acidification, insecticide usage)	Week 1: Atmospheric Chemistry and the Ozone Layer (function of ozone, Chapman Cycle, Montreal Protocol, Kyoto and carbon	Chapters 8 – 11, 16 - 17	13-Feb	Lab 4: Buffering Lakes and Streams - neutralizing acid rain
14-Feb	W		Week 2: Lithosphere - Farming and Fertilizer overuse, Eutrophication, Dead zones, Nitrogen Cycle			
16-Feb	F				20-Feb	Lab 5: Movie and Reading Inconvenient Truth (Global Warming)
19-Feb	M		Week 3: Hydrosphere - water cycle, water purification and testing methods, Sustainability of clean drinking water			
21-Feb	W				27-Feb	Lab 6: Talk and Water Analysis of Lake Katherine with the Yakin Riverkeeper Watershed
23-Feb	F					
26-Feb	M					
28-Feb	W					
2-Mar	F					
			SPRING BREAK		SPRING BREAK	
12-Mar	M		Midterm Review			
14-Mar	W			MID	Lab 7: Movie about History of Polio Vaccines and TED talk about Polio Eradication	
16-Mar	F	UNIT III: Medicinal Chemistry (drug classification, cancer chemotherapy, psychoactive drugs, and vaccines)	Week 1: Drug Classification, structure/function, Penicillin, Antivirals, Antibiotics, Antibiotic Resistance, Flu virus/ Week 2: Vaccines, Immune system, History, types, Case Study on Wakefield, AntiVax, Herd Immunity	Chapters 14 - 15	16-Mar	Lab 8: Analysis of OTC drugs - pH, reactivity, phenol content
19-Mar	M					
21-Mar	W					
23-Mar	F		GOOD FRIDAY HOLIDAY		23-Mar	Lab 9: Synthesis of Aspirin
26-Mar	M					
28-Mar	W					
30-Mar	F		Week 3: Illicit Drugs (Dangers, methods of action, enzymes/ receptors, nerves and neurotransmitters)			
2-Apr	M				30-Mar	Lab 10: Boiling Point Analysis of Aspirin and Winstergreen Synthesis.
4-Apr	W					
6-Apr	F	UNIT IV: Biochemistry and Biotechnology (DNA, genes, proteins, sugars, carbohydrates and other biomolecules, metabolism, GMOs, food sustainability)	Week 1: Sugars and Carbohydrates (proteins, glycolysis, Kreb's, Energy, Diabetes, Metabolism)	Chapters 12 - 13	6-Apr	Lab 11: Soda Can Calorimetry - Measuring the caloric content of food
9-Apr	M					
11-Apr	W				Week 2: DNA, Genes, Genetics (Mendelian vs. Complex disease)	13-Apr
13-Apr	F					
16-Apr	M		Week 3: GMO's and Food Sustainability (tie back into Farming and Environmental)		20-Apr	Lab 13: Sustainable of Food Production - Visit and Talk at Campus Garden/ Kitchen to learn
18-Apr	W					
20-Apr	F					
23-Apr	M					
25-Apr	W					
27-Apr	F					
30-Apr	M		Video Presentations (Reactions in Everyday Chemistry)		1-May	NO LAB
2-May	W		Wed May 9th at 2pm Final Exam			

Attendance:

Lectures will require student participation in many forms. Student feedback and engagement will be essential to keep the pace of the course on track with student learning and student interests. Students are expected to arrive prepared and ready to participate in discussion or activities.

Due to the fact that class participation and attendance are considered in your final grade, any absences from class discussions, late assignments or projects must be submitted with a formal excuse. The only excuses that MAY be accepted include those for medical reasons (obtain note from physician, not a receipt from the student health center), family emergency, and participation in an official University activity (obtain note from sponsor/director).

Office Hours:

Students are encouraged to email me or drop by my office to see me whenever you have questions or concerns about the course or course content. It is not necessary to have an appointment, but to be sure to catch me you might call ahead, email me or make some arrangement with me when we are together in lecture. Please do not hesitate to communicate with me by email (rudockme@wfu.edu). I will make every effort to respond quickly.

Sakai Course Site:

There will be a Sakai site for this course, which will provide online access to the course syllabus, reading materials, learning objectives, lecture notes, homework assignments, and a links online resources. It can be accessed at <https://sakai.wfu.edu/portal/>. Information and resources will be added to this site as the semester proceeds, so please be sure to check it regularly for updates.

Learning Assistance Center:

If you have a disability that may require an accommodation for taking this course, please contact the WFU Learning Assistance Center (336-758-5929) within the first two weeks of the course.

Academic Integrity:

It is expected that students will know and abide by the Wake Forest University Honor system (see the 2017/2018 WFU Bulletin)