

Course Outline

Course: NATS 1211, Science of Contemporary Issues

Term: Autumn 2004

Instructor: Dr. Joseph J. Bozell

Course Description: This one quarter course is an overview of the basics of general and organic chemistry for the nonmajor. The intent is to enhance your skills in understanding the concepts that a chemist deals with on a regular basis, and to illustrate them through real world examples. Through reading and working with this information, you will be better able to understand the impact and influence of chemistry in today's world.

Assignments: You will be responsible for completion of a series of homework assignments. **All homework assignments are due every Friday at the beginning of class. Late homework will not be accepted, and will be given a grade of zero.** The homework will be checked for completeness, and one question will be chosen at random for grading in detail.

Quizzes and examinations: There will be both quizzes and comprehensive examinations over the quarter. On most Fridays, there will be a 25 minute quiz at the beginning of class. There will also be two 50 minute comprehensive examinations and a 1hr, 45 minute final examination during the quarter.

Read the following carefully:

1) There will be no makeup exams given. If you have a need to take the exam outside of the normal exam time, you will need to have an exceptionally good excuse AND will need to notify me at least one week in advance of the exam. Regardless, I reserve the right to deny the request, as special examinations are generally unfair to the remainder of the class who are able to take the exam at the assigned time.

2) There are no makeup quizzes given, and no quizzes will be given outside of normal class time. Only the five best scores out of six quizzes will be counted, i. e., you can drop one quiz without penalty.

Grading – final grades will be based on a curve (a distribution of scores).

Homework – 100 points

Quizzes – 100 points

Comprehensive exam 1 – 150 points

Comprehensive exam 2 – 150 points

Final exam – 300 points

Lab reports – 200 points

Total – 1000 points

Laboratory and Lab Reports

- 1) The total lab report points will be prorated down to 200 points in calculating the final grade.
- 2) You must attain at least 50% (100 points) in lab in order to pass the course.
- 3) Attendance is mandatory for the laboratory part of the course. You are required to do EVERY lab. You must attend the lab section in which you are registered.
- 4) **There are no makeup labs.** If you miss your lab for any reason, you must make it up in the same week the lab is offered. If you cannot make your scheduled lab time, you **MUST** get permission from your teaching assistant before changing.
- 5) **Proper eye, skin and foot protection is required.** In general, this will mean no shorts or open toed shoes will be allowed in the laboratory. Exceptions may be made depending on the nature of the laboratory experiment. A student refusing to comply will have to leave the lab for the day.
- 6) A format for all lab reports will be provided.
- 7) If you were working in groups, please note the full names of your partners on your report. Give credit where credit is due.
- 8) Spelling and grammar will be considered in grading of your report.
- 9) Reports are due by the beginning of lab the week following completion of the lab.
- 10) Late reports will be assessed a 10% penalty per day. Reports more than 5 days late will not be counted.
- 11) Concepts demonstrated in the labs may show up as questions on the exams.

Class Schedule (The class will follow this schedule fairly closely, but I reserve the right to change as necessary)

Week	Topics	Chapter	Homework (DUE FRIDAY)	EACH	Laboratory
Sept 13 15 17	Course introduction, expectations, grading The basics: chemistry, scientific method, measurements, conversions	D1	Memorize elements symbols and names	1-36,	No lab this week
Sept 20 22 24	The basics: matter, periodic table, elements and compounds QUIZ 1	D2	D1: 1.23 – 1.28, 1.37 – 1.40, 1.53 – 1.65, 1.71, 1.73, 1.75 – 1.79; CT 1,3		How to Lie With Statistics
Sept 27 29 Oct 1	The basics: atoms, electrons, protons, neutrons, chemical formulas QUIZ 2	D3	D1 2.11 – 2.12, 2.15 – 2.24, 2.27 – 2.28; CT 4	2.24,	Material Safety Data Sheets
Oct 4 6 8	The basics: chemical bonds, molecular shapes, Lewis formulas, valence and the octet rule Help session for 1 st exam	D4	Memorize list of ions; D3: 3.15–3.32, 3.51, 3.53–3.54; CT 1		Chemical Bonds and Molecular Models
Oct 11 13 15	MONDAY! Guest lecture: <i>Moody, Sullen Girls, Angry, Hostile Boys</i> Organic chemistry: introduction	D11	D4: 4.29–4.30, 4.33–4.48, 4.53–4.56; CT 2		Gatorade
Oct 18 20 22	Organic chemistry: functional groups, nomenclature, alkanes, alkenes, arenes QUIZ 3	D12	Memorize list of organic compounds; D11: 11.19–11.21, 11.24, 11.31–11.52 (odd); CT 1		Mystery Lab
Oct 25 27 29	Organic chemistry: energy in society, petroleum refineries, renewable feedstocks, sugars, natural oils QUIZ 4	CIC4	Memorize list of functional groups; D12: 12.17–12.20, 12.21–12.30(odd), 12.49–12.52		Chromatography
Nov 1 3 5	Organic chemistry: drugs and pharmaceuticals Guest lecture: <i>Polymers and Plastics</i> Help session for 2 nd exam QUIZ 5	CIC10	TBD		Soil Moist – The Principle of Disposable Diapers
Nov 8 10 12	Nuclear chemistry Guest lecture: <i>The Story of Three Mile Island</i> FRIDAY! 2nd comprehensive exam	CIC7	TBD		Soaps and Fats
Nov 15 17 19	Biochemistry basics: the genetic code, proteins, the chemistry of diseases QUIZ 6	CIC12	TBD		Help Session for Final in all labs
Week of Nov 22	Final examination				

Memorization List 1

Memorize elements 1-36 (hydrogen [H] through krypton [Kr]), both names and symbols.

Memorization List 2

Memorize the following *monoatomic* ions:

F^-	fluoride	O^{2-}	oxide
Cl^-	chloride	S^{2-}	sulfide
Br^-	bromide	N^{3-}	nitride
I^-	iodide	P^{3-}	phosphide
Fe^{2+}	ferrous	Cu^{1+}	cuprous
Fe^{3+}	ferric	Cu^{2+}	cupric

Memorize the following *polyatomic* ions:

NH_4^+	ammonium	PO_4^{3-}	phosphate
NO_3^-	nitrate	CO_3^{2-}	carbonate
SO_4^{2-}	sulfate	HCO_3^-	bicarbonate
OH^-	hydroxide	MnO_4^-	permanganate
CN^-	cyanide		

Memorization List 3

Memorize the following compounds and their name as substituents.

[illegible]

Memorize the following functional groups:

Structure of functional group	Compound class
$\text{R}-\text{O}-\text{H}$	alcohol
$\text{R}-\text{O}-\text{R}$	ether
$\begin{array}{c} \text{O} \\ \parallel \\ \text{R}-\text{C}-\text{H} \end{array}$	aldehyde
$\begin{array}{c} \text{O} \\ \parallel \\ \text{R}-\text{C}-\text{R} \end{array}$	ketone
$\begin{array}{c} \text{O} \\ \parallel \\ \text{R}-\text{C}-\text{O}-\text{H} \end{array}$	carboxylic acid
$\begin{array}{c} \text{O} \\ \parallel \\ \text{R}-\text{C}-\text{O}-\text{R} \end{array}$	ester
$\begin{array}{c} \text{H} \\ \\ \text{R}-\text{N}-\text{H} \end{array}$	amine
$\begin{array}{c} \text{O} \\ \parallel \\ \text{R}-\text{C}-\text{N}-\text{H} \\ \\ \text{H} \end{array}$	amide
Cl-	chloro
Br-	bromo
I-	iodo