Natural Science 1820 6.0 York University
*Molecules and the Mind*

Course Outline

2013-2014

Lecturer: W. Pietro
Office: Petrie Science and Engineering Bldg., Room 138
Phone: 416 736 2100 ext. 77700

The Natural Science courses at York University are designed for students who are not intending to become professionally involved in science. However, science is a part of everyone's day to day life, and as such, it is important to become familiar to a certain extent with the scientific method and outlook and to be cognizant of some of the achievements of scientific thought. The various NATS courses offer the opportunity to investigate the scientific process in a non-technical but nevertheless thought-provoking manner.

Everything on this earth is made of something. From food and cosmetics to tables, cars, paper, drugs, rocks and mountains; from trees to mice to humans, it is all made of this something and the science of this something is called Chemistry.

This course will look at the world in which we live from a chemical perspective and in doing so will uncover the inherent beauty of the molecular world, and the benefits and dangers of chemistry.

**Text Required:**

There is no text essential to this course. However, either of the following could prove useful to you as references. Both are available in the Steacie Science and Engineering library.

*The Extraordinary Chemistry of Ordinary Things*: Carl Snyder, 4th edition


**Office Hours**

Professor Pietro holds office hours on Wednesdays from 1:30 to 3:30 PM. He does not answer chemistry questions by email. If you need extra help, please attend his office hours. If you cannot attend his regularly scheduled office hours, you may make an appointment with him for a different day.
Assessment and Evaluation:

Fall Term:
3 in-class Tests each worth 10%
Midterm Exam worth 20%

Winter Term:
3 in-class Tests each worth 10%
Final Exam 30%

Of the six in-class tests, only the highest five will be counted toward your grade. The in-class tests therefore represent 50% of the total grade. All of the material appearing in the quizzes and exams will come directly from lecture, so lecture attendance is strongly advised.

Format:

Lecture: Monday and Wednesday from 4:00 to 5:30 PM
Location: VH-B (Vari Hall B)

Important Dates:

First lecture of 1st semester will be on Monday, September 9, 2013.

Last lecture of 1st semester will be on Wednesday, December 4, 2013.

First lecture of 2nd semester will be on Monday, January 6, 2014.

Last lecture of 2nd semester will be on Wednesday, April 2, 2014.

Midterm and final exams will be scheduled by the university and held during the posted exam periods.

Class will not be held during reading week (February 15-21).

Class will not be held on October 30 (co-curricular week)

Class will not be held Monday, October 14 (Thanksgiving) and Monday, February 17 (Family Day).

Last day to ENROL without requiring Course Director permission for Term Y is September 22, 2013.

Last day to ENROL with Course Director permission for Term Y is October 25, 2013.
Last day to DROP the course without a grade being submitted for Term Y is February 14, 2014.

**Important information:**

There will be six hourly tests held during regular lecture period. Professor Pietro will count the five highest scores of these six tests toward your final grade for a total of 50% of your grade. If you miss a test, that will be the one dropped. However, he DOES NOT offer make-up tests, so if you miss more than one, the subsequent missed test(s) will be counted with a score of zero.

Students who feel that there are extenuating circumstances which may interfere with the successful completion of the exam or other course requirements are encouraged to discuss the matter with the Course Director as soon as possible.

Students with physical, learning or psychiatric disabilities who require reasonable accommodations in teaching style or evaluation methods should discuss this with the Course Director/Lecturer early in the term so that appropriate arrangements can be made.
Tentative list of topics to be covered

Fall semester

1. Philosophy of science, laws, theories, postulates, the scientific method

2. Brief expose of the history of science, history of chemistry, important figures in science and chemistry

3. Working with numbers, significant figures, measurements, units, dimensional analysis

4. Atomic structure, quantum theory, orbitals, the Uncertainty Principle, the periodic table

5. Molecules and molecular structure, symmetry, VSEPR theory, balancing chemical equations, types of chemical reactions, historic laws of chemistry, Le Chatelier’s principle

6. Acids and bases, pH, buffers, acid rain

7. Basic principles of thermodynamics and thermochemistry, the Laws of Thermodynamics, entropy and disorder

8. Introduction to organic chemistry, organic structures, functional groups, organic nomenclature, polymers, synthesis, isomers, chirality

9. Introduction to biochemistry, biomolecules, biopolymers, enzymes, membranes

10. Introduction to brain chemistry, the anatomy of the brain, neuron structure and activity, neurotransmitters, receptors, endorphins and enkephalins

11. Brain chemistry and drug discovery, therapeutic and illicit psychotropic drugs, the interaction of food molecules with the brain, designer drugs, the chemistry of mental illness, the chemistry of pain and pleasure, the chemistry of addiction

12. Truffles, pigs, and chocolate: the chemistry of sex. Hormones, pheromones, the Jovan experiment, Martha McClintock and menstrual synchrony, essence of Genevieve, the chemistry of deviant sexuality

Winter semester - TBA