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ISDP ENVIRONMENTAL CHEMISTRY

Professor James T. Spencer
Spring 2008

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COURSE DESCRIPTION AND PREREQUISITE SKILLS: Our planet is facing many difficult choices that concern the environment: global warming, acid rain, nuclear energy, ozone depletion, smog and pollution, dwindling fossil energy supplies, and many more. The steps we take in the next few years will be critical to the future path, and even the ultimate survival, of life on Earth. But how can there be so many opinions about what to do about these issues - and why do people so often seemingly even disagree about the fundamental nature of the basic problem itself? To understand the heart of these issues more deeply requires first an understanding of the chemical processes involved. In this course, and through the text "Chemistry in Context", many aspects of environmental chemistry will be presented as they relate to life on the planet. Topics are chosen to "reflect a real and pressing societal issue" and to understand the chemistry at work.

This chemistry course intended for non-science students with an interest in science and has a special focus on environmental issues. No prior chemistry instruction is required or assumed but the course should appeal to those who have also had high school chemistry.

LEARNING GOALS: Whether we like it or not, we live in a dynamic chemical universe. Chemical properties and reactions influence our every action (and reaction). We rely upon chemical properties and reactions to both sustain and enrich our lives. This course is intended to provide an introduction to understanding on a deeper level the role of chemistry in the environment of our world. This will be accomplished by providing a rational basis for interpreting and understanding important environmental issues by exploring the underlying chemical phenomena observed in nature. .

The lectures and textbook are designed to explore chemical ideas on a "need to know" basis in the context of "real-world" problems. Chemical principles are introduced in order to understand the scientific and societal issues behind issues of current importance.

RESIDENCY LECTURES: The material covered in residency lecture will be illustrative rather than exhaustive. In lecture, alternate ways of understanding the material will often be presented. Several laboratory experiments will also be presented during the residency. The intent of the residency lectures are to provide a

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background from which to launch self-investigations of the world of environmental chemistry, as explained in the textbook (and also additional optional readings). Significant amounts of time will be allowed for questions and discussion of the topics.

GRADING: Final grades will be based upon *completion* of the submitted assignments (due periodically during the semester) and a class project (paper, study, etc.). The project should be on an important concept explored in the assigned materials. The final project should be arranged into sections in which all the known facts are first summarized, then the known scientific data presented, the analysis of the scientific data presented, and the conclusions reached discussed.

Materials should be submitted to Prof. Spencer. The assignments should be sent by email to jtsponce@syr.edu. The final project should be sent (also by email or by regular mail) to Prof. James Spencer, Department of Chemistry, Center for Science and Technology, Syracuse University, Syracuse, New York 13244-4100.

REQUIRED TEXTBOOKS: The required textbook for this course is: “Chemistry in Context” by Stanitski, Eubanks, Middlecamp, and Pienta (fifth edition); published for the American Chemical Society by McGraw Hill.

MISCELLANEOUS:

- (1) Students who may need special consideration due to a physical or learning disability should see Prof. Spencer as soon as possible.

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ISA 200/400

Approximate Lecture/Lab Schedule Professor James T. Spencer Spring 2007

Day	Topic
Fri., Jan. 4	Lectures and overviews Meet in Lecture Room
Sat., Jan. 5	Lectures and overviews Meet in Lecture Room
Sun., Jan. 6	Laboratory Experiments Meet in 203A Bowne Hall

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Assigned Materials (Required)

Professor James T. Spencer

Spring 2008

Date	Chapter	Required Materials
Sat., Jan. 4-6		Residency
Jan. 18	Chapter 1: The Air We Breathe	Chapter 1: 15, 17, 21, 22, 33, 36, 37, 40, 50
Feb. 1	Chapter 2: Protecting the Ozone layer	Chapter 2: 3, 5, 7, 11, 15, 16, 24, 32, 36, 37, 43
Feb. 15	Chapter 3: The Chemistry of Global Warming	Chapter 3: 2, 3, 6, 9, 12, 18, 21, 27, 32, 42
Feb. 29	Chapter 7: The Fires of Nuclear Fission	Chapter 7: 4, 6, 7, 11, 21, 24, 30, 37, 43, 53
Mar. 14	Chapter 10: Manipulating Molecules and designing Drugs	Chapter 10: 6, 8, 16, 19, 22, 24, 47
Mar. 28	Chapter 11: Nutrition – Food for Thought	Chapter 11: 2, 5, 6, 8, 18, 21, 25, 29, 40, 42
Apr. 11	Chapter 12: Genetic Engineering	Chapter 12: 7, 10, 12, 17, 19, 25, 26, 42
Apr. 25	Final Project Due	