Physical Science (NSCI 100) March 18-May 11, 2013 Sat./Mon. 1715-2015, Camp Lemmonier Classroom

Instructor: Dr. Chris Gregg Contact: Phone: 824-4033 (W), 824-6171 (CLU) christopher.gregg@faculty.umuc.edu Class Website: http://ecosimulation.com/nsci100 Office Hours: By appointment, and directly after each class

Textbook: Hewitt, P. G., Suchocki, J., & Hewitt, L. A. (2011). Conceptual Physical Science (5th ed). San Francisco, CA: Pearson Addison-Wesley.
Other Required Materials: Basic scientific calculator (must have a square root button and sin and cos buttons).
Prerequisites: MATH 012 or higher

Course Outline:

Monday 18 March	Class introduction, Chapters 1-2
Saturday 23 March Monday 25 March	Chatper 3 Chapters 4-5
Saturday 30 March Monday 1 April	Project #1 Due, Chapters 6-7 Chapters 8-9
Saturday 6 April Monday 8 April	
Saturday 13 April Monday 15 April	. Project #2 Due, Midterm Exam, Chapters 14-15
Saturday 20 April Monday 22 April	
Saturday 27 April Monday 29 April	
Saturday 4 May Monday 6 May	
Saturday 10 May Monday 12 May	

Attendance and Student Preparedness: Attendance is mandatory; there is too much material to cover in a short amount of time for missed classes. In the event a student must miss class, prior consultation with Dr. Gregg will be expected.

Students are required to read the chapters we will cover in class before each class begins. If Dr. Gregg does not feel that is being done, classes will begin with reading quizzes that will test the material from each chapter. In order to best understand class material, students need to have seen the material at least once before.

Course Projects: The course will include four (4) course projects, each on a major topic that we cover (choose from: Newton's Laws, Heat Transfer, Electricity and Magnetism, Chemistry and Chemical Processes, Earth Science, and Astronomy). During the course, each student will be required to present one of their projects to the class during a 15-20 minute presentation.

Each course project will consist of a student-chosen topic that is approved by Dr. Gregg. Students will receive separate guidance on project details, but each project will include at least one non-trivial mathematical computation that will be explained in detail.

Project grades will be determined by the written and/or multimedia products that students turn in. Given that there are limited computing resources on Camp Lemonnier, there will be flexibility on the definition of "products." Presentation grades will be determined by a combination of Dr. Gregg's and other classmates' assessments.

Homework: In addition to the weekly textbook reading assignments, homework will primarily consist of projects, which will be due every two weeks. Minimal other homework will be assigned, and will be geared towards practice problems that test conceptual understanding of course material. NCSI 101 lab reports will be generated during the lab itself (in cumulative lab notebooks), and will not generate homework.

Grade Policy:

- 1. Late work will only be accepted by prior agreement with Dr. Gregg. If you need extra time on an assignment, email Dr. Gregg at least twelve hours prior to class time. Except for extenuating circumstances, agreed upon late work will be due at most one week late.
- 2. Students may appeal grading decisions, and re-grades will be handled on a case-by-case basis. Students who wish for a regrade on an assignment should prepare a rebuttal in writing prior to requesting the regrade, and the rebuttal should clearly indicate why the student believes the grade is incorrect.
- 3. NCSI 100 and NCSI 101 will receive separate grades, which will be independent of each other.

Course Description: An introduction to the basic principles of physics and chemistry, with applications to geology, oceanography, meteorology, and astronomy. The objective is to use scientific and quantitative reasoning to make informed decisions about topics related to physical science. Discussion covers the development of scientific thinking, the scientific method, the relationships among the various physical sciences, and the role of the physical sciences in interpreting the natural world.

Course Objectives: After completing this course, you should be able to

- 1. apply knowledge of the fundamental principles of physics and chemistry to form hypotheses and draw logical conclusions about matter-matter and matter-energy interactions
- 2. critically weigh evidence and make informed decisions by recognizing that scientific knowledge is an evolving process and is clearly distinct from tenets derived from the misleading practice of pseudoscience
- 3. convey the scientific principles underlying fundamental forces, laws of motion, conservation laws, and thermodynamics, and critically assess how these principles impact decisions about technology, policy, and daily life

Grading: Grades for NSCI 100 will be based on a midterm exam, a final exam, four projects, and one oral project report, with the weights giving in the following table:

Class Participation	10%
Project 1	10%
Project 2	10%
Midterm Exam	20%
Project 3	10%
Project 4	10%
Oral Project Report	10%
Final Exam	20%

Textbook Table of Contents:

Prologue: About Science

Part 1: Physics

1. Equilibrium and Linear Motion

Read for 18 March

- 2. Newton's Laws of Motion
- 3. Momentum and Energy } Read for 23 March

4.	Gravity, Projectiles,	and Satellites)	for 25 March		
5.	Projectile and Satelli	ite Motion \int			
6.	Temperature, Heat, a	and Thermodyr	namics	Read for 30 March	
7.	Heat Transfer and Cl	l Change of Phase $\int \frac{1}{2} $			
8.	Electrostatics and Ele	ectric Current		Read for 1 April	
9.	Magnetism and Elect	electromagnetic Induction $\int^{\pi e u u} \int^{\pi e u} \int^{\pi e u} \int^{\pi e u} \int^{\pi e u u} \int^{\pi e u u} \int^{\pi e u} \int^{\pi e u u} \int^{\pi e u u} \int^{\pi e u u} \int^{\pi e u} $			
10.	Waves and Sound $\Big)$	Read for 6 April			
11.	Light	neua jor o ripr	00		
Part	2: Chemistry				
12	Atoms and the Period	dic Table			

- 12. Atoms and the Periodic Table Read for 8 April 13. The Atomic Nucleus Read for 13 April 14. Elements of Chemistry
- 15. How Atoms Bond and Molecules Attract
- 16. Mixtures Read for 15 April
- 17. How Chemicals React
- 18. Two Types of Chemical Reactions
 19. Organic Compounds
 Read for 20 April 19. Organic Compounds

Part 3: Earth Science

20.	Rocks and Minerals) Read	for 22 April		
21.	Plate Tectonics and Earths Interior	J	<i>jor 22 liptu</i>		
22.	Shaping the Earths Surface		Read for 27 Anril		
23.	23. Geologic Team–Reading the Rock Record $\int \frac{1}{27} \frac{1}{100} \frac{1}{27} \frac{1}{100} $				
24.	The Oceans, Atmosphere, and Clima	tic Eff	ects) Read for 29 April		
25.	Driving Forces of Weather				

Part 4: Astronomy

26. The Solar System Read for 4 May 27. The Stars

28. Cosmology } Read for 6 May