

NSC111 – Physical Science
Spring 2005 – EDP Session IV

Syllabus

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<http://linus.highpoint.edu/~atitus/>

We will use *Physics by Inquiry*[2]. “*Physics by Inquiry* has been designed for courses in which the primary emphasis is on discovering rather than on memorizing and in which teaching is by questioning rather than by telling. Such a course allows time for open-ended investigations, dialogues between the instructor and individual students, and small group discussions. A major goal is to help students think of physics not as an established body of knowledge, but rather as an active process of inquiry in which they can participate.” [1]

Lab: MTTh 6:00 pm–9:30 pm, 103 HHSC

Office and/or Lab Hours: You can email me or call me. You can also meet with me before or after class.

Course Description: An introductory study of the basic concepts of physical sciences, especially physics and chemistry. Laboratory work emphasizes the application of the scientific method to understanding physical reality. Four or six hours credit. Three class hours; three laboratory hours. Satisfies the laboratory science requirement and is recommended for the student who seeks a single semester course. Pre or co requisite: MTH 105 or 131.

Textbook(s) and other materials: *Physics By Inquiry* by Lillian McDermott.

Class web site: <http://linus.highpoint.edu/~atitus/courses/nsc111/>

Grading Scale (min%): A+ (96), A (92), A– (88), B+ (84), B (80), B– (76), C+ (72), C (68), C– (64), D+ (60), D (56), D– (52), F (<52).

Grade Determination: There will be three major components of your grade: (1) lab notebook (50%), midterm exam (25%), and final exam (25%). Your lab notebook will consist of all of your observations, measurements, and answers to questions. You will also record answers to your homework questions in your lab notebook. All assessment questions will focus on *how you know*; therefore, your reasoning is as important as your final answer. You may use your book and lab notebook when taking the exams.

Lab: Each night, you will work on experiments for approximately 3 hours. On occasion, we may spend the last 15 minutes in class discussion.

Lab Notebook: Your lab notebook is the single most important assessment instrument in the course. It should be a 3-ring binder containing lined notebook paper and graph paper. It should be organized by experiment number. Homework should be kept in a separate section from the experiments. Use tabbed dividers between the sections. In this notebook, record your answers, measurements, and observations.

Attendance: Because you will work in groups, it is essential for everyone to attend class. If you miss 4 classes, you will be given a probation notice. If you miss 5 classes, you will be withdrawn from the course. If you miss a class, you must make up the lab. You may make it up on Mon, Tues, or Thurs from 5:00 PM–6:00 PM or by appointment, but you must notify me before you come.

Goal statement for a core course in science for the general education curriculum: Our graduates should understand the methods of and developments in the natural sciences and the impact of science on society and their lives.

Specific objectives of the science course in the general education curriculum:

1. Students should demonstrate that they can use the scientific method of inquiry, including the formulation of a problem, gathering and interpreting data, and deductive reasoning.
2. Students should know the essential principles, theories, and research findings of at least one area of natural science.
3. Students should know how to use scientific apparatus for gathering information and discovery.
4. Students should understand the function of science and its impact in the modern world.

General education requirements for writing: The general education curriculum emphasizes writing in all courses with the exception of mathematics and physical education activity courses. In this course, students will be graded on their writing. Students must express themselves well and use proper grammar on all assignments, exams, and lab reports.

Expectations: This is not a “talk and chalk” course. It is a guided-inquiry course where you conduct and learn from scientific experiments. This requires greater involvement than simply taking notes from a lecture. If you want a “memorize the facts” science course and do not want a “hands-on” course, then I suggest taking this course from someone else. However, if you want a science course that will turn you on to science, alleviate fears that you might have, and open your mind to what science is, then this course is for you.

Accommodations: If you need accommodations due to a disability, please notify Dr. Titus before the end of the first week of class. If you must reschedule the mid-term or final exam due to serious illness, death in the family, participation in official school events, or another such valid reason, please alert Dr. Titus before the event or as soon as possible after the event.

References

- [1] Lillian McDermott. Physics by inquiry home page [online]. Available from: <http://www.phys.washington.edu/groups/peg/pbi.html>.
- [2] Lillian McDermott. *Physics By Inquiry*, volume I. John Wiley & Sons, 1996.

Topics Covered

1. PROPERTIES OF MATTER.
 - (a) Measurements of Matter.
 - (b) Pure Substances.
 - (c) Scientific Representations.
 - (d) Solutions of Solids in Water.
 - (e) Solutions of Solids, Liquids, and Gases.
2. ELECTRIC CIRCUITS.
 - (a) Behavior of Simple Electric Circuits.
 - (b) Measurements of Current and Resistance.
 - (c) Measurement of Voltage.
 - (d) Batteries and Bulbs in Everyday Life.
3. MAGNETS.
 - (a) Behavior of Magnets.
 - (b) Magnetic Materials.
4. KINEMATICS.
 - (a) Motion with Constant Speed.
 - (b) Motion with Changing Speed.
 - (c) Graphical Representations of Motion.
 - (d) Algebraic Representations of Motion.

NC SCS goals

This course meets the following NC SCS strands:

1. Nature of science
2. Science as inquiry

This course addresses the following science competency goals:

Kindergarten Goals 3 and 4

1st grade Goals 3 and 4.04–4.05

2nd grade Goals 3.01, 3.04–3.06

4th grade Goal 3

5th grade Goal 4.01

6th grade Goals 1.01, 1.04–1.06

7th grade Goals 1.01, 1.04–1.06, 6.05

8th grade Goals 1.01, 1.04–1.06, 4.05–4.07

Schedule

We will cover the Properties of Matter unit during the first half of the course, as shown in the schedule. I've left the rest of the schedule blank since I'm unsure how long it will take to finish the Properties of Matter unit. I'll fill in the schedule as we get closer to that time.

week	date	topic	comments	homework
1	3/15	POM 1 and 2		1.1, 2.3, 2.6
1	3/17	POM 3, 5, 6	skip 3.4–3.8	6.2, 6.3, 6.4 (a)
2	3/21	POM 7, 8		
2	3/22	POM 9, 10, 11		9.1, 10.1, 10.2
2	3/24	POM 12		12.1, 12.4, 12.5
3	3/28	POM 13, 14		13.2, 14.1–14.3, 14.8–14.10
3	3/29	POM 15, 16, 17		16.1
3	3/31	POM 18, 19, 20		18.1, 18.2, 18.6, 19.1, 20.1, 20.3
4	4/4	POM 21, 22, 23		22.5, 23.1
4	4/5	POM 24, 25		
4	4/7	POM 26, 27		26.1
5	4/11	midterm		
5	4/12			
5	4/14			
6	4/18			
6	4/19			
6	4/21			
7	4/25			
7	4/26			
7	4/28			
8	5/2			
8	5/3	NO CLASS		
8	5/5	FINAL EXAM		