Science Literacy

Physics 10062
T, Th 9:30-10:45 am
NSH 123

Course Description: Science Literacy is essential to making decisions in the world today. Science, technology, and innovations play a significant role in all aspects of society. Decisions on health, wealth, and ethical values need some knowledge and understanding of scientific concepts to create the kind of world that we want to live in. This course will serve as an introduction to the scientific approach to knowing, from subatomic particles to galaxies and all the scales in between. We will not use complex mathematics but we will address all the important challenges of the day from Biology, Chemistry, Physics, Cosmology, Climate, and Computation. We will discuss implications and policies with respect to the involvement of the federal government. The research enterprise of the US, with respect to the rest of the world.

Modules:

Scientific Method (Chapter 1)
What we know today and how we got here (Chapter 2)
  - Physics
  - Astronomy
  - Biology
  - Technology

Physics: Energy, Heat, Motion and Mechanics
  - Electricity & Magnetism, Waves, Radiation
  - Relativity and Quantum Mechanics
  (Chapters 3,4,5,6,7,8,9)

Chemistry: Atoms, combinations of atoms into molecules, materials of our modern world
  (Chapters 10,11)

Nuclear Physics: Nuclear Power, Energy, Matter
  (Chapters 12, 13)

Cosmology, the stars (Chapters 14, 15)

Geology: The Earth, plate tectonics, cycles environment
  (Chapters 16, 17,18,19)

The science of Life: What is life? Evolution, Genetics, Nutrition, Disease, Cancer, strategies of life
  (Chapters 20, 21, 22, 23, 24, 25)
Instructor: Professor Ani Aprahamian
183 Nieuwland Science Hall
Telephone: 631-8120
Email: aapraham@nd.edu
Office Hours: can be arranged anytime by appointment and Tuesdays 3:00-5:00pm

Webpage: course lectures and other materials will be posted
http://isnap.nd.edu/html/academics_lecture.html
Syllabus
Lecture Notes
Handouts
Schedule

Teaching Assistants: Bryant Vande Kolk: vandekolk.1@nd.edu
Alison Showalter: Alison.Showalter.5@nd.edu
Mallory Smith: msmith40@nd.edu
Nancy Paul: npaul@nd.edu

Text Book: The Sciences – 7th Edition – by Trefil and Hazen
John Wiley Publishers

What are we going to do?
Distinguish between Science and Other ways of knowing
Know something about the latest discoveries in science
Know the limitations of our knowledge today
Know the challenges that society faces in all aspects of science
Spend time thinking about the moral/ethical impacts of scientific discoveries

Why should you be interested in this?
85% of growth in wealth of economy depends on science & technology
You are paying for it
It will determine the kind of world you live in and you should know how to decide on that
Future leaders of industry, finances, politics
Workload: Every Thursday: Article on science + 1 page commentary on article
(Not a summary: Why you found it interesting, What is the impact? What are some potential implications? (legal, ethical, economic, scientific)).

Problems to be assigned, as we go along and always due on Thursday.

Expect you to read the chapter in advance of coming to class. In class, I expect your participation in the discussions. You will have occasional quizzes on Tuesdays.

Grades:

<table>
<thead>
<tr>
<th>Homework – articles</th>
<th>15%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Homework – problems and Quizzes</td>
<td>20%</td>
</tr>
<tr>
<td>Examination 1</td>
<td>Thursday February 14, 2012</td>
</tr>
<tr>
<td>Examination 2</td>
<td>Thursday March 21, 2012</td>
</tr>
<tr>
<td>Examination 3</td>
<td>Thursday April 18, 2012</td>
</tr>
<tr>
<td>Final Examination</td>
<td>TBA (week of May 6-10)</td>
</tr>
</tbody>
</table>

Total: 100%