

# MEMORANDUM

**Department of Chemical Engineering**  
**Michigan Technological University**

TO: CM4710 Students

FROM: David R. Shonnard;  
Professor and CM4710 Instructor  
Room 202I, email: drshonna@mtu.edu, 487-3468

DATE: 12 September, 2007

SUBJECT: Instructions for Homework Assignment #1. Due Sept. 21 in class.

Dear CM4710 Students

Read an article on some aspect of biochemical, biomedical, or pharmaceutical engineering and report your summary of the article in a Memorandum format. You should use this document as a guide in structuring your Memorandum. In the body of the Memorandum, limit the length to one page single-spaced. A list of literature and web sources for reading is shown below. A number of the topics listed below were feature articles in the journal *Scientific American*. Another good journal to read for articles in this area is *Chemical and Engineering News*. Both are found in our library.

Possible Topics; but the topic is up to you!

1. Genetically modified foods - are they safe and why does "Old Europe" not like them?
2. Products from renewable resources using bioprocessing (ethanol from biomass, ..)
3. The human genome project - <http://www.ornl.gov/hgmis/project/info.html>
4. The human genome business - prior issue (2000?) of the journal *Scientific American*
5. Bioinformatics - prior issue (2000?) of the journal *Scientific American*
6. Beyond the human genome – Proteomics
7. Bioplastics-Are they good for nature? - prior issue (2000?) of the journal *Scientific American*
8. Anthrax - is the disease caused by the bacteria itself or something it produces? What about a vaccine?
9. SARS - what is it, how does it act, and why is it so hard to cure?
10. Drug development - what steps are needed in developing a new drug? What kinds of testing are needed? Are there special standards in manufacture of drugs? See section 5 of Chapter 1 for a start.
11. Epidemics: Why are experts concerned about future outbreaks of previously-controlled diseases. What biological agents cause these diseases?
12. Dead zones in coastal marine ecosystems: What causes the depletion of oxygen at the bottom of the oceans in these coastal regions. What biological processes are at work. What environmental and societal issues are involved?

13. Genetic engineering and drug development: How does genetic engineering enable the production of new drugs. Find example applications.

Here are a couple of trade organizations with web sites for further reading possibilities.

*Pharmaceutical Research and Manufacturers of America (PhRMA)*

*1100 15th Street NW*

*Washington, DC 20005*

*(202)-835-3400*

*Web Site: <http://www.phrma.org>*

*Trade association representing prescription pharmaceutical firms in legislative and regulatory affairs. Publishes industry statistics.*

*The Biotechnology Industry Organization (BIO)*

*1625 K Street NW, Suite 1100*

*Washington, DC 20006*

*(202)-857-0244*

*Web Site: <http://www.bio.org>*

*Trade association representing biotechnology companies, academic institutions, and state biotechnology centers in legislative and regulatory affairs. Publishes industry statistics. **Look under Issues and Policies, Overview: Guide to Biotechnology***