Agricultural & Biological Engineering II

From BioMASS Laboratory Wiki

General Course Information

Instructors

Luis F. Rodriguez & *Yuanhui Zhang* (http://age-web.age.uiuc.edu/faculty/yhz/yhz.asp)

- Professor Rodriguez will teach the second half of the course covering the topics described herein.

TAs

Malia Appleford, Haibei Jiang, Glen Menezes

Office Hours

I generally keep an *open door* policy, but my preferred times are: Tuesday mornings 9-11 AM.

Contact Information

217-333-2694

lfr@uiuc.edu (mailto:lfr@uiuc.edu)

Or via IM (take your pick):

- rodriguezluisf via AIM
- wheezito via YahooIM
- wheeztio@hotmail.com via MSN
- wheezito via iChat
- luis.f.rodriguez1@gmail.com via Google Talk

Office

376C Agrigultural Engineering Sciences Building

Course Description

Introduction to biological systems. Principles of procedural and heuristic systems analysis. Overview of engineering economics. Techniques of simulation and optimization. Solutions for bio-based engineering problems by systems analysis methods.

Learning Objectives

1. To recognize the need for and associate the appropriate uses of systems analysis and modeling tools.
2. To apply systems analysis and modeling tools to problems considering engineered systems with biological components.
3. To leverage the appropriate software tools in application analysis and modeling.
4. To evaluate the results of simulation and recommend actions for system improvement.
5. To deliver quality scientific writing.

Required Materials

- Rees, Williams E., Wackernagel, Mathis, Testemale, Phil, 1995, *Our Ecological Footprint: Reducing Human Impact on the Earth (New Catalyst Bioregional Series)*, New Society Publishers. (http://www.amazon.com/Our-Ecological-Footprint-Reducing-Bioregional/dp/086571312X/sr=8-1/qid=1171827692/ref=pd_bbs_sr_1/104-0480907-9847924?ie=UTF8&s=books)
- This **wiki**.
- **MATLAB** is available in 220 AESB (or elsewhere on campus)
- **Spreadsheets** are generally available. **MS Excel** has been tested for these problems.
- **Alternative software packages** and/or programming languages can be utlized with **approval from the instructor**.

Supplemental Materials

The following resources should be available in my office and you may feel free to borrow these from time to time. Occasional handouts will be prepared for class use from these sources. I also encourage you to visit your library and borrow these if you have any extensive questions.

- Fleisher, G.A., *Introduction to Engineering Economy*, PWS Pub. Co., Boston, 1994.
- Hillier, F.S., Lieberman, G.J., *Introduction to operations research*, McGraw-Hill, New York, 1995.
- Klir, G.J. and Folger, T.A., *Fuzzy sets, uncertainty, and information*, Prentice Hall, Englewood Cliffs, N.J., 1988.
- Kondo, N., and Ting, K.C., *Robotics for Bio Production Systems*, American Society of Agricultural & Biological Engineering, Warrandale, PA, 1998.
- Singh, R.P. and Heldman, D.R., *Introduction to Food Engineering 2nd Edition*, Academic Press, New York, 1993.
- Stoecker, W.F., *Design of Thermal Systems, Third Edition*, McGraw-Hill, New York, 1989.

Course Rules

Grading Policy

All students will begin the semester with zero points. Points shall be accumulated throughout the semester based on the evaluations listed in Table 1. Both absolute and curved grades will be determined based on the graded evaluations and the proportions described in Table 1. The better of the two grades on the respective scales on a class basis will constitute the final grade. *Please note* this score will be averaged with the score acquired from Professor Zhang's half of the course.

Table 1. Grade contributions

Evaluation	Points
Homework	50
Class Participation	200
Laboratories	150
Exam I	300
Final Exam	300
Total	**1000**

Computer Laboratories

A written report will be required for each computer laboratory assignment. The outline of the report will include:

- Statement of the Problem,
- Methods,
- Results and Discussion,
- Conclusions, and
- Appendix.

All sections of the report are required, except for the Appendix section. However, if you generate any code while performing an assignment, it should be included in the Appendix.

You are expected to write quality laboratory reports. All your reports will be rigorously graded for technical content and the quality of your writing. Here is a  laboratory grading rubric (http://biomass.age.uiuc.edu/index.php/Image:LabGradingRubric.pdf) to help you prepare the reports. **Please note that quality writing is assumed.** Any substandard reports will be returned for reworking.

Depending on the size of the class, laboratories may be delivered as group assignments. This determination will be made at the first laboratory period. In any case, the option to work individually is always available to any student.

Homework

All homework assignments must be turned in one week after they are assigned at the beginning of class. If appropriate, they may be sent to the instructor electronically. Please be sure that the time stamp is prior to the beginning of the class period.

Class Participation

Your class participation is expected and, with the wiki, there are now several media which can allow you to do so. During class I will expect you to be an active participant. I will make every effort to incorporate active discussions in the class, but be clear this is a two way street. I consider attendance the first step towards class participation, but certainly not enough.

Our wiki inherently incorporates a discussion page at every location that can be edited by any user. I would encourage you to use this feature to discuss content. I expect you will all become a users of our wiki by clicking *log*

in / create account, on the top right, and following the instructions. Please be sure to sign all of your discussion points. Here (http://meta.wikimedia.org/wiki/Help:Talk_page) are some guidelines for managing effective discussion threads.

Again, class participation is a two way street. I will be monitoring the wiki on a regular basis to see what you may have posted. I similarly expect each of the students to do the same. I personally use the *watch* (http://meta.wikimedia.org/wiki/Watch) function to be advised of when changes happen on pages that I am interested in. You might find this helpful as well.

As we complete each discussion topic, I will note which students have made a *positive contribution* to the discussion. Positive contributions bolster the discussion by ensuring that all key points regarding the subject matter receive due attention. Similarly, I will monitor activity on the website. Positive contributions will be noted in the same table where I will note class participation. I expect that you will make **at least one** positive contribution to each topic. Certainly comments should never be derisive in nature; rather my purpose in active class discussion is to help every person in the classroom achieve the class objectives.

Reading Assignments

All reading assignments must be completed prior to the related lecture. This is imperative to the ability of this class to function and there can be no exception. This will be considered a lack of class participation and the class participation portion of your grade will suffer.

Examinations

Two examinations will be administered during this course. Exams may occur in several formats including: in class, take home, open book, and oral. It is possible that examinations may be given over multiple class periods. Final examinations will be administered by the university schedule and will comprehensively cover semester topics taught by Professor Rodriguez.

Academic Integrity

There will be no cheating. We will generally default to the university policy on cheating. Please think twice before taking the risk of putting either of us in such an uncomfortable postion. If, however, suspicious activity is observed you should expect swift action on my part.

Proposed Schedule

Table 2. Proposed ABE 222 Schedule for Spring 2008

Dates	Monday/Wednesday/Friday Lecture	Thursday Lab	Reading
March 5-7	Introduction, *Our Ecological Footprints*	Matlab, Excel, & Wikis	*Our Ecological Footprints*
10-14	*Our Ecological Footprints*, Engineering Economics	Profitable Composting	*Our Ecological Footprints*, Kondo (12.3), Stoecker (3)
17-21	Spring Break	n/a	n/a
24-28	Mass Balances	Dry Grind Ethanol Production	Stoecker (4-4.3)
March 31		Life Support Crop	

March 31-April 4	Midterm-exam, Modeling	Life Support Crop Production	Stoecker (4.4-4.10)
7-11	Fuzzy Logic	Soil Management Decision Making	Chao
14-18	Linear Optimization	Life Support System Design	Stoecker (12)
21-25	System Abstraction		
28-30	Make up materials, review, or heuristic optimization		

FINAL EXAM: 8:00-11:00 AM, Tuesday, May 6