Agricultural engineering course designed by Hala Chaoui

The following is hypothetical course I designed during my PhD training.

COURSE TITLE: Designing management tools for sustainable agro-ecosystems

COURSE DESCRIPTION:
The many variables that factor into a sustainable agro-ecosystem make it a seemingly overwhelming system to manage at first. In this senior level class students pool their knowledge on economical, environmental and social factors involved in managing a sustainable agroecosytem. Students will use this knowledge and combine it with their skills in mathematical modeling and computer programming, to create a software that will assist in managing a sustainable agroecosytem.

Credit Hours 5

COURSE OBJECTIVES:

1. To review basic economical, environmental and social factors in agroecosytem management.

2. To develop an understanding of basic mathematical modeling.

3. To develop an ability to express a mathematical model in a computer program.

4. To successfully communicate with farmers in order to develop farmer-friendly software.

5. To encourage creativity and independent learning skills.

Texts & Required Materials:
Altough 2 textbooks are required their total cost is less than $40 (($26.32 for the book by Altieri and $11.53 for the book by Hawken).

1. Agroecology: The Science of Sustainable Agriculture
by Miguel A. Altieri ($26.32)
Book description from amazon.com: An introduction and overview for students, researchers, and practitioners of agriculture, updated from the 1987 edition to incorporate new thinking, research, and case studies. Covers the theoretical basis of sustainable agriculture; designing alternative systems and technologies; alternative production systems; managing insect pests, pathogens, and weeds; and prospects for the field. The research findings and examples cited are from throughout the developed and undeveloped world.

2. The Ecology of Commerce: A Declaration of Sustainability
by Paul Hawken ($11.53)
Book description from amazon.com: Paul Hawken, the entrepreneur behind the Smith & Hawken gardening supplies empire, is no ordinary capitalist. Drawing as much on Baba Ram Dass and Vaclav Havel as he does on Peter Drucker and WalMart for his case studies, Hawken is on a one-man crusade to reform our economic system by demanding that First World businesses reduce their consumption of energy and resources by 80 percent in the next 50 years. As if that weren't enough, Hawken argues that business goals should be redefined to embrace such fuzzy categories as whether the work is aesthetically pleasing and the employees are having fun; this applies to corporate giants and mom-and-pop operations alike. He proposes a culture of business in which the real world, the natural world, is allowed to flourish as well, and in which the planet's needs are addressed. Wall Street may not be ready for Hawken's provocative brand of environmental awareness, but this fine book is full of captivating ideas.

3. At least 2 zip disks:

4. The following online tutorial for visual basic programming:
http://www.vbtutor.net/vbtutor.html

EVALUATIONS:

<u>Final project</u>:
Final project will be graded with consideration to
Design
Documentation
user-friendly quality
Underlining mathematical models

200 points

Each phase of the final project must be submitted for a grade on or
before the due date. Only the final version will be graded, but
grades will be deducted if the intermediate phases are not
submitted. A ZERO is given for a missing project. All project
must be written in visual basic.

<u>Exams</u>: Two midterms and a comprehensive Final. A one week
notice will be given for each hour exam. No Make ups except for
extreme conditions.

200 Points

Class Participation/Farmer-student symposium

This class builds on communication between students and   **100 Points**
farmers, and among students. Attendance is therefore expected
and will be graded.

ATTENDANCE:

Attendance at all classes is required. Notice is required of any unavoidable absence. If a
student must be absent for some extenuating circumstances he/she is still responsible for
all class work and assignments and should make arrangements with the instructor to be
informed of missed class work, handouts and lecture notes.

ETHICS:

Students are expected to maintain the highest level of ethical practice with regard to their
work. While studying in groups and working together in teams to enhance learning is
encouraged, cheating is another matter which is not in the interest of education. Please
refer to the student handbook for consequences of cheating and if in doubt, ask your
professor to clarify.

ELECTRONIC COMMUNICATION DEVICES:

Cell phones, beepers, and pagers are not permitted to be on during class or lab unless I receive from the Dean of Students a formal request for permission for you to have such a device.

USE OF COMPUTER LABS:

Computers are located in region 1 of all engineering department, and so is the vsual basic program. Students are encouraged to help one another in the laboratory. However, the process of simply copying a program is not acceptable. If this should be discovered, one grade will be given for that assignment and will be shared among all copies.

COURSE OUTLINE:
Week 1 and 2: an overview of economics and resource economics (cost befit analysis)

Week 3: review of agroecology

Week 4: review of rural sociology.

Week 5: developing simplified mathematical models for living systems

Week 6: applying simplified mathematical model to agro-ecological, economical, and social variables.

Week 7: developing the software that allows farmers to make decisions based on the given variables.

Week 8: a preliminary farmers / student meeting to evaluate the softwares. Making corrections to the softwares.

Finals: presenting the final software products at a farmers / student mini-convention.