BES 459
Compost and Organic Soil Amendments

When: Friday 8:30 – 12:30, Spring - odd years 5 Credits
Location: TBD
Instructor: Chuck Henry email: clh@u.washington.edu
Web site: http://faculty.washington.edu/clh/compost.html

Soil organic matter provides energy for microbial functions, a supply of available nutrients, holds moisture -- so it's really an important component of soil quality. Our society generates fairly substantial quantities of organic wastes. Properly managed, this material is ideal for increasing the organic matter in soil.

Solid waste management is becoming increasingly challenging in light of increased waste production, decreased landfill space and increased resistance (both regulatory and public) to siting new landfills. Since approximately half of the waste produced is organic, the goal for reduction in solid waste is completely compatible with the benefits of use of organics as soil amendments.

Purpose: This course is an introduction to management of organic wastes both as a feedstock for composting and as a soil amendment. It is designed to give:

1. an understanding of the science of composting,
2. an understanding of the science of land application of organic soil amendments,
3. experience in compost processes at the UW compost facility,
4. management of nutrients and contaminants,
5. benefits of organic soil amendments, including organic farming,
6. guidelines, regulations and exposure risk assessment
7. opportunities and considerations for land application

The class will monitor an actual composter, learn to run tests that are pertinent to composting, get experience calculating application rates, and know what is involved in designing sites. Field trips will include visits two local large-scale compost operations, a biosolids application site, and an organic farm.

The students will be required to write and submit lab and field trip reports indicating your observations and interpretations of them with regard to analytical analyses, feedstock, mechanical and biological operations, and market potentials. They will also be required to prepare a website on any of a number of aspects of composting or use of an organic soil amendment. Students will give presentations of their website during the last week of classes. There will also be periodic homework assignments and a final. A $40 field trip and analysis fee is required of all students registered for the course.

Text: There is no text for this class. We will have readings from a variety of sources that you will find on eReserve.

Schedule

Week	Lecture	Lab/field trip	Reading	Assignment
April 1	**Introduction to organic soil amendments and composting** Character of residuals What is composting Benefits of organic matter	Tests for composting, lab practice	Beneficial Co-Utilization of Ag, Muni & Industrial By-Products, Ch 1, 2, 3	Sample lab calculations, and changing units for soil amendments
April 8	The carbon cycle Nitrogen cycling Measuring C & N	Start compost pile!!!	Managing Nitrogen from Biosolids Ch. 2	Nitrogen and carbon problems
April 15	**Process variables and components** Composting systems Compost microbiology Operational parameters	Work on the UWS composter breakdown	On-Farm Composting Handbook	Investigation of a particular composting process
April 22	**Quality** Maturity and stability Nutrients and availability Contaminants Disease suppression Odors	Weekly monitoring and analysis	Compost lit review; Understanding Biosolids; Carbon fractions in compost and compost maturity tests	Short lit review of a compost quality parameter
April 29	**Regulations** Risk assessment Compost and biosolids	Weekly monitoring and analysis	Understanding Biosolids Ch. 5	Find a compost regulation in the nation
May 6	Design approaches	Field trip - GroCo compost	Managing Nitrogen from Biosolids Ch. 1	Field trip report
May 13	N balance approach	Field trip - Snoqualmie Tree Farm	Managing Nitrogen from Biosolids Ch. 4, 6	Field trip report
May 19	Reclamation, Balanced C/N approach Site Guidelines	Weekly monitoring and analysis	Managing Nitrogen from Biosolids Ch. 8	Application calculation
May 26	Sustainable ag	Field trip - Organic farming	USDA Organic Regulations	Field trip report
June 3	Monitoring systems Review	Final compost analysis		Lab write-ups due
Final				

Laboratory exercises

A. Lab Analysis
- i. Temperature
- ii. Moisture
- iii. pH
- iv. Sieve analysis

v. CHN
vi. Volatile solids
vii. Bulk density
viii. Pile volume

B. Start of our compost batch
C. Weekly monitoring and maintenance assignments

Field trips

- Biosolids/manure compost field trip - GroCo - Kent Facility
- Mountains to Sound Greenway Biosolids field trip
- Organic farming field trip

Grading

Laboratory write-up	20%
Weekly assignments	30%
Midterm	20%
Final	30%

Student Eligibility

This class is intended for undergraduate students in environmental related studies.
Recommended: BES 301, 302.

Academic Honesty

As UW Bothell students, you are expected to uphold the highest standards of academic conduct. In this class, you should be particularly aware that instances of cheating on exams or plagiarism in writing will be dealt with very seriously. A separate, more detailed handout on academic honesty will be provided to you on the first day of class. You are responsible for reading it thoroughly and understanding its contents.

All work on the exams and papers should be strictly your own and without the aid of any materials not specifically allowed. Plagiarism is defined in the UW Bothell catalog as (I have placed a section in bold and underlined it for emphasis):

> "Plagiarism is the use of the creations, ideas or words of someone else without formally acknowledging the author or source through appropriate use of quotation marks, references, and the like. Plagiarizing is stealing someone's work and presenting it as one's own original work or thought. Student work in which plagiarism occurs will not ordinarily be accepted as satisfactory by the instructor, and may lead to disciplinary action against the student submitting it. **Any student who is uncertain whether his or her use of the work of others constitutes plagiarism should consult the course instructor for guidance before formally submitting the course work involved.**"