Soils from Pedon to Landscape: A Course at Philadelphia University

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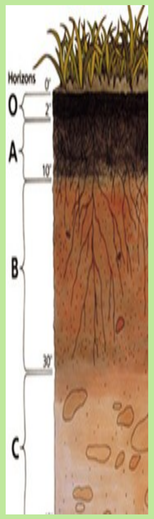

http://soils.usda.gov/education/resources/lessons/profile/

This is a basic, interactive, lecture/laboratory course. It includes soil formation factors, a discussion of physical, chemical, ecological, and morphological properties that affect soil characteristics in managed and natural landscapes, and how important soil classification variables are influenced by these properties and processes. It is complemented by field trips and service/learning projects (street tree planting) with emphasis on soils from pedon-to-landscapes as resources for environmental protection. Students give a 50-minute, professional presentation on a soils-related topic of their choice relevant to their major. A discussion follows and their classmates participate. Work on exams and laboratory reports are used to evaluate student's integration of information. Our hands-on approach to a soils course using instruction inside and outside the classroom has proven to be successful at Philadelphia University.

Figure 1 : Soil test kit used in some Lecture /Laboratory

Table1: Synopsis of Soils (ECBIO-207) course content at Philadelphia University

Month	Highlights of Course Content
January	Review information, syllabus. What is soil? Composition and importance of soils.
	Information Literacy: Research your soil topic.
	Soil Forming Factors.
	Soil color, texture.
	Soil physical and chemical weathering.
	Soil Water.
February	Greenhouse visit.
	Presentation 1.
	Soil chemistry, pH. Assignment 1 due.
	Nitrogen: **N**
	Phosphorus **P**
	Potassium: **K**
March	Macronutrients Calcium, Magnesium, and Sulfur.
	Micronutrients
	Campus soil tour. Assignment 2 due.
	Mid-term Exam.
	Spring Brake (1 week).
	Erosion; Laboratory report 1 due.
April	Fertilizers.
	Soil Organisms video.
	Soils survey and classification.
	Visit a local gardening supply store.
	Professional presentation. Assignment 3 due.
	Service Learning Tree planting. Late April.
May	Last day of class. Laboratory report 2 due.

Figure 2 :Students collecting Soil Samples on campus

SOILS AND TREE PLANTING: A SERVICE/LEARNING PROJECT

We were awarded a University Green Grant (Co-P.I. with the director of the Landscape Architecture program) from the Pennsylvania Horticultural Society (PHS) and **the US Forest Service Urban and Community Forestry Program** to advance current forestry and greening works. This project was designed to create and document a replicable model of urban-forestry partnerships between universities and their surrounding communities. We were selected as one of five local universities to be part of this pilot program because of our previous and ongoing involvement with the **Pennsylvania Horticultural Society (PHS)** and our commitment to the East Falls Tree Tenders project through the Landscape Architecture program, Soils and the Environmental Science (for non-science majors) courses since 2005.

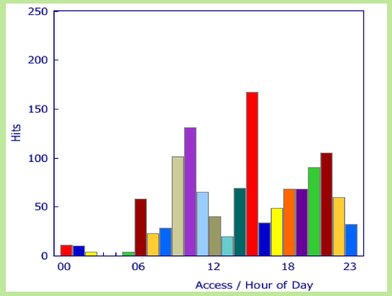

Figure 3. Blackboard® Access time by students

Table 2. Student evaluations of selected aspects of the Soils (ECBIO 207) course content

		Majors†				
		L.A.	Mix	Mix	Mix	Mix
	Questions	2006	2007	2008	2009	2010
1	How would you rate the exams as a reflection of the course material?	3.5‡	3.0	2.9	3.3	2.9
2	How would you rate the effectiveness of the papers and other course assignments?	3.3	4.0	3.4	3.5	3.3
3	How clear were the objectives of this course?	3.2	4.0	3.0	3.3	3.0
4	How would you rate the textbooks, lab manuals, readings, and other course materials?	3.3	4.0	3.4	3.4	2.9
5	How effective was the laboratory work as an opportunity to apply and enhance course material?	3.4	4.0	3.5	3.5	3.7
6	How do you rate the appropriateness of the laboratory exercises in terms of the course level?	3.3	4.0	3.5	3.6	3.8
7	How would you rate the availability and quality of laboratory, computer, library and other learning resources?	3.7	4.0	3.3	3.1	3.2
8	Overall, how would you rate your learning experience in this course?	3.8	4.0	3.0	3.5	3.2

† L.A. = Only Landscape Architecture enrolled in course; Mix = Majors include L.A, Biology, and Environmental and Conservation Biology, majors.

‡ Responses = well above avg. (5) above avg. (4) avg. (3) below avg. (2) and well below avg.(1)

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SOIL INFORMATION LITERACY

An important component of this course is teaching students to be able to research topics by searching available literature. Most universities have good computer resources available. We have worked cooperatively with our library to increase these resources for soils. Several useful literature search resources are available online for this course. Students are also aided in these activities by a training class given by the information literacy coordinator. The objective of the information literacy lecture is to improve student's library research skills. This hands-on demonstration uses several literature databases including **AGRICOLA.** This database provides a good index to articles relevant to their group presentations and writing assignments. Students then learn how to use interlibrary loan procedures to obtain the needed articles directly from the record. This also provides them with many additional references and descriptions of possibilities for student research projects.

Garden, Landscape and Horticulture Index (GLHIä) is not a full text resource. However, if a publication is included in the academia search premier for another **EBSCOä database** subscribed by our library, it will be accessed by GLHI which covers garden and landscape design and history as well ecology. L.A. students have often used this database for their literature searches.

CONCLUSIONS

- Students response to this course have been positive both in terms of comments on formal course evaluations and in terms of word of mouth, which has kept the enrollment increasing in majors for which it is offered as an elective course.
- A recently proposed revision of the L.A. curriculum suggested placing this soil course in the fourth year of the five-year program.
- Biology (elective) and Environmental and Conservation Biology (required) will continue taking the course in their second year.
- A positive feedback has been that there are a small (but increasing) number of students who are motivated to take this course even thought it is not required for their majors.

REFERENCES

Brady, N.C., and R.R. Weil. 2002. The Nature and Properties of Soils. 13th Ed. Prentice-Hall, Upper Saddle River, NJ.

Brady, N.C., and R.R. Weil. 2010. Elements of the nature and properties of soils 3rd ed. Prentice-Hall, Upper Saddle River, NJ.

Daniel, H., K.L. Greenwood, and P.V Lockwood. 1996. Oz Soils - an interactive introduction to soil science, Multimedia CD-ROM, Teaching and Learning Centre, The University of New England, Australia, http://www.une.edu.au/dec/mm.html (Accessed 15 Dec. 2005, Verified 15 May 2010).

Dines, N.T and K.D. Brown. 2001. Landscape Architect's Portable Handbook. McGraw-Hill. New York.

Epstein, E., and A.J. Bloom. 2004. Mineral Nutrition of Plants. Sinauer Associates. Sunderland, MA.

Hendrix, P.F. 2006. Biological Invasions Belowground: Earthworms as Invasive Species. (Ed) Springer, Dordrecht, The Netherlands.

Keefer, R.F. 2006. Handbook of Soils for Landscape Architects. Oxford University Press, USA.

Marschner, H. 1995. Mineral Nutrition of Higher Plants. Academic Press, London.