

ENR5265 Syllabus for Autumn 2012 Semester

Course Title:

Characterization of Soil in the
Field and Laboratory

Time: Wednesdays and Fridays from 11:10 AM to 12:30 PM
Room 382, Kottman Hall

ENR5265 is undergraduate/graduate course specifically designed to teach basic principles of soil, ecological or environmental sampling. It provides an overview of theory, principles and techniques of instrumental analytical and laboratory methods used for field soil investigations. Focus will be on description of (1) field experimental designs and multivariate SAS programming; (2) field measurements of soil respiration (CO₂ emission) and biological activity; (3) rainfall impact and soil erosion; (4) soil temperature and heat flux; (5) soil compaction and bulk density; (6) soil moisture, texture, and water infiltration; (7) chemical analysis of soil properties and contaminants, (8) nutrient testing of soil, plants, and natural waters, (9) characterization of soil microbial and faunal communities in soils and (10) activity of microorganism relative to biogeochemical processes. Operational theory and hands-on experience of field and laboratory instruments will be stressed.

CONTACT INFORMATION

Warren A. Dick
dick.5@osu.edu

Ed McCoy
mccoy.13@osu.edu

Nicholas T. Basta
basta.4@osu.edu

Richard P. Dick
dick.78@osu.edu

REPORTS, EXAMINATIONS AND GRADING

Required reports will be assigned by individual instructors along with the points that can be earned by each report. Dates of exams and exam points will be announced at least one week before the exam date. Attendance and participation will count for 25% of the final grade.

COURSE SCHEDULE (some variation from what is written below may occur during the quarter)

WEEK 1

Wednesday - August 22 (Warren Dick)

Introduction to ENR5265; sampling techniques for measuring greenhouse gases.

Friday – August 24 (Rafiq Islam)

Temporal, vertical, and spatial variability. Experimental design, analysis of variance, partitioning of errors and SAS programming for ANOVA and multivariate analyses, various statistical approaches.

WEEK 2 (Rafiq Islam)

Wednesday – August 29

Sampling and analytical techniques continued. Soil quality assessments.

Friday – August 31

Soil quality assessments continued.

WEEK 3 (Warren Dick)

Wednesday – September 5

Soil temperature

Friday – September 7

Plant biomass measurements and residue cover

WEEK 4 (Warren Dick)

Wednesday – September 12

Methods to estimate C sequestration

Friday – September 14

Erosion estimates

WEEK 5 (Warren Dick)

Wednesday – September 19 (Guest Lecturer)

Earthworm and soil microvertebrate sampling.

Friday – September 21 (Guest Lecturer)

Use of soil maps.

WEEK 6 (Nick Basta)

Wednesday – September 26

Introduction to soil chemical measurements, soil processing and soil preparation.
Sampling for soil pH, total CN and organic C

Friday – September 28

Soil contaminant assessment: metal(loids)

WEEK 7 (Nick Basta)

Wednesday – October 3

Soil nutrients/fertility, available N, available P, available micronutrients

Friday – October 5

Field measurements of nutrients and contaminants in soil/water

WEEK 8 (Nick Basta)

Wednesday – October 10

Soil contaminant assessment, toxic organic chemicals

Friday – October 12

Field chemistry data interpretation

WEEK 9

Wednesday - October 17 (Nick Basta)

Urban soil measurements

Friday – October 19 (Richard Dick)

N mineralization

WEEK 10 (Richard Dick)

Wednesday – October 24

Nitrification/denitrification

Friday – October 26

Enzyme activities and kinetics

WEEK 11 (Richard Dick)

Wednesday – October 31

Microbial biomass C, microbial culturing and isolation

Friday – November 2

Microbial enumeration and direct counts/microscopy

WEEK 12 (Richard Dick, Warren Dick)

Wednesday – November 7

Microbial profiling – Extraction of fatty acids (FA)

Friday – November 9

Microbial profiling – FA GC analysis and multivariate analysis

WEEK 13 (Richard Dick)

Wednesday – November 14

Microbial data analyses, nucleic acid searches/investigations

Friday – November 16

Data analyses

WEEK 14 (Ed McCoy)

Wednesday – November 21

To be determined.

Friday – September 23 (Thanksgiving Vacation)

WEEK 15 (Ed McCoy)

Wednesday – November 28

To be determined.

Friday – November 30

To be determined.

REPORTS

When required, reports (two page minimum and three page maximum single spaced, 12 point font size) should be written-up as follows:

- Introduction
- Scientific background
- Exercise description
- Results and Discussion
- Summary/Conclusions
- References.
- Appendix (data tables, one or two tables and or/graphs, etc.)

Any deviation from this general outline will be provided prior to when a report is due.

ACADEMIC MISCONDUCT STATEMENT

Academic misconduct as defined by the university (Faculty Rule 3335-31-02) will not be tolerated. Students guilty of plagiarism of laboratory reports or cheating on examinations will be assigned a grade of E.

DISABILITY STATEMENT

Students with disabilities who need accommodations should see one of the course instructors during office or contact them by e-mail to make arrangements to address the disability. Special needs must be discussed and arrangements made well in advance (preferably before the first week of class) of when arrangements to accommodate specific needs are required. Special accommodations may be arranged through the OSU Office of Disability Services, 150 Pomerene Hall, 1760 Neil Ave., Telephone 614-292-3307, www.ods.ohio-state.edu.