Fundamentals in Soil Biology and Ecology

October 2 and October 9, 2013

Certified Soil Scientist Preparatory Short Course offered by the Soil Science Society of America

Primary Instructor:
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Facilitator: Dr. Dawn R. Gibas, Licensed and Certified Soil Scientist
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Soil Biology and Soil Ecology Course Description:

Soil is a living body. As such, the living constituents of soil will be introduced including what groups of soil organisms are present (from microorganisms to macrofauna), interesting characteristics, numbers and biomass (prevalence), what they do (functional importance), and where they are (influence of the complex soil matrix). The influence of abiotic conditions on organisms and organisms' impact on their surroundings will be discussed. As nutrient cycles are driven by biochemical activities, biogeochemical cycles will be an important topic. Decomposition of organic substrates and the synthesis of and properties impacted by soil organic matter are important topics in this section. We will finish with brief coverage of practical functional applications driven by soil biology and ecology such as composting, degradation and remediation of pollutants, and water treatment.

This course is taught via distance learning, but the instructor will supplement lecture material with additional readings and practical examples to illustrate the concepts and provide practical examples of how the concepts are used in practice. This course is designed to complement the students existing knowledge of soil science and help the student understand the principles behind the Soil Science Performance Objectives, which define the practice of soil science.

Class Schedule/Time:
Orientation will be posted by August 19 for viewing on your own and the Biology portion of the course will be Wednesday October 2 and 9 (two weeks); the course will conclude on Wednesday, October 9, 2013.

Class times will be 7:00 to 9:00 PM Eastern/ 6:00 to 8:00 PM Central/ 5:00 to 7:00 PM Mountain/ 4:00 to 6:00 PM Pacific.

Most class periods will last the full two hours with a 10 minute break halfway through. The software that is used for the course will allow students to enter questions that they would like the instructor to answer. If there is time at the end of the class, the instructor may use that time to answer questions, but all questions will be answered in writing and then posted on the course website.

To achieve the greatest benefit from this course, students will be expected to spend time attending all the classes, reading any needed supplemental materials, and completing the quizzes. The instructors may be contacted at any time via email with questions or comments.

Communications Requirements
The course is delivered live via the web using GoToMeeting software. All sessions are also recorded. *An email address and high-speed internet access are required.* GoToMeeting Systems Requirements:
http://support.citrixonline.com/GoToMeeting/help_files/GTM010003#What

Recommended Textbooks *(Optional - to be purchased or obtained by the student)*

Soil Science Fundamentals Exam – Performance Objectives
This document can be downloaded for free from the SSSA website:
https://www.soils.org/files/certifications/fundamentals-exam-objectives.pdf

The Nature and Properties of Soils (Brady and Weil; Pierson/Prentice Hall Publisher)
The current edition is the 14th edition, which can be found on Amazon.com for about $137.00 (new). There are also options to buy used textbooks or rent them from various vendors. You may use earlier editions of this text, but pleases be aware that some information may not be as up-to-date as the information in the latest edition and instructors may not be able to give you the pages for equivalent information in an earlier text.

Other Textbooks (supplemental materials)

You may choose from these books as needed for supplemental materials.

Principles and Applications of Soil Microbiology (2nd edition), David Sylvia, Jeffry J. Fuhrmann, Peter G. Hartel, and David Zuberer, 1998, Prentice Hall, Inc., Upper Saddle River, NJ.

Soils and Environmental Quality, 3rd edition (Pierzynski, G.M., J.T. Sims, and G.F. Vance)
The publisher is Taylor & Francis; the book can be found on Amazon.com for $87.00 (new) with decreased prices for used books or the Kindle version.

Soil Science Study Guide Book ($100.00)
This document may be obtained either in print format or by download from the SSSA website: https://portal.sciencesocieties.org/Purchase/ProductDetail.aspx?Product_code=190f6ed6-66e3-df11-938b-0013210e308c Note: This document is slated to be updated and a new version available December 2013.

Math for Soil Scientists (M.S. Coyne and J.A. Thompson, 2006)
The publisher is Thomson/Delmar Learning; found on Amazon.com for about $43.00.

Note: Instructor may also add readings as needed.

Student Directory Information
Student name, city/state/country, phone, and email will be included in a listing on the course website and will be available *only* to other Soil Science Fundamentals students and those administering the course. Students can opt out of this listing when registering for the course.

Use of Class Materials
Registrant agrees that the name indicated on the registration form is the sole individual receiving the on-line instruction and the only person completing the on-line quizzes. Individuals found in violation of this policy will be subject to dismissal from this course, revocation of certification, and possible loss of privileges to participate in future offerings from the Soil Science Society of America.

The PowerPoint presentations, class recordings, quizzes, worksheets, and other materials developed specifically for this class are for the educational purposes and use of students registered for this class. Students are not to be copy, forward or share in any way with anyone for any other use without the permission of the Soil Science Society of America.

Grading
A ten question quiz will be offered weekly that covers the materials from the previous week, available for students to take on-line during their own time. Individual performance on weekly quizzes will be provided confidentially to students to give an indication of the mastery of various topics. ***No make-up quizzes will be offered.*** There will not be a final exam for this course, and grades will not be assigned. Students who complete both quizzes or accumulate at least 14 of the 20 quiz points (70%) can request a certificate of completion for the course. Missed quizzes will count as zero. Certified individuals seeking Continuing Education Units (CEUs) must achieve a passing score (at least 7 of 10) on a quiz to get credit for that particular session.

Quizzes will be posted on the class website by Friday each week and will be due the by the Tuesday following the next class (or 12 days later). ***Access to quizzes will close at 11:59 PM central time; you will need to have completed AND submitted the quiz by that time in order for it to be assigned a score.*** Print out your quizzes before you submit them for your reference and in case a score isn't recorded to be able to show that you took it. Note: The system allows you to take the quizzes multiple times, but only your first score is counted.

Please make sure that you keep complete the quizzes! See class schedule for availability and due dates of quizzes.

Class Web Site
Students registered for the course will have access to the class web site where the following will be posted:

Lecture video recordings; audio with PowerPoint slides.
PowerPoint slides in pdf format.
Link to quizzes and answer keys to quizzes.

Access to the class web site will begin August 12 and end one month following the last class period; ending November 9, 2013.

Class Schedule: Topics, Reading, and Quizzes (subject to modification):

Week		**Supplemental/Optional Readings**
Orientation Available on-line by August 19 (access is available anytime)	Introduction to Course and Logistics (This session is not required, but is recommended if you have not taken an on-line course prior to this one.)	No reading required for this class No quiz
	Soil Biology and Ecology	**Recommended Readings**
October 2	Basic Concepts Cycles Soil Ecology	Brady and Weil: Chapter 11 Chapter 1 pages 56-60 Chapter 13 Chapter 14 pages 602-608 (Sylvia et al: Covers more depth for all soil biology topics) Quiz 1 available October 4
October 9	Biological and Biochemical Activities SOM Applications	Brady and Weil: Chapter 12 Chapter 7 pages 269-280, 288-292 Chapter 18 pages 800-816 Chapter 20 pages 874-875 (Sylvia et al: Covers more depth for all soil biology topics) Quiz 2 available October 11

Quiz Due Dates:

Quiz 1	October 15
Quiz 2	October 22

Instructor

Dr. Mary Savin

Dr. Mary C. Savin is a professor in the Department of Crop, Soil, and Environmental Sciences (CSES) at the University of Arkansas (UA) who is interested in the microbial ecology of both terrestrial and aquatic ecosystems. Research interests include investigating how the ecology and biogeochemistry of various systems, and the ability to utilize biological organisms as objective indicators of response, are affected by disturbances such as management practices or

the presence of antibiotics. Mary is a member of the UA Teaching Academy who teaches many classes, including freshmen in orientation through seniors in soils, ecology, and capstone colloquium courses, and graduate students in microbial ecology. She is a co-advisor for the CSES Undergraduate Club, which participates in the Club Poster Contest at American Society of Agronomy (ASA) annual meetings. She serves as an academic advisor for undergraduate students, and mentors M.S. and Ph.D. graduate students. Current research projects include destruction of broad host range plasmid and bacterial DNA in wastewater treatment plant disinfection, 2) native versus non-native earthworm distributions and impacts on soil functioning including N cycling, and 3) grazing management and organic production systems on soil biological responses.

Mary is an active member of ASA and current vice-chair of the Education and Extension section. She is also a Soil Science Society of America S3 Soil Biology and Biochemistry Division member. Before joining the UA in 2002, she was a post-doctoral research associate at the University of Massachusetts Lowell analyzing marine eukaryotic plankton communities. Her M.S. (1995) and Ph.D. (1999) dissertation work at the University of Rhode Island involved biodegradation of a herbicide in bog soil and investigating nutrient availability as a function of nematode-microbe interactions at different matric potentials. She continued research investigating ecological and nutrient dynamics in earthworm burrows. Prior to graduate studies, Mary worked in the Environmental Analysis Unit as a research assistant for Arthur D. Little in Cambridge, MA.

Facilitator

Dr. Dawn Gibas

Dr. Dawn Gibas joined the SSSA staff in July 2010 as the Soil Science Program Coordinator. Most recently she was faculty at The Ohio State University in the School of Environment and Natural Resources (SENR) where much of her research was located in Iceland studying successional landscapes, restoration and soil carbon. She still maintains an adjunct faculty position within SENR. Prior to her position at OSU, Dr. Gibas spent the majority of her career in environmental consulting and, for a shorter time, in county government. During her career she has, among other things, owned her own consulting business, managed the MN office of Tetra Tech, and traveled across the U.S. as part of her work. She has a B.S. in soil science from the University of Wisconsin, a M.S. in soil physics and a PhD in Forest Hydrology from the University of Minnesota. Dr. Gibas is both a licensed and certified soil scientist and has worked on issues surrounding the implementation of these programs since the early 1990s; Dr. Gibas has been involved with the Council of Soil Science Examiners since its inception and was the chair for several years. She also held a Governor appointed position as the Soil Science Board Member on the MN Board of Architecture, Engineering, Land Surveying, Landscape Architecture, Geoscience and Interior Design.

Briefly, some of the primary objectives of Dr. Gibas's position with SSSA include overseeing the soil science licensing and certification programs for SSSA (including legislative issues), facilitating continuing education for soil scientists, and to overall help to grow the soil science profession by working with and facilitating communication between the private sector, government and academia.