COURSE SYLABUS
ENR 5263 – Biology of Soil Ecosystems

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Text: Principles and Applications of Soil Microbiology, Sylvia et al. 2005. Pearson Prentice Hall

Office Hours: By email appointment

Exams: (2) Mid-terms; (2) Final (Monday February 24 at 5PM)

Term Paper: 5 page paper on some aspect of soil microbial ecology

Lecture Topics

A. Soil Ecosystems as Habitat
- The soil resource – Pedons, horizonation, state factors of soil formation, landscape position
- Physical properties - Soil structure (particles, aggregates and porosity), air and water
- Chemical properties - Soil organic matter and C/energy dynamics and other nutrients and pH relative to soil organisms.

B. Soil organisms
- Microbial community members and functions – soils and aquatic ecosystems
- Soil faunal community members and functions
- Methods for studying microbial ecology – activity, mass and diversity
- Soil biologically driven processes that control ecosystem productivity (redox potential, decomposition and mineralization
- Biodiversity – does it matter?
- Interactions and food webs across trophic levels

C. Soil Microbiology and Ecosystem Management
- Disturbance and environmental impacts on soil biological properties
- Manipulating microbial communities for beneficial effects - Case studies: Tillage and organic matter inputs; plant growth promoting rhizobacteria; pathogen suppression.; bioremediation

D. Soil Biological Properties as Ecological Indicators
- Soil Quality: Definition and concept
- Microbial indicators
- Soil enzyme activities as integrative soil biological indicators
- Practical applications