

# College of Public Health & Health Professions

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PHC-6103 Systems Thinking for Public Health

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Summer, 2017

May 9 – July 6 2017

Tuesday and Thursday 9:30 am – noon

HPNP G210

Course Managed on Canvas

**N.B. this course is conducted over eight weeks. (Summer A plus an individual project lasting an additional two weeks). The initial six weeks require both classroom and site visit attendance. The final two weeks can be flexibly scheduled.**

## Instructor Information

Ralph E. Horky  
352-273-5420

HPNP Adjunct Office

By appointment - Please contact the instructor through the Canvas website

## Course Overview or Purpose

Overview: The course will investigate the fundamental attributes of the systems that influence modern environments and the complexity inherent when diverse types of systems interact. Public Health examples will be emphasized. Both “closed” (biological, mechanical, algorithmic) and “open” (social, political, economic) system will be discussed. Analytical and systems approaches will be contrast and compared as tools for managing change.

Purpose: To prepare students to approach the practical realities of modern multi-system work environments. To provide an initial experience in parsing such complex environments.

## Course Objectives and/or Goals

Upon successful completion of the course students should be able to critically describe multi-system interrelationships, envision a desired future state for a complex situation and suggest interventions with clear milestones. Students will learn to combine empirical and narrative methods and accommodate financial, political, social, scientific and other points of view. These skills are important in managing organizational change, for developing position papers, creating strategic and business plans, and in effective hypothesis formation and grant writing.

## **Course Materials and Expectations of Students**

Required: Thinking in Systems by Donella H Meadows (complete prior to May 16)

Required: The Fifth Discipline” by Peter Senge (complete prior to May 30)

Suggested: "Systems Thinking: Managing Chaos and Complexity" by Jamshid Gharajedaghi

Other articles and readings will be assigned or suggested over the course of the semester.

## **Evaluation and Grading**

Downstream Consequences Exercise - Narrative and Diagram (20%) **May 25, 2017**

Test: Multiple Choice and Interpretive Problem (25%) **Tentatively June 8, 2017**

Final Project Diagrams and Narratives (40%) **July 13, 2017**

Attendance, Participation and (“stickers”) Course Contributions (15%)

## **Session Outlines (timing and order subject to change)**

### **Session 1: Class Introductions, Practical Information**

**Discussion:** Student Career Goals – Survey Monkey

**Presentation:** The General Content of the Course

Whitewater - Nature of the Problem and State of the Art

Formal Theory of Systems (Bertalanffy, Ackoff, Boulding)

Field Visits: Natural and Social Systems

Parsing Subsystem Interactions

Diagramming Practical Approaches – Flow Charts to Causal Loops

Mental Images, Shared Visions and Desired States

Senge’s Archetypes

Intervention in a Complex System - Individual Exercise

**Discussion:** Student Evaluation Methodology

**Presentation:** Textbooks and Materials

**Assignment:** Review and Study Boulding’s taxonomy of systems

### **Session 2: Introduction to Systems**

**Presentation:** Managing Complexity – Four Big Theory Gaps

Emergent Properties (the whole is not the sum of the parts)

Time (can distort our perception of systems)

Shifting Context (constantly changing boundaries)

The Illusion of control (limits to our influence)

**Discussion:** Data, Information, Knowledge, Understanding and Wisdom

**Presentation:** Systems Thinking Fundamentals

Open and Closed Systems, Boundaries, Interfaces  
Environments, Systems within Systems with Sub-Systems  
Natural Systems – Models in Nature  
Mindless Mechanical and Electronic Systems  
Purposeful Systems - Organizations and Cultural Systems  
**Assignment:** Read Ackoff's "Systems. Messes and Interactive Planning"  
**Assignment:** Read Bellinger "Data, Information, Knowledge and Wisdom"

**Session 3: Field Visit #1 Human Systems and Natural Systems (this session will be held offsite at either Millhopper State Park or Sweetwater Branch Park in Gainesville)**

**Discussion:** Relating site visit observations to Boulding's Taxonomy  
**Presentation:** Patterns in Nature  
Identifying Immediate, Proximate and Remote Influences  
Criticality  
Nested, Hierarchical, Peer Systems in Environments  
Control vs. Influence  
**Assignment:** Read and prepare to discuss Peruvian Guano NYT Article  
**Assignment:** Complete Reading Thinking in Systems, Donella H Meadows

**Session 4: Parsing Complex Systems**

**Discussion:** Site visit retrospective  
**Presentation:** Planning  
Blueprints, Roadmaps and Compasses  
Black Swans to Demographic Near Certainties  
**Discussion: Structures**  
Processes to Cultures and all that Lie Between  
Accretion and Atrophy  
The Negative Entropic Character of Social Systems  
**Group Exercise:** Diagraming Simple Decision Trees  
**Discussion:** The Peruvian Guano Problem  
  
**Graded Assignment:** Downstream Consequences: The Guano Problem (20%)

**Session 5: Simple Closed Systems (Metaphors from Mindless Systems)**

**Exercise:** Wiring and Circuits (RadioShack Models)  
**Discussion:** Metaphors from Electronics  
Cycles of Throughput (Current)  
Pathways, Conductivity, Resistance and Uneven Throughput  
Batteries, Capacitors and Storage  
Components and Modularity  
Capacitors as Buffers

Transistors as Leverage  
Branching Logic and Boolean Math  
Accelerating and Stabilizing Influences  
Interfaces and Interactions  
Noise, Short Circuits  
Feedback Loops  
Discussion: Electrical Wiring as a metaphor

## **Session 6: Purposeful Systems and Organizations**

**Exercise:** 20 Questions: Deductive and Inductive Logic

**Presentation:** Analytical vs. Systems Approach

Goal Seeking Systems – Growth and Efficiency  
The Paternalistic Model of Ownership and Control  
Division of Labor and “Staff” Level Management  
Financial, Operating and Management Control  
Decision Support Systems  
Market (Simple Goal) v. Mission (Higher Order) Motivation  
Success and the Ensuing Issues of Large Scale  
Roles vs. Positions  
Ownership, Governance, Management and Production  
The Marriage of Mechanical and Human Systems  
The Centralize to Decentralize Pendulum  
Complexity: “Predict and Prepare”

**Assignment:** Read Smith’s Five Postures (Article)

**Assignment:** Read and Study Diagramming Causal Loops (North)

## **Session 7: Bridging Theoretical Underpinnings and Practical Application**

**Discussion:** Causal Loops: Balancing and Reinforcing influences

**Presentation:** Philosophical and Theoretical Underpinnings

Dialectical Properties: Chickens and Eggs  
Cumulative Qualities Human Knowledge  
Multi-Minded Organizations  
Predestination and Free Will  
Google, Facebook and the Wiki World  
“Bubbles”

Alignment: Mental Models, “Desired States”, Shared Objectives

**Discussion:** Telling, Selling, Asking, Consulting and Co-Creating

**Assignment:** Complete Reading Senge’s “Fifth Discipline”

## **Session 8: Senge: Leadership Styles and Practical Application**

**Presentation:** Personal Mastery, Team Learning and Systems Thinking  
Discovering Underlying Structures  
Consensus, Unanimity, Plurality  
Dialogue and Discussion  
Conflict, Coalition, Competition, Cooperation  
The Role of the Facilitator  
Seven Learning Disabilities of Organizations

**Presentation:** Envisioning Alternative Futures – Scenario Planning  
Mental Models and Shared Vision

**Discussion:** Topics for scenario planning exercise

**Discussion:** Assignment of Archetypes for Student Presentations

**Assignment:** Individual students prepare presentations of Senge Archetypes

### **Session 9: Archetypes Presentations and Scenario Planning Part 1**

**Class Exercise:** Scenario Planning

Enumerating Variables – the Exhaustive List  
Identifying Controllable and Uncontrollable Influences  
Reducing Variables to a Critical Set  
Interrelating Multiple Subsystems  
Nicknames Evoking Mental Models  
Narrative Development

**Assignment:** Each student to prepare to present narrative for one scenario “quadrant”

### **Session 10 (Tentatively June 8, 2017) Test Multiple Choice and Interpretive Questions (25%)**

### **Session 11: Didactic Wrap Up**

**Discussion:** Test Decompress

**Student Presentations:** Quadrant Narratives

**Discussion:** Preparation for Open System Site Visit

**Discussion:** Meeting Schedule for individual Projects

**Discussion:** Continuous Improvement

How can the course be made better for the next cohort?

### **Session 12: Field Visit #2 Open Systems in Community Public Health (this session will be held offsite at a social service or public health agency - venue to be determined)**

**June 26-July 13 - Final Two weeks - Individual Projects. 5-7 well annotated power point and word slides (40%)**

Individual projects will parse, diagram and describe the salient features (environment, major structures, processes, organizations, pathways) of a complex system (of the student’s choosing).

Each student is responsible to schedule two 20 minute one on one meetings with the Instructor.

Meeting 1: Approve subject matter in concept and identify a desired state

Meeting 2: Critical review of intervention plan and project outline.

Assignment: Final Projects due July 13, 2017.

**Note: The sequence of sessions is subject to change.**

**Statement of University's Honesty Policy (cheating and use of copyrighted materials)**

**Academic Integrity** –Students are expected to act in accordance with the University of Florida policy on academic integrity (see Student Conduct Code, the Graduate Student Handbook or this web site for more details: [www.dso.ufl.edu/judicial/procedures/academicguide.php](http://www.dso.ufl.edu/judicial/procedures/academicguide.php)).

**Cheating, lying, misrepresentation, or plagiarism in any form is unacceptable and inexcusable behavior.**

*We, the members of the University of Florida community,  
Pledge to hold ourselves and our peers to the  
Highest standards of honesty and integrity.*

**Policy Related to Class Attendance**

**Attendance and Make-up Work** – Students are expected to attend and participate in all class sessions and will be graded on the quality of their participation. Material will not be repeated. Unusual personal issues with respect to class attendance or fulfillment of course requirements will be reviewed on an individual basis but, after two excused absences, students should generally expect a reduction in their grade for additional absences.

