New Major Core Courses

Freshman Seminars
- Transition to college life
- Resources available at CSU (academic, writing, & legal? help, social groups, counseling)
- Learn about what CAS and BSPM faculty study, etc.
- Learn about the breadth of agricultural sciences & gain hands-on experience (AGRI 181)
- Computer and software competencies
- Scientific method and hypothesis testing
- Social justice component: Principles of Community
- Introduction to systems thinking; Scientific method

Sophomore Seminar
- Professional development
- Writing a resume
- Presenting ourselves professionally
- Prepare for internship, practicum, etc.
- Quantitative and Qualitative data analysis
- Social justice awareness: implicit bias and microaggression; awareness, knowledge, skills, action
- Practice with systems thinking

Junior Seminar
- Lay foundation for the capstone course/project/experience (requirements, ideas, etc.)
- How to give oral and poster presentation
- Service learning
- Social justice awareness & knowledge: privilege and oppression
- Apply systems thinking to real-world problems

Senior Capstones
- Integrate and reflect on coursework from across the curriculum of the major
- Employ a systems approach to develop science-based management solutions to real-world problems
- Teamwork
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- Present at CURC and/or “CAS senior project showcase”
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Systems Thinking & Environmental Problem Solving

Heuristic Models and Approaches
Systems Theory

• an interdisciplinary theory about the nature of complex systems in nature, society, and science

• *a framework by which one can investigate and/or describe any group of objects that work together to produce some result*

• single organism, any organization or society, or any electro-mechanical or informational artifact
  • Applied in
    • living systems theory
    • software & computing
    • sociology & sociocybernetics
    • system dynamics
    • systems engineering
    • systems psychology
Systems Biology

- Systems Biology aims to obtain a holistic understanding of biological systems such as a single cell, an organ or even a whole living organism, by combining approaches from Systems-, Life and Computer Sciences.
- Universities of Stuttgart, Magdeburg and Liège
Systems Theory

- Ecosystem science
Systems Theory

- Applied to management
- Environmental problem solving
- Gen Z are systems thinkers
Barbier et al. 2009

“Problem-solving consists of looking for a way to reduce the gap between a non-satisfactory situation and a desired situation (Proulx, 1999). The cyclic process of problem-solving usually consists of eight steps: Finding a problem, posing a problem, finding solutions, assessing and choosing solutions, planning the action, acting and evaluating the action (Higgins, 1994).”
Barbier et al. 2009

“Problem solving is presented as a cyclic process involving constant back and forth movement between the problem space, the solution space and the action space. One perceives the presence of a problem, explores, reflects, investigates and formulates the problem in its different dimensions. These are sources, causes, players, places, impacts, time, obstacles to action and desired situation. The whole process happens in a metacognitive space, as the individual constantly monitors and adjusts his or her way of working on the problem. The success of the process empowers the individual to solve more problems and transfer the skills to other contexts. Finally, the ideal problem-solving process occurs when there is collaborative work between many people who form a learning community in which individuals help each other plan and execute various operations. Of a particular interest for our analysis is the definition of empowerment that borrows from Bandura theory of collective Self-efficacy (2003): a belief shared by a group as to its capacities to organize and perform up to a desired level (p.708).”
The Problem Solving Process

Barbier et al. 2009
Steps for solving environmental problems
1. Identifying a problem
2. Posing a problem
3. Finding solutions
4. Choosing a solution
5. Action plan
6. Taking action
7. Evaluating the action
8. Personal reinforcement
DOC’S KEY

• Define the problem
  • Clearly define the problem and your desired outcome

• Objectives
  • Set clear objectives

• Constraints
  • Identify constraints, boundaries, assumptions, limitations, and unacceptable impacts

• Strategies
  • Seek creative strategies – generate ideas

• Keepers
  • Select your best strategies

• Experiment
  • Try out your strategies and make adjustments

• Yes!
  • Implement your strategies and check to make sure they give you the results you want

J.W. Hughes, Environmental Problem Solving: A How-To Guide
S-M-A-R-T Objectives

• Specific
• Measurable
• Attainable
• Reasonable
• Time limit identified
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Diversity, Inclusion & Social Justice
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Freshman – Principles of community

• The benefit of working in diverse teams and in a diverse university
• Community expectations
• Existing in different communities
• Recognizing assumptions we make about others
Sophomore – Implicit Bias and Microaggressions

• How we unconsciously and consciously communicate value to others
• Working in diverse teams – behaviors to promote inclusion
Junior – Privilege and Oppression

• Identity of self
• Identity of others
• Systemic inequity and how it relates to the individuals and future careers
Senior – Application

• How does this apply to your future profession?
Diversity, Inclusion and Social Justice

• Tie to learning objectives
• Incorporate reflection pieces
• Make content interactive
• Setting up community – community guidelines
• Train and equip faculty who are teaching this content
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