SUSAG 50 Course Outline as of Fall 2005

CATALOG INFORMATION

Dept and Nbr: SUSAG 50 Title: INTRO SUSTAIN AGRI
Full Title: Introduction to Sustainable Agriculture
Last Reviewed: 3/11/2024

Units		Course Hours per Week		Nbr of Weeks	Course Hours Total	
Maximum	3.00	Lecture Scheduled	3.00	17.5	Lecture Scheduled	52.50
Minimum	3.00	Lab Scheduled	0	10	Lab Scheduled	0
		Contact DHR	0		Contact DHR	0
		Contact Total	3.00		Contact Total	52.50
		Non-contact DHR	0		Non-contact DHR	0

Total Out of Class Hours: 105.00 Total Student Learning Hours: 157.50

Title 5 Category:	AA Degree Applicable
Grading:	Grade or P/NP
Repeatability:	00 - Two Repeats if Grade was D, F, NC, or NP
Also Listed As:	
Formerly:	SUSAG 100

Catalog Description:
Introduction to the concepts and principles of agroecology as applied to the design and management of sustainable agricultural systems. Includes an examination of case studies to connect sustainable agriculture principles to actual farming practices.

Prerequisites/Corequisites:

Recommended Preparation:
Eligibility for ENGL 100 or ESL 100

Limits on Enrollment:

Schedule of Classes Information:
Description: Introduction to the concepts and principles of agroecology as applied to the design and management of sustainable agricultural systems. Includes an examination of case studies to connect sustainable agriculture principles to actual farming practices. (Grade or P/NP)
Prerequisites/Corequisites:
Recommended: Eligibility for ENGL 100 or ESL 100
Limits on Enrollment:

Transfer Credit: CSU;UC.
Repeatability: Two Repeats if Grade was D, F, NC, or NP

ARTICULATION, MAJOR, and CERTIFICATION INFORMATION:

AS Degree:	**Area**		Effective:	Inactive:
	C	Natural Sciences	Fall 2005	
CSU GE:	**Transfer Area**		Effective:	Inactive:
	B1	Physical Science	Fall 2019	
IGETC:	**Transfer Area**		Effective:	Inactive:

CSU Transfer:	Transferable	Effective:	Fall 2005	Inactive:
UC Transfer:	Transferable	Effective:	Fall 2025	Inactive:

CID:

Certificate/Major Applicable:
Both Certificate and Major Applicable

COURSE CONTENT

Outcomes and Objectives:
Upon successful completion of this course the student will be able to:
1. Relate the methods of scientific investigation to agricultural productivity.
2. Define the nature of scientific inquiry.
3. Describe the values, themes, methods, and history of sustainable agriculture regionally and worldwide.
4. Define sustainable agriculture.
5. Describe the characteristics of a natural ecosystem.
6. Compare and contrast the properties of natural ecosystems, sustainable agroecosystems, and conventional agroecosystems.
7. Evaluate the role of soil fertility in an ecological production system.
8. Discuss the principles and strategies of sustainable agriculture.
9. Optimize the use of water to promote an ecological use of resources.
10. Summarize the ecological roles of plants and their functional relationships to an agroecosystem.
11. Assess an agroecosystem for its level of sustainability based on indicators of a sustainable system.
12. Prescribe ways of converting to a sustainable system through the redesign of a conventional agroecosystem.
13. Identify career opportunities and objectives in sustainable agriculture.

Topics and Scope:

I. Introduction to Agroecology and Sustainable Agriculture
 A. What is sustainable agriculture?
 B. Terms related to sustainability

C. Common themes of sustainable agriculture
D. The three "E's of sustainability
1. Economic viability
2. Environmental health
3. Equity (social)

II. Concepts of Agroecology and Sustainability
A. Agroecology as a science
1. The nature of scientific inquiry
2. Application of the scientific method to problem solving
3. Ecological imperative for sustainable agriculture
4. Global impacts of sustainable agriculture
B. Ecosystem characteristics
1. Natural ecosystems
2. Sustainable agroecosytems
3. Conventional agroecosystems
C. Ecological Principles
1. Niche
2. Succession
3. Biological diversity
4. Applications of niche theory to agriculture
D. Steps in the ecological design process
1. Observation
2. Visioning
3. Planning
4. Development
5. Implementation
E. Natural patterns in the garden

III. History of Sustainable Agriculture
A. Worldwide
B. United States
1. 1980 - 1990
2. 1990- present
C. Regionally
D. Advent of modern agriculture
E. Modern agriculture in crisis
F. Why conventional agriculture is not sustainable
G. Barriers to Developing Agricultural Sustainability
1. Ecological
2. Social
3. Economic

IV. Principles of Sustainable Agriculture
A. Soil fertility and nutrient cycling
B. Enhancing and maintaining biological diversity
C. Integrated pest management (IPM)
D. Input reduction
E. Water management
F. Conservation of natural resources
G. Ecosystem (agroecosystem) management
H. Benefits of a sustainable agroecosystem
1. Genetic diversity
2. Productivity
3. Resilience

4. Low reliance on external input

V. Achieving Sustainability

A. Learning from existing agroecological systems

1. Biological agriculture
2. Nature farming
3. Organic agriculture
4. Biodynamic agriculture
5. Permaculture

B. Converting to sustainable practices

VI. Specific Strategies

A. Soil fertility & nutrient cycling

1. Healthy soil is a key component of sustainability
2. Soil as a "living" medium
   a. Soil minerals
   b. Macro and micro nutrients
   c. Signs of nutrient deficiency

B. Soil fertility

1. Physical properties of soil
2. Methods to protect and enhance soil microbiology and productivity
   a. Regular additions of organic matter
      i. humus
      ii. compost and/or manures
      iii. mulch
      iv. cover cropping for fertility
   b. Regular soil testing and analysis
   c. Cover cropping for fertility
   d. Reduced tillage
   e. Avoid traffic on wet soils

C. Water management

1. Use of water in agriculture
   a. Ecology of irrigation
   b. Optimizing use of the water resource
2. Water in the soil
   a. Soil moisture
   b. Water holding capacities
      i. saturation
      ii. field capacity
      iii. wilting point
3. Water-conserving methods
   a. High organic matter content
   b. Deep mulching
   c. Water-conserving plants
   d. Dense planting
   e. Soil contouring
      i. swales
      ii. contours
4. Water catchment
   a. Harvest and storage of rainwater
   b. Using greywater

E. Enhancing and maintaining biological diversity

1. Plants uses
   a. Multipurpose plants

b. Ecological roles of plants
i. mulch makers
ii. nutrient accumulators
iii. nitrogen fixers
iv. soil fumigants and pest repellants
v. insecting plants
vi. spike roots
vii. wildlife nurturers
viii. shelterbelters
2. Annuals and perennials
a. Perennial vegetables
b. Herbs
c. Greens
3. Roots and tubers
4. Microclimates
5. Plant communities
a. Interplanting /intercropping
b. Polyculture
c. Plant guilds
b. Habitat strips and hedgerows

F. Integrated pest management (IPM)
1. Attracting beneficial insects
a. Predatory insects
b. Parasitic insects
c. Pollinators
d. Weed feeders
2. Attracting birds
a. Food
b. Water
c. Shelter
d. Protection
e. Habitat diversity
3. Use of other animals
a. Chickens
b. Ducks
c. Rabbits
d. Other livestock species

G. Input reduction (efficient use of inputs)
1. Maximize reliance on natural, renewable and on-farm inputs
2. Not simple input substitution
3. Assess situations where the use of synthetic chemicals would be more "sustainable"
4. Goal: develop efficient, biological systems which do not need high levels of material inputs

H. Conservation of natural resources
1. Wildlife habitat
2. Energy
3. Air

I. Ecosystem (agroecosystem) management

J. Animal Husbandry
1. Variety selection and animal reproduction
2. Select appropriate stock for farm or ranch resources

3. Grazing and range management
4. For herd health and productivity
5. For environmental quality
6. For biodiversity conservation
7. Integrating crop and livestock production
8. National Organic Program (NOP) standards

VII. Case Studies
A. National perspective
B. Local case studies

VIII. Career Opportunities in Sustainable Agriculture

Assignment:

Representative assignments may include and may not be limited to:
1. Specific reading and study assignments from texts, handouts, and internet sites (15-30 pages per week).
2. Applications of scientific method that may include:
a. analyze agricultural productivity in conventional vs. sustainable systems and write a 2-3 page report on findings
b. formulate and test hypotheses regarding soil fertility in a production system
c. evaluate scientific testing of the effects of cover crops or intercropping
d. evaluate and compare conventional vs. organic system field trials (based on field trips to Shone Farm Vineyard)
3. Develop a soil fertility enhancement plan (2-3 pages).
4. Prepare a written evaluation of a local farm's level of sustainability, using the indicators of a sustainable system (3-5 pages).
5. Conduct interviews with farmers for case studies.
6. Write 2-3 case studies based on interviews, 3-5 pages each.
7. Quizzes, midterm, final exam.

Methods of Evaluation/Basis of Grade:

Writing: Assessment tools that demonstrate writing skills and/or require students to select, organize and explain ideas in writing.

Field notes/journal; field trip reports; evalu.	Writing 30 - 40%

Problem Solving: Assessment tools, other than exams, that demonstrate competence in computational or non-computational problem solving skills.

test hypotheses; cover crop eval.; field trials.	Problem solving 20 - 30%

Skill Demonstrations: All skill-based and physical demonstrations used for assessment purposes including skill performance exams.

None	Skill Demonstrations 0 - 0%

Exams: All forms of formal testing, other than skill performance exams.

Multiple choice, True/false, Completion	Exams 30 - 40%

Other: Includes any assessment tools that do not logically fit into the above categories.

None	Other Category 0 - 0%

Representative Textbooks and Materials:
Ecological Principles in Agriculture. Powers, Laura E. and McSorely, Robert. Delmar, 2000.
Agroecology: Ecological Processes in Sustainable Agriculture. Gliessman, Stephen R. Sleeping Bear Press, 1998.
Gaia's Garden: A Guide to Home-Scale Permaculture. Hemenway, Toby. Chelsea Green Publishing Co., 2000.