SUSAG 119 Course Outline as of Fall 2022

CATALOG INFORMATION

Dept and Nbr: SUSAG 119 Title: SPECIALTY CROP PROD
Full Title: Specialty Crop Production
Last Reviewed: 2/14/2022

Units		Course Hours per Week		Nbr of Weeks	Course Hours Total	
Maximum	2.00	Lecture Scheduled	2.00	17.5	Lecture Scheduled	35.00
Minimum	2.00	Lab Scheduled	0	10	Lab Scheduled	0
		Contact DHR	1.00		Contact DHR	17.50
		Contact Total	3.00		Contact Total	52.50
		Non-contact DHR	0		Non-contact DHR	0

Total Out of Class Hours: 70.00 Total Student Learning Hours: 122.50

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:	AG 251

Catalog Description:
In this introductory course, students will explore the history, uses, cultivation, cultivar selection, propagation techniques, agronomic practices, crop improvement strategies, and pest and disease management for both indoor and outdoor cultivation of industrial hemp (Cannabis sativa L.). Students will also discuss post-harvest processing, compliance testing requirements, local and federal regulations for industrial hemp cultivation.

Prerequisites/Corequisites:

Recommended Preparation:
Eligibility for ENGL 100 or ESL 100

Limits on Enrollment:

Schedule of Classes Information:
Description: In this introductory course, students will explore the history, uses, cultivation, cultivar selection, propagation techniques, agronomic practices, crop improvement strategies, and pest and disease management for both indoor and outdoor cultivation of industrial hemp (Cannabis sativa L.). Students will also discuss post-harvest processing, compliance testing

requirements, local and federal regulations for industrial hemp cultivation. (Grade or P/NP)
Prerequisites/Corequisites:
Recommended: Eligibility for ENGL 100 or ESL 100
Limits on Enrollment:
Transfer Credit:
Repeatability: Two Repeats if Grade was D, F, NC, or NP

ARTICULATION, MAJOR, and CERTIFICATION INFORMATION:

AS Degree:	**Area**	Effective:	Inactive:
CSU GE:	**Transfer Area**	Effective:	Inactive:
IGETC:	**Transfer Area**	Effective:	Inactive:

CSU Transfer:	Effective:	Inactive:
UC Transfer:	Effective:	Inactive:

CID:

Certificate/Major Applicable:
Both Certificate and Major Applicable

COURSE CONTENT

Student Learning Outcomes:
At the conclusion of this course, the student should be able to:
1. Discuss at least four major agronomic factors to consider for industrial hemp cultivation.
2. Explain the differences between the different forms and uses of industrial hemp.
3. Develop basic cultivation Standard Operating Procedures (SOP) for a small-scale hemp farm.
4. Discuss at least two crop steering techniques for increasing yield and quality.

Objectives:
At the conclusion of this course, the student should be able to:
1. Discuss the history of industrial hemp cultivation in the United States
2. Explain the differences between the different forms of industrial hemp
3. Identify and discuss factors that influence hemp cultivar selection
4. Describe propagation methods used for cultivating industrial hemp
5. Explain the benefits and limitations of cultivating from seeds or clones
6. Discuss ideal soil/media selection and management for effective hemp cultivation
7. Describe the significance of compliance testing including the current federal and local regulatory guidelines for testing
8. Identify and discuss common hemp pest and diseases and appropriate management strategies
9. Explain some of the required agronomic practices used in hemp cultivation
10. Discuss the differences between indoor and outdoor hemp cultivation in terms of cost and agronomic practices
11. Analyze market data to determine current and future trends in the hemp industry
12. Describe some considerations and methods for harvesting and curing hemp

Topics and Scope:

I. History, Uses and Cultivars of Industrial Hemp
- A. Origin of industrial hemp
- B. Scheduling/Criminalizing hemp in the United States
- C. Uses of hemp pre 1930s
- D. Emerging uses of hemp

II. Forms of Industrial Hemp
- A. Flower/Cannabidiol (CBD) hemp
- B. Grain/Seed crop
- C. Dual crop
- D. Tri-crop
- E. Fiber
- F. Full-term versus autoflower

III. Factors that Affect Hemp Cultivar Selection
- A. Use
- B. Structure
- C. Yield
- D. Terpene profile
- E. Cannabidiol (CBD)
- F. Fibe quality
- G. Pest and disease resistance
- H. Location and climate

IV. Cultivation and Propagation
- A. Indoor versus outdoor cultivation
- B. Factors associated with outdoor cultivation
  1. Land preparation and field layout
  2. Planting in beds versus flats
  3. Irrigation
  4. Nutrient management
  5. Pest and disease management
  6. Scale of production and quality of yield
- C. Factors associated with indoor cultivation
  1. Environmental controls (light, temperature, humidity, moisture)
  2. Container versus in ground planting
  3. Cost of production
  4. Pest and disease management
  5. Scale of production and quality of yield
- D. Propagation from seeds
  1. Advantages and disadvantages of starting from seeds
  2. Media selection for germinating seeds
  3. Improving germination rates and breaking dormancy
  4. Managing seedlings (auto flower and full term)
- E. Propagation from clones
  1. Advantages and disadvantages of starting from clones
  2. Sourcing clones versus making clones
  3. Developing mother plants
  4. Factors to consider and basic cloning techniques
- F. Micropropagation
  1. What is tissue culture?
  2. Significance of micropropagation in hemp cultivation
  3. Techniques and protocols for micropropagation
  4. Materials needed for micropropagation

V. Agronomic Practices

- A. Transplanting and crop management
  1. Preparing plants for transplanting
  2. Timing and spacing (autoflower and full-term plants)
  3. Up potting versus field transplanting
  4. Mechanized versus manual transplanting
  5. Timing and significance of topping/pruning de-leafing
  6. Scouting and culling male plants
  7. Canopy management
  8. Scouting for pests, diseases, and nutrient deficiencies
- B. Irrigation
  1. Outdoor versus indoor irrigation
  2. Materials and considerations for different irrigation designs
  3. Advantages and disadvantages of different irrigation setup
- C. Soil and nutrient management
  1. Soil/media selection for different forms of hemp
  2. Nutrient requirements for different forms of hemp
  3. Key micronutrients in hemp cultivation
  4. Key macronutrients in hemp cultivation
  5. Nutrient deficiencies and management
  6. Water-use efficiency
- D. Fertigation
  1. Considerations for fertigation
  2. Design and timing of fertigation
  3. Material and cost of fertigation
  4. Liquid fertilizers
  5. Compost teas

VI. Crop Improvement and Cultivar Development

- A. Breeding and selection
  1. Ancestry and parentage of hemp cultivars
  2. Selecting breeding stock
  3. Basic breeding techniques
  4. Breeding and stabilizing varieties
- B. Crop steering
  1. Definition
  2. Varying light spectrum and crop steering in indoor environments
  3. Light Deprivation (Light Dep) cultivation
  4. Carbon dioxide CO2 enrichment
  5. Varying temperature, moisture, humidity in relation to plant metabolism
  6. Timing and application of different nutrients to boost yield and quality
- C. Lighting and Indoor hemp cultivation
  1. Significance of supplemental lighting
  2. Effects of different wavelengths of light on the stages of plant growth
  3. Different type of indoor lights (High Pressure Sodium (HPS), LEDs etc)
  4. Measuring the intensity and quality of supplemental lights
  5. Light Deprivation (Light Dep)

VII. Harvesting and Compliance Testing

- A. Harvesting and Curing
  1. Pre-harvest planning
  2. Harvesting methods for different forms of hemp (flower/dual/Tri crops/fiber)
  3. Drying methods (field, container, or buildings)
  4. Design of drying facilities
  5. Optimum conditions for drying and curing

6. Basic supplies for drying and curing

B. Compliance Testing

1. Definition
2. Required test
3. Federal and local guidelines for testing industrial hemp
4. Sample collection for compliance testing
5. Approved laboratories

VIII. Pest and Disease Management

A. Most common pests (such as spider mites, russet mites, aphids, white flies, hemp borers thrips, caterpillars, leaf beetles, earwigs) and appropriate management strategies

B. Most prevalent diseases (such as grey mould, hemp canker, yellow leaf spot, downy mildew, fusarium root rot/fusarium wilt, powdery mildew, brown blight) and appropriate management strategies

IX. Economic Aspects and Emerging Trends

A. Yield projections for cultivators, processors and manufacturers
B. Secondary markets associated with the hemp industry
C. Hemp market information/research
D. Emerging uses and markets

Assignment:

1. Weekly readings (20-30 pages).
2. One cultivation Standard Operating Procedure (SOP) project (3-5 pages).
3. Case studies (4-5, 1-2 pages each).
4. One industry report (2-3 pages) on a selected trend (e.g. Federal polices, compliance testing, processing, genetics, pesticide use, extracts, edible products).
5. Exams (2-4), including final exam.
6. Quizzes (2-5).

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.

Industry report, case studies	Writing 20 - 30%

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

Case Studies	Problem solving 15 - 20%

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

Standard Operating Procedures (SOP)	Skill Demonstrations 10 - 20%

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

Quizzes, exams, including final exam.	Exams 20 - 30%

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

Participation.	Other Category 10 - 20%

Representative Textbooks and Materials:
Hemp: Industrial Production and Uses. 1s ed. Bouloc, Pierre. CABI Publishing. 2013 (classic)
The Cultivation of Hemp: Botany, Varieties, Cultivation and Harvesting. 1st ed. Bocsa, Ivan and Karus, Michael. Hemptech. 1998 (classic)
Industrial Hemp as a Modern Commodity 1st ed. Williams, David. American Society of Agronomy. 2019
Hemp Diseases and Pests: Management and Biological Control 1st ed. McPartland, J.M., Clarke, R.C., and Watson, D.P. CABI Publishing. 2000 (classic)
Instructor prepared materials