

Colorado CTE Course – Scope and Sequence

Course Name	Soil Science		Course Details	Level III course in the Plant Science course sequence. This course could serve for either the Agronomy or Horticulture strand. Semester A	
			Course = 0.50 Carnegie Unit Credit		
Course Description	Focuses on formation, physical properties, chemical properties, land classification and management of soils emphasizing conditions that affect plant growth. Participation in FFA student organization activities and Supervised Agricultural Experience (SAE) projects is an integral course component for leadership development, career exploration and reinforcement of academic concepts				
Note:	This is a suggested scope and sequence for the course content. The content will work with any textbook or instructional resource. If locally adapted, make sure all essential knowledge and skills are covered.				
SCED Identification #		Schedule calculation based on 60 calendar days of a 90-day semester. Scope and sequence allows for additional time for guest speakers, student presentations, field trips, remediation, or other content topics.			
All courses taught in an approved CTE program must include Essential Skills embedded into the course content. The Essential Skills Framework for this course can be found at https://www.cde.state.co.us/standardsandinstruction/essentialskills					
Instructional Unit Topic	Suggested % of Instructional Time	CTE or Academic Standard Alignment	Competency / Performance Indicator	Outcome / Measurement	CTSO Integration
Careers	3%	CS.05. Describe career opportunities and means to achieve those opportunities in each of the Agriculture, Food & Natural Resources career pathways.	CS.05.01. Evaluate and implement the steps and requirements to pursue a career opportunity in each of the AFNR career pathways (e.g., goals, degrees, certifications, resumes, cover letter, portfolios, interviews, etc.).	CS.05.01.02.a. Examine the educational, training and experiential requirements to pursue a career in an AFNR pathway (e.g., degrees, certifications, training, internships, etc.).	
Formation and Morphology	6%	PLSC.11. Understand, evaluate and apply management practices for soils	PLSC.11.01 Understand and relate the factors of soil formation	PLSC.11.01.b Describe the process of soil formation through the five soil forming factorstime, topography, weathering, soil organisms, and climate PLSC.11.01.c Differentiate soils based on soil horizons, parent material, Etc.	Land Evaluation CDE

				PLSC.11.01.d Describe the soil classification system and relate it to geographic landforms, etc.	
Water Capacity	4%	PS.01. Develop and implement a crop management plan for a given production goal that accounts for environmental factors.	PS.01.02. Prepare and manage growing media for use in plant systems.	PS.01.02.02.a. Identify the categories of soil water. PS.01.02.02.b. Discuss how soil drainage and water-holding capacity can be improved.	
Structure, Infiltration, and Percolation	2%	PS.01. Develop and implement a crop management plan for a given production goal that accounts for environmental factors.	PS.01.02. Performance Indicator: Prepare and manage growing media for use in plant systems. PLSC.11.02 Identify soil physical characteristics and relate to soil management	PS.01.02.02.b. Discuss how soil drainage and water-holding capacity can be improved. PLSC.11.02.b Explain how the physical qualities of the soil influence the infiltration and percolation of water	
Soil Color	4%	PLSC.11. Understand, evaluate and apply management practices for soils	PLSC.11.05 Explain soil color and relate to soil management	PLSC.11.05 a. Identify factors that determine soil color such as hue, chroma, and value PLSC.11.05.b Utilize a Munsell color chart to determine soil color PLSC.11.05.c Determine how soil color is related to subsurface drainage problems like gleying and mottling PLSC.11.05.d Prescribe treatments for soils lacking suitable characteristics for plant growth based on their soil color (i.e. gleying and mottling)	

Soil pH and Salinity <ul style="list-style-type: none"> • Impact • Measurement • Management • 	4%	<p>PS.01. Develop and implement a crop management plan for a given production goal that accounts for environmental factors.</p> <p>PLSC.11. Understand, evaluate and apply management practices for soils</p>	<p>PS.01.03. Develop and implement a fertilization plan for specific plants or crops.</p> <p>PLSC.11.11 Explain soil salinity, sodacity and their management</p>	<p>PS.01.03.02.a. Discuss the influence of pH and cation exchange capacity on the availability of nutrients.</p> <p>PS.01.03.02.b. Contrast pH and cation exchange capacity between mineral soil and soilless growing media.</p> <p>PS.01.03.02.c. Adjust the pH of growing media for specific plants or crops.</p> <p>PLSC.11.11.b Discuss the sources of soluble salts, the EC test and EC test values that limit plant growth</p>	
Chemical Properties and Bulk Density <ul style="list-style-type: none"> • Impact on production & non-production use 	4%	<p>PLSC.11. Understand, evaluate and apply management practices for soils</p>	<p>PLSC.11.02 Identify soil physical characteristics and relate to soil management</p>	<p>PLSC.11.02.a Identify physical properties of soil (bulk density, aeration/drainage, water holding capacity, texture, structure)</p>	
Erosion and Tillage and Compaction	9%	<p>PS.01. Develop and implement a crop management plan for a given production goal that accounts for environmental factors.</p>	<p>PS.01.03. Develop and implement a fertilization plan for specific plants or crops.</p>	<p>PS.01.03.05.a. Research and summarize production methods focused on soil management (e.g., crop rotation, companion planting, cover crops, etc.).</p> <p>PS.01.03.05.b. Assess and describe the short- and long-term effects production methods have on soil.</p> <p>PS.01.03.05.c. Devise a plan for soil management for a selected production method.</p>	

<p>Conservation & Soil Management</p> <ul style="list-style-type: none"> • Historical perspectives • NRCS & Soil Conservation Programs • Conservation practices 	<p>9%</p>	<p>PS.03. Propagate, culture and harvest plants and plant products based on current industry standards.</p>	<p>PS.03.04. Apply principles and practices of sustainable agriculture to plant production</p>	<p>PS.03.04.01.a. Compare and contrast the alignment of different production systems (conventional and organic) with USDA sustainable practices criteria.</p> <p>PS.03.04.01.b. Analyze the alignment of modern technologies used in production systems (e.g., precision agriculture, GE crops, etc.) with USDA sustainable practices criteria.</p> <p>PS.03.04.01.c. Research, prepare and defend plans for a plant systems enterprise that aligns with USDA sustainable practices criteria.</p>	
<p>Regenerative Ag</p> <ul style="list-style-type: none"> • Definition • Promising practices • Implications & impact 	<p>4%</p>	<p>PS.03. Propagate, culture and harvest plants and plant products based on current industry standards.</p>	<p>PS.03.04. Apply principles and practices of sustainable agriculture to plant production.</p>	<p>PS.03.04.02.a. Summarize national/international and local/regional food production systems.</p> <p>PS.03.04.02.b. Compare and contrast the impact on greenhouse gas, carbon footprint of the national/international production system with local/regional production system markets.</p> <p>PS.03.04.02.c. Select and defend the use of nationally/internationally grown or locally/regionally grown for a production operation system.</p>	

Classification of soils	4%	PLSC.11. Understand, evaluate and apply management practices for soils	PLSC.11.16 Understand and apply soil surveys	PLSC.11.16.c Utilize soil survey to determine best land uses (crop land, homesite, etc.)	
Fertilizer Management	7%	PS.01. Develop and implement a crop management plan for a given production goal that accounts for environmental factors.	PS.01.03. Performance Indicator: Develop and implement a fertilization plan for specific plants or crops.	<p>PS.01.03.04.a. Identify fertilizer sources of essential plant nutrients; explain fertilizer formulations, including organic and inorganic; and describe different methods of fertilizer application.</p> <p>PS.01.03.04.b. Calculate the amount of fertilizer to be applied based on nutrient recommendation and fertilizer analysis.</p> <p>PS.01.03.04.c. Calibrate application equipment to meet plant nutrient needs.</p> <p>PS.01.03.06.c. Devise a plan to meet plant nutrient needs based on environmental factors present.</p>	