# Scope & Sequence

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| Course Name: Advanced Energy and Natural Resource Technology **TSDS PEIMS Code:** 13001200 | | | **Course Credit:** 1.0  **Course Requirements:** Recommended for Grades 11-12.  **Prerequisites:** None.  **Recommended Prerequisites:** A minimum of one credit from the courses in Agriculture, Food, and Natural Resource Career Cluster. |
| **Course Description:** Advanced Energy and Natural Resource Technology is designed to explore the interdependency of the public and natural resource systems related to energy production. In addition, renewable, sustainable, and environmentally friendly practices will be explored. | | | |
| **NOTE:** This is a suggested scope and sequence for the course content. This content will work with any textbook or instructional materials. If locally adapted, make sure all TEKS are covered. | | | |
| **Total Number of Periods**  **Total Number of Minutes**  **Total Number of Hours** | 175 Periods  7,875 Minutes  131.25urs\* | \*Schedule calculations based on 175/180 calendar days. For 0.5 credit courses, schedule is calculated out of 88/90 days. Scope and sequence allows additional time for guest speakers, student presentations, field trips, remediation, extended learning activities, etc. | |
| **Unit Number, Title, and Brief Description** | **# of Class Periods\***  (assumes 45-minute periods)  Total minutes per unit | **TEKS Covered**  **130.12. (c) Knowledge and skills** | |
| **Unit 1: Professional Standards/Employability Skills**  Students will discuss the professional standards and employability skills, including identifying career development and entrepreneurship opportunities in energy and natural resources, applying competencies related to resources, information, interpersonal skills, and systems of operation in energy and natural resources. Students will further develop and demonstrate these skills and attributes throughout the course. In small groups and/or in other classroom activities, students will demonstrate knowledge of personal and occupational safety, environmental regulations, first aid policy in the workplace, and analyze employers' expectations such as appropriate work habits, ethical conduct, legal responsibilities, and good citizenship skills. | 15 periods  675 minutes | 1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:  (A) identify career development, education, and entrepreneurship opportunities in the field of energy and natural resources;  (B) apply competencies related to resources, information, interpersonal skills, and systems of operation in energy and natural resources;  (C) demonstrate knowledge of personal and occupational safety, environmental regulations, and first aid policy in the workplace; and  (D) analyze employers' expectations such as appropriate work habits, ethical conduct, legal responsibilities, and good citizenship skills. | |
| **Unit 2: Policies and Purpose – Natural Resource Management and Energy Production**  Students will discuss the role of natural resource management and energy production policies at the local, state, and national levels. In small groups and/or in other classroom activities, students will identify policy affecting the use of natural resources, identify policy affecting energy production, research controls that protect Earth's natural resources, identify state and federal agencies that have natural resource management and energy production responsibilities, and define the roles of government, society, and property owners in the development of natural resource management and energy production policy. Students will also learn how to recognize the purpose of land use planning for natural resource management and energy production. Students will discuss advantages and disadvantages of land use planning for natural resource management and energy production and compare and contrast land use policy trends within the state. | 20 periods  900 minutes | (6) The student understands the role of natural resource management and energy production policies at the local, state, and national levels. The student is expected to:  (A) identify policy affecting the use of natural resources;  (B) identify policy affecting energy production;  (C) research controls that protect Earth's natural resources;  (D) identify state and federal agencies that have natural resource management and energy production responsibilities; and  (E) define the roles of government, society, and property owners in the development of natural resource management and energy production policy.  (7) The student recognizes the purpose of land use planning for natural resource management and energy production. The student is expected to:  (A) discuss advantages and disadvantages of land use planning for natural resource management and energy production; and  (B) compare and contrast land use policy trends within the state. | |
| **Unit 3: Ethical Issues – Natural Resource Management and Energy Production**  Students will analyze ethical issues related to natural resource management and energy production. In small groups and/or in other classroom activities, students will compile examples of different lease agreements used for leasing minerals and natural resources, interpret legal documents related to natural resource management and energy production, and compare and contrast public and industry interest in natural resource management. | 10 periods  450 minutes | 5) The student analyzes ethical issues related to natural resource management and energy production. The student is expected to:  (A) compile examples of different lease agreements used for leasing minerals and natural resources;  (B) interpret legal documents related to natural resource management and energy production; and  (C) compare and contrast public and industry interest in natural resource management. | |
| **Unit 4: Evaluate – Energy and Natural resources**  Students will determine and evaluate the importance and scope of energy and natural resources. In small groups and/or in other classroom activities, students will identify various types of natural resources, identify renewable, non-renewable, and sustainable energy resources and determine their availability, evaluate the impacts of energy production on natural resources and the agricultural economy, and analyze the geographic and demographic uses of natural resources. | 15 periods  675 minutes | (4) The student determines and evaluates the importance and scope of energy and natural resources. The student is expected to:  (A) identify various types of natural resources;  (B) identify renewable, non-renewable, and sustainable energy resources and determine their availability;  (C) evaluate the impacts of energy production on natural resources and the agricultural economy; and  (D) analyze the geographic and demographic uses of natural resources. | |
| **Unit 5: Water Use and Wastewater Management**  Students will discuss water use and wastewater management. In small groups and/or in other classroom activities, students will identify municipal, industrial, and agricultural uses of water, explore and develop water recycling opportunities, evaluate sources of point and non-point source pollution associated with municipal, industrial, and agricultural uses, describe effective management practices commonly used to abate point and non-point sources of pollution, analyze how water use impacts water availability, research water use legislation, discuss water quality policy and how it affects the decisions made in agricultural production, and discuss the interaction of energy production and water resources. | 25 periods  1,125 minutes | (8) The student identifies water use and wastewater management. The student is expected to:  (A) identify municipal, industrial, and agricultural uses of water;  (B) explore and develop water recycling opportunities;  (C) evaluate sources of point and non-point source pollution associated with municipal, industrial, and agricultural uses;  (D) describe effective management practices commonly used to abate point and non-point sources of pollution;  (E) analyze how water use impacts water availability;  (F) research water use legislation;  (G) discuss water quality policy and how it affects the decisions made in agricultural production; and  (H) discuss the interaction of energy production and water resources. | |
| **Unit 6: Air Quality**    Students will discuss air quality associated with natural resource management and energy production. In small groups and/or in other classroom activities, students will research air quality legislation, identify sources and effects of air pollution, discuss different emission management strategies, and identify air pollution controls used in energy production. | 15 periods  675 minutes | (9) The student describes air quality associated with natural resource management and energy production. The student is expected to:  (A) research air quality legislation;  (B) identify sources and effects of air pollution;  (C) discuss different emission management strategies; and  (D) identify air pollution controls used in energy production. | |
| **Unit 7: Soil Erosion**  Students will examine soil erosion as related to natural resource management and energy production. In small groups and/or in other classroom activities, students will examine the effects of natural resource management and energy production on soil erosion, analyze the components and functions of soils, appraise soil and water conservation programs, and compare soil erosion control methods. | 15 periods  675 minutes | (10) The student examines soil erosion as related to natural resource management and energy production. The student is expected to:  (A) examine the effects of natural resource management and energy production on soil erosion;  (B) analyze the components and functions of soils;  (C) appraise soil and water conservation programs; and  (D) compare soil erosion control methods. | |
| **Unit 8: Disposing of Waste and Hazardous Materials**  Students will analyze the identification, handling, storing, and disposing of waste and hazardous materials. In small groups and/or in other classroom activities, students will classify types of waste and hazardous materials, research legislation related to waste and hazardous materials, select appropriate entities responsible for waste and hazardous material management, and describe safe handling, storing, and disposal of waste materials such as composting and recycling. | 20 periods  900 minutes | (11) The student analyzes the identification, handling, storing, and disposing of waste and hazardous materials. The student is expected to:  (A) classify types of waste and hazardous materials;  (B) research legislation related to waste and hazardous materials;  (C) select appropriate entities responsible for waste and hazardous material management; and  (D) describe safe handling, storing, and disposal of waste materials such as composting and recycling. | |
| **Unit 9: Processes – Energy and Green Products**  Students will discuss the processes for producing energy and green products from agricultural, biomass, fossil fuel, wind, solar, and geothermal sources. In small groups and/or in other classroom activities, students will identify agricultural and silvicultural crops and bio-products suitable for renewable production, discuss production processes for agricultural- and silvicultural-based bio-products, describe the fundamentals for non-renewable resource recovery, analyze the effects of non-renewable resource recovery methods and the environmental considerations associated with each method such as environmentally friendly alternatives, analyze the advantages and disadvantages of wind-generated energy, identify public policy considerations associated with transmission line construction to transport wind-generated energy, locate areas in the state that have geothermal energy production potential, explain the benefits of geothermal energy, identify solar energy systems and describe the function of each, and identify the environmental considerations associated with biofuels. | 25 periods  1,125 minutes | (12) The student learns the processes for producing energy and green products from agricultural, biomass, fossil fuel, wind, solar, and geothermal sources. The student is expected to:  (A) identify agricultural and silvicultural crops and bio-products suitable for renewable production;  (B) discuss production processes for agricultural- and silvicultural-based bio-products;  (C) describe the fundamentals for non-renewable resource recovery;  (D) analyze the effects of non-renewable resource recovery methods and the environmental considerations associated with each method such as environmentally friendly alternatives;  (E) analyze the advantages and disadvantages of wind-generated energy;  (F) identify public policy considerations associated with transmission line construction to transport wind-generated energy;  (G) locate areas in the state that have geothermal energy production potential;  (H) explain the benefits of geothermal energy;  (I) identify solar energy systems and describe the function of each; and  (J) identify the environmental considerations associated with biofuels. | |
| **Unit 10: Supervised Agriculture Experience Program**  Students will discuss and develop all components of a supervised agriculture experience. Through a variety of classroom activities, students will utilize appropriate technology to plan, propose, conduct, document and evaluate their supervised agriculture experience program, apply appropriate record-keeping skills, and participate in leadership opportunities, Students will use instructional time to conduct field and laboratory investigations using safe, environmentally appropriate, and ethical practices in a supervised agriculture experience. Students will apply accepted procedures for the use and conservation of resources and for the safe handling of materials. As a culminating activity for this unit, students will produce and participate in a local program of activities using a strategic planning process. | 15 periods  675 minutes | (2) The student develops a supervised agriculture experience program. The student is expected to:  (A) plan, propose, conduct, document, and evaluate a supervised agriculture experience program as an experiential learning activity;  (B) apply proper record-keeping skills as they relate to the supervised agriculture experience;  (C) participate in youth leadership opportunities to create a well-rounded experience program; and  (D) produce and participate in a local program of activities using a strategic planning process.  (3) The student uses instructional time to conduct field and laboratory investigations using safe, environmentally appropriate, and ethical practices in a supervised agriculture experience. The student is expected to:  (A) demonstrate safe practices during field and laboratory investigations in a supervised agriculture experience; and  (B) apply accepted procedures for the use and conservation of resources and for the safe handling of materials. | |