Delaware Department of Education

CTE & STEM Office

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Phone: 302.735.4015

 Submit via email to: CTE.STEM@doe.k12.de.us

**DELAWARE CTE PROGRAM OF STUDY APPLICATION**

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| LOCAL EDUCATION AGENCY INFORMATION  |
| **Local Education Agency (LEA):** |
| **School(s) where the Program of Study will be Located:** | **Program of Study Start Date:**  |
| **LEA CTE Coordinator Name:** **Phone:** **E-Mail Address:**  |
| **Career Cluster Title:**Agriculture, Food, and Natural Resources | **Career Pathway Title:**Power, Structural and Technical Systems  | **Program of Study Title:**Agricultural Structures and Engineering  |
| **CTE Program of Study Course Titles & Sequence:**1. Fundamentals of Agricultural Structures and Engineering (FASE)
2. Structural Systems in Agriculture (SSA)
3. Essential Skills in Agricultural Structures and Engineering (ESASE)
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| **CTE Program of Study Request:**[x]  State-model CTE Program of Study[ ]  Local CTE Program of Study |
| ASSURANCES & SIGNATURES |
| CTE Program of Study approval and funding is contingent upon the following assurances:1. The LEA will comply with Delaware Administrative Code, 14 Del.C. §525, Requirements for Career and Technical Education Programs and the Delaware State Plan for the Carl D. Perkins Career and Technical Education Act of 2006;
2. The LEA will submit CTE program data as required by the Delaware Department of Education;
3. All teachers are certified in the appropriate CTE area and participate in program specific professional learning;
4. The LEA will convene and engage a program advisory committee for the purposes of program development, implementation, and continuous improvement;
5. All students have equal access to the program of study as well as early career/early college options;
6. Career and Technical Student Organizations are integral components of the program of study;
7. The LEA will maintain safe facilities and equipment aligned with the program of study goals; and
8. A process for continuous improvement has been established, which includes a model of evaluation and program improvement.
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| LEA CTE Coordinator Signature: Date: |
| LEA Chief School Officer Signature: Date: |

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| PROGRAM ADVISORY COMMITTEE MEMBER INFORMATION |
| Complete the list of program advisory committee members. Program of study representatives should include, but are not limited to: CTE and academic teachers, CTE/curriculum district coordinators, school counselors, business and industry representatives, labor representatives, and post-secondary partners. Community stakeholders including parents and students can also be considered. *Attach additional information if applicable*. |
| Name: Title:  |
| Affiliation: |
| Address: |
| Phone: E-Mail:  |
| Area of Expertise: |
| Representing: [ ]  Business/Industry[ ]  Secondary Education[ ]  Post-Secondary Education[ ]  Community/Other |
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| Area of Expertise:      |
| Representing: [ ]  Business/Industry[ ]  Secondary Education[ ]  Post-Secondary Education[ ]  Community/Other |
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| LABOR MARKET DEMAND |
| Certify that a labor market needs analysis has been completed for the proposed CTE program of study. Attach the [*Labor Market Information (LMI) Review*](http://www.doe.k12.de.us/Page/435) document. |
| Access the [*Labor Market Information (LMI) Review*](http://www.doe.k12.de.us/Page/435) document. [x]  The LEA certifies that regional, state, and local labor market data have been reviewed to assure a demand exists for the POS occupations and that the number of POS completers will not significantly exceed this demand. Department of Labor data are available and/or documented. Supporting evidence of supply and demand is submitted with this proposal. [ ]  No data exist for POS due to a unique labor market demand. Supporting evidence of demand is submitted with this proposal. Evidence may include, but is not limited to: real-time labor market information, documentation of national, regional, state, or local labor trends, or letters from employers or workforce agencies documenting projected employment specific to the career pathway.  |

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| ACADEMIC AND TECHNICAL SKILL STANDARDS |
| List the academic, technical, and workplace skills and knowledge used to develop the program of study. |
| **Title and source of academic standards:** [Common Core State Standards (CCSS)](http://www.corestandards.org/) The Common Core State Standards (CCSS) are national standards that set clear college- and career-ready expectations for kindergarten through 12th grade in English language arts/literacy and Mathematics. The standards help to ensure that students graduating from high school are prepared to take credit bearing introductory courses in two- or four-year college programs and enter the workforce. The standards were developed by the nation's governors and education commissioners, through their representative organizations, the National Governors Association Center for Best Practices (NGA) and the Council of Chief State School Officers (CCSSO). Teachers, parents, school administrators, and experts from across the country provided input into the development of the standards. The implementation of the Common Core, including how the standards are taught, the curriculum developed, and the materials used to support teachers as they help students reach the standards, is led entirely at the state and local levels. For more information on CCSS, please visit the link above.[Next Generation Science Standards (NGSS)](http://www.nextgenscience.org/) The Next Generation Science Standards (NGSS) are national standards for science that lay out the disciplinary core ideas, science and engineering practices, as well as crosscutting concepts that students should master in preparation for college and careers. The standards were developed through a state-led effort that was managed by Achieve. The development of the NGSS involved the National Research Council (NRC), the National Science Teachers Association (NSTA), the American Association for the Advancement of Science (AAAS), and other critical partners such as K–12 teachers, state science and policy staff, higher education faculty, scientists, engineers, cognitive scientists, and business leaders. For more information on the NGSS, please visit the link above.  |
| **Title and source of technical skill standards:**[Agriculture, Food, and Natural Resources (AFNR) Career Cluster Content Standards](https://www.ffa.org/thecouncil/afnr)These standards are intended to shape the design of an agricultural education program including: 1) Classroom and laboratory instruction; 2) Work-based learning experiences such as Supervised Agricultural Experience (SAE) Programs and internships; and 3) Career and Technical Student Organization (CTSO) experiences through organizations such as the National FFA Organization. For more information on the AFNR standards, please visit the link above. [National Center for Construction Education & Research (NCCER)](https://www.nccer.org/)NCCER is a standardized construction and maintenance curriculum and assessments with portable credentials. These credentials are tracked through NCCER’s registry system that allows organizations and companies to track the qualifications of their craft professionals and/or check the qualifications of possible new hires. NCCER's registry system also assists craft professionals by maintaining their records in a secure database. |
| **Title and source of workplace or other skill standards, as applicable:**[Common Career Technical Core (CCTC)](http://www.careertech.org/CCTC)The Common Career Technical Core (CCTC) are national standards for Career & Technical Education (CTE) that help inform the establishment of state standards and/or programs of study. The CCTC were developed by educators, school administrators, representatives from business and industry, faculty from higher education, as well as workforce and labor markets economists. The CCTC includes a set of standards for each of the sixteen (16) Career Clusters and the corresponding Career Pathways that help to define what students should know and be able to do after completing instruction in the ENRS program of study. Within the ENRS program of study, the CCTC standards for the Agriculture, Food, and Natural Resource (AFNR) Career Cluster have been embedded in each course. The program has students apply the CCTC AFNR standards, specifically the Environmental Service Systems Career Pathway standards. For more information on the CCTC, please visit the link above.[Career Ready Practices (CRP)](http://www.careertech.org/career-ready-practices)The Career Ready Practices (CRP) are a component of the CCTC framework and includes twelve (12) statements that address the knowledge, skills, and dispositions that are important to becoming career ready. The CRP describes the career-ready skills that educators should seek to develop in their students. These practices are not exclusive to a Career Pathway, program of study, discipline, or level of education and should be taught and reinforced in all career exploration and preparation programs with increasingly higher levels of complexity and expectation as a student advances through a career pathway. Within the ENRS program of study, the CRP statements are embedded throughout the program to ensure students display the appropriate workplace and soft skills required to be successful in a career. For more information on the CRP, please visit the link above.[The National FFA Organization](https://www.ffa.org/home)The National FFA Organization (FFA) makes a positive difference in the lives of its members by developing their potential for premier leadership, personal growth, and career success through agricultural education. To accomplish the FFA mission, FFA instruction will focus on: developing competent and assertive agricultural leaders; increasing awareness of the global and technological importance of agriculture and its contribution to our well-being; strengthening the confidence of agricultural students in themselves and their work; promoting the intelligent choice and establishment of an agricultural career; encouraging achievement in supervised agricultural experience programs; encouraging wise management of economic, environmental and human resources of the community; developing interpersonal skills in teamwork, communications, human relations and social interaction; building character and promotes citizenship, volunteerism and patriotism; promoting cooperation and cooperative attitudes among all people; promoting healthy lifestyles; encouraging excellence in scholarship.  |

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| EARLY CAREER AND EARLY COLLEGE OPPORTUNITIES |
| Identify CTE program of study early career opportunities, industry-recognized certifications and licenses, options for early college credit, two- and four-year degree and certification program alignment, and the technical skill attainment measures for the program of study. *Attach articulation/dual enrollment agreement(s)*. |
| **Describe early career opportunities (i.e. work-based learning experiences and industry-mentored projects):** The Agricultural Structures and Engineering program is a three (3) course program of study that provide students with the scientific principles and methods required to understand the interrelationships of construction. Students practice real world applications and problem solving skills associated with agricultural designs and engineering principles. Students utilize problem solving, as well as communication skills to develop engineering concepts and building practices that are sound and reliable. Students participating in this pre-apprenticeship program will be prepared to enter a Delaware registered apprenticeship program in one of the following areas: carpentry, construction laborer, electrician, masonary, plumbing, or pipe fitting. Students completing this program will demonstrate com­petence in the application of principles and techniques for the development, the application and management of power and structural and technical systems.Local business partners and agencies work with educators by serving on advisory boards and as mentors to provide a real-world connection to Power, Structural and Technical Systems coursework. Work-based learning experiences and industry-mentored projects are included in each course and will be reviewed with the LEA Program Advisory Council (PAC) to further identify opportunities to engage the community. The Supervised Agriculture Experience (SAE) program provides students with the opportunity to consider multiple careers and occupations, demonstrate workplace behavior, develop skills within the environmental and natural resource sciences, and apply academic and occupational skills in the workplace or a simulated workplace environment. Supervised Agriculture Experience (SAE) programs are classified in six different categories: Ownership/Entrepreneurship, Placement/Internship, Research, Exploratory, School-Based Enterprise, or Service Learning. |
| **List industry-recognized certifications and/or licenses, as appropriate (include the partner organization and credential):** [NCCER Credentialed Craft Professional’s Training](https://www.nccer.org/workforce-development-programs/credentials-registry)The National Center for Construction & Engineering Research (NCCER) provides industry-recognized credentials for students and craft professionals that have national portability of skills through the [NCCER Credentialed Craft Professional’s Training](https://www.nccer.org/workforce-development-programs/credentials-registry). NCCER maintains credentialing and certification through its registry system. The NCCER curriculum provides industry-based, end of module assessments. NCCER will report valid and reliable scores on overall student performance for each course. The end of module assessment(s) give students an objective evaluation of their achievement and stakeholders the opportunity to obtain and use data to make informed decisions. [Occupational Safety and Health Administration (OSHA) 10-Hour Construction Certification](https://www.osha.gov/)The Occupational Safety and Health Administration ([OSHA](https://www.osha.gov/)) 10-Hour Construction certification covers a broad spectrum of valuable health and safety workplace topics that will familiarizes students with OSHA construction standards. Topics included in the OSHA 10-Hour Construction certification are: fall protection, electrocution hazards, struck-by hazards, caught-in hazards, personal protective equipment (PPE), health hazards, material handling, and tools. |
| **Describe early college credit options (i.e. advanced placement, dual enrollment, transcripted and/or articulated credit, credit by exam, pre-apprenticeship, other) and options for two- and four-year degree and/or certification program alignment (attach articulation/dual enrollment agreement). The partner organization and hours of credit earned should be included, as applicable:**Students completing the Agricultural Structures and Engineering program of study will receive credentials for the NCCER Core Curriculum coursework (72 hours) and will be granted advanced placement in Delaware registered apprenticeship programs through the adult education divisions of the New Castle County, Polytech, and Sussex Technical systems. Qualifying apprenticeable trades include: carpentry, construction laborer, electrician, masonary, plumbing, and pipe fitting.The Department of Education is currently negotiating articulation agreements with Delaware Technical Community College (DTCC). |
| **List technical skill attainment measures for the program of study (i.e. industry recognized certification or license, advanced placement, dual enrollment, transcripted and/or articulated credit, dual enrollment, credit by exam):**[x]  Certification/credentialing exam (specify): NCCER Credentialed Craft Professional’s Training – Core Curriculum[ ]  Licensing exam (specify): [ ]  Nationally recognized exam (specify): [x]  Advanced standing (specify): Delaware Registered Apprenticeship programs: Carpentry, Construction, Electrical, Masonry, Plumbing, and Pipe Fitting [ ]  Other (specify):       |

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| POS OVERVIEW, COURSE DESCRIPTIONS, END-OF-COURSE, AND PROGRAM ASSESSMENTS |
| Provide a CTE program of study overview that broadly describes the program and student expectations. Identify end-of-program assessment(s) and opportunities for students to participate in early college and early career experiences. List each course title in the CTE program of study. Provide an overview of each course and define what students should know and be able to demonstrate upon completion of each level. Identify appropriate end-of-course assessment(s).  |
| **CTE Program of Study Overview:** The Agricultural Structures & Engineering program of study is a three (3) course Career & Technical Education (CTE) instructional program designed to provide students with the scientific principles and methods required to understand the interrelationships of construction. Students practice real world applications and problem solving skills associated with agricultural designs and engineering principles. Students utilize problem solving, as well as communication skills to develop engineering concepts and building practices that are sound and reliable. The program prepares students for a variety of careers including carpentry, engineering, architectural design, electrical, plumbing, masonry, construction framing, business management, sales, building maintenance, home improvement, and green energy technologies. * **Fundamentals of Agricultural Structures & Engineering (FASE)** provides students a variety of experiences in the fields of agricultural structures and engineering. Students engage in hands-on projects reading and developing construction plans and drawings, evaluating site preparation techniques, selecting wood types, constructing buildings, and tool identification, use and safety. Students participate in project based instruction and apply principles of agricultural structures and engineering.
* **Structural Systems in Agriculture (SSA)** enables students tobuild on the knowledge and experiences gained in FASE. Students design, plan and construct small structures that directly relate to large scale construction projects. SSA includes hands-on experiences for students to expand their skills in advanced equipment and engineering applications, electrical wiring, and plumbing.
* **Essential Skills in Agricultural Structures & Engineering (ESASE)** provides students with the scientific principles and methods required to incorporate the skills and knowledge needed to be employed in agricultural structures and related agricultural industries. Students will learn HVAC principles, concrete and masonry skills, advanced woodworking skills, and various interior building finishing techniques needed to complete an agricultural structure.
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| **End-of-Program Assessment(s):**[x]  Certification/credentialing exam (specify):  NCCER Credentialed Craft Professional’s Training – Core Curriculum OSHA 10-Hour Training for Construction[ ]  Licensing exam (specify):      [ ]  Nationally recognized exam (specify):      [ ]  Other (specify):       |
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| **Course title:**Fundamentals of Agricultural Structures and Engineering (FASE) |
| **Course description (include prerequisites):**Fundamentals of Agricultural Structures & Engineering (FASE) provides students a variety of experiences in the fields of agricultural structures and engineering. Students engage in hands-on projects reading and developing construction plans and drawings, evaluating site preparation techniques, selecting wood types, constructing buildings, and tool identification, use and safety. Students participate in project based instruction and apply principles of agricultural structures and engineering.  |
| **Course knowledge and skills (what students will know and be able to do):** 1. Describe the importance of safety, the causes of workplace incidents, and the process of hazard recognition and control; identify the safe work requirements for elevated work, including fall protection guidelines; explain how to avoid struck-by and caught-in-between hazards; Identify common energy-related hazards and explain how to avoid them; demonstrate the proper use of personal protective equipment (PPE); and describe other specific job-site safety hazards. *(Basic Safety - Module One - 00101-15)*
2. Identify various tools used to measure length and show how they are used; convert units of length, weight, volume, and temperature between the imperial and metric systems of measurement; calculate area and volume of angles and geometric shapes. *(Introduction to Construction Math - Module Two - 00102-15)*
3. Demonstrate the proper way to use various types of hand tools; demonstrate the proper way to use various types of measurement and layout tools; demonstrate the proper way to use various types of cutting and shaping tools. *(Introduction to Hand Tools - Module Three - 00103-15)*
4. Demonstrate the proper way to use various types of power drills and impact wrenches, the power saws, grinders, and grinder attachments. *(Introduction to Power Tools - Module Four - 00104-15)*
5. Identify fundamental components and features of construction drawings; describe the purpose of the five basic construction drawing components; explain the significance of various drawing elements, such as lines of construction, symbols, and grid lines; demonstrate the use of dimensions and various drawing scales; and demonstrate how to use engineer’s and architect’s scales.  *(Introduction to Construction Drawings - Module Five - 00105-15)*
6. Describe various types of rigging slings, hardware, and equipment; describe various types of slings; inspect various types of slings; inspect common rigging hardware; identify and describe various types of hoists; and demonstrate basic rigging hitches and the related Emergency Stop hand signal. *(Introduction to Basic Rigging - Module Six - 00106-15)*
7. Describe the communication, listening, and speaking processes and their relationship to job performance; describe the communication process and the importance of listening and speaking skills; describe the listening process and identify good listening skills; describe the speaking process and demonstrate good speaking skills; describe good reading and writing skills and their relationship to job performance; describe the importance of good reading and writing skills; describe job-related reading requirements and identify good reading skills; and escribe job-related writing requirements and identify good writing skills. *(Basic Communication Skills - Module Seven - 00107-15)*
8. Describe the opportunities in the construction business and how to enter the construction workforce; describe the construction business and the opportunities offered by the trades, explain how workers can enter the construction workforce; explain the importance of critical thinking and how to solve problems; describe critical thinking and barriers to solving problems; describe how to solve problems using critical thinking; describe problems related to planning and scheduling; explain the importance of social skills and identify ways good social skills are applied in the construction trade; identify good personal and social skills; explain how to resolve conflicts with co-workers and supervisors; explain how to give and receive constructive criticism, identify and describe various social issues of concern in the workplace; and work in a team environment and demonstrate effective leader skills. *(Basic Employability Skills - Module Eight - 00108-15)*
9. Demonstrate proper material handling and common safety precautions; tie knots commonly used in material handling, identify various types of material handling equipment and demonstrate how they are used; identify non-motorized material-handling equipment and demonstrate how they are used; and identify motorized material-handling equipment and demonstrate how they are used. *(Introduction to Material Handling - Module Nine - 00109-15)*
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| **End-of-Course Assessment(s):**[x]  Teacher designed assessment[ ]  LEA designed assessment[x]  Certification/credentialing exam (specify): NCCER Credentialed Craft Professional’s Training – Core Curriculum[ ]  Licensing exam (specify):      [ ]  Nationally recognized exam (specify):      [x]  Other (specify): Supervised Agriculture Experience (SAE) Program |
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| **Course title:**Structural Systems in Agriculture (SSA) |
| **Course description (include prerequisites):**Structural Systems in Agriculture (SSA) enables students to build on the knowledge and experiences gained in FASE. Students design, plan and construct small structures that directly relate to large scale construction projects. SSA includes hands-on experiences for students to expand their skills in advanced equipment and engineering applications, electrical wiring, and plumbing. Prerequisite: Fundamentals of Agricultural Structures and Engineering (FASE) |
| **Course knowledge and skills (what students will know and be able to do):** 1. Identify the components of ceiling framing; identify common types of roofs used in residential construction; identify the components and define the terms associated with roof framing; lay out a common rafter; erect a gable roof; frame a basic gable end wall; describe the basics of roof sheathing installation; and perform a material takeoff for a roof.  *(Ceiling Joist and Installation Techniques - Module Four - 27112-13)*
2. Identify safety requirements for roofing projects; identify the tools and fasteners used in roofing; identify the different roofing systems and their associated materials; install a roof using common roofing systems; and develop an estimate for a roofing project. *(Roofing Application - Module Five - 27202-13)*
3. Identify the components of a wall system; lay out a wood frame wall, including plates, corner posts, door and window openings, partition Ts, bracing, and fire-stops; assemble, erect, and brace exterior walls for a frame building; describe wall framing techniques used in masonry construction; develop an estimate for the materials required to frame walls; identify alternative wall systems. *(Wall Systems - Module Six - 27111-13)*
4. Describe the safety hazards when working with exterior finish materials; describe the various types and applications of exterior finish materials; install exterior finish materials; and develop an estimate for an exterior finish project. *(Exterior Finishing - Module Seven - 27204-13)*
5. Demonstrate safe working practices in the construction environment; explain the purpose of OSHA and how it promotes safety on the job; identify electrical hazards and how to avoid or minimize them in the workplace; explain electrical safety issues concerning lockout/tagout procedures, confined space entry, respiratory protection, and fall protection systems; develop a task plan and a hazard assessment for a given task and select the appropriate PPE and work methods to safely perform the task. *(Electrical Safety - Module Nine - 26102-14)*
6. Explain the role of the National Electrical Code® in residential wiring and determine electric service requirements for dwellings; explain the grounding requirements of a residential electric service; calculate and select service-entrance equipment; select the proper wiring methods for various types of residences; compute branch circuit loads and explain their installation requirements; explain the types and purposes of equipment grounding conductors; explain the purpose of ground fault circuit interrupters and tell where they must be installed; size outlet boxes and select the proper type for different wiring methods; describe rules for installing electric space heating and HVAC equipment; describe the installation rules for electrical systems around swimming pools, spas, and hot tubs; explain how wiring devices are selected and installed; and install lighting fixtures and controls. *(Residential Electrical Services - Module Ten - 26111-14)*
7. Explain how waste moves from a fixture through the drain system into the environment; identify the major components of a drainage system and describe their functions; identify the different types of traps and their components, explain the importance of traps, and identify the ways that traps can lose their seals; and identify significant code and health issues, violations, and consequences related to DWV systems*. (Introduction to Drain, Waste, and Vent (DWV) Systems - Module Twelve - 02111-12)*
8. Identify the various types of plastic pipe; identify the material properties, storage, and handling requirements of plastic pipe; identify the types of fittings and valves used with plastic pipe; identify the techniques used in hanging and supporting plastic pipe; properly measure, cut, and join plastic pipe; and identify the hazards and safety precautions associated with plastic pipe. *(Plastic Pipe and Fittings - Module Thirteen - 02106-12)*
9. Identify the various types of copper tube; identify the material properties, storage, and handling requirements of copper tube; identify the types of fittings and valves used with copper tube; identify the techniques used in hanging and supporting copper tube; properly measure, cut, and join copper tube; and identify the hazards and safety precautions associated with copper tube. *(Copper Tube and Fittings - Module Fourteen - 02107-12)*
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| **End-of-Course Assessment(s):**[x]  Teacher designed assessment[ ]  LEA designed assessment[ ]  Certification/credentialing exam (specify): [ ]  Licensing exam (specify):      [ ]  Nationally recognized exam (specify): [x]  Other (specify): Supervised Agriculture Experience (SAE) Program |
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| **Course title:**Essential Skills in Agricultural Structures and Engineering (ESASE) |
| **Course description (include prerequisites):**Essential Skills in Agricultural Structures & Engineering (ESASE) provides students with the scientific principles and methods required to incorporate the skills and knowledge needed to be employed in agricultural structures and related agricultural industries. Students will learn HVAC principles, concrete and masonry skills, advanced woodworking skills, and various interior building finishing techniques needed to complete an agricultural structure. Prerequisite: Structural Systems in Agriculture (SSA) |
| **Course knowledge and skills (what students will know and be able to do):** 1. Describe modern masonry materials and techniques; recognize the basic safety precautions when working with masonry materials; and mix mortar and lay masonry units. *(Introduction to Masonry - Module One - 28101-13)*
2. Install brick; cut concrete masonry units and brick; install masonry reinforcement and accessories; and describe the skills, attitudes, and abilities needed to be a successful mason. *(Masonry Units and Installation Techniques - Module Two - 28105-13)*
3. Identify the types of stairways; identify the various components associated with stairs; identify terms associated with stair framing; determine the total rise, number and size of risers, and number and size of treads required for a stairway; and lay out and cut stringers, risers, and treads. *(Basic Stair Layout - Module Nine - 27110-13)*
4. Explain the basic principles of heating, ventilation, air conditioning, and refrigeration; describe the principles that guide HVAC/R installation and service techniques; and identify career paths available in the HVAC/R trade. *(Introduction to HVAC - Module one - 03101-13)*
5. Identify and describe the types of wood commonly used to construct cabinets; identify and describe the safe use of various cabinetmaking power tools; identify and describe joints and other construction features of cabinet components and their related hardware and fasteners; assemble, sand, and finish cabinets; apply laminate to a countertop. *(Cabinetmaking - Module - 27501-15)*
6. Describe the safety hazards when installing cabinets; identify the different types of cabinets; identify cabinet components and hardware and describe their purpose; and lay out and install a basic set of cabinets. *(Cabinet Installation - Module Eleven - 27211-13)*
7. Describe basic welding processes, the welding trade, and training/apprenticeship programs; identify, and demonstrate how to properly wear personal protective equipment (PPE) related to the welding trade; and identify and describe welding safety practices related to specific hazards or environments. *(Welding Safety - Module One - 29101-15)*
8. Describe oxyfuel cutting and identify related safe work practices; identify and describe oxyfuel cutting equipment and consumables; setup, light, and shut down oxyfuel equipment; and perform various oxyfuel cutting procedures. *(Oxyfuel Cutting - Module Two - 29102-15)*
9. Discuss plasma arc cutting processes and identify related safety precautions; identify and describe plasma arc cutting equipment; and set up, safely operate, and care for plasma arc cutting equipment. *(Plasma Arc Cutting - Module Three - 29103-15)*
10. Identify GMAW-related safety practices and explain how to set up for welding; describe equipment control and welding procedures for GMAW and explain how to produce basic weld beads; and perform welding procedures needed to produce proper fillet and V-groove welds using GMAW welding techniques. *(GMAW – Plate - Module Six - 29209-15)*
11. Identify GTAW-related safety practices and describe the electrical characteristics that affect GTAW; identify and describe GTAW equipment and consumables; and set up a welder for GTAW welding. *(GTAW – Equipment and Filler Metals - Module Eight - 29207-15)*
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| **End-of-Course Assessment(s):**[x]  Teacher designed assessment[ ]  LEA designed assessment[x]  Certification/credentialing exam (specify):  NCCER Credentialed Craft Professional’s Training – Construction Technology OSHA 10-Hour Training for Construction[ ]  Licensing exam (specify):       [ ]  Nationally recognized exam (specify): [x]  Other (specify): Supervised Agriculture Experience (SAE) Program |

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| PROGRAM OF STUDY CURRICULUM |
| Identify the method of technical and academic curriculum development (adopted, adapted, or developed in accordance with guidance from the program advisory committee).  |
| **POS technical and academic curriculum will be:**[x]  Adopted (specify source): State model program of study[ ]  Adapted (specify source):      [ ]  Developed locally (describe):      [ ]  Other (specify):       |

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| TEACHER CERTIFICATION |
| Provide valid teacher certification(s), candidate experience, pre-requisite and requisite licensure or certification requirement(s) for POS teachers. |
| **POS teacher requirements include:**[x]  Teacher certification(s) (list): AgriScience Education or Skilled and Technical Sciences (STS) in Power, Structural & Technical Systems[x]  Candidate experience (describe): Candidate may have experience in applying knowledge of engineering technology and biological science to agricultural problems concerned with power and machinery, electrification, structures, soil and water conservation, and processing of agricultural products; driving and controlling farm equipment to till soil and to plant, cultivate, and harvest crops. For more information, please see the Bureau of Labor Statistics: Agricultural Engineering and Agricultural Mechanics and Machinery Operation.[x]  Pre-requisite professional licensure or certification requirement(s) (list): NCCER Instructor Certification Training (24 Hrs) [ ]  Requisite professional licensure or certification requirement(s) (list):      [ ]  Other (describe):       |

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| VALUE-ADDED OPPORTUNITIES |
| List extended early career and college credit opportunities available during the student’s senior year. Document transition services, cooperative learning experiences, additional dual enrollment, or other.  |
| **Opportunities for extended and accelerated learning include:**[ ]  Cooperative education (describe):      [ ]  Structured internship (describe): [ ]  Dual enrollment (list):      [ ]  Advanced Placement (list):      [ ]  Transition services (describe):      [ ]  Other (describe):       |

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| CAREER AND TECHNICAL STUDENT ORGANIZATIONS |
| Indicate the Career and Technical Student Organization (CTSO) affiliation by checking the appropriate box. |
| [x]  FFA  |

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| PROGRAM OF STUDY MATRIX |
| Complete the program of study matrix to demonstrate the alignment of academic and technical courses, culminating early career and/or early college experiences. Identify appropriate certification and licensure options, opportunities for obtaining early college credit (courses with articulated or dual enrollment credit agreements should be appropriately designated within the matrix), the post-secondary program sequence, and potential career options. *Attach the Program of Study Matrix*. |
| Access the [Program of Study Matrix](http://www.doe.k12.de.us/Page/2016).  |

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| DEPARTMENT OF EDUCATION PROGRAM OF STUDY APPROVAL |
| The following section will be completed by staff from the Delaware Department of Education, CTE & STEM Office and reported to the LEA as part of the CTE program of study approval process. |
| **Date Delaware CTE Program of Study Application Received:**      |
| **Local Education Agency (LEA):**     **School(s):**      | **Program of Study Start Date:** |
| **LEA CTE Coordinator Name:** **Phone:** **E-Mail Address:**                    |
| **Career Cluster & Code:**Agriculture, Food, and Natural Resources / 1 | **Career Pathway & Code:**Power, Structural, & Technical Systems / 1.04 | **Program of Study Title & Code:**Agricultural Structures and Engineering / 1.04603 |
| **CTE Program of Study Course Titles, Course Codes, and Funding Levels:**1. Fundamentals of Agricultural Structures and Engineering / 1.04603011 / 2
2. Structural Systems in Agriculture / 1.04603022 / 3
3. Essential Skills in Agricultural Structures and Engineering / 1.04603033 / 3
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| **CTE Concentrator/Completer Course Titles:**1. Concentrator Course: Structural Systems in Agriculture / 1.04603022
2. Completer Course: Essential Skills in Agricultural Structures & Engineering / 1.04603033
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| **CTE Program of Study Request:**[x]  State-model CTE Program of Study[ ]  Local CTE Program of Study |
| **CTE Program of Study Attachments:**[x]  Labor Market Information (LMI) Review;[x]  Articulation/Dual Enrollment Agreement(s); and[x]  Program of Study Matrix. |
| DDOE CTE & STEM Director Signature: Date: |
| DDOE Chief Academic Officer Signature: Date: |