ARCHITECTURE & CONSTRUCTION CAREER CLUSTER DESIGN

Design and Pre-Construction Pathway – CIP Code 15.1303

Approved Pathway:

1) Includes minimum of three secondary-level credits.
2) Includes a work-based element.
3) Consists of a sequence: Introductory-level, Technical-level, and Application-level courses.
4) Supporting documentation include Articulation Agreement(s) and a Program of Study.
5) Technical-level and Application-level courses receive .5 state-weighted funding in an approved CTE pathway.

Concentrator Requirement

For a student to be a concentrator, at least 2 of 3 required secondary level credits taken must be a combination of technical and application levels.

Nov. 2009

INTRODUCTORY LEVEL

Introduction to Industrial Technology	38001	.5 credit
Drafting	21102	.5 credit

TECHNICAL LEVEL

*Drafting/CAD	21107	1 credit
* Architecture Design	21103	1 credit
Residential Carpentry	17002	1 credit
Cabinetmaking & Furniture Design	17007	1 credit

APPLICATION LEVEL

Research & Design for Pre-Construction	21109	1 credit
**Interior Design IIb	22212	.5 credit
**Commercial & Industrial Interior Design	38212	.5 credit
Advanced Studies	38050	.5 credit

*One of these two is required for pathway approval
**Check for appropriate teacher licensure requirements
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ALL ONE CREDIT COURSES MAY BE TAUGHT AS TWO .5 CREDIT COURSES.

KANSAS STATE CAREER CLUSTER COMPETENCY PROFILE (C.I.P. 15.1303)

ARCHITECTURE & CONSTRUCTION

DESIGN & PRE-CONSTRUCTION PATHWAY

STUDENT_____

Rating Scale:

4 - Exemplary Achievement
3 - Proficient Achievement
2 - Limited Achievement
1 - Inadequate Achievement
0 - No Exposure

Graduation Date _____

I certify that the student has received training in the areas indicated.

Instructor Signature _____

Instructor Signature _____

Instructor Signature _____

Instructor Signature _____

38001-INTRODUCTION TO INDUSTRIAL TECHNOLOGY (.5 Credit)

An introductory level course designed to instruct students in the basic skills necessary to all occupations in the Construction, Manufacturing & Transportation areas.

4 3 2 1 0 1. **Basic Safety**

-Identify causes of accidents and the impact of accident costs.
- Follow safe behavior procedures on and around ladders, scaffolds and stairs.
-Follow safe behavior procedures around electrical hazards.
-Demonstrate the use, care and inspection of appropriate personal protective equipment (PPE)
-Explain the importance of hazard communications (HazCom) and material safety data sheets (MSDSs).
-Respond to hazardous-materials and hazardous-waste emergency situations in accordance with regulatory requirements.
- Follow safety procedures required for lifting heavy objects.
-Demonstrate a working knowledge of safety education, environment, and enforcement for life and work.
- Apply safe practices while using tools and equipment.
-Apply safe practices for housekeeping,
dress, fire, chemicals & personal protection while working in a shop.
-Describe fire prevention and firefighting techniques.
-Explain the purpose of OSHA and how it promotes safety on the job.

4 3 2 1 0 2. **Industrial Math**

-Add, subtract, multiply, and divide whole numbers, fractions, decimals and percentages.
-Use a standard ruler, a metric ruler, and a measuring tape to measure.
-Demonstrate conversion skills for decimals and fractions.
-Recognize and perform calculations using metric units of length, weight, volume and temperature.

4 3 2 1 0 3. **Hand Tools**

-Recognize and identify some of the basic hand tools and their proper uses in industrial trades.
-Demonstrate the safe use of common hand tools.

4 3 2 1 0 4. **Power Tools**

-Recognize and identify some of the basic power tools and their proper uses in the industrial trades.
-Demonstrate the safe use of common power tools.
-Perform preventive maintenance on basic power tools used in the industrial trades.

4 3 2 1 0 5. **Blueprint Reading**

-Perform the drafting principles needed to draw the basic geometric shapes.
-Develop a pictorial sketch of an object.
-Develop a multi-view drawing.
-Identify basic symbols used in blueprints.
-Identify various types of blueprint views used in Architecture, Construction, Manufacturing and Engineering.

4 3 2 1 0 6. **Communication Skills**

-Interpret information and follow instructions presented in both verbal and written form.
-Communicate effectively in on-the-job situations using verbal and written

skills in various delivery modes (face-to-face, paper, & electronic).
-Create and complete various written documents used in industrial trades.
-Demonstrate knowledge and use of computer systems and word processing software in effective communication.

4 3 2 1 0 7. **Employability Skills**
-Create and utilize employment documents including a resume and portfolio.
-Demonstrate job seeking and interview skills.
-Understand and respond to performance reviews.

4 3 2 1 0 8. **21st Century/Foundation Skills**
-Demonstrate critical thinking skills and the ability to solve problems using those skills.
-Define effective relationship skills.
-Demonstrate a working knowledge of workplace issues such as sexual harassment, stress, and substance abuse.
-Demonstrate the ability to achieve common goals through team work

4 3 2 1 0 8. **Materials Handling**
-Verify that health, safety, environmental and government regulations are met.
-Recognize hazards and follow safety procedures required for materials handling.
-Demonstrate ability to load and unload materials properly and safely.

4 3 2 1 0 9.

21102-DRAFTING (Architectural & Mechanical) (.5 Credit)
An introductory course designed to expose students to both architectural and mechanical (technical) drafting skills.

4 3 2 1 0 1. Identify types of architectural and mechanical drawings.
4 3 2 1 0 2. Display knowledge of careers in architecture and drafting.
4 3 2 1 0 3. Display knowledge of drafting standards (line styles, dimensions, sheet layout, etc.)
4 3 2 1 0 4. Demonstrate ability to perform manual drafting skills.
4 3 2 1 0 5. Demonstrate ability to do lettering on a drawing.
4 3 2 1 0 6. Demonstrate ability to perform sketching, geo construction and 2d drafting.
4 3 2 1 0 7. Demonstrate the ability to dimension a drawing.
4 3 2 1 0 8. Demonstrate visualization skills in orthographic projection.
4 3 2 1 0 9. Display knowledge of architectural symbols.
4 3 2 1 0 10.

21107 - DRAFTING/CAD (1 Credit)
A comprehensive course designed to instruct students in the use of CAD design and software.

4 3 2 1 0 1. Identify and demonstrate the use of CAD commands and system peripherals.
4 3 2 1 0 2. Demonstrate the ability to dimension drawings on the CAD system.
4 3 2 1 0 3. Demonstrate proficiency in setting limits and scale on the CAD system.
4 3 2 1 0 4. Demonstrate proficiency in setting, turning on and turning off layers.
4 3 2 1 0 5. Create standard drawings for templates.
4 3 2 1 0 6. Demonstrate the ability to create drawings in 3D.
4 3 2 1 0 7. Demonstrate the ability to load, store files, and transport files via Internet.
4 3 2 1 0 8. Place text on a drawing and be able to change to different font styles, sizes and angles.
4 3 2 1 0 9. Be proficient in the use of printer/plotter operations.
4 3 2 1 0 10. Demonstrate ability to place text on a drawing and change to different font styles, sizes and angles.
4 3 2 1 0 11. Demonstrate ability to dimension drawings on the CAD system.
4 3 2 1 0 12. Demonstrate proficiency in setting limits and scale on the CAD system.
4 3 2 1 0 13. Construct drawings using straight line, circle, and hidden line statements, etc.
4 3 2 1 0 14. Construct isometric and 3D drawings.
4 3 2 1 0 15. Set grid and snap specifications.
4 3 2 1 0 16. Define and use commands to modify a drawing.
4 3 2 1 0 17. Use symbols (from a symbol library) in a drawing.
4 3 2 1 0 18.

21103 – ARCHITECTURAL DESIGN (1 Credit)
A comprehensive course designed to instruct students in the basic skills of architectural design with a particular emphasis on residential and light commercial applications.

4 3 2 1 0 1. Identify historical styles of architecture and types of structural designs.
4 3 2 1 0 2. Design a functional structure suitable for a particular site.
4 3 2 1 0 3. Calculate/estimate building costs for a particular structure and develop brief specifications for the project.
4 3 2 1 0 4. Produce a floor plan with all walls, doors, windows and stairs properly identified.
4 3 2 1 0 5. Draw plumbing and electrical layers.
4 3 2 1 0 6. Draw a foundation plan for a single family dwelling.
4 3 2 1 0 7. Draw elevations and pictorial presentations e.g. exterior, interior, etc.
4 3 2 1 0 8. Dimension and draw wall section with all components identified.

4 3 2 1 0 9. Develop Plot Plan with house, out buildings, trees, utility supply lines and communications supply lines identified.
4 3 2 1 0 10. Demonstrate the ability to 3D model a structure using different mediums in design.
4 3 2 1 0 11. Draw a roof framing plan for a single family dwelling.
4 3 2 1 0 12. Draw interior elevations with fixtures, built-ins, trims, utilities and openings.
4 3 2 1 0 13. Construct an interior finish schedule.
4 3 2 1 0 14. Draw an interior one-point perspective drawing.
4 3 2 1 0 15. Create an exterior two-point perspective view.

17007-CABINETMAKING & FURNITURE DESIGN I (1 Credit)

A comprehensive course designed to instruct students in the basic knowledge and skills required for cabinetmaking and furniture design

4 3 2 1 0 1. Utilize hand tools for cutting, scraping or planing the stock for a project.
4 3 2 1 0 2. Apply math skills to control distance, spacing &/or angle measurements and placements for constructing a project
4 3 2 1 0 3. Utilize portable power tools to construct a project.
__belt sander __router __hand drill
__power plane __finish sander __nail gun
__circular saw __reciprocating saw
4 3 2 1 0 4. Utilize machines to construct a project.
__radial arm __jointer __planer/surface
__table saw __band saw __drill press
__power miter saw __shaper __mortiser
__thickness sander __lathe __scroll saw
__panel saw __disc/belt sander __grinder
4 3 2 1 0 5. Perform the steps to interpret, transfer and layout lines &/or markings to be used for constructing a project.
4 3 2 1 0 6. Construct a project, incorporating the elements & principles of design as related to traditional styles in history.
4 3 2 1 0 7. Select and perform "best-method" for joining and assembling project parts.
4 3 2 1 0 8. Apply a quality finish on a project utilizing appropriate materials & equipment.
4 3 2 1 0 9.

17002-RESIDENTIAL CARPENTRY I (1 Credit)

A comprehensive course designed to instruct students in the basic knowledge and skills required for construction of residential structures.

4 3 2 1 0 1. Safely maintain and utilize tools common to the building trades industry.
4 3 2 1 0 2. Demonstrate Blueprint reading skills including the interpretation of plans, elevations, schedules, sections and details.
4 3 2 1 0 3. Estimate building materials and cost for a project.
4 3 2 1 0 4. Set up and utilize leveling instruments
4 3 2 1 0 5. Install sill seal and sill plate to the foundation.
4 3 2 1 0 6. Lay out, construct and erect walls and partitions.
4 3 2 1 0 7. Lay out, cut and install ceiling joists.
4 3 2 1 0 8. Construct a frame roof and apply sheathing.
4 3 2 1 0 9. Install a pre-hung window.
4 3 2 1 0 10. Install a pre-hung exterior door with weather-stripping.
4 3 2 1 0 11. Install a lockset on an entry door.
4 3 2 1 0 12. Describe the types of and demonstrate the application of common wood sidings used as exterior finishes.
4 3 2 1 0 13. Apply fiberglass shingles with a 5"exposure, including at least one rooftop projection.
4 3 2 1 0 14. Install factory-made cabinets, countertops, and backsplashes.
4 3 2 1 0 15.

22212-RESIDENTIAL INTERIOR DESIGN (.5 Credit)

An application level course designed to instruct students in the skills necessary to design interior spaces that apply design elements and principles to spaces for residential and special needs (e.g. single family homes, multi-family structures, homes for special needs, child care centers, retirement homes, etc.). Topics will include meeting client's needs, legislated codes, historic considerations, current and future trends, and public policy.

4 3 2 1 0 1. Examine Education and training requirements and opportunities for career paths in building/interior design.
4 3 2 1 0 2. Examine legislation, regulations, and public policy affecting the building industry.
4 3 2 1 0 3. Assess community, family and financial resources needed to achieve client's goals.
4 3 2 1 0 4. Compare historical architectural trends to current building/interior design trends.
4 3 2 1 0 5. Consider future trends in building/interior design.
4 3 2 1 0 6. Determine the effects that the principles and elements of design have on the individual, aesthetics and function.
4 3 2 1 0 7. Review measuring, estimating, ordering, purchasing and pricing skills.
4 3 2 1 0 8. Draw an interior space to scale, using correct architectural symbols, and drafting skills.
4 3 2 1 0 9. Create floor plans, using computer design software.
4 3 2 1 0 10. Examine floor plans for efficiency and safety, and areas including, but not limited to, zones, traffic patterns, storage, universal design and space function.

4 3 2 1 0 11. Utilize applicable building codes, universal guidelines, and regulations in space planning.
4 3 2 1 0 12.

38212-COMMERCIAL & INDUSTRIAL INTERIOR DESIGN (.5 CREDIT)
An application level course designed to instruct students in the skills necessary to design interior spaces that acknowledge client needs, legislated codes, historic, current and future trends, and public policy for commercial and industrial buildings (e.g. office buildings, warehouses and manufacturing sites, etc.).

4 3 2 1 0 1. Examine Education and training requirements and opportunities for career paths in building/interior design.
4 3 2 1 0 2. Examine legislation, regulations, and public policy affecting the building industry.
4 3 2 1 0 3. Assess community, family and financial resources needed to achieve client's goals.
4 3 2 1 0 4. Compare historical architectural trends to current building/interior design trends.
4 3 2 1 0 5. Consider future trends in building/interior design.
4 3 2 1 0 6. Determine the effects that the principles and elements of design have on the individual, aesthetics and function.
4 3 2 1 0 7. Review measuring, estimating, ordering, purchasing and pricing skills.
4 3 2 1 0 8. Draw an interior space to scale, using correct architectural symbols and drafting skills.
4 3 2 1 0 9. Create floor plans, using computer design software.
4 3 2 1 0 10. Examine floor plans for efficiency and safety and areas including, but not limited to, zones, traffic patterns, storage, electrical and mechanical systems.
4 3 2 1 0 11. Utilize applicable building codes, universal guidelines, and regulations in space planning.

21109-RESEARCH & DESIGN FOR PRE-CONSTRUCTION (1 Credit)
An advanced research and application course covering specific topics in design and pre-construction to include management and "green design" skills.

4 3 2 1 0 1. Work with a client to develop a client-driven product.
4 3 2 1 0 2. Produce a working model (graphic or physical) using advanced software and/or equipment.
4 3 2 1 0 3. Demonstrate ability to apply shading and rendering techniques to 3d surfaces and solid models.
4 3 2 1 0 4. Demonstrate ability to access and utilize industry resources.
4 3 2 1 0 5. Use appropriate grammar and word usage in the creation and implementation of a formal graphic presentation using current standards and technology.
4 3 2 1 0 6. Apply principles of dimensioning/tolerances, fasteners/hardware, and power transmission.
4 3 2 1 0 7. Apply basic principles of environmental impact to enhance project acceptance and quality.
4 3 2 1 0 8. Demonstrate ability to apply design requirements for people needing special accommodations.
4 3 2 1 0 9. Utilize effective management techniques to organize work flow.
4 3 2 1 0 10. Use technology and resources to research licensing certification and credentialing in the architecture and construction industry.
4 3 2 1 0 11. Conduct product and facility evaluations and critique their effectiveness.
4 3 2 1 0 12. Research new technologies to meet future client needs.
4 3 2 1 0 13. Demonstrate ability to access and utilize industry resources.
4 3 2 1 0 14. Demonstrate abilities in design/planning, visual communication and problem solving in current architectural practices.
4 3 2 1 0 15. Integrate alternative construction methods and materials in current architectural drawings.
4 3 2 1 0 16. Demonstrate ability to use CSI – Construction Specifications Institute's Uniform Drawing System and Master Format.
4 3 2 1 0 17. Research various methods for obtaining financing for building projects.
4 3 2 1 0 18. Demonstrate ability to incorporate specific codes as given for a selected jurisdiction.
4 3 2 1 0 19. Demonstrate ability to set and work within defined budget.
4 3 2 1 0 20. Research and use information for product development.
4 3 2 1 0 21. Manipulate materials and processes to meet client needs.
4 3 2 1 0 22. Demonstrate ability to manage and set project goals and timelines

38050 -ADVANCED STUDIES (.5 Credit)
An advanced level application course covering specific research-based topics in architectural design.
4 3 2 1 0 1. Employ basic methods of data collection and analysis to provide information for projects.

4 3 2 1 0 2. Research and report on methods for employing "Green Building" techniques.
4 3 2 1 0 3. Research and report on the latest technology used in HVAC Systems design.
4 3 2 1 0 4. Research and report on the latest technology used in Electrical Systems Design.
4 3 2 1 0 5. Research and report on the latest technology used in Plumbing Systems Design.
4 3 2 1 0 6. Apply suitable practices of environmental impact to enhance project acceptance and quality.
4 3 2 1 0 7. Integrate structural, environmental, safety, building envelopes and building service systems to design and construct buildings and structures.
4 3 2 1 0 8. Develop a landscape design for a commercial building.
4 3 2 1 0 9. Appreciate the diversity of needs, values and social patterns in project design to appropriately meet client needs.
4 3 2 1 0 10. Use communication skills and strategies to work effectively with potential clients.
4 3 2 1 0 11. Develop technical drawings by hand and computer-generated plans to design structures.

THE FOLLOWING ARE NOT STAND-ALONE COURSES. THEY ARE SKILLS TO BE EMBEDDED IN ALL COURSES.

WORKPLACE SAFETY SKILLS (Embedded in all Core CTE Courses)

4 3 2 1 0 1. Demonstrate a working knowledge of safety education, environment, and enforcement for life and work.
4 3 2 1 0 2. Apply safe practices while using tools and equipment to construct a project.
4 3 2 1 0 3. Apply safe practices for housekeeping, dress, fire, chemicals & personal protection while working in a shop.
4 3 2 1 0 4. Demonstrate the use and care of appropriate personal protective equipment (PPE).
4 3 2 1 0 5. Explain the importance of Hazard Communications (HazCom) and Material Safety Data Sheets (MSDS)
4 3 2 1 0 6. Describe fire prevention and firefighting techniques.
4 3 2 1 0 7. Follow safety procedures required for lifting heavy objects.
4 3 2 1 0 8. Follow safe behavior procedures on and around ladders and scaffolds.
4 3 2 1 0 9. Explain the purpose of OSHA and how it promotes safety on the job.
4 3 2 1 0 10. Respond to hazardous-materials and hazardous-waste emergency situations in accordance with regulatory requirements.
4 3 2 1 0 11.

LEADERSHIP/21ST CENTURY SKILLS (Embedded in all Core CTE Courses)

4 3 2 1 0 1. Demonstrates speaking skills
4 3 2 1 0 2. Utilizes listening skills
4 3 2 1 0 3. Uses writing skills to produce and compile documents
4 3 2 1 0 4. Uses decision making / problem solving skills
4 3 2 1 0 5. Participates as team member to achieve common goals
4 3 2 1 0 6. Demonstrates time management
4 3 2 1 0 7. Takes responsibility and displays work ethics
4 3 2 1 0 8. Establishes positive relations with others
4 3 2 1 0 9. Demonstrate a working knowledge of workplace issues such as sexual harassment, stress, and substance abuse.
4 3 2 1 0 10.

CAREER DEVELOPMENT SKILLS (Embedded in all Core CTE Courses)

4 3 2 1 0 1. Utilizes effective job seeking skills
4 3 2 1 0 2. Created and utilizes an occupationally specific resume
4 3 2 1 0 3. Created and utilizes a portfolio
4 3 2 1 0 4. Understands proper interview techniques
4 3 2 1 0 5. Understands performance reviews
4 3 2 1 0 6. Explain the construction industry, the role of companies within the industry, and the role of individual professionals in the industry.
4 3 2 1 0 7. Demonstrate the value of computers in the construction industry through use of email, databases, Internet and billing/inventory software.
4 3 2 1 0 8.
4 3 2 1 0 9.

ACADEMIC FOUNDATIONS (Embedded in all Core CTE Courses)

4 3 2 1 0 1. Apply the four basic math functions to whole numbers, decimals, percentages and fractions.
4 3 2 1 0 2. Use a standard ruler and a metric ruler to measure.
4 3 2 1 0 3. Explain the importance of the metric system in the construction trade and utilize metric units of length, weight, volume and temperature.
4 3 2 1 0 4. Recognize the basic shapes used in the construction industry, and apply basic geometry to measure them.
4 3 2 1 0 5. Demonstrate the ability to interpret information and instructions in both written and verbal form.
4 3 2 1 0 6. Demonstrate the ability to communicate effectively in on-the-job situations using verbal and written skills.

4 3 2 1 0 7. Perform physics skills to work with materials and load applications.

4 3 2 1 0 8.

OCCUPATIONAL PROFILE RATING SCALE RUBRIC

Rating Scale (Occupational Profile)

4 - Exemplary Achievement:	Student possesses outstanding knowledge, skills or professional attitude. Works Independently.
3 - Proficient Achievement:	Student demonstrates good knowledge, skills or professional attitude. Requires limited supervision.
2 - Limited Achievement:	Student demonstrates fragmented knowledge, skills or professional attitude. Requires close supervision.
1 - Inadequate Achievement:	Student lacks knowledge, skills or professional attitude.
0 - No Instruction / Training:	Student has not received instruction or training in this area.