



**CAREER PATHWAY
PRE-ENGINEERING
DRAFTING AND DESIGN TECHNOLOGY
CIP Code 15.1301**

**Pennsylvania's Targeted Industry Cluster:
Manufacturing**



Potential Careers

17-3011	Architectural & Civil Drafters
17-3012	Electrical & Electronics Drafters
17-3013	Mechanical Drafters
17-3019	Drafters, All Others

National and State Occupational Outlook Trends (Based on Department of Labor and Industry Reports)

United States	Employment		Percent Change	¹ Job Openings	2012 Median Annual Wage
	2010	2020			
Architectural and Civil Drafters	92,700	95,700	+3%	2,090	\$47,900
Pennsylvania	Employment		Percent Change	¹ Job Openings	2012 Median Annual Wage
	2010	2020			
Architectural and Civil Drafters	5,130	4,660	-9%	100	\$45,200

¹Job Openings refers to the average annual job openings due to growth and net replacement

Drafters

- Operate computer-aided drafting (CAD) equipment or conventional drafting station to produce designs, working drawings, charts, forms and records.
- Analyze building codes, by-laws, space and site requirements, and other technical documents and reports to determine their effect on architectural designs.
- Coordinate structural, electrical and mechanical designs and determine a method of presentation to graphically represent building plans.
- Draw rough and detailed scale plans for foundations, buildings and structures, based on preliminary concepts, sketches, engineering calculations, specification sheets and other data.
- Lay out and plan interior room arrangements for commercial buildings using computer-assisted drafting (CAD) equipment and software.
- Obtain and assemble data to complete architectural designs, visiting job sites to compile measurements as necessary.
- Supervise, coordinate, and inspect the work of draftspersons, technicians, and technologists on construction projects.
- Determine procedures and instructions to be followed, according to design specifications and quantity of required materials.
- Represent architect on construction site, ensuring builder compliance with design specifications and advising on design corrections, under architect's supervision.
- Check dimensions of materials to be used and assign numbers to lists of materials.

Skills and Abilities

- Active Listening — Giving full attention to what other people are saying, taking time to understand the points being made, asking questions as appropriate, and not interrupting at inappropriate times.
- Critical Thinking — Using logic and reasoning to identify the strengths and weaknesses of alternative solutions, conclusions or approaches to problems.
- Judgment and Decision Making — Considering the relative costs and benefits of potential actions to choose the most appropriate one.
- Reading Comprehension — Understanding written sentences and paragraphs in work related documents.
- Speaking — Talking to others to convey information effectively.
- Coordination — Adjusting actions in relation to others' actions.
- Active Learning — Understanding the implications of new information for both current and future problem-solving and decision-making.
- Monitoring — Monitoring/Assessing performance of you, other individuals, or organizations to make improvements or take corrective action.
- Time Management — Managing one's own time and the time of others
- Near Vision — The ability to see details at close range (within a few feet of the observer).
- Visualization — The ability to imagine how something will look after it is moved around or when its parts are moved or rearranged.
- Problem Sensitivity — The ability to tell when something is wrong or is likely to go wrong; problem recognition.
- Deductive Reasoning — The ability to apply general rules to specific problems to produce answers that make sense.
- Oral Comprehension — The ability to listen to and understand information and ideas presented through spoken words and sentences.
- Inductive Reasoning — The ability to combine pieces of information to form general rules or conclusions (includes finding a relationship among seemingly unrelated events).
- Information Ordering — The ability to arrange things or actions in a certain order or pattern according to a specific rule or set of rules (e.g., patterns of numbers, letters, words, pictures, mathematical operations).
- Written Comprehension — The ability to read and understand information and ideas presented in writing.
- Flexibility of Closure — The ability to identify or detect a known pattern (a figure, object, word, or sound) that is hidden in other distracting material.
- Finger Dexterity — The ability to make precisely coordinated movements of the fingers of one or both hands to grasp, manipulate, or assemble very small objects.

Character Traits for Workplace Success

- Attention to Detail — Job requires being careful about detail and thorough in completing work tasks.
- Integrity — Job requires being honest and ethical.
- Dependability — Job requires being reliable, responsible, and dependable, and fulfilling obligations.
- Cooperation — Job requires being pleasant with others on the job and displaying a good-natured, cooperative attitude.
- Achievement/Effort — Job requires establishing and maintaining personally challenging achievement goals and exerting effort toward mastering tasks.
- Initiative — Job requires a willingness to take on responsibilities and challenges.
- Adaptability/Flexibility — Job requires being open to change (positive or negative) and to considerable variety in the workplace.
- Innovation — Job requires creativity and alternative thinking to develop new ideas for and answers to work-related problems.
- Analytical Thinking — Job requires analyzing information and using logic to address work-related issues and problems.
- Stress Tolerance — Job requires accepting criticism and dealing calmly and effectively with high stress situations.

Somerset County Technology Center - Program of Study/Units of Instruction (3-Year Program)

Unit Number & Title

100 – Orientation	1000 – Introduction to Civil Drafting
200 – Introduction to Drafting and Design	1100 – Introduction to Electrical and Electronic Drafting
300 – Geometric Construction	1200 – Using Computer Assisted Drafting (CAD)
400 – Lettering	1300S – Introduction to Residential & Commercial Wiring Diagrams
500 – Freehand Drawing and Sketching	1400S – Introduction to Pipe/Plumbing Drawings
600 – Introduction to Engineering Math	1500S – Introduction to Sheet Metal HVAC Drawings
700 – Introduction to Mechanical Drawing and Design	1600S – Introduction to Structural Steel Drawings
800 – Dimensioning	1700S – Professional Development Program
900 – Introduction to Architecture	

High School Courses Recommended For Career And Technical Education Students

9th Grade	10th Grade	11th Grade	12th Grade
English I	English II	English III	English IV
Algebra I or Geometry	Geometry or Algebra II	Algebra II	Algebra II
Biology I	Chemistry I	Physics	Physics
Geography/State History	World History	American History	Economics/Government
Required Electives: PE, Art/Music, Foreign Language, Computer Technology	Required Electives: PE, Foreign Language, Computer Technology	Required Electives: PE	Required Electives: PE
	Career and Technology Scope and Sequence	Career and Technology Scope and Sequence	Career and Technology Scope and Sequence


Program's Math Skill Level

- Students must be able to complete math curriculum (10th – 12th) that incorporates a basic understanding of basic mathematical operations, converting measurements, formula calculations and apply that knowledge to the Drafting and Design curriculum according to the POS.

Certifications/Licensures

Pennsylvania Skills Certificate (NOCTI)	A.A.S. – Equivalent to 13 credit hours with Pennsylvania Highlands Community College for Drafting and Design
AutoCAD Certification or other Autodesk Software Certification	

Continuing Education/College Options

Articulation Agreements	Additional College/Continuing Education Options
<ul style="list-style-type: none"> Commonwealth Technical Institute Johnson College Penn College of Technology Pennsylvania Institute of Technology 	 <p>Students who complete the Drafting & Design Technology curriculum can earn college credit. SCTC's Drafting & Design Technology program has articulation agreements with colleges across Pennsylvania through the SOAR program. For more information on the SOAR program, please visit: http://www.techlinkpa.com</p>

Prerequisites, Safety, and Equipment Requirements

<ul style="list-style-type: none"> Working knowledge of how to use basic software and computer equipment. Working knowledge of basic safety awareness. Independent decision making skills and ability to use problem solving skills. 	<ul style="list-style-type: none"> Students must adhere to the SCTC dress code in the Student Handbook Students must be professionally dressed to participate in any job or work experience. Students wearing clothing with holes, revealing, or with inappropriate content will not be able to participate in the job or work experience.
---	--

Program Details

<ul style="list-style-type: none"> Theory Structure <ul style="list-style-type: none"> Instructor Lecture – approximately 4 to 5 hours. Large group, small group, and individual tasks weekly, 8 to 10 hours per week. Read, write, and speak in a professional manner in written work and presentations.
<ul style="list-style-type: none"> Textbook and Supplemental Reading Materials <ul style="list-style-type: none"> Exploring Drafting, G-W Publisher, Walker, Mathis, 2012, (10th – 12th grade reading level) Drafting and Design for Architecture, Thomson, Delmar Learning, D.J. Hepler, R. Wallace, D.E Hepler, 2006 (10th -12th grade reading level) Schrock AutoCAD Workbook, IP, Cheryl Schrock, 2012 (10th -12th grade reading level) Various texts and print material (post-secondary reading level) Various electronic and Internet based materials (post-secondary reading level)
<ul style="list-style-type: none"> Lab Experience <ul style="list-style-type: none"> Open-end projects for SCTC and on-site work. SCTC Architectural project – “Design a Home for a Client” Students will work on Program of Study assigned tasks that mimic on-the-job experiences.
<ul style="list-style-type: none"> Homework <ul style="list-style-type: none"> Students are expected to complete tasks within the set completion dates. At times this requires students to complete tasks outside of the school day. Projects and some preparation work are also required outside of the school day.
<ul style="list-style-type: none"> Co-op Requirements (Grades 11-12) <ul style="list-style-type: none"> Satisfactory attendance records “B” average Instructor’s recommendation Transportation