KENTUCKY CTE EMPOWERED
Today's Career and Technical Education

Guidance Document:

Careers, Skills, and Postsecondary Opportunities for Kentucky CTE Pathways

2025-26 Program of Studies - Pathways

(Updated May 19, 2025)

Introduction

Understanding Career and Technical Education (CTE) pathways, potential careers, and postsecondary programs is crucial for guiding students into pathways that align with their interests, aptitudes, and values. With each of the 122 pathways offering ten to twelve (or more) potential career options, having an in-depth knowledge of all possible career paths is nearly impossible. This document aims to provide a snapshot of potential careers that these pathways can lead to.

This document offers a brief overview of each career pathway and is not exhaustive in its information. When exploring fields of study, a thorough investigation of career paths should be part of the student's process. It is recommended that the CTE teacher of the student's pathway or an industry professional be involved in the student's further research to provide a real-world perspective.

The postsecondary programs listed include state community colleges and universities. Private universities are not listed unless they offer the only degree available in Kentucky. **Students should conduct a thorough investigation of all available programs for their postsecondary studies and select the one that best meets their needs.**

Table of Contents

AGRICULTURAL EDUCATION

Agribusiness Systems CIP 01.0101.00

Agribusiness systems contribute to the production, processing, marketing, distribution, financing and development of agricultural commodities and resources. This includes food, fiber, wood products, natural resources, horticulture and other plant and animal products and services. Agribusiness is a high-tech industry that uses satellite systems, computer databases and spreadsheets, biotechnology and many other innovations to increase efficiency and profitability

Career Choices	Aptitudes Needed	Common Work Environments	Postsecondary Opportunities in Kentucky
Agricultural Operations Manager: Oversees the daily operations of farms, ranches, and other agricultural establishments. **Agricultural Sales Representative:** Sells farm equipment, supplies, and services to farmers and agricultural businesses. **Agricultural Economist:** Analyzes economic data related to agriculture to help businesses and policymakers make informed decisions. **Farm Manager:** Manages the overall operations of a farm, including crop production, livestock care, and financial management. **Agricultural Consultant:** Provides expert advice to farmers and agribusinesses on improving efficiency, sustainability, and profitability. **Agricultural Engineer:** Designs and develops machinery, systems, and processes to improve agricultural production and efficiency. **Agricultural Extension Specialist:** Works with universities or government agencies to provide education and resources to farmers and the community. **Agricultural Marketing Specialist**: Focuses on promoting and selling agricultural products, often working on branding, market research, and advertising campaigns. **Supply Chain Manager**: Manages the logistics of getting agricultural products from farms to consumers, ensuring efficiency and minimizing costs.	**Mathematics and Economics:** Understanding financial calculations, economic principles, and data analysis is crucial for managing agricultural businesses. **Computer Literacy:** Proficiency in using business software, such as spreadsheets and databases, is essential. **Agricultural Knowledge**: Basic understanding of agricultural practices, crop management, and livestock care. **Attention to Detail:** Precision in managing records, finances, and resources is important. **Problem-Solving Skills:** Ability to troubleshoot and find solutions to challenges in agricultural operations. **Physical Stamina:** Agribusiness can involve hands-on work, so good physical health is beneficial. **Leadership and Teamwork:** Skills in leading projects and working collaboratively with others. **Communication Skills:** Effective verbal and written communication for marketing, sales, and management1. **Adaptability:** Willingness to learn and adapt to new agricultural technologies and methods.	**Indoor & Outdoor work** Office Work**:** There is a substantial amount of office work, including planning, data analysis, financial management, and marketing. This involves using computers and other office equipment Field Work**:** Many agribusiness professionals spend a significant amount of time outdoors, managing crops, livestock, or overseeing agricultural operations. This can involve working in various weather conditions. **Physical Demands** Hands-On Tasks: Roles in agribusiness often require physical activity, such as inspecting crops, handling livestock, or operating machinery. Sedentary Tasks: Office-based tasks can be more sedentary, involving long hours at a desk working on reports, financial statements, or marketing plans. **Working Hours** Work hours can be irregular, especially during planting and harvest seasons, which may require early mornings, late nights, and weekends. Most agribusiness roles are full-time, and some may require more than 40 hours per week, particularly during peak seasons. **Collaborative Environment** Agribusiness professionals often work in teams, collaborating with other managers, workers, and external partners (e.g. vendors, customers, etc.).	**KCTCS Campues** HCC Henderson Community College- Agriculture | HCC HCC-Hopkinsville Community College- Agriculture | HCC OCTC-Owensboro Community and Technical College- Agriculture Studies | OCTC **University Programs** University of Kentucky- https://www.ca.uky.edu/ Kentucky State University | Option in Agriculture Business

Agricultural Power, Structural, Technical Systems CIP 01.0201.00

The Agricultural Power, Structural, Technical Systems pathway is built on the application of concepts and technology in engineering, hydraulics, pneumatics, electronics, power, structures, and controls to the field of agriculture. Students design agricultural structures, machinery, and equipment while utilizing safe operation and maintenance practices.

Career Choices	Aptitudes Needed	Common Work Environments	Postsecondary Opportunities in Kentucky
Agricultural Engineer: Design and develop machinery, equipment, and structures used in agriculture. Focus on improving efficiency, sustainability, and productivity. **Diesel Technician**: Specialize in the maintenance and repair of diesel engines used in agricultural machinery. **GIS Specialist**: Use Geographic Information Systems to analyze and manage spatial data for agricultural purposes. **Land Surveyor**: Measure and map land areas for agricultural development and planning. **Farm Equipment Technician:** Maintain and repair farm machinery and equipment. **Contractor/Builder:** Construct agricultural buildings and structures, ensuring they meet safety and efficiency standards. **Welder:** Fabricate and repair metal structures and equipment used in agriculture. **Millwright:** Installs, maintains, repairs, and disassembles industrial machinery and equipment.	**Mechanical Skills**: Understanding how machines and tools work, including their design, use, repair, and maintenance. **Problem-Solving Abilities:** Ability to identify issues and develop practical solutions, especially in mechanical and structural contexts. **Technical Knowledge:** Familiarity with agricultural machinery, power systems, and structural components. **Mathematical Skills:** Proficiency in math, particularly in areas like algebra and geometry, which are essential for technical calculations and measurements. **Attention to Detail:** Precision in tasks such as welding, electrical work, and machinery repair. **Physical Stamina:** Ability to perform physically demanding tasks, often in outdoor environments. **Teamwork and Communication:** Effective collaboration and communication skills for working with peers and instructors. **Safety Awareness:** Understanding and adhering to safety protocols to prevent accidents and injuries	**Varied Settings**: Work environments can range from outdoor agricultural fields to indoor workshops and laboratories. You might find yourself working on farms, in greenhouses, or at agricultural equipment manufacturing facilities. **Hands-On Work:** The job often involves practical, hands-on tasks such as operating and maintaining machinery, constructing agricultural structures, and performing technical repairs. **Technical and Mechanical Focus**: You'll work with a variety of tools and equipment, including tractors, irrigation systems, and other agricultural machinery. Understanding and applying principles of engineering, hydraulics, and electronics is crucial. **Collaborative Environment:** Many roles require teamwork and effective communication with other professionals, such as engineers, technicians, and farmers. **Safety-Conscious:** Safety is a top priority. You'll need to follow strict safety protocols to prevent accidents and ensure a safe working environment. **Problem-Solving:** The work often involves troubleshooting and solving technical issues, requiring strong problem-solving skills and the ability to think on your feet.	**KCTCS Campues** HCC Henderson Community College- Agriculture | HCC HCC-Hopkinsville Community College- Agriculture | HCC OCTC-Owemsboro Community and Technical College- Agriculture Studies | OCTC **University Programs** University of Kentucky- https://www.ca.uky.edu/ Agricultural Systems Technology | Agriculture | Murray State University Department of Agriculture and Food Science | Western Kentucky University Bachelor of Science in Agriculture - Eastern Kentucky University Agricultural Sciences | Morehead State University | Kentucky Agriculture and Natural Resources - Berea College

Animal Science Systems CIP 01.0901.00

This pathway focuses on the scientific principles underlying the breeding, care, and management of agricultural animals and the production, processing, and distribution of agricultural animal products. This includes developing better, more efficient ways of producing and processing meat, poultry, eggs and dairy products, as well as studying genetics, nutrition, reproduction, growth and development of animals.

Career Choices	Aptitudes Needed	Common Work Environments	Postsecondary Opportunities in Kentucky
Animal Nutritionist: These professionals formulate diets for animals to ensure their optimal health and performance. **Wildlife Biologist:** Wildlife biologists study animals in their natural habitats, focusing on behavior, genetics, and conservation. **Animal Behaviorist:** Animal behaviorists study the behavior of animals to understand their actions and develop training programs. **Zookeeper:** Zookeepers care for animals in zoos and aquariums, ensuring they are healthy and well-maintained. **Animal Care Specialist:** These specialists provide basic care for animals, including feeding, grooming, and cleaning their living spaces. **Veterinary Technician:** Veterinary technicians assist veterinarians with medical procedures. **Animal Production Manager:** These managers oversee the production of animals for food, fiber, or other products. **Animal Geneticist:** Animal geneticists study the genetics of animals to improve breeding programs and enhance desirable traits. **Regulatory Affairs Specialist:** These specialists ensure that animal-related products and practices comply with government regulations.	**Strong Science Background:** Proficiency in biology and chemistry is essential, as these subjects form the foundation of animal science studies. **Mathematical Skills:** Good understanding of math, particularly statistics, for analyzing data and conducting research. **Interest in Animals:** A genuine interest in working with animals and understanding their behavior, health, and welfare. **Problem-Solving Abilities:** Ability to identify issues and develop practical solutions, especially in animal health and management. **Attention to Detail:** Precision in tasks such as observing animal behavior, administering treatments, and conducting experiments. **Physical Stamina:** Ability to perform physically demanding tasks, often in outdoor or farm settings. **Communication Skills:** Effective communication for working with peers, instructors, and potentially presenting research findings. **Technical Skills:** Familiarity with laboratory equipment and techniques, as well as basic computer skills for data analysis.	**Physical Demands:** Many roles involve hands-on work with animals, which can be physically demanding. This might include lifting, restraining, or caring for animals, as well as maintaining their living environments. **Work Hours**: Animal scientists often work full-time, but the hours can vary. Some positions may require early mornings, late evenings, weekends, or holidays, especially in roles involving direct animal care or fieldwork. **Indoor and Outdoor Work:** Depending on the job, you might work indoors in laboratories, offices, or classrooms, outdoors on farms, in wildlife reserves, or in natural habitats. Outdoor work can expose you to various weather conditions. **Team Collaboration**: Many animal scientists work as part of a team, collaborating with other scientists, veterinarians, farm workers, or students. Effective communication and teamwork are often essential. **Health and Safety**: Ensuring the health and safety of both animals and humans is a significant responsibility. This includes following all safety protocols to prevent injuries and the spread of diseases. **Travel:** Some roles may require travel to different locations for fieldwork, conferences, or collaborative projects. This can add variety to the job but may also require time away from home.	**KCTCS Campues** ECTC, Elizabethtown Animal Science - Certificate HCC-Hopkinsville Community College- Agriculture | HCC (certificate in AS) Agriculture | MCC (certificate in AS) OCTC-Owensboro Community and Technical College- Agriculture Studies | OCTC (certificate in AS) **University Programs** University of Kentucky- https://www.ca.uky.edu/ Agricultural Systems Technology | Agriculture | Murray State University Department of Agriculture and Food Science | Western Kentucky University Kentucky State University | Division of Food and Animal Science Louisville's Pre-Veterinary Program — Pre-Veterinary Program Veterinary Science, B.S. | Morehead State University | Kentucky

Environmental Science and Natural Resources Systems CIP 03.0101.00

This pathway focuses on studies and activities relating to the natural environment and its conservation, use, and improvement. The basic principles of environmental science and natural resource management are the foundational concepts of this pathway. Subjects addressed include air, soil, water, wildlife, plants, and energy sources. Instruction related to using these resources economically and recreationally is also included.

Career Choices	Aptitudes Needed	Common Work Environments	Postsecondary Opportunities in Kentucky
Environmental Specialist: These professionals monitor the impact of the environment on people and propose solutions to environmental issues. **Environmental Technician:** Environmental technicians identify, assess, and prevent various forms of contamination within the environment. **Wildlife Biologist:** Wildlife biologists study animals in their natural habitats, focusing on behavior, genetics, and conservation. **Marine Biologist:** Marine biologists research life within the ocean and other saltwater areas. **Environmental Chemist:** These chemists collect and test soil, air, and water samples to determine their quality and how they affect the environment. **Soil Technician:** Soil technicians improve soil quality, reduce soil erosion, and foster sustainable land usage techniques. **GIS Technician:** GIS technicians create custom Geographic Information Systems to manipulate and understand land data. **Microbiologist**: Microbiologists study microorganisms and their effects on the environment.	**Strong Foundation in STEM:** Proficiency in science, technology, engineering, and math (STEM) subjects is crucial. **Analytical Skills:** The ability to analyze data, interpret scientific research, and solve complex problems is essential. **Communication Skills:** Effective written and verbal communication skills are important for presenting research findings, writing reports, and collaborating with others. **Passion for the Environment:** A genuine interest in environmental issues and a commitment to sustainability can drive motivation and success in this field. **Fieldwork Experience:** Hands-on experience through internships, volunteer work, or participation in environmental projects can provide practical knowledge and skills. **Teamwork and Collaboration:** Working well with others, including scientists, policymakers, and community members, is often necessary in environmental science careers1. **Adaptability and Creativity:** The ability to adapt to new challenges and think creatively to solve environmental problems is highly valued.	**Office and Laboratory Work:** Many environmental scientists and specialists spend a significant amount of time in offices and laboratories. **Fieldwork:** A substantial part of the job involves fieldwork. This can include collecting samples, conducting surveys, and monitoring environmental conditions. Fieldwork can take you to various locations such as forests, wetlands, rivers, and urban areas. **Outdoor Job Sites**: For those in natural resource management, work often takes place outdoors. This might involve managing wildlife habitats, overseeing conservation projects, or working in parks and protected areas. **Indoor Facilities:** Some roles, like those of environmental technicians, may involve working in indoor facilities where they inspect businesses and industrial sites for compliance with environmental regulations. **Collaborative Environment:** Collaboration with other scientists, policymakers, and community members is common. **Variable Conditions:** The work environment can vary greatly depending on the specific job and location. You might experience different weather conditions, terrains, and ecosystems.	**KCTCS Campuses** **Environmental Science Technology | BCTC (**AAS and Biotech Certificate programs at BCTC) *Other KCTCS campuses that offer courses in environmental Sciences* **Environmental Science Technology | KCTCS) (**KCTCS general information page) Jefferson Community and Technical College (JCTC) West Kentucky Community and Technical College (WKCTC) Madisonville Community College (MCC) Somerset Community College (SCC) **University Programs** UK-Natural Resources & Environmental Science | Academics U of L Department of Geographic and Environmental Sciences WKU-Earth, Environmental, and Atmospheric Sciences Murray State-Department of Earth and Environmental Sciences NKU-Environmental Science

Food Science and Processing Systems CIP 01.1001.00

This pathway focuses on applying biological, chemical, and physical principles to the study of converting raw agricultural products into processed forms suitable for direct human consumption and storing such products. Human health and safety related to food processing and consumption are continually addressed in this pathway.

Career Choices	Aptitudes Needed	Common Work Environments	Postsecondary Opportunities in Kentucky
Food Technologist: Food technologists work on developing and improving food products, ensuring they are safe, nutritious, and of high quality. **Quality Assurance Manager:** These professionals ensure that food products meet safety and quality standards. **Food Safety Specialist:** Food safety specialists focus on preventing foodborne illnesses by ensuring that food production processes comply with health regulations. **Sensory Scientist:** Sensory scientists study how food's taste, smell, and texture affect consumer preferences. **Flavor Chemist:** Flavor chemists create and test new flavors for food and beverages. **Nutritionist/Dietitian:** Nutritionists and dietitians create diet plans and food programs to help individuals maintain healthy lifestyles. **Food Research and Development Technician:** These technicians assist in developing new food products and recipes, ensuring accurate sample preparation and maintaining organized records1. **Food Market Researcher:** These professionals analyze consumer and competitor data **Food Inspector:** Food inspectors ensure that food products meet safety and quality regulations.	**Strong Foundation in Science and Math:** Courses in biology, chemistry, and mathematics are essential. Understanding scientific principles and being able to apply **Analytical Skills**: The ability to analyze data and solve problems. **Attention to Detail:** Precision is key in food science. **Communication Skills:** Both written and verbal communication skills are important for documenting research, writing reports, and collaborating with others. **Teamwork:** Many projects in food science require working in teams, so being able to collaborate effectively is necessary **Curiosity and Creativity**: A natural curiosity about how things work and a creative approach to problem-solving can help in developing new food products. **Technical Skills**: Familiarity with laboratory equipment and techniques, as well as basic computer skills. **Time Management:** The ability to manage time effectively and handle multiple tasks is important, especially when balancing coursework and lab work.	**Laboratory and Production Environments:** Food scientists often work in laboratories, conducting experiments and quality control tests. They may also work in production facilities, overseeing the processing and packaging of food products. **Physical Demands:** While the work is generally less physically demanding than fieldwork, it can still involve standing for long periods, handling heavy equipment, and performing repetitive tasks. **Health and Safety:** Workers must adhere to strict hygiene and safety protocols to prevent contamination and ensure food safety. **Work Hours:** The hours can be long and irregular, especially in production facilities that operate around the clock. Some roles may require working nights, weekends, or holidays. **Stress Levels:** The need to meet production deadlines and maintain high standards of quality can create a high-pressure environment. **Collaboration and Communication:** Food scientists often work as part of a team, collaborating with other scientists, engineers, and production staff. **Regulatory Compliance:** Ensuring compliance with food safety regulations and standards is a critical part of the job. This involves staying up to date with the latest regulations and implementing necessary changes in processes and procedure	**University Programs** UK Food Biosciences Program | Animal & Food Sciences Department of Agriculture and Food Science | Western Kentucky University Kentucky State University | Division of Food and Animal Science

Plant Science Systems CIP 01.1101.00

This pathway focuses on the scientific principles that underlie the breeding, cultivation, and production of agricultural plants and the production, processing, and distribution of agricultural plant products. Includes instruction in the plant sciences, crop cultivation and production, and agricultural and food products processing

Career Choices	Aptitudes Needed	Common Work Environments	Postsecondary Opportunities in Kentucky
Horticulturist: Horticulturists cultivate and manage plants, focusing on improving plant growth, quality, and resistance to pests and diseases. **Crop Consultant:** Crop consultants advise farmers on best practices for planting, fertilizing, and managing crops. **Plant Breeder/Geneticist:** These professionals develop new plant varieties with desirable traits such as increased yield, disease resistance, or improved nutritional value. **Soil and Plant Scientist:** Soil and plant scientists study soil properties and plant interactions to improve agricultural productivity and sustainability. **Environmental Scientist:** Environmental scientists focus on protecting and managing natural resources. **Agronomist:** Agronomists specialize in crop production and soil management. **Plant Pathologist:** Plant pathologists study plant diseases and develop methods to prevent and control them. **Greenhouse Manager:** Greenhouse managers oversee the production of plants in controlled environments. **Research Scientist:** Research scientists conduct experiments to advance knowledge.	**Strong Foundation in Science and Math:** Courses in biology, chemistry, and mathematics are essential. Understanding scientific principles and being able to apply. **Analytical Skills:** The ability to analyze data and solve problems is important. This includes interpreting scientific data and conducting experiments. **Attention to Detail**: Precision is key in plant science, whether it's measuring soil nutrients or identifying plant diseases2. **Curiosity and Passion for Plants:** A natural curiosity about how plants grow and interact with their environment. **Communication Skills:** Both written and verbal communication skills are important for documenting research and writing reports. **Teamwork:** Many projects in plant science require working in teams, so being able to collaborate effectively is beneficial. **Technical Skills:** Familiarity with laboratory equipment and techniques, as well as basic computer skills, are useful3. **Time Management:** The ability to manage time effectively and handle multiple tasks is important/	**Fieldwork and Laboratory Work:** Plant scientists often split their time between fieldwork and laboratory work. Fieldwork involves collecting samples, conducting experiments, and monitoring plant growth in various environments. Laboratory work includes analyzing samples, conducting genetic research, and developing new plant varieties**.** **Physical Demands:** Fieldwork can be physically demanding, involving long hours outdoors, sometimes in extreme weather conditions. **Health and Safety:** Workers must follow safety protocols to handle chemicals, pesticides, and laboratory equipment safely. **Work Hours**: The hours can be irregular, especially during planting and harvesting seasons. Some roles may require early mornings, late evenings, or weekend work. **Collaboration and Communication:** Plant scientists frequently collaborate with other researchers, farmers, and agricultural professionals. Effective communication skills are essential. **Environmental Conditions:** Fieldwork exposes workers to various environmental conditions, including heat, cold, rain, and insects. **Technological and Scientific Advances:** The field is constantly evolving with new technologies and scientific discoveries. Staying up to date with the latest research and techniques is crucial for success.	**KCTCS Campuses** Horticulture - Certificate: KCTCS: offered at both Henderson Community College and Madisonville Community College. **University Programs** University of Kentucky Plant and Soil Sciences Agronomy- Plant Science | Western Kentucky University Kentucky State University | Option in Agricultural Systems

BUSINESS AND MARKETING EDUCATION CAREER PATHWAYS

Accounting CIP 52.0301.00

This pathway generally prepares individuals to practice the profession of accounting and to perform related business functions. Includes instruction in accounting principles and theory, financial accounting, managerial accounting, cost accounting, budget control, tax accounting, legal aspects of accounting, auditing, reporting procedures, statement analysis, planning and consulting, business information systems, accounting research methods; professional standards and ethics; and applications to specific for-profit, public, and non-profit organizations.

Career Choices	Aptitudes Needed	Common Work Environments	Postsecondary Opportunities in Kentucky
Certified Public Accountant (CPA): CPAs provide accounting services such as auditing, tax preparation, and consulting. **Financial Analyst:** Financial analysts evaluate financial data to help businesses make investment decisions. **Management Accountant:** Analyze financial information to assist management in decision-making. **Auditor:** Auditors examine financial records to ensure accuracy and compliance with regulations. **Tax Advisor:** Tax advisors specialize in tax planning and preparation. **Budget Analyst:** Budget analysts help organizations plan their finances. **Forensic Accountant:** Forensic accountants investigate financial discrepancies and fraud. **Financial Manager:** Financial managers oversee the financial health of an organization. **Controller**: Controllers manage the accounting operations of a company. **Accounting Clerk:** Accounting clerks handle basic accounting tasks.	**Strong Mathematical Skills**: A solid understanding of mathematics, particularly algebra and basic arithmetic, is essential. **Attention to Detail:** Precision is crucial in accounting. **Analytical Thinking:** The ability to analyze data, identify trends, and solve problems is important. **Organizational Skills:** Good organizational skills are necessary to manage multiple tasks, keep accurate records, and maintain orderly financial documents. **Communication Skills:** Both written and verbal communication skills are important for explaining financial information clearly. **Ethical Judgment:** A strong sense of ethics and integrity is vital in accounting. **Computer Literacy:** Ability to gain skill with accounting software and basic computer skills are essential. **Time Management:** The ability to manage time effectively and meet deadlines. **Data Analysis:** Utilize various data analysis tools and methodologies	**Office Setting:** Most accountants work in an office environment, often in a corporate setting, accounting firm, or government agency. **Remote Work:** With advancements in technology, many accounting tasks can be performed remotely, allowing for flexible work arrangements. **Standard Business Hours:** Typically, accountants work standard business hours (9 AM to 5 PM), but this can vary. **Overtime:** During busy periods, such as tax season or year-end closing, accountants may work longer hours to meet deadlines. **Routine Tasks:** Daily tasks include preparing financial statements, managing budgets, and ensuring compliance with financial regulations. **Special Projects:** Accountants may also work on special projects, such as audits, financial analysis, and strategic planning. **Deadlines:** The need to meet strict deadlines can create a high-pressure environment. **Attention to Detail:** Accuracy is crucial, and mistakes can have significant consequences, adding to the stress.	**KCTCS Campuses** Accounting - Certificate < KCTCS **Universities in Kentucky** UK-Accounting Accountancy : University of Louisville – College of Business Department of Accounting | Western Kentucky University Accounting: Northern Kentucky University, Greater Cincinnati Region Bachelor of Business Administration — Accounting - Eastern Kentucky University Accounting, BBA | Morehead State University | Kentucky Accounting Program | Murray State University

Administrative Support CIP 52.0401.00

This pathway is designed to provide students with advanced experience to propel them into the 21st-century business world as they serve as college interns, administrative assistants, graduate assistants, and office managers. Instruction includes fundamental business procedures, human resource management, time management software, workstation management, travel planning, financial reporting, payroll, mail procedures, effective communication, and ethical decision-making skills

Career Choices	Aptitudes Needed	Common Work Environments	Postsecondary Opportunities in Kentucky
Administrative Assistant: Administrative assistants perform a range of clerical duties, including preparing documents, organizing workspaces, and scheduling meetings. **Office Manager:** Office managers oversee the operations of an office, manage support staff, maintain organization, and ensure that the administrative team has the resources they need to work efficiently. **Human Resources Coordinator:** HR coordinators assist with various HR functions, such as recruiting, employee records management, and answering employee questions. **Data Entry Specialist:** Data-entry specialists input and manage data in computer systems, ensuring accuracy and efficiency. **Receptionist:** Receptionists are the first point of contact for visitors and callers. They handle phone calls, greet visitors, and perform various administrative tasks to support the office. **Customer Service Representative:** Customer service representatives handle customer inquiries, complaints, and provide information about products and services. They often work in call centers or customer service departments. **Project Coordinator:** Project coordinators assist in planning, executing, and closing projects.	**Organizational Skills:** Being able to manage multiple tasks, keep accurate records, and maintain an orderly workspace. **Attention to Detail:** Precision is important when handling documents, scheduling, and data entry. **Communication Skills:** Strong written and verbal communication skills are essential for interacting with colleagues, clients, and supervisors. **Computer Literacy:** Familiarity with office software such as Microsoft Office (Word, Excel, PowerPoint) and other administrative tools is important. **Time Management:** The ability to prioritize tasks and manage time effectively is crucial. **Problem-Solving Skills:** Being able to think critically and solve problems efficiently.. **Interpersonal Skills:** Good interpersonal skills help in building positive relationships with colleagues and clients. **Ethical Judgment:** A strong sense of ethics and integrity is vital, as administrative professionals often handle sensitive information. **Data Analysis:** Utilize various data analysis tools and methodologies. **Event Logistics Planning:** Manage logistical aspects of events, including venue sourcing, vendor coordination, budget control, guest management, on-site support, and post-event reporting.	**Office Environment:** Most administrative support roles are based in office settings. **Remote Work:** With advancements in technology, many administrative tasks can be performed remotely. **Team Collaboration:** Administrative support often involves working closely with other team members, including managers, executives, and other administrative staff.. **Client Interaction:** Depending on the role, you may interact with clients, customers, or the public. **Structured Routine:** Administrative roles often involve a structured routine with regular tasks such as data entry, filing, and managing schedules. **Busy Periods:** Certain times of the year, such as the end of the fiscal year or during major projects, can be particularly busy. **Supportive Role**: As an administrative professional, you play a crucial supportive role in ensuring the smooth operation of the office..	**KCTCS Campuses** Administrative Office Technology | BCTC Administrative Office Technology | ECTC Hopkinsville & Owensboro: (go to KCTCS general page) Administrative Office Technology | KCTCS Administrative Office Technology | MCTC Administrative Office Technology | WKCTC

E-Commerce CIP 52.0208.02

This pathway focuses on the creation, execution, transmission, and evaluation of commercial messages in various media intended to promote and sell products, services, and brands, and that prepares individuals to function as advertising assistants, technicians, and managers. Includes instruction in advertising theory, marketing strategy, advertising design and production methods, campaign methods and techniques, media management, related business management principles, and applicable technical and equipment skills.

Career Choices	Aptitudes Needed	Common Work Environments	Postsecondary Opportunities in Kentucky
Marketing Specialist: Develops and implements marketing strategies to boost online sales and brand awareness. **Customer Service Representative:** Handles customer inquiries and issues. **Web Developer:** Designs and maintains e-commerce websites. **Data Analyst:** Analyzes sales data to help businesses make informed decisions and improve their online strategies. **Content Writer:** Creates engaging product descriptions, blog posts, and other content to attract and retain customers1. **SEO Specialist:** Optimizes website content to improve search engine rankings and drive organic traffic. **Social Media Manager:** Manages social media accounts to engage with customers and promote products. **Supply Chain Manager:** Oversees the entire supply chain process, from procurement to delivery.	**Communication Skills:** Effective written and verbal communication is crucial for marketing, customer service, and team collaboration. **Analytical Thinking:** The ability to analyze data and make informed decisions is essential for roles like data analysis. **Technical Proficiency:** Basic knowledge of web development, coding, and using e-commerce platforms can be very beneficial. **Creativity:** Creativity is important for roles in marketing, content creation, and user experience design2. Problem-Solving Skills: Being able to troubleshoot issues and find solutions quickly is valuable in any e-commerce role. **Time Management:** Managing time effectively to meet deadlines and handle multiple tasks is crucial. **Customer Focus:** Understanding customer needs and providing excellent service is key to success in e-commerce. **Adaptability:** The e-commerce landscape is constantly changing, so being adaptable and open to learning new skills is important. **Data Analysis:** Utilize various data analysis tools and methodologies	**Fast-Paced Environment:** E-commerce is a rapidly evolving industry, often requiring quick decision-making and adaptability to new trends and technologies. **Collaborative Culture:** Many e-commerce companies emphasize teamwork and collaboration across different departments, such as marketing, IT, customer service, and logistics. **Customer-Centric Focus:** A significant part of e-commerce involves understanding and meeting customer needs. This means a lot of roles are geared towards enhancing user experience and customer satisfaction. **Remote and Flexible Work Options:** With the rise of digital tools, many e-commerce jobs offer remote work opportunities and flexible schedules, allowing for a better work-life balance. **Continuous Learning and Development:** Today's industry is constantly changing, so remaining abreast on the latest developments and professional growth/continued learning is essential. **Tech-Driven:** E-commerce heavily relies on technology, so you can expect to work with various digital tools and platforms, and possibly be involved in data analysis, SEO, and digital marketing.	**KCTCS Campuses** Home | BCTC Offers a variety of business-related programs that may include e-commerce components. Home | JCTC Provides business administration programs with potential e-commerce specializations. Home | GCTC: Features business and IT programs that can encompass e-commerce studies. **University Programs** UK-Gatton College of Business and Economics: Offers various business and technology programs that can include e-commerce components. University of Louisville – College of Business: Provides business administration and information technology programs with potential e-commerce specializations. Western Kentucky University: Features business and marketing programs that may cover e-commerce topics.

Financial Services CIP 52.1908.00

This pathway prepares individuals to perform various customer services in banks, insurance agencies, savings and loan companies, and related enterprises. Includes instruction in communications and public relations skills, business equipment operation, and technical skills applicable to the methods and operations of specific financial or insurance services.

Career Choices	Aptitudes Needed	Common Work Environments	Postsecondary Opportunities in Kentucky
Financial Analyst: Analyzes financial data to help businesses make informed decisions. **Financial Planner/Advisor:** Works with individuals to create personalized financial plans, including retirement planning, investment strategies, and tax planning. **Investment Banker:** Helps companies raise capital by issuing stocks or bonds and provides advisory services. **Loan Officer:** Evaluates and approves loan applications for individuals and businesses. **Credit Analyst:** Assesses the creditworthiness of individuals or companies to determine the risk of lending money. **Insurance Underwriter:** Evaluates insurance applications and determines coverage amounts and premiums. **Risk Manager:** Identifies and mitigates financial risks within an organization. **Compliance Officer**: Ensures that a company adheres to financial regulations and internal policies. **Wealth Manager:** Provides high-net-worth individuals with comprehensive financial services, including investment management, estate planning, and tax advice.	**Analytical Skills:** The ability to analyze financial data, identify trends, and make data-driven decisions. **Attention to Detail**: Precision is essential in financial services to ensure accuracy in financial reporting and compliance. **Communication Skills:** Possess strong oral and written communication skills **Interpersonal Skills:** Ability to build and maintain relationships with clients, colleagues, and stakeholders. **Problem-Solving**: The capacity to identify issues and develop effective solutions. **Technical Proficiency:** Familiarity with financial software, data analysis tools, and other technology. **Ethical Judgment and Integrity:** Upholding ethical standards and demonstrating integrity in all financial dealing. **Adaptability:** Be able to adapt to new regulations, technologies, and market conditions. **Business Acumen:** Understanding how businesses operate and making money helps in providing relevant financial advice and services1. **Emotional Intelligence:** Managing your own emotions and understanding others' emotions. **Data Analysis:** Utilize various data analysis tools and methodologies **Accountancy: B**asic to advanced accounting skills**.**	**Hybrid Work Models:** Many financial services firms have adopted hybrid work models, allowing employees to split their time between the office and remote work. **Fast-Paced and High-Pressure:** The industry often involves high-stakes decision-making and tight deadlines. **Collaborative Atmosphere:** Teamwork is crucial, as many projects require collaboration across different departments. **Structured and Regulated:** Financial services are highly regulated, so there is a strong emphasis on compliance and adherence to policies and procedures. **Professional Development:** Continuous learning and professional development are encouraged, with many firms offering training programs and opportunities for career advancement. **Technology-Driven:** The industry relies heavily on technology, so you can expect to work with various financial software and data analysis tools. **Client-Focused:** Building and maintaining client relationships is a key aspect, requiring strong interpersonal and communication skills.	**KCTCS Campuses** Business Administration - AAS KCTCS Business Communication - Certificate KCTCS Business Transfer - Certificate < KCTCS Business Foundations - Certificate < KCTCS **University Programs** UK-Gatton College of Business and Economics: University of Louisville – College of Business Morehead State University, Elmer R. Smith College of Business & Technology Western Kentucky University: College of Business - Eastern Kentucky University: Northern Kentucky University, Haile College of Business Murray State University, Arthur J. Bauernfeind College of Business

Hospitality, Travel, Tourism and Recreation CIP 52.1910.00

The Hospitality, Travel, Tourism and Recreation career pathway prepares individuals to provide services in the hospitality and leisure fields. Includes instruction in hospitality operations, customer sales, marketing techniques, assistance operations and techniques, essential office management, sports, recreation and equipment management, and food and beverage services. The Hospitality, Travel, Tourism and Recreation career pathway is a hybrid pathway that consists of courses within Family and Consumer Sciences Education and Marketing Education. It blends two program areas to help students explore technical skills in the industry.

Career Choices	Aptitudes Needed	Common Work Environments	Postsecondary Opportunities in Kentucky
Hotel Manager: Oversees the operations of a hotel, ensuring guest satisfaction and efficient management of staff and resources . **Event Planner:** Organizes and coordinates events such as weddings, conferences, and corporate meetings. **Travel Agent:** Assists clients in planning and booking travel arrangements, including flights, accommodations, and tours. **Food and Beverage Manager:** Manages the operations of restaurants, bars, and other food service establishments. **Cruise Director:** Plans and oversees activities and entertainment on cruise ships. **Spa Manager:** Manages the operations of a spa, including staff, services, and customer satisfaction. **Hospitality Analyst:** Analyzes data to improve business operations and customer experiences. **Tour Guide:** Leads groups on tours, providing information and insights about the destinations. **Recreation Manager:** Oversees recreational facilities and programs, such as sports complexes, parks, and community centers.	**Communication Skills:** Effective verbal and written communication. **Customer Service Orientation:** A strong focus on providing excellent service and ensuring customer satisfaction **Interpersonal Skills:** The ability to build and maintain positive relationships with a diverse range of people. **Organizational Skills:** Being able to manage time, tasks, and resources efficiently. **Problem-Solving Abilities:** The capacity to handle unexpected situations and find solutions. **Attention to Detail:** Ensuring accuracy in reservations, event planning, and customer interactions. **Adaptability:** The industry can be fast-paced and ever-changing, so being flexible and open to new experiences is beneficial. **Cultural Awareness:** Understanding and respecting different cultures enhances the ability to serve a diverse clientele. **Teamwork:** Many roles require working closely with others, so being a good team player is important. **Technical Proficiency:** Familiarity with industry-specific software and tools. **Data Analysis:** Utilize various data analysis tools and methodologies	**Irregular Hours:** Many roles require working evenings, weekends, and holidays to accommodate guests and travelers. Shift work is common, and hours can be long and unpredictable. **Physical Demands:** Jobs in this field often involve standing for long periods, lifting heavy items, and performing repetitive tasks. **Customer Interaction**: High levels of customer interaction are typical, requiring strong communication and interpersonal skills. Employees must be able to offer excellent service under pressure. **Stress Levels:** The need to meet customer expectations and manage busy periods can create a high-stress environment. **Health and Safety:** Workers must adhere to safety protocols to prevent accidents and ensure a safe environment for guests. **Wages and Benefits:** Pay can vary significantly, with many entry-level positions offering low wages. Benefits such as health insurance and paid leave may be limited, especially in smaller establishments. **Seasonal Employment:** Many jobs in tourism and recreation are seasonal, with peak periods during holidays and vacation seasons. This can lead to periods of unemployment or underemployment.	**KCTCS Campuses** Hospitality Management - Certificate < KCTCS **University Programs** EKU-Global Hospitality & Tourism NKU: Online Hotel Management UK-Hospitality Management & Tourism WKU-Hotel, Restaurant, & Tourism Management Concentration

Management and Entrepreneurship CIP 52.0701.00

This pathway generally prepares individuals to plan, organize, direct, and control the functions and processes of a firm or organization. Includes instruction in management theory, human resources management and behavior, accounting and other quantitative methods, purchasing and logistics, organization and production, marketing, and business decision-making.

Career Choices	Aptitudes Needed	Common Work Environments	Postsecondary Opportunities in Kentucky
MANAGEMENT CAREERS **General Manager:** Oversees operations, manages staff, and ensures business goals are met. **Operations Manager:** Focuses on improving efficiency and productivity within an organization. **Project Manager:** Plans, executes, and closes projects. **Human Resources Manager:** Manages recruitment, employee relations, and organizational development. **Marketing Manager:** Develops and implements marketing strategies to promote products or services. **Financial Manager:** Oversees financial planning, budgeting, and reporting. **Sales Manager:** Leads sales teams, sets sales goals, and develops strategies. **ENTREPRENEUSHIP CAREERS** **Business Owner:** Starts and runs their own business, managing all aspects from operations to finance. **Startup Founder:** Launches a new business venture, often in innovative or emerging markets. **Consultant:** Provides expert advice to businesses on how to improve operations, strategy, and profitability. **Product Manager:** Develops and manages products from conception to market launch. **Venture Capitalist:** Invests in startups and helps them grow by providing capital and strategic guidance. **Franchise Owner:** Operates a business under the brand and business model of an established company.	**Leadership Skills:** The ability to inspire and guide others. **Critical Thinking:** Analyzing situations, identifying problems, and developing effective solutions. **Communication Skills:** Strong verbal and written communication skills are essential. **Creativity and Innovation:** The ability to think outside the box and come up with new ideas. **Organizational Skills:** Managing time, tasks, and resources efficiently. **Financial Literacy:** Understanding basic financial principles, such as budgeting, accounting, and financial analysis. **Resilience and Adaptability:** The ability to bounce back from setbacks and adapt to changing circumstances. **Networking Skills:** Building and maintaining professional relationships. **Teamwork:** Collaborating effectively with others is essential for achieving common goals and fostering a positive work environment. **Ethical Judgment:** Upholding ethical standards and demonstrating integrity in all business dealings. **Data Analysis:** Utilize various data analysis tools and methodologies **Risk Analysis/Management:** Identify, assess, and mitigate potential risks to minimize negative impacts and maximize opportunities.	**Work Hours:** Managers and entrepreneurs often work long and irregular hours, including evenings and weekends, to meet deadlines and manage business operations. **Stress Levels:** High levels of responsibility and the need to make critical decisions can create a stressful environment. **Flexibility:** While the hours can be demanding, there is often a degree of flexibility in how and where work is done. **Collaboration and Communication:** Effective communication and teamwork are essential. Managers and entrepreneurs frequently collaborate with employees, clients, and stakeholders. **Travel:** Depending on the business, travel may be a significant part of the job. This can include attending meetings, conferences, and networking events. **Continuous Learning:** The dynamic nature of business requires staying updated with industry trends, new technologies, and best practices. **Financial Risk:** Entrepreneurs, in particular, face financial risks, especially in the early stages of a business. Managing cash flow and securing funding are critical aspects of the role. **Work Environment**: The work environment can vary from corporate offices to home offices or co-working spaces. The setting often depends on the nature and size of the business.	**KCTCS Campuses** Entrepreneurship - Certificate < KCTCS Management - Certificate < KCTCS **University Programs** **MANAGEMENT** UK-Management U of L Management WKU-Management, Bachelor of Science NKU-Management EKU-Bachelor of Business Administration Murray State-Management **ENTREPRENEURSHIP** Entrepreneurship: University of Louisville – College of Business Innovation & Entrepreneurship: Northern Kentucky University, Greater Cincinnati Region Entrepreneurship, Bachelor of Science-Western Kentucky University Kentucky State University | Business Certificate Programs

Marketing CIP 52.1401.01

This pathway generally prepares individuals to undertake and manage developing consumer audiences and moving products from producers to consumers. Includes instruction in buyer behavior and dynamics, principles of marketing research, demand analysis, cost-volume and profit relationships, pricing theory, marketing campaign and strategic planning, market segments, advertising methods, sales operations and management, consumer relations, retailing and applications to specific products and markets

Career Choices	Aptitudes Needed	Common Work Environments	Postsecondary Opportunities in Kentucky
Marketing Manager: Oversees marketing strategies and campaigns to promote products or services. **Social Media Manager:** Manages an organization's social media presence and campaigns . **Market Research Analyst:** Analyzes market conditions to identify potential sales opportunities. **Brand Manager:** Develops and maintains a brand's image, ensuring consistency across all marketing efforts. **Digital Marketing Specialist:** Focuses on online marketing strategies, including SEO, email marketing, and online advertising. **Content Marketing Manager:** Creates and manages content strategies to attract and retain customers. **Public Relations Specialist:** Manages the public image of an organization and handles communication. **Event Manager:** Plans and coordinates events to promote products or services. **Advertising Manager:** Develops and manages advertising campaigns across various media channels. **Sales Manager:** Leads a sales team and develops strategies to meet sales targets.	**Communication Skills:** Effective verbal and written communication is crucial for conveying ideas clearly and persuasively. **Creativity:** The ability to think outside the box and develop innovative marketing strategies and campaigns. **Analytical Skills:** Strong analytical skills are needed to interpret market data, understand consumer behavior, and measure the effectiveness of marketing efforts. **Teamwork:** Marketing often involves collaboration with others, so being able to work well in a team is important. **Problem-Solving:** The ability to identify problems and come up with effective solutions. **Time Management:** Managing multiple projects and meeting deadlines requires good organizational and time management skills. **Technological Proficiency:** Familiarity with digital tools and platforms used in marketing, such as social media, analytics software, and content management systems. **Data Analysis:** Utilize various data analysis tools and methodologies	**High Level of Social Interaction:** Marketing professionals frequently interact with customers, coworkers, and stakeholders. This involves communication through various means such as phone calls, emails, face-to-face meetings, and presentations. **Teamwork:** Collaboration is a key part of marketing. Professionals often work as part of a team to develop strategies, create campaigns, and solve problems. **Indoor Work Environment:** Most marketing roles are office-based, with occasional travel for meetings, conferences, or client visits. **Competitive Atmosphere:** The marketing field is highly competitive, with strict deadlines and performance targets. **Decision-Making:** Marketing managers and professionals make decisions that can significantly impact the company's reputation and financial performance. **Work Hours:** Marketing roles often involve long hours, especially during campaign launches or peak business periods. **Travel:** Depending on the role, travel may be required to meet with clients, attend industry events, or conduct market research. **Use of Technology:** Marketing professionals frequently use various software and tools for data analysis, campaign management, and customer relationship management.	**KCTCS Campuses** Social Media Marketing - Certificate < KCTCS The following campuses offer various marketing courses within their business administration program. Business Administration | BCTC Business Administration | JCTC Business Administration | GCTC **University Programs** Murray State University Marketing University of Kentucky Marketing Marketing: University of Louisville – College of Business

Retail Services CIP 52.1803.00

This pathway generally prepares individuals to perform operations associated with retail sales in a variety of settings. Includes instruction in over the counter and other direct sales operations in business settings, basic bookkeeping principles, customer services, team/staff leadership and supervision, floor management, and applicable technical skills

Career Choices	Aptitudes Needed	Common Work Environments	Postsecondary Opportunities in Kentucky
Retail Sales Associate: Engage directly with customers, help them find products, and handle transactions. **Visual Merchandiser:** Design and set up store displays to attract customers and drive sales. **Store Manager:** Oversee daily operations, manage staff, and ensure customer satisfaction. **Buyer:** Select and purchase products for retail stores, often working closely with suppliers. **Customer Service Representative:** Assist customers with inquiries, returns, and complaints. **Loss Prevention Specialist:** Implement strategies to prevent theft and fraud in retail environments. **E-commerce Specialist:** Manage online sales platforms, including product listings and customer interactions. **Fashion Merchandiser:** Curate and manage the selection of fashion items for retail stores.	**Communication Skills**: Being able to effectively communicate with customers and colleagues is crucial. This includes both verbal and written communication. **Customer Service Orientation:** A genuine interest in helping customers and ensuring they have a positive experience is essential. **Problem-Solving Skills:** The ability to quickly and effectively resolve customer issues and handle unexpected situations. **Attention to Detail:** Ensuring accuracy in tasks such as handling transactions, stocking shelves, and maintaining displays. **Teamwork:** Working well with others to achieve common goals and maintain a positive work environment. **Time Management:** Being able to prioritize tasks and manage time efficiently, especially during busy periods. **Basic Math Skills**: Handling cash transactions and understanding pricing, applicable taxes and discounts. **Adaptability:** Being flexible and able to adjust to new tasks, technologies, and changes in the retail environment. **Data Analysis:** Utilize various data analysis tools and methodologies	**Fast-Paced Atmosphere**: Retail environments are often busy, especially during peak shopping times like holidays and weekends. **Customer Interaction:** A significant part of the job involves interacting with customers, helping them find products, answering questions, and providing excellent service. **Team Collaboration:** You'll work closely with other staff members, including sales associates, managers, and stock clerks, to ensure the store runs smoothly. **Physical Activity:** The job can be physically demanding, involving standing for long periods, walking around the store, and sometimes lifting or moving merchandise. **Flexible Hours:** Retail jobs often require working evenings, weekends, and holidays to accommodate customer shopping habits. **Sales Goals:** Many retail positions have sales targets or quotas and is often a major component of performance evaluation. **Clean and Well-Lit Spaces:** Most retail stores are designed to be inviting and comfortable for customers, which means you'll typically work in clean, well-lit areas.	**KCTCS Campuses** Small Business Management - Diploma KCTCS **University Programs** UK-Retailing and Tourism Management Management | Murray State University BS in Management, Business Administration | Western Kentucky University Management: Northern Kentucky University, Greater Cincinnati Region

Supply Chain Management CIP 52.0203.00

This pathway prepares individuals to manage and coordinate all supply chains in an enterprise, ranging from acquisitions to receiving and handling, through internal allocation of resources to operations units to the handling and delivery of output. Includes instruction in acquisitions and purchasing, inventory control, storage and handling, just-in-time manufacturing, logistics planning, shipping and delivery management, transportation, quality control, resource estimation and allocation, and budgeting.

Career Choices	Aptitudes Needed	Common Work Environments	Postsecondary Opportunities in Kentucky
Purchasing Agent: Responsible for buying the equipment, supplies, and services needed for an organization. **Logistics Analyst:** Oversees the entire production life cycle of a product, from raw materials to distribution. **Logistics Manager:** Manages the supply chain operations, including purchasing, distribution, and team coordination. **Operations Manager**: Focuses on improving organizational productivity through staff management and process optimization. **Supply Chain Analyst:** Specializes in optimizing supply chain networks. **Procurement Specialist:** Manages the acquisition of goods and services, ensuring cost-effectiveness and quality. **Inventory Control Manager:** Oversees inventory levels, ensuring that stock is maintained at optimal levels. **Distribution Manager:** Manages the distribution of products, ensuring timely and efficient delivery. **Demand Planner:** Forecasts product demand to ensure that supply meets customer needs.	**Analytical Skills:** The ability to analyze data and make informed decisions is crucial. **Mathematical Proficiency:** A strong foundation in mathematics, particularly in areas like algebra and statistics, is essential. **Communication Skills:** Effective communication, both written and verbal. **Organizational Skills:** Being well-organized helps in managing multiple tasks, coordinating logistics, and ensuring that all aspects of the supply chain run smoothly. **Attention to Detail:** Precision is key in supply chain management to avoid errors. **Technical Skills:** Ability to gain familiarity with software tools and technologies used in supply chain management. **Problem-Solving Abilities**: The capacity to identify issues, think critically, and develop effective solutions. **Teamwork and Collaboration:** Working well in a team is important as you will work with multiple partners. **Adaptability:** The ability to adapt to changing circumstances and new technologies is crucial. **Ethical Judgment:** Understanding and adhering to ethical standards in business practices is important. **Data Analysis:** Utilize various data analysis tools and methodologies	**Office and Warehouse Environments:** Supply chain professionals often work in office settings for planning and coordination but may also spend time in warehouses or distribution centers. **Physical Demands**: Roles in warehouses and distribution centers can be physically demanding, involving lifting, moving goods, and operating machinery. Office roles are less physical but can involve long hours at a desk. **Work Hours:** The hours can be irregular, especially in roles that require coordination with international suppliers or managing logistics operations. Shift work and overtime are common, particularly in warehouses. **Stress Levels:** Managing supply chain disruptions, meeting deadlines, and ensuring efficient operations can create a high-stress environment. **Health and Safety**: Ensuring safety in warehouses and during transportation is critical. Workers must follow safety protocols to prevent accidents and injuries. **Collaboration and Communication:** Effective communication and teamwork are essential. Supply chain professionals frequently collaborate with suppliers, logistics providers, and other departments. **Technological Integration:** The use of technology is prevalent in supply chain management, including software for inventory management, logistics planning, and data analysis.	**KCTCS Campuses** Supply Chain Management (Logistics) | BCTC **University Programs** Murray State-Logistics and Supply Chain Management Supply Chain Management | Sullivan University

COMPUTER SCIENCE CAREER PATHWAYS

Additive Manufacturing CIP 15.1307.00

A program that prepares individuals to apply technical knowledge and skills in using three-dimensional (3D) computer technology to create technical illustrations and models used in manufacturing, design, production, and construction. Includes instruction in 3D computer-aided design (CAD), 3D printing, 3D model design and construction, and 3D scanning.

Career Choices	Aptitudes Needed	Common Work Environments	Postsecondary Opportunities in Kentucky
Additive Manufacturing Engineer: Focuses on designing and optimizing 3D printing processes and systems. **3D Printing Technician:** Operates and maintains 3D printing equipment, ensuring that machines run smoothly and produce high-quality parts. **Materials Scientist:** Develops and tests new materials for use in additive manufacturing, including metals, polymers, and composites. **Product Designer:** Uses 3D printing technology to create prototypes and final. **Quality Control Specialist:** Ensures that 3D printed products meet quality standards and specifications. **Research and Development (R&D) Specialist:** Works on advancing additive manufacturing technologies and applications. **Supply Chain Specialist:** Manages the logistics and supply chain aspects of additive manufacturing. **Sales and Marketing Specialist:** Focuses on promoting and selling 3D printing products and services. **Consultant:** Provides expert advice to companies looking to implement or optimize additive manufacturing processes.	**TECHNICAL SKILLS** **Computer-Aided Design (CAD):** Familiarity with CAD software is crucial for designing 3D models. **Mathematical Proficiency:** Strong skills in geometry and algebra are important. **Mechanical Aptitude:** Understanding basic mechanical principles and how machines work . **ANALUTICAL SKILLS** **Problem-Solving:** The ability to troubleshoot and solve technical problems. **Attention to Detail:** Precision is key in additive manufacturing to ensure high-quality outputs. **CREATIVITY** **Innovative Thinking:** The ability to think creatively and design unique solutions. **Effective Communication:** Being able to clearly communicate ideas and collaborate with others. **Understanding of Technology:** Familiarity with the latest technologies and trends in additive manufacturing can give students an edge1. Hands-On Skills: **Practical Experience:** Comfort with hands-on work, including operating and maintaining 3D printers.	**Material Exposure:** Workers may be exposed to powdered materials, liquid resins, and other substances. **Emissions:** 3D printers can emit volatile organic compounds (VOCs) and ultrafine particles (UFPs) during the printing process. **Mechanical Risks:** Handling and maintaining machines can pose risks of mechanical injury. **Fire and Explosion:** Flammable materials used in some processes can create fire hazards. **Ventilation:** Proper ventilation systems to reduce inhalation risks from emissions. **Personal Protective Equipment (PPE):** Use of gloves, masks, and protective clothing to minimize exposure to hazardous materials. **Training:** Comprehensive training on safe handling of materials and operation of machines. **Regular Monitoring:** Continuous monitoring of air quality and machine performance to ensure a safe working environment **Workstation Design:** Ergonomically designed workstations to reduce strain and injury. **Breaks and Rotation:** Regular breaks and rotating tasks to prevent repetitive strain injuries.	**KCTCS Campuses** Madisonville Community College-3D Printing Technician Somerset Community College-3D Printing Technician **University Programs** UK-Stanley and Karen Pigman College of Engineering Kentucky State University | School of Engineering and Technology Bachelor of Science in Manufacturing Engineering - Eastern Kentucky University

Computer Programming CIP 11.0201.01

The Computer Programming pathway courses will prepare students to design and create apps and troubleshoot the latest programming languages used in the industry. The coursework will include instruction in the principles of Computational Science, App Development, Computer Programming and Web Page Development. Upon Completion of this career pathway, students will be prepared for an entry-level position or continue their education in Computer Programming.

Career Choices	Aptitudes Needed	Common Work Environments	Postsecondary Opportunities in Kentucky
Web Developer: Designs and creates websites, ensuring they are visually appealing and functional. **Software Developer:** Develops software applications for various platforms, including desktop, mobile, and web. **Systems Analyst:** Analyzes and designs information systems to help organizations **Database Administrator:** Manages and maintains databases, ensuring data is stored securely and can be accessed efficiently. **Computer Programmer:** Writes and tests code that allows software programs to function. **IT Support Specialist**: Provides technical support to users, helping them troubleshoot and resolve software and hardware issues. **Network Administrator:** Manages and maintains an organization's computer networks. **Cybersecurity Analyst:** Protects an organization's computer systems and networks from cyber threats.. Game Developer: Designs and creates video games for various platforms. **Machine Learning Engineer:** Develops algorithms and models that enable machines to learn and make decisions.	**Logical Thinking:** The ability to think logically and systematically. **Mathematical Proficiency:** A strong foundation in mathematics, particularly in algebra and discrete mathematics. **Problem-Solving Skills:** The capacity to identify problems, think critically, and develop effective solutions. **Attention to Detail:** Precision is key in programming to avoid errors and ensure that code functions correctly. **Persistence and Patience:** Programming often involves trial and error. Being persistent and patient helps in overcoming challenges. **Creativity:** The ability to think creatively can help in designing innovative solutions and writing efficient code. **Communication Skills:** Effective communication, both written and verbal, is important for collaborating with team members. **Technical Literacy:** Familiarity with basic computer operations and software tools is beneficial. **Self-Motivation and Curiosity:** A strong interest in technology and a desire to remain current on the latest technology.	**Work Environment**: Most computer programmers work in office settings, often within the computer systems design and related services industry1. However, remote work has become increasingly common. **Hours:** Programmers usually work full-time, with a standard 40-hour work week. However, overtime may be required to meet project deadlines. **Tasks:** Their daily tasks include writing, modifying, and testing code and scripts to ensure software and applications function properly. **Collaboration:** Effective communication is crucial for understanding project requirements and delivering solutions. **Technology:** They use various programming languages and tools to develop software. Staying updated with the latest technologies and programming trends is essential. **Challenges:** The job can be stressful due to tight deadlines and the need for precision. Programmers must be detail-oriented and capable of solving complex problems. **Flexibility:** Many programming roles offer flexibility in terms of work hours and location, especially with the rise of remote work.	**KCTCS Campuses** Computer and Information Technology | KCTCS **University Programs** Computer Science, Morehead State University Computer Science (CSC) Murray State Computer Science-Eastern Kentucky University Computer Science Major: Northern Kentucky University Computer Science-UK Computer Science - University of Louisville Computer Science-Western Kentucky University

Cybersecurity CIP 14.0902.00

The Cybersecurity pathway is a blend of programming, cybersecurity, and hardware engineering disciplines. Students will learn to research, design, develop, and test computer systems and components. The coursework explores robotics, electricity, ethical computing, and security concerns in today's digital society.

Career Choices	Aptitudes Needed	Common Work Environments	Postsecondary Opportunities in Kentucky
Information Security Analyst: Protects an organization's computer networks and systems by monitoring security breaches, investigating incidents, and developing security strategies. **Cybersecurity Engineer:** Designs and implements secure network solutions to defend against hackers, cyberattacks, and other persistent threats. **Penetration Tester (Ethical Hacker):** Simulates cyberattacks to identify and fix security vulnerabilities. **Security Consultant:** Advises organizations on how to protect their IT infrastructure and data from cyber threats. **Incident Responder:** Responds to security breaches and cyberattacks. **Security Architect:** Designs and builds secure systems and networks. **Chief Information Security Officer (CISO):** Oversees an organization's entire information security strategy and team.	**Analytical Thinking:** The ability to analyze complex problems and identify potential solutions is crucial in cybersecurity. **Attention to Detail:** Cybersecurity professionals need to notice small details that could indicate security breaches or vulnerabilities. **Technical Proficiency:** A strong foundation in computer science, including knowledge of programming languages, networking, and operating systems, is essential. **Problem-Solving Skills:** The ability to think critically and creatively to solve security issues is highly valued. **Curiosity and Continuous Learning:** Cybersecurity is a constantly evolving field, so a willingness to stay updated with the latest trends and technologies is important. **Communication Skills:** Being able to explain complex technical issues to non-technical stakeholders. **Ethical Mindset:** A strong sense of ethics and responsibility is crucial, as cybersecurity professionals often handle sensitive information.	**Dynamic and Fast-Paced:** Cybersecurity professionals often work in a fast-paced environment where they need to respond quickly to emerging threats and incidents. **Collaborative**: Many cybersecurity roles involve working closely with other IT professionals, management, and sometimes even law enforcement to ensure comprehensive security measures. **Problem-Solving Focused:** The job often requires a lot of problem-solving and critical thinking to identify vulnerabilities and develop effective security strategies. **Continuous Learning:** Cybersecurity is a constantly evolving field, so professionals need to stay updated with the latest trends, technologies, and threat landscapes. **High Responsibility:** Given the importance of protecting sensitive data and systems, cybersecurity roles come with a high level of responsibility and sometimes stress. **Flexible Work Arrangements:** Many cybersecurity jobs offer flexible work arrangements, including remote work options.	**KCTCS Campuses** Cybersecurity | BCTC Cybersecurity | KCTCS **University Programs** Cybersecurity | Stanley and Karen Pigman College of Engineering Cybersecurity - J.B. Speed School of Engineering - University of Louisville Cybersecurity Major: Northern Kentucky University Cybersecurity Degree | Network Management | Murray State Master of Science in Cybersecurity Data Analytics | Western Kentucky University Bachelor of Science in Digital Forensics & Cybersecurity - Eastern Kentucky University

Data Science CIP 11.0802.00

Students will apply software systems and industry software to acquire, collect, store and communicate data meaningfully to clients. Students will manage projects, work in teams, think critically, solve problems and propose solutions to design problems. Further, they will learn to apply literacy, mathematics, and science concepts and use technology to solve real-world challenging problems effectively. Through project-based learning, students will explore the future of data science and learn those habits of behavior and mind unique to professionals in the field. Data Science leverages technology, data, and communication by instilling in a new generation the knowledge, imagination, and flexibility to tackle complex issues successfully in a data-rich digital world. It is the process of designing systems that take raw data and convert it into new knowledge that can be applied to any field while considering the impact on individuals, organizations, and society.

Career Choices	Aptitudes Needed	Common Work Environments	Postsecondary Opportunities in Kentucky
Data Journalist: Uses and examines statistics to provide objective and in-depth reporting and news writing. They use programming to automate the process of gathering and combining information. **Data Analyst:** Modifies company or industry data to perform analyses that answer specific business questions. They primarily use programming languages and frameworks to review data and make inferences. **Statistical Analyst:** Collects and examines data from various sources. They use visualization and business intelligence tools to communicate their findings to decision-makers at an organization. **Computer Systems Analyst**: Inspects a company's computer systems to assess their efficiency and determine whether they align with business needs and goals.	**Mathematical Proficiency**: A strong foundation in mathematics, particularly in algebra, calculus, and statistics. **Programming Skills:** Ability to learn programming languages such as Python, R, or Java is crucial. **Analytical Thinking:** The ability to think critically and analytically is important for interpreting data. **Problem-Solving Skills:** Data science involves solving complex problems. **Attention to Detail:** Precision and accuracy are vital when working with data to ensure the validity and reliability of results. **Curiosity and Eagerness to Learn:** A natural curiosity and a willingness to continuously learn and adapt to new technologies and methodologies are important. **Communication Skills:** The ability to communicate findings clearly and effectively, both in writing and verbally, is essential. **Teamwork**: Data science projects often require collaboration with others, so being able to work well in.	**Collaborative Atmosphere:** Data analysts often work closely with other team members, including data scientists, business analysts, and IT professionals. **Office Setting:** Most data analysts work in an office environment, though remote work is becoming more common. **Full-Time Hours:** The majority of data analysts work full-time, with some positions requiring occasional overtime to meet deadlines. **Attention to Detail:** The role requires a high level of accuracy and attention to detail, as small errors can significantly impact the results. **Mild Stress Levels**: While the job can involve some time pressure, it is generally not considered highly stressful. **Limited Creativity:** The work is often structured and may not allow for much creative expression. **Continuous Learning:** Data analysts need to stay updated with the latest tools and techniques in data analysis, which involves continuous learning.	**KCTCS Campuses** Computer and Information Technology | KCTCS **University Programs** **UK-Statistics and Data Science** **Data Science Major: Northern Kentucky University** **Bachelor of Science in Business Data Analytics | Western Kentucky University** **Bachelor of Science in Data Science & Statistics - Eastern Kentucky University**

Digital Design and Game Development CIP 36.0113.00

The Digital Design and Game Development pathway courses provide students with a thorough understanding of techniques for designing advances in games, apps, AR/VR and other experiences. The courses will cover 2D and 3D graphics, animation, character development, program design and coding, texturing, scripting, and game setup using state-of-the-art software development tools. Completing students will have developed the skills necessary to create 3D graphics and applications that can be used for games and simulations.

Career Choices	Aptitudes Needed	Common Work Environments	Postsecondary Opportunities in Kentucky
Game Designer: Responsible for creating the concepts, storylines, characters, and gameplay mechanics of a game. **Developer/Programmer:** Focuses on writing the code that brings the game to life, ensuring it runs smoothly and efficiently. **Game Animator**: Uses specialized software to create visual elements and animations in a game. **Level Designer:** Designs the levels or stages of a game, creating engaging and challenging environments for players. **Audio Engineer:** Creates the sound effects, music, and audio elements. **Quality Assurance Tester:** Tests games for bugs and issues, ensuring they meet quality standards. **Technical Support Specialist:** Provides support to players experiencing technical issues with games. **User Interface (UI) Designer:** Designs the menus, buttons, and overall interface. **Narrative Designer**: Develops the storylines, dialogues, and narrative elements of a game. **Game Producer:** Manages the game production process.	**Creativity:** The ability to think outside the box and come up with innovative ideas for game concepts, characters, and storylines. **Problem-Solving Skills:** The capacity to tackle challenges and find solutions. **Technical Skills:** A basic understanding of programming languages as well as familiarity with game development tools and software. **Artistic Skills:** Proficiency in drawing, graphic design, and animation can be very beneficial for creating visual elements of games. **Attention to Detail:** The ability to notice and correct small errors in code, design, or gameplay mechanics. **Teamwork and Collaboration:** Many game development projects require working in teams. **Time Management:** The ability to manage time effectively to meet deadlines and balance multiple tasks. **Passion for Gaming:** A genuine interest in video games and a desire to learn about the industry. **Storytelling Skills:** The ability to create engaging narratives and characters. **Adaptability:** The willingness to learn new tools, technologies, and techniques.	**Work Environment:** The work environment can range from relaxed and flexible to intense and demanding, depending on the studio and project. Some studios may have a more laid-back atmosphere, while others might have periods of "crunch time" with long hours. **Creativity and Innovation:** The work environment is often vibrant and fast-paced, with a strong emphasis on creativity and innovation. **Team Collaboration:** You'll work closely with a diverse team of professionals, including artists, programmers, writers, and sound designers. **Varied Daily Tasks:** Your daily tasks can vary greatly depending on the stage of development. This can include concept development, creating design documents, building prototypes, and testing game features. **Challenges and Rewards:** The industry can be challenging, with tight deadlines and high expectations. However, it can also be highly rewarding. **Continuous Learning:** Staying up to date with industry trends, emerging technologies, and player preferences is essential.	**KCTCS Campuses** BCTC-Video Game Design Graphic Design | BCTC **University Programs.** Computer Science-Eastern Kentucky University... Game Content Design, Minor Eastern Kentucky University Visual Arts, Bachelor of Fine Arts Western Kentucky University

Information Support and Services CIP 47.0104.01

The Information Support and Services pathway focuses on the design of computing systems. The courses include instruction in the principles of computer hardware and software components, algorithms, databases, and telecommunications.

Career Choices	Aptitudes Needed	Common Work Environments	Postsecondary Opportunities in Kentucky
Help Desk Analyst: Provide technical support to customers or colleagues, troubleshooting and resolving IT issues. **Computer Support Specialist:** Assist users with computer problems and provide support for software and hardware. **Network Technician**: Maintain and troubleshoot network systems, ensuring connectivity and security. **Database Administrator:** Manage and maintain databases, ensuring data integrity, security, and availability. **Systems Analyst:** Analyze and design information systems to help organizations operate more efficiently. **IT Project Manager:** Oversee IT projects, ensuring they are completed on time, within budget, and meet the required standards. **Technical Support Specialist:** Provide advanced technical support and solve complex IT issues. **Information Systems Manager:** Manage an organization's IT infrastructure, including hardware, software, and networks.	**Technical Skills:** A strong interest in and understanding of computers, software, and technology is essential. **Problem-Solving Abilities**: The ability to analyze issues, think critically, and develop effective solutions is crucial. **Communication Skills:** Good verbal and written communication skills are important for explaining technical information clearly to non-technical users and collaborating with team members. **Attention to Detail:** Precision and accuracy are vital when working with complex systems and data. **Patience and Empathy:** Providing support often requires patience and understanding, especially when dealing with frustrated users. **Organizational Skills:** Being organized helps in managing multiple tasks, keeping track of issues, and maintaining documentation. **Continuous Learning:** A willingness to learn and adapt to new technologies and methods.	**Office and Remote Settings:** You may work in a traditional office setting or remote, depending on the organization. **Team Collaboration:** You'll often collaborate with other IT professionals, such as network administrators, software developers, and system analysts. **Problem-Solving Focus**: The work environment is centered around troubleshooting and problem-solving. You'll be diagnosing and fixing technical issues. **Customer Interaction:** Providing support to users is a significant part of the job. This involves communicating with customers or colleagues to understand their issues and guide them through solutions. **Access to Tools and Resources:** You'll have access to various hardware and software tools necessary for diagnosing and resolving technical problems. **Structured Environment:** A well-organized workspace is crucial for efficiency. Proper infrastructure, reliable hardware, and robust network systems support your work. **Stress and Time Pressure:** The job can sometimes be stressful, especially when dealing with urgent issues or tight deadlines.	**KCTCS Campuses** Computer and Information Technology | KCTCS **University Programs** **Information Technology: Northern Kentucky University** **UK-Bachelor's in ICT** **Bachelor of Science in Management Information Systems - Eastern Kentucky University** **Kentucky State University | Computer Information Systems Option**

Network Administration CIP 11.0901.01

The Network Administration pathway courses will help students learn new administration support skills or upgrade existing computer information systems skills. Students will be able to install networking software on an appropriately sized computer properly, configure the software for a simple server environment and connect it correctly to a physical network, manage a simple networking environment, effectively troubleshoot problems, add new users and attend security concerns; and work within the ethical/professional parameters in the field of network administration.

Career Choices	Aptitudes Needed	Common Work Environments	Postsecondary Opportunities in Kentucky
Network Administrator: Responsible for managing and maintaining an organization's computer networks, ensuring they run smoothly and efficiently. **Network Engineer:** Focuses on designing and implementing network solutions. **Systems Administrator:** Manages and supports the overall IT infrastructure, including servers, networks, and storage systems.. **IT Support Specialist:** Provides technical support to users, resolving network-related issues and assisting with hardware and software problems. **Network Security Administrator:** Specializes in protecting an organization's network from cyber threats. **Cloud Network Administrator:** Manages cloud-based network services, ensuring they are properly configured and secure. Network administration	**Basic Computer Literacy:** Understanding how to use computers and common software applications. **Basic Networking Concepts:** Understanding of fundamental networking principles, such as IP addressing, subnetting, and network topologies. **Problem-Solving:** Ability to troubleshoot and resolve technical issues. **Attention to Detail:** Precision in configuring and maintaining network systems. **Basic Math:** Comfortable with basic arithmetic and algebra, which are often used in network calculations and configurations. **Verbal and Written Communication:** Ability to explain technical concepts clearly to non-technical users and document procedures effectively. **Curiosity and Willingness to Learn:** Eagerness to stay updated with the latest technological trends and advancements. **Patience and Perseverance:** Ability to remain patient and persistent when troubleshooting complex issues. **Teamwork:** Ability to work well with others. **Organizational/Time Management:** Ability to prioritize tasks and manage time effectively.	**Work Environment:** Network administrators typically work in office settings, but remote work is also possible. They are employed by a variety of organizations, including IT firms and schools. **Hours**: Most network administrators work full-time, with a standard 40-hour work week. However, they may need to work evenings, nights, or weekends to monitor, maintain, or update networks and systems. **Tasks:** Their daily tasks include installing, configuring, and maintaining network hardware and software. They also monitor network performance, troubleshoot issues, and ensure network security. **Collaboration:** Network administrators often collaborate with other IT professionals to ensure the smooth operation of the organization's network. **Technology:** They use various tools and technologies to manage networks, including network monitoring software and security tools. Staying updated with the latest networking technologies and best practices is crucial. **Challenges:** The job can be stressful due to the need for rapid response to network issues and the constant threat of cyber-attacks. Network administrators must be detail-oriented and analytical. **Flexibility:** While many roles offer flexibility in terms of work hours and location, the need for on-call availability can limit this flexibility.	**KCTCS Campuses** Computer and Information Technology | KCTCS **University Programs** Computer Science, Morehead State University Computer Science (CSC) Murray State Computer Science-Eastern Kentucky University Computer Science Major: Northern Kentucky University Computer Science-UK Computer Science - University of Louisville Computer Science-Western Kentucky University

Network Security CIP 11.1003.00

The Network Security pathway will help students be able to properly design and install a wired LAN, including all network devices, physically connect servers and desktop computers, properly design and install a wireless LAN, including all network devices, and make physical LAN connections for servers and desktop computers, integrate the Wireless LAN with wired LAN and work within the ethical and professional parameters in the Computer Networking profession. Students will be team members, learn new network administration support skills and upgrade existing computer information system skills.

Career Choices	Aptitudes Needed	Common Work Environments	Postsecondary Opportunities in Kentucky
Network Security Specialist: These professionals are responsible for protecting an organization's network from cyber threats by implementing security measures and monitoring network traffic. **Security Analyst:** Security analysts monitor networks for security breaches, investigate incidents, and implement security measures to protect data. **Penetration Tester** (Ethical Hacker): Penetration testers simulate cyberattacks to identify vulnerabilities in an organization's network and recommend improvements. **Security Consultant:** Security consultants advise organizations on best practices for securing their networks and help design and implement security solutions. **Network Security Engineer:** These engineers design, implement, and maintain secure network infrastructure, including firewalls, VPNs, and intrusion detection systems. **Incident Responder:** Incident responders are the first line of defense during a cyberattack, responsible for identifying, containing, and mitigating security incidents. **Chief Information Security Officer (CISO):** CISOs are senior executives responsible for an organization's overall information security strategy and management.	**Analytical Thinking:** The ability to analyze complex problems and identify potential security threats. **Attention to Detail:** Network security requires meticulous attention to detail to spot vulnerabilities and ensure systems are secure. **Problem-Solving Skills:** Being able to think critically and solve problems efficiently is essential for addressing security issues. **Technical Proficiency:** A strong foundation in computer science, including knowledge of operating systems, networking, and programming. **Curiosity and Continuous Learning:** The field of network security is constantly evolving, so continued learning is essential. **Communication Skills:** Effective communication is necessary to explain security issues and solutions to non-technical stakeholders. **Ethical Mindset:** A strong sense of ethics and responsibility is vital. **Teamwork:** Collaboration with other IT professionals and departments is often required to implement security measures.	**Office Setting:** Many network security professionals work in traditional office settings, often within IT departments of organizations. **Remote Work:** Many network security roles can be performed from home or other remote locations. **High-Pressure Situations:** Network security professionals often deal with high-pressure situations, especially during security breaches or cyberattacks. **Continuous Learning:** The field of network security is constantly evolving, so professionals need to stay updated with the latest technologies, threats, and best practices. **Team Collaboration:** Network security often requires working closely with other IT professionals, security analysts, and sometimes external consultants. **On-Call Duties:** Depending on the organization, you might be required to be on-call outside of regular working hours to respond to security incidents or emergencies. **Use of Advanced Tools:** You'll work with a variety of security tools and technologies, such as firewalls, intrusion detection systems, and security information and event management (SIEM) systems.	**KCTCS Campuses** Cybersecurity | BCTC Cybersecurity | KCTCS **University Programs** Cybersecurity | Stanley and Karen Pigman College of Engineering Cybersecurity - J.B. Speed School of Engineering - University of Louisville Cybersecurity Major: Northern Kentucky University, Greater Cincinnati Region Cybersecurity Degree | Network Management | Murray State Master of Science in Cybersecurity Data Analytics | Western Kentucky University Bachelor of Science in Digital Forensics & Cybersecurity - Eastern Kentucky University

Web Development/Administration CIP 11.0801.01

The Web Development/Administration pathway involves creating, designing, and producing interactive multimedia products and services. This will include developing digitally generated or computer-enhanced media and adhering to web standards in business, training, communications and marketing. Organizations of all types and sizes use digital media, web pages, and websites to communicate with existing and potential customers, track transactions, and collaborate with colleagues. This pathway will prepare students to enter the workforce ready to participate as leaders in various careers and further their education.

Career Choices	Aptitudes Needed	Common Work Environments	Postsecondary Opportunities in Kentucky
Front-End Developer: Focuses on the visual aspects of a website, including layout, design, and user interface. **Back-End Developer:** Handles the server-side logic, databases, and application integration. **Full-Stack Developer:** Combines the skills of both front-end and back-end developers, capable of handling all aspects of web development. **Web Designer:** Specializes in the visual design of websites, focusing on aesthetics, layout, and user experience. **Web Administrator:** Manages and maintains websites, ensuring they are secure, up-to-date, and running smoothly. **UX/UI Designer:** Focuses on user experience (UX) and user interface (UI) design, ensuring that websites are intuitive, accessible, and user-friendly. **Web Content Manager:** Responsible for creating, editing, and managing the content on a website. **SEO Specialist:** Optimizes websites to rank higher in search engine results, increasing visibility and traffic. **Web Project Manager:** Oversees web development projects. **E-commerce Specialist:** Focuses on developing and managing online stores, ensuring a smooth shopping experience for customers.	**Problem-Solving Skills:** The ability to troubleshoot and solve technical issues. **Attention to Detail:** Precision is important when writing code and managing websites. **Creativity:** A creative mindset helps in designing visually appealing and user-friendly websites. **Technical Proficiency**: A strong foundation in computer science, including knowledge of HTML, CSS, JavaScript, and other programming languages. **Analytical Thinking:** The ability to analyze user needs and design solutions that meet those needs is essential. **Communication Skills:** Effective communication is necessary to collaborate with team members and clients **Curiosity and Continuous Learning:** The field of web development is constantly evolving, so a willingness to learn new technologies and stay updated with industry trends is important. **Time Management:** The ability to manage time effectively and meet deadlines is crucial, especially when working on multiple projects. **Teamwork:** Collaboration with other developers, designers, and stakeholders is often required to complete projects successfully.	**Office Setting:** Many web developers and administrators work in traditional office settings, often within IT departments or digital agencies. **Remote Work:** Many web development roles can be performed from home or other remote locations. **Project-Based Work:** Web development often involves working on specific projects with defined goals and deadlines. **Continuous Learning:** The field of web development is constantly evolving, so professionals need to stay updated with the latest technologies, frameworks, and best practices. **Team Collaboration**: Web development and administration require working closely with other team members. **Problem-Solving:** You'll frequently encounter and need to solve technical issues **Use of Advanced Tools:** You'll work with a variety of development tools and technologies, such as version control systems (e.g., Git), content management systems (e.g., WordPress), and various programming languages and frameworks.	Computer and Information Technology | KCTCS **University Programs** Computer Science, Morehead State University Computer Science (CSC) Murray State Computer Science-Eastern Kentucky University Computer Science Major: Northern Kentucky University Computer Science-UK Computer Science - University of Louisville Computer Science-Western Kentucky University

CONSTRUCTION TECHNOLOGY

Environmental Control System Technician CIP 47.0201.05

This pathway prepares individuals to apply technical knowledge and skills to repair, install, service and maintain the operating condition of heating, air conditioning, and refrigeration systems. The pathway includes instruction in diagnostic techniques, the use of testing equipment and the principles of mechanics, electricity, and electronics related to the repair of heating, air conditioning and refrigeration systems.

Career Choices	Aptitudes Needed	Common Work Environments	Postsecondary Opportunities in Kentucky
HVAC Technician: Specializes in installing, maintaining, and repairing heating, ventilation, and air conditioning systems. **Environmental Control Engineer**: Focuses on designing and implementing systems that control environmental conditions. **Building Automation Technician:** Works with automated systems that control building environments, including HVAC, lighting, and security systems. **Energy Management Technician:** Monitors and manages energy usage in buildings to optimize efficiency and reduce costs. **Environmental Services Technician:** Responsible for maintaining and improving environmental conditions. **Critical Environment Technician:** Works in data centers or other critical environments to ensure that environmental control systems are functioning properly.	**Mechanical Aptitude:** Understanding how machines and systems work is crucial for diagnosing and repairing environmental control systems. **Problem-Solving Skills:** The ability to troubleshoot and solve technical issues. **Attention to Detail:** Precision is important when working with complex systems to ensure they operate correctly and safely. **Technical Proficiency:** A strong foundation in subjects like mathematics, physics, and computer science is beneficial. **Analytical Thinking:** The ability to analyze data and system performance. **Communication Skills:** Effective communication is necessary to explain technical issues and solutions. **Curiosity and Continuous Learning:** The field is constantly evolving, so a willingness to learn new technologies and stay updated with industry trends is important.	**Indoor and Outdoor Settings:** You may work in both indoor and outdoor environments, depending on the specific job. **Physical Demands:** The job can be physically demanding, requiring you to lift heavy equipment, climb ladders, and work in confined spaces. Good physical fitness and stamina are important. **Exposure to Hazards:** You may be exposed to various hazards, such as electrical components, chemicals, and extreme temperatures. **Technical and Precision Work:** The role involves working with complex systems that require precision and attention to detail. **Team Collaboration**: You may work as part of a team, collaborating with other technicians, engineers, and facility managers. **Variable Hours:** Depending on the employer, you might work standard business hours or have shifts that include evenings, weekends, and on-call duties.	**KCTCS Campuses** Environmental Control System Servicer - Certificate KCTCS **Apprenticeships** Registered Apprenticeships - Kentucky Works **University Programs** (While most Environmental Control System Technician programs in Kentucky are offered through community and technical colleges, there are also related programs at universities that can provide a strong foundation in this field.) UK-Mechanical Engineering Mechanical Engineering (ME) < Western Kentucky University Engineering Physics at Murray State

Residential Maintenance Carpenter Assistant CIP 46.0401.01

This pathway prepares individuals to apply technical knowledge and skills to keep a building functioning and to service a variety of structures, including commercial and industrial buildings and mobile homes. Includes instruction in the essential maintenance and repair skills required to service building systems, such as air conditioning, heating, plumbing, electrical, major appliances, and other mechanical systems.

Career Choices	Aptitudes Needed	Common Work Environments	Postsecondary Opportunities in Kentucky
Residential Maintenance Professional: This role involves performing maintenance and repair tasks in residential properties. **Carpenter Assistant:** Working under the supervision of experienced carpenters, you'll assist with various carpentry tasks, including construction, repair, and installation. **Maintenance Technician:** In this position, you'll handle a range of maintenance duties, from fixing plumbing issues to electrical repairs. **Property Maintenance Worker:** This job involves maintaining the overall condition of residential properties. **Facilities Maintenance Technician:** Working in larger residential complexes or commercial buildings, you'll be responsible for maintaining the facilities. **Handyman:** Offering a wide range of repair and maintenance services, this role allows for flexibility and variety in the types of tasks you perform.	**Manual Dexterity:** The ability to work with hands efficiently and skillfully. **Attention to Detail:** Precision is important when effecting repairs of building anything, **Problem-Solving Skills:** Being able to troubleshoot and find solutions to various maintenance issues is essential. **Basic Math Skills:** Understanding measurements, geometry, and basic arithmetic is necessary for accurate construction and repairs. **Physical Stamina:** Carpentry and maintenance work can be physically demanding, so good physical condition is beneficial. **Communication Skills:** Must be able to understand instructions and communicate effectively with team members and clients. **Technical Aptitude**: Familiarity with tools, equipment, and basic construction techniques is helpful.	**Physical Demands:** The job often involves physical labor, including lifting heavy materials, bending, kneeling, and standing for long periods. **Tools and Equipment:** They use a variety of hand and power tools, such as saws, drills, sanders, and chisels. **Work Environment:** They may work indoors or outdoors, depending on the project. Working at heights on ladders or scaffolding is common. **Safety:** Ensuring compliance with safety regulations and using protective gear like gloves, goggles, and masks is essential. **Tasks:** Responsibilities include assisting with measurements, cutting lumber, painting prep, project setup, and cleanup.	**KCTCS Campuses** Construction Technology KCTCS **University Programs** Construction Management: Northern Kentucky University Bachelor of Science in Construction Management - Eastern Kentucky University Construction Management | Western Kentucky University

Construction Architectural Engineering CIP 15.0101.02

This pathway provides the opportunity to blend Career and Technical Education (CTE) courses with engineering courses to help students apply technical skills along with Science, Technology, Engineering, and Math (STEM) skills to solve real-world problems. This pathway prepares individuals to apply engineering principles and technical skills to support architects, engineers and planners in designing and developing buildings, urban complexes, and related systems. Includes instruction in design testing procedures, building site analysis, model building and computer graphics, structural systems testing, analysis of prototype mechanical and interior systems, report preparation, basic construction and structural design, architectural rendering, computer-aided drafting (CAD), layout and designs, architectural blueprint interpretation, building materials, and basic structural wiring diagramming.

Career Choices	Aptitudes Needed	Common Work Environments	Postsecondary Opportunities in Kentucky
Architectural Engineer: Design and oversee the construction of buildings. **Construction Project Manager:** Plan, coordinate, and oversee construction projects from start to finish. **Building Services Engineer:** Design and install essential systems within buildings. **Structural Engineer:** Focus on the design and analysis of building structures. **Construction Estimator:** Prepare cost estimates for construction projects. **Sustainability Consultant:** Advise on sustainable building practices. **Facilities Manager:** Oversee the maintenance and operation of buildings. **Urban Planner**: Work on the development and planning of urban areas, integrating architectural and engineering principles.	**Mathematical Skills:** Understanding of algebra, geometry, and trigonometry is essential. Calculus and physics can also be very helpful. **Analytical Thinking**: Ability to analyze complex problems and develop practical solutions. **Technical Drawing:** Ability to learn how to use technical drawing and design software. **Communication Skills:** Effective verbal and written communication skills are crucial for collaborating with team members and presenting ideas. **Attention to Detail:** Precision is important in both design and construction phases. **Creativity:** Innovative thinking to design functional and aesthetically pleasing structures. **Time Management:** Strong organizational skills to manage multiple tasks and meet deadlines.	**Office Work:** Much of their time is spent in offices, where they develop plans, meet with clients, and consult with engineers and other architects. They use computer software for design, budgeting, and project management. **Site Visits:** They frequently visit construction sites to inspect progress, ensure compliance with architectural plans, and address any issues that arise . **Physical Demands:** Site visits can involve walking, climbing, and standing for extended periods. They may need to wear protective gear like hard hats and boots . **Collaboration:** They work closely with various stakeholders, including contractors, environmental experts, and code enforcement officials . **Work Hours:** The job can require long hours, especially when deadlines are approaching .	**KCTCS Campuses** Architectural Technology | KCTCS **University Programs** Construction Management: Northern Kentucky University Bachelor of Science in Construction Management - Eastern Kentucky University Construction Management | Western Kentucky University UK-Architecture

Structural Engineering CIP 14.0803.00

This pathway provides the opportunity to blend Career and Technical Education (CTE) courses with Engineering courses to help students apply technical skills along with Science, Technology, Engineering, and Math (STEM) skills to solve real-world problems. This pathway prepares individuals to apply engineering principles and technical skills to support architects, engineers and planners in designing and developing buildings, urban complexes, and related systems. It includes instruction in design testing procedures, building site analysis, model building and computer graphics, structural systems testing, analysis of prototype mechanical and interior systems, report preparation, basic construction and structural design, architectural rendering, architectural-aided drafting (CAD), layout and designs, architectural blueprint interpretation, building materials, and basic structural wiring diagramming.

Career Choices	Aptitudes Needed	Common Work Environments	Postsecondary Opportunities in Kentucky
Structural Engineer: Design and analyze buildings, bridges, and other structures. **Civil Engineer:** Work on broader infrastructure projects, including roads, dams, and water supply systems. **Project Engineer:** Manage specific aspects of construction projects. **Consulting Engineer:** Provide expert advice on structural integrity, safety, and compliance. **Research and Development Engineer:** Work on developing new materials, construction techniques, and technologies. **Forensic Engineer:** Investigate structural failures and accidents to determine causes and recommend improvements **Building Inspector:** Ensure that construction projects are compliant. **Teaching:** Teach in secondary and postsecondary institutions and conduct research	**Mathematical Proficiency:** Strong skills in algebra, geometry, trigonometry, calculus, physics, & mechanics. **Analytical Thinking**: Ability to analyze complex problems. **Attention to Detail:** Precision is vital in structural engineering. **Technical Drawing Skills:** Familiarity with technical drawing and design software. **Communication Skills:** Clear verbal and written communication. **Creativity and Innovation:** Ability to design functional and visually appealing structures creatively. **Teamwork:** Ability to work well with both internal & external partners. **Time Management:** Good organizational skills to manage multiple tasks and meet deadlines efficiently. **Problem-Solving Skills:** Ability to think critically and address unexpected challenges effectively.	**Office Work:** Structural engineers spend a significant amount of time in offices, where they design structures, create blueprints, and use software for simulations and calculations. They also meet with clients, architects, and other engineers to discuss project details . **Site Visits**: Regular visits to construction sites are essential to inspect the progress, ensure compliance with design specifications, and address any issues that arise. **Physical Demands:** Site visits may require wearing protective gear such as hard hats, safety glasses, and boots. Engineers need to be prepared for various weather conditions and the physical demands of navigating active construction sites. **Collaboration:** Structural engineers work closely with other professionals, including architects, contractors, and other engineers, to ensure that all aspects of the project are coordinated and meet safety standards. **Problem-Solving:** They often encounter challenges that require critical thinking and problem-solving skills. **Work Hours:** The job can involve long hours, especially when deadlines are approaching or when unexpected issues arise on-site.	**KCTCS Campuses** Architectural Technology | KCTCS **University Programs** UK-Civil Engineering Civil & Environmental Engineering-University of Louisville Civil Engineering, Bachelor of Science, Western Kentucky University Department of Engineering & Technology - Eastern Kentucky University

Electrical Construction Engineering CIP 15.0303.00

This pathway provides the opportunity to blend Career and Technical Education (CTE) courses with Engineering courses to help students apply technical skills along with Science, Technology, Engineering, and Math (STEM) skills to solve real-world problems. This pathway prepares individuals to apply technical knowledge and skills to install, operate, maintain, and repair electric apparatus and systems such as residential, commercial, and industrial electric power wiring, DC and AC motors, controls, and electrical distribution panels. It includes instruction in the principles of electronics and electrical systems, wiring, power transmission, safety, industrial and household appliances, job estimation, electrical testing and inspection, and applicable codes and standards.

Career Choices	Aptitudes Needed	Common Work Environments	Postsecondary Opportunities in Kentucky
Electrical Engineer: Design, develop, and maintain electrical systems and components for buildings. **Construction Project Manager:** Oversee electrical aspects of construction projects. **Electrical Design Engineer:** Create detailed electrical plans and schematics for construction projects. **Field Engineer:** Work on-site to install, test, and troubleshoot electrical systems and equipment. **Maintenance Engineer:** Ensure the ongoing operation and safety of electrical systems in buildings and facilities. **Quality Control Engineer:** Monitor and inspect electrical installations. **Systems Engineer**: Design and integrate complex electrical systems. **Technical Sales Engineer:** Provide technical support and sales expertise for electrical products. **Consulting Engineer**: Offer expert advice on electrical systems and infrastructure.	**Mathematical Proficiency:** Strong skills in algebra, geometry, trigonometry, and calculus. **Analytical Thinking:** Ability to analyze complex problems and develop solutions. **Attention to Detail:** Precision is vital in electrical engineering to ensure safety and accuracy **Technical Skills:** Familiarity with electrical circuits, wiring, and design software. **Communication Skills:** Effective verbal and written communication skills are important. **Creativity and Innovation:** Ability to think creatively to design innovative systems. **Teamwork:** Strong ability to work well in a team, as electrical construction projects often require collaboration. **Time Management**: Good organizational skills to manage multiple tasks and meet deadlines efficiently. **Problem-Solving Skills:** Ability to think critically and address unexpected challenges effectively.	**Office Work:** Engineers spend time in offices designing electrical systems, creating blueprints, and using software for simulations and calculations. They also meet with clients, architects, and other engineers. **Site Visits:** Regular visits to construction sites are essential to inspect progress, ensure compliance with design specifications, and address any issues that arise. **Physical Demands:** Site visits may require wearing protective gear such as hard hats, safety glasses, and boots. Engineers need to be prepared for various weather conditions and the physical demands of navigating active construction sites. **Safety Concerns**: Electrical engineers must be vigilant about safety, as they work with live wires, electrical systems, and equipment. **Collaboration:** They work closely with other professionals, including contractors, electricians, and safety inspectors, to ensure that all aspects of the project are coordinated and meet safety standards. **Problem-Solving:** Engineers often encounter challenges that require critical thinking and problem-solving skills. **Work Hours:** The job can involve long hours, especially when deadlines are approaching or when unexpected issues arise on-site.	**KCTCS Campuses** Electrical Engineering Technology - Certificate < KCTCS **University Programs** Electrical Engineering, UK Electrical & Computer Engineering (Dept) - University of Louisville Electrical Engineering-Western Kentucky University Electrical and Electronics Engineering-NKU Department of Engineering & Technology - Eastern Kentucky University

Industrial Electrician Assistant CIP 46.0302.02

This pathway prepares individuals to apply technical knowledge and skills to install, operate, maintain, and repair electric apparatus and systems in residential, commercial, and industrial electric power wiring, DC and AC motor controls, and electrical distribution panels. The pathway includes instruction in the principles of electronics and electrical systems, wiring, power transmission, safety, industrial and household appliances, job estimation, electrical inspecting and inspection, and applicable codes and standards. Instruction includes the principles of electronics and electrical systems, wiring, power transmission, safety industrial and household appliances, job estimation, electrical testing and inspection, and applicable codes and standards.

Career Choices	Aptitudes Needed	Common Work Environments	Postsecondary Opportunities in Kentucky
Industrial Electrician: Work in factories, manufacturing plants, and other industrial facilities, handling complex electrical systems and machinery. **Electrical Maintenance Technician:** Focus on maintaining and repairing electrical systems in large facilities like hospitals, schools, and retail buildings. **Construction Electrician Helper:** Assist experienced electricians in installing wiring systems in new buildings and renovation projects. **Residential Electrician Assistant:** Work alongside residential electricians on tasks like wiring, repairing electrical systems, and installing circuit breakers in homes and apartments. **Electrical Installer:** Specialize in installing components for security systems, lighting, and low-voltage wiring in residential and commercial buildings3	**Mathematical Skills:** A solid understanding of basic math, including algebra and geometry. **Technical Aptitude:** Comfort with using tools and technology, as well as an interest in how things work. **Problem-Solving Skills:** The ability to troubleshoot and think critically to diagnose and fix electrical issues. **Attention to Detail:** Precision is key in electrical work to ensure safety and functionality. **Physical Dexterity:** Good hand-eye coordination and manual dexterity. **Communication Skills:** Being able to effectively communicate with team members and supervisors. Safety Awareness: A strong understanding of safety protocols. **Willingness to Learn:** A proactive attitude towards learning new skills and staying updated.	**Physical Demands:** The job often involves lifting heavy equipment, climbing ladders, and working in confined spaces. Assistants may need to bend, squat, or kneel frequently to make connections in awkward locations. **Safety Concerns:** Working with live electrical systems poses risks such as electrical shocks, arc flashes, and electrical fires. Adhering to safety protocols and using personal protective equipment is crucial. **Work Environment:** They may work indoors in industrial facilities or outdoors on construction sites. The environment can be noisy, dusty, and subject to varying weather conditions . **Tools and Equipment:** Assistants use a variety of hand and power tools, including wire strippers, pliers, drills, and multimeters. **Collaboration:** They work closely with industrial electricians, engineers, and other construction professionals to ensure electrical systems are installed and maintained correctly. **Work Hours:** The job can involve long hours, especially when deadlines are approaching or when unexpected issues arise on-site	**KCTCS Campuses** Industrial Electrician Level I - Certificate < KCTCS Electrical Technology < KCTCS

Heavy Equipment Sciences CIP 49.0202.01

The Heavy Equipment Sciences program will prepare students for construction jobs, infrastructure projects (roads, bridges, and ports, otherwise called non-building construction), and mining and timber operations. A trained and experienced equipment operator provides the necessary skills for any project that requires moving and transporting heavy materials or that demands any earthmoving.

Career Choices	Aptitudes Needed	Common Work Environments	Postsecondary Opportunities in Kentucky
Heavy Equipment Operator: Operate machinery such as bulldozers, excavators, and loaders. **Heavy Equipment Technician:** Maintain and repair heavy machinery. **Construction Equipment Operator:** Specialize in operating equipment used in building roads, bridges, and other infrastructure. **Mining Equipment Operator:** Work in mining operations, using heavy machinery to extract minerals and other resources. **Equipment Specialist:** Provide technical support and expertise in the selection, operation, and maintenance of heavy equipment. **Field Service Technician:** Travel to different job sites to perform maintenance and repairs on heavy equipment. **Equipment Sales Representative:** Work for equipment manufacturers or dealers, selling heavy machinery and providing customer support and training.	**Mechanical Aptitude:** An interest in and understanding of how machines and engines work. **Physical Stamina:** Operating and maintaining heavy equipment can be physically demanding. **Hand-Eye Coordination:** Precision in controlling machinery and tools is essential for safety and efficiency. **Spatial Awareness:** The ability to understand and visualize spatial relationships. **Problem-Solving Skills:** The ability to think critically and solve mechanical issues. **Attention to Detail:** Being meticulous ensures that machinery is operated safely **Technical Skills**: Familiarity with basic tools and technology **Safety Awareness:** A strong understanding of safety protocols. **Communication Skills:** Effective communication with team members.	**Physical Demands:** Operating heavy equipment like cranes, bulldozers, and excavators involves significant physical effort. Workers may need to lift heavy materials, climb into and out of machinery, and work in confined spaces. **Safety Concerns:** The job poses risks such as struck-by incidents, rollovers, and equipment malfunctions. Adhering to safety protocols and using personal protective equipment (PPE) is crucial. **Work Environment:** Workers may be exposed to noisy, dusty, and varied weather conditions. They often work outdoors on construction sites or indoors in industrial facilities. **Tools and Equipment:** The job involves using a variety of heavy machinery and tools, including cranes, excavators, loaders, and forklifts. Regular maintenance and pre-operation inspections are essential to ensure safety and efficiency. **Collaboration:** Heavy equipment operators work closely with other construction professionals, including site supervisors, safety inspectors, and ground workers, to ensure projects are completed safely and efficiently. **Work Hours:** The job can involve long hours, especially when deadlines are approaching or when unexpected issues arise on-site.	**KCTCS Campuses** Heavy Equipment Operation KCTCS

Bricklayer Assistant CIP 46.0101.01

This program prepares individuals to apply technical knowledge and skills in laying and setting exterior brick, concrete block, hard tile, marble and related materials, using trowels, levels, hammers, chisels, and other hand tools. Instruction includes technical mathematics, blueprint reading, structural masonry, decorative masonry, foundations, reinforcement, mortar preparation, cutting and finishing, and applicable codes and standards.

Career Choices	Aptitudes Needed	Common Work Environments	Postsecondary Opportunities in Kentucky
Bricklayer: Work on constructing and repairing walls, floors, partitions, and other structures using bricks, stones, and other materials. **Masonry Worker:** Assist in building and maintaining structures made of brick, concrete blocks, and other masonry materials. **Construction Laborer:** Support construction projects by preparing sites, transporting materials, and assisting skilled tradespeople. **Scaffold Builder:** Erect and dismantle scaffolding to provide safe working platforms for construction workers. **Tuckpointer:** Specialize in repairing and restoring the mortar joints between bricks or stones in existing structures. **Waterproofer:** Apply waterproofing materials to structures to prevent water damage.	**Physical Stamina:** Bricklaying is physically demanding work that requires strength and endurance. **Manual Dexterity:** Good hand-eye coordination and fine motor skills are essential. **Attention to Detail:** Precision is crucial in bricklaying to ensure structures are level, plumb, and aesthetically pleasing. **Basic Math Skills:** Understanding measurements, proportions, and basic geometry. **Problem-Solving Skills:** The ability to troubleshoot and find solutions to construction challenges. **Spatial Awareness:** The ability to visualize and understand spatial relationships. **Teamwork:** Effective communication and collaboration with other workers and supervisors are important. **Safety Awareness:** A strong understanding of safety protocols. **Willingness to Learn:** A proactive attitude towards learning new techniques.	**Physical Demands:** The job involves lifting heavy materials, bending, kneeling, and standing for long periods. Assistants often work in confined spaces and at heights on scaffolding. **Safety Concerns:** Working with tools like saws and mixers poses risks such as cuts, falls, and exposure to hazardous materials. Wearing protective gear is essential. **Work Environment:** Bricklayer assistants typically work outdoors, exposed to varying weather conditions. They may also work indoors when installing fireplaces or industrial furnaces. **Tools and Equipment:** The job involves using various hand and power tools, including trowels, hammers, and mixers. **Collaboration:** They work closely with bricklayers and other construction professionals to ensure structures are built correctly and safely. **Work Hours:** The job usually requires working 40 hours a week, but may include weekends and holidays, especially when deadlines are approaching	**KCTCS Campuses** Masonry (MSY) < KCTCS **Big Sandy Community and Technical College** **Bluegrass Community and Technical College** **Hazard Community and Technical College** **Hopkinsville Community College** **Jefferson Community and Technical College** **Maysville Community and Technical College** **Somerset Community College** **Southeast Kentucky Community and Technical College** **West Kentucky Community and Technical College**

Plumber Assistant CIP 46.0501.02

This pathway prepares individuals to practice as licensed plumbers by applying technical knowledge and skills to layout, assemble, install, and maintain piping fixtures and systems for steam, natural gas, oil, hot water, heating, cooling, drainage, lubricating, sprinkling, and industrial processing systems in home and business environments. It includes instruction in source determination, water distribution, waste removal, pressure adjustment, fundamental physics, technical mathematics, blueprint reading, pipe installation, pumps, welding and soldering, plumbing inspection, and applicable codes and standards.

Career Choices	Aptitudes Needed	Common Work Environments	Postsecondary Opportunities in Kentucky
Plumber: Work on installing, repairing, and maintaining plumbing systems in residential, commercial, and industrial settings. **Plumbing Technician:** Specialize in diagnosing and fixing plumbing issues, often working for service companies or as part of a maintenance team. Pipefitter: Focus on installing and maintaining high-pressure piping systems. **Steamfitter:** Similar to pipefitters, but specifically work with systems that carry steam. **Plumbing Inspector:** Ensure that plumbing installations comply with local codes and regulations. **Construction Laborer:** Assist with various tasks on construction sites. **Maintenance Worker:** Perform general maintenance tasks, including plumbing repairs, in residential or commercial buildings.	**Mechanical Aptitude:** An interest in and understanding of how plumbing systems and tools work. **Physical Stamina:** Plumbing can be physically demanding, requiring strength and endurance to handle heavy tools. **Manual Dexterity:** Good hand-eye coordination and fine motor skills are essential. **Problem-Solving Skills:** The ability to think critically and solve plumbing issues quickly and efficiently. **Attention to Detail:** Precision is important to ensure that plumbing systems are installed or repaired correctly. **Basic Math Skills:** Understanding measurements, proportions, and basic calculations. **Safety Awareness:** A strong understanding of safety protocols. **Communication Skills:** Effective communication with team members, supervisors, and customers.	**Physical Demands:** The job involves lifting heavy materials, bending, kneeling, and standing for long periods. Assistants often work in confined spaces and may need to crawl under buildings or into tight areas. **Safety Concerns:** Working with tools like saws and pipe cutters poses risks such as cuts, falls, and exposure to hazardous materials. Wearing protective gear is essential. **Work Environment:** Plumber assistants typically work indoors in residential homes, commercial buildings, and construction sites. They may also work outdoors, exposed to varying weather conditions. **Tools and Equipment:** The job involves using various hand and power tools, including wrenches, pliers, pipe cutters, and soldering equipment. **Collaboration:** They work closely with plumbers and other construction professionals to ensure plumbing systems are installed and maintained correctly. **Work Hours**: The job usually requires working 40 hours a week, but may include weekends and holidays, especially when deadlines are approaching.	**KCTCS Campuses** Plumbing Technology | KCTCS

EDUCATION AND TRAINING CAREER PATHWAYS

Teaching and Learning CIP 13.0101.00

This pathway focuses on the general theory and practice of learning and teaching, the basic principles of educational psychology, the art of teaching, the planning and administration of educational activities, school safety and health issues, and the social foundations of education.

Career Choices	Aptitudes Needed	Common Work Environments	Postsecondary Opportunities in Kentucky
Classroom Teacher: Teach at the elementary, middle, high school, or specific content areas such as CTE or special education. **Educational Consultant:** Work with schools and educational organizations to improve curriculum, teaching methods, and student outcomes. **Instructional Coordinator:** Develop instructional material, coordinate its implementation, and assess its effectiveness in schools. **Teacher Mentor:** Support and guide new teachers, helping them develop their teaching skills. **Educational Administrator:** Take on leadership roles such as principal, vice-principal, school counselor, or district administrator, overseeing school operations and policies. **Corporate Trainer:** Develop and deliver training programs for employees in various industries. **Curriculum Developer:** Design educational content and programs.	**Communication & Collaboration:** Strong verbal and written communication skills and the ability to work with others. **Patience**: Teaching requires patience to work with students of varying abilities and backgrounds. **Creativity:** The ability to develop engaging and innovative lesson plans that capture students' interest. **Organizational Skills:** Good organizational skills help in planning lessons, managing the classroom, and keeping track of student progress. **Empathy:** Understanding and being sensitive to the needs and feelings of students. **Adaptability:** The ability to adapt teaching methods to meet the diverse needs of students. **Critical Thinking:** Strong critical thinking skills are necessary for developing effective teaching strategies. **Technological** Proficiency: Familiarity with educational technology and digital tools.	**Classroom Environment:** Teachers spend most of their time in classrooms, managing student behavior, delivering lessons, and fostering a positive learning atmosphere. **Physical Demands:** The job involves standing for long periods, moving around the classroom, and occasionally lifting materials or equipment. Teachers may also need to set up and take down classroom displays. **Work Hours**: Teachers typically work during school hours but often spend additional time planning lessons, grading assignments, and attending meetings. This can extend their workday beyond regular hours. **Safety Concerns:** Ensuring a safe environment for students is crucial. Teachers must be vigilant about potential hazards and manage classroom disruptions . **Collaboration:** Teachers work closely with colleagues, administrators, and parents to support student learning and address any issues that arise. Professional development and collaboration are key aspects of their role. **Mental and Emotional Demands**: The job can be emotionally taxing, as teachers often deal with student behavior issues, academic pressures, and the need to support students' mental health. **Technology Use**: Increasingly, teachers use technology for lesson planning, delivering instruction, and communicating with students and parents.	**KCTCS Campuses** Education - BSCTC Education – BCTC Education - ECTC Education - GCTC Education - HCTC Education - HCC Education - JCTC Education - MCC Education – MCTC Education - SKCTC **University Programs** UK - College of Education U of L — College of Education and Human Development Kentucky State University - School of Education, Human Development and Consumer Sciences WKU - College of Education and Behavioral Sciences EKU - College of Education & Applied Human Sciences Murray State College of Education and Human Services Morehead State Ernst & Sara Lane Volgenau College of Education NKU - College of Education

ENGINEERING TECHNOLOGY

Energy Management CIP 15.0503.02

Entry-level positions in the energy production industry include renewable energy sales, LEED consultants, alternative energy consultants, and residential audits. Energy Management graduates can also find employment in the growing fields of energy audit, energy consulting, and facilities management. Employment opportunities are expected to be the greatest in metropolitan areas.

Career Choices	Aptitudes Needed	Common Work Environments	Postsecondary Opportunities in Kentucky
Energy Manager: Oversee energy use in buildings or organizations. **Energy Analyst:** Analyze energy data, identify trends, and recommend improvements. **Sustainability Consultant:** Advise businesses and organizations on sustainable practices. **Energy Program Manager:** Manage energy-related projects and programs. **Renewable Energy Specialist:** Focus on the development and implementation of renewable energy projects. **Facilities Manager:** Oversee the operation and maintenance of building systems. **Energy Auditor:** Conduct audits to assess energy use and efficiency. **Environmental Engineer:** Work on projects that improve environmental quality, including energy efficiency and pollution control.	**Analytical Skills:** The ability to analyze data and identify patterns. **Mathematical Proficiency:** A strong foundation in math, including algebra and statistics. **Technical Aptitude:** Comfort with technology and an interest in how environmental systems work. **Problem-Solving Skills:** The ability to think critically and develop innovative solutions to reduce energy consumption. **Attention to Detail:** Precision is important when monitoring energy use and implementing efficiency measures. **Communication Skills:** Effective communication is essential for explaining energy-saving strategies. **Environmental Awareness:** A strong understanding of environmental issues and a commitment to sustainability. **Project Management Skills:** The ability to plan, organize, and manage projects.	**Office Work:** Much of their time is spent in offices, where they analyze energy usage data, develop energy-saving strategies, and create reports. **Site Visits:** Regular visits to facilities are essential to inspect energy systems, ensure compliance with energy efficiency standards, and implement energy-saving measures. **Collaboration:** Energy managers work closely with various stakeholders, including facility managers, engineers, and sustainability teams. **Safety Concerns:** Ensuring the safety of energy systems is crucial. Professionals must adhere to safety protocols and use personal protective equipment (PPE) when inspecting or working on energy systems. **Problem-Solving:** They often encounter challenges that require critical thinking and problem-solving skills, such as optimizing energy usage and integrating renewable energy sources. Work Hours: The job can involve long hours, especially when deadlines are approaching or when unexpected issues arise.	**KCTCS Campuses** Energy Technologies - AAS < KCTCS **Kentucky Universities** UK – Stanley and Karen Pigman College of Engineering UK – Power and Energy Certificate Materials & Energy Science and Engineering – J.B. Speed School of Engineering – University of Louisville Earth, Environmental, and Atmospheric Sciences | Western Kentucky University

Sustainability and Energy Application Technician CIP 15.0503.01

This pathway prepares students to apply engineering principles and technical skills in support of engineers and other professionals engaged in developing energy-efficient systems or monitoring energy use. The content includes activities to develop knowledge and skill in but is not limited to the study of power systems and the kinds and sources of energy, repair, service, and maintenance of small internal-combustion engines used on portable power equipment such as generators, electrical motors, generators, and wind turbines. The content and activities will also include studying safety and leadership skills.

Career Choices	Aptitudes Needed	Common Work Environments	Postsecondary Opportunities in Kentucky
Energy Auditor: Conduct energy assessments for residential, commercial, or industrial buildings to identify energy-saving opportunities. **Sustainability Specialist:** Help organizations develop and implement sustainable practices, conduct audits, and make recommendations. **Environmental Technician:** Collect samples and data for environmental research, focusing on air, water, or soil quality. **Renewable Energy Technician:** Install, maintain, and repair renewable energy systems. **Energy Manager:** Oversee energy use within an organization, develop strategies to improve energy efficiency. **Urban Planner:** Develop land use plans that emphasize sustainability. **Green Building Consultant:** Advise on sustainable building practices and help design energy-efficient buildings.	**Strong Math Skills:** A good grasp of algebra, geometry, and basic statistics is essential. **Science Proficiency:** Knowledge in physics, chemistry, and environmental science. **Technical Aptitude:** Comfort with using tools, equipment, and technology. **Analytical Thinking:** The ability to analyze data, identify patterns, and solve problems. **Attention to Detail:** Precision is key when working with energy systems and ensuring compliance with regulations and standards. **Communication Skills:** Effective written and verbal communication skills are necessary for reporting findings, collaborating with teams, and educating clients. **Interest in Sustainability:** A genuine interest in environmental issues and sustainable practices will drive motivation and engagement in the field.	**Field Work:** Many technicians spend a significant amount of time outdoors, conducting site assessments, installing and maintaining renewable energy systems. **Laboratories:** Some technicians work in labs, analyzing samples and conducting experiments. **Industrial and Commercial Sites:** Technicians often work in factories, commercial buildings, and other industrial settings. **Offices:** Office environments are common for those involved in planning, project management, and data analysis. **Educational Institutions:** Some technicians work in schools, universities, or research institutions, contributing to academic research and teaching. **Government Agencies:** Working for local, state, or federal government agencies is another possibility, where technicians help develop and enforce policies related to energy use and sustainability.	**KCTCS Campuses** Energy Technologies – AAS < KCTCS **Kentucky Universities** UK - Environmental & Sustainability Studies Materials & Energy Science and Engineering – J.B. Speed School of Engineering – University of Louisville Earth, Environmental, and Atmospheric Sciences | Western Kentucky University

Aerospace Engineering CIP 14.0201.01

This pathway prepares individuals to apply mathematical and scientific principles to the design, development and operational evaluation of aircraft, space vehicles, and their systems; applied research on flight characteristics; and the development of systems and procedures for the launching, guiding, and controlling of air and space vehicles. Aerospace engineers primarily design aircraft, spacecraft, satellites, and missiles. In addition, they test prototypes to ensure they function according to design.

Career Choices	Aptitudes Needed	Common Work Environments	Postsecondary Opportunities in Kentucky
Aerospace Engineer: Design, develop, and test aircraft, spacecraft, and related systems. **Aerospace Technician:** Assist engineers in the development and testing of new aerospace technologies. **Flight Test Engineer:** Plan and conduct tests on new aircraft and spacecraft. **Aircraft/Spacecraft Designer:** Focus on the conceptual and detailed design of aircraft and spacecraft. **Mission or Payload Specialist:** Work on the planning and execution of space missions, including the design and integration of payloads. **CAD Technician:** Use computer-aided design software to create detailed technical drawings. **Inspector and Compliance Officer:** Ensure that aerospace products and processes comply with industry standards. **Materials Engineer:** Develop and test materials used in the construction of aircraft and spacecraft.	**Strong Mathematics Skills:** Proficiency in algebra, geometry, trigonometry, and calculus. **Physics Knowledge:** A solid understanding of physics, particularly mechanics and thermodynamics. **Analytical Thinking:** The ability to analyze complex problems, think critically, and develop logical solutions. **Attention to Detail:** Precision is key in aerospace engineering. **Creativity and Innovation:** Designing new aircraft and spacecraft requires creative & innovative thinking **Technical Skills:** Familiarity with computer-aided design (CAD) software and basic programming. **Teamwork and Communication:** Aerospace projects often involve large teams. **Problem-Solving Skills:** Engineers frequently encounter challenges that require quick and effective solutions.	**Government Agencies:** Many aerospace engineers work for agencies like NASA, the Federal Aviation Administration (FAA), and the Department of Defense (DoD).. **Private Industry:** Companies such as Boeing, Lockheed Martin, and SpaceX employ aerospace engineers to design, develop, and manufacture aircraft. **Research and Development:** Some engineers focus on R&D, working on new technologies and materials **Academia:** Teaching and conducting research at universities and colleges is another common environment. **Manufacturing Facilities:** Engineers may work in manufacturing settings, overseeing the production of aerospace components. **Laboratories:** Testing and analyzing materials, components, and systems. Offices: Much of the design and planning work is done in office settings, where engineers use computer-aided design (CAD) software and other tools.	**KCTCS Campuses** Aviation Maintenance Technology | KCTCS **University Programs** UK- Aerospace Engineering

Automation Engineering CIP 15.0613.00

This pathway prepares individuals to apply scientific and mathematical principles to the design, development, and implementation of automated and robotic systems. The pathway includes instruction in materials science and engineering, manufacturing processes, process engineering, assembly and product engineering, robotic systems design, and manufacturing competitiveness. Automation Engineers plan manufacturing practices by researching and developing tools, processes, machines, and equipment to integrate the facilities and systems for producing quality products with the optimal capital expenditure.

Career Choices	Aptitudes Needed	Common Work Environments	Postsecondary Opportunities in Kentucky
Automation Engineer: Design, develop, and maintain automated systems to improve efficiency and productivity. **Industrial Automation Engineer:** Focus on creating and implementing automated systems for manufacturing and production lines. **Robotics Engineer:** Develop and maintain robotic systems used in manufacturing, healthcare, and other fields. **Control Systems Engineer:** Design and manage control systems that regulate processes and machinery. **Automation Technician:** Assist engineers in installing, maintaining, and troubleshooting automated systems. **Quality Assurance (QA) Automation Tester:** Develop and execute automated tests to ensure software quality and performance. **Electro-mechanical Technician:** Work with both electrical and mechanical systems, often in manufacturing settings.	**Strong Mathematics Skills:** Proficiency in algebra, geometry, trigonometry, and calculus. **Physics Knowledge:** A solid understanding of physics, particularly mechanics and electricity **Analytical Thinking:** The ability to analyze complex problems, think critically, and develop logical solutions. **Technical Skills:** Familiarity with computer programming and software tools, such as CAD and PLC can be very beneficial. **Attention to Detail:** Precision is key in automation engineering. **Problem-Solving Skills:** Engineers frequently encounter challenges that require quick and effective solutions. **Creativity and Innovation:** Designing new automated systems and improving existing ones. **Teamwork and Communication:** Automation projects often involve large teams.	**Manufacturing Plants:** Many automation engineers work in factories and production facilities. **Research and Development Labs:** Engineers in R&D labs focus on developing new automation technologies and improving existing systems. **Office Settings:** Some automation engineers work in office environments, particularly those involved in designing and programming automated systems. **Warehouses and Distribution Centers:** Automation engineers in these settings design and maintain automated systems for inventory management, order fulfillment, and logistics. **Call Centers and Processing Centers:** Engineers may work on automating processes in service industries. **Remote Work:** With advancements in technology, many automation engineers have the flexibility to work remotely.	**KCTCS Campuses** Automation and Industrial Technology | MCC Industrial Maintenance Technology | BCTC Engineering and Electronics Technology | JCTC Advanced Manufacturing | SCC **University Programs** UK - Stanley and Karen Pigman College of Engineering LARRI - J.B. Speed School of Engineering - University of Louisville Manufacturing Engineering Technology | Western Kentucky University Murray State School of Engineering Department of Engineering & Technology - Eastern Kentucky University

Civil Engineering CIP 14.0801.00

This pathway generally prepares individuals to apply mathematical and scientific principles to the design, development and operational evaluation of structural, loadbearing, material moving, transportation, water resource, material control systems, and environmental safety measures. Civil engineers design, build, supervise, operate, and maintain construction projects and systems in the public and private sectors, including roads, buildings, airports, tunnels, dams, bridges, and water supply and sewage treatment systems.

Career Choices	Aptitudes Needed	Common Work Environments	Postsecondary Opportunities in Kentucky
Civil Engineer: Design, construct, and maintain infrastructure projects. **Structural Engineer:** Focus on the design and analysis of structures **Transportation Engineer**: Plan, design, and manage transportation systems. **Geotechnical Engineer:** Analyze soil and rock properties. **Water Resources Engineer:** Work on projects related to water supply. **Environmental Engineer:** Develop solutions to environmental problems. **Construction Manager:** Oversee construction projects. **Project Manager:** Manage engineering projects. **Urban Planner**: Develop plans and programs for land use in urban areas. **Coastal Engineer:** Design and manage projects related to coastal areas. **Municipal Engineer:** Work for local governments to design and maintain public infrastructure. **Construction Engineer:** Focus on the planning and execution of construction projects. **Bridge Engineer:** Specialize in the design, construction, and maintenance of bridges. **Geomatics Engineer:** Use surveying and mapping techniques to collect and analyze spatial data.	**Strong Mathematics Skills:** Proficiency in algebra, geometry, trigonometry, and calculus. **Physics Knowledge:** A solid understanding of physics, particularly mechanics and electricity **Analytical Thinking:** The ability to analyze complex problems, think critically, and develop logical solutions. **Technical Skills:** Familiarity with computer programming and software tools, such as CAD and PLC can be very beneficial. **Attention to Detail:** Precision is key in automation engineering. **Problem-Solving Skills:** Engineers frequently encounter challenges that require quick and effective solutions. **Creativity and Innovation:** Designing new automated systems and improving existing ones. **Teamwork and Communication:** Automation projects often involve large teams.	**Office-Based Work:** A significant portion of a civil engineer's work is conducted in an office setting. **Fieldwork and Site Visits:** Civil engineers frequently visit construction sites to inspect the progress of projects. Project Management: Many civil engineers take on project management roles, overseeing the progress of construction projects. **Environmental Assessments:** Civil engineers may conduct field assessments to evaluate the impact of construction on natural habitats. **Collaborative Work:** Civil engineering projects often require collaboration with a diverse range of professionals **Client Interaction:** Civil engineers regularly interact with clients, government agencies, and community stakeholders.	**KCTCS Campuses** Civil Engineering Technology | KCTCS **University Programs** UK - Civil Engineering U of L-Civil & Environmental Engineering Civil Engineering, Bachelor of Science Western Kentucky University Civil Engineering Degree Program at Murray State University

Electrical/Electronics Engineering CIP 14.1001.00

This pathway prepares individuals to apply mathematical and scientific principles to the design, development and operational evaluation of electrical electronic-related systems and their components. Electrical engineers design, develop, test, and supervise electrical equipment manufacturing, such as electric motors, electrical controls, instrumentation, HMI Interfaces, PLCs, industrial controls, and power generation equipment. Electrical engineers design, develop, test, and supervise electrical equipment manufacturing, such as electric motors, radar and navigation systems, communications systems, and power generation equipment. Electronics engineers design and develop electronic equipment, including broadcast and communications systems like portable music players and Global Positioning System (GPS) devices

Career Choices	Aptitudes Needed	Common Work Environments	Postsecondary Opportunities in Kentucky
Electrical Engineer: Design, develop, and test electrical systems, equipment, and devices. **Electronics Engineer:** Focus on designing and developing electronic devices and systems. **Power Systems Engineer:** Work on the generation, transmission, and distribution of electrical power. **Control Systems Engineer:** Design and manage control systems that regulate processes. **Telecommunications Engineer:** Design and optimize communication networks. **Automation Engineer:** Develop and implement systems that streamline and optimize industrial processes **Embedded Systems Engineer:** Design and develop computer systems integrated into various devices. **Instrumentation Engineer:** Focus on the design and maintenance of instruments and devices. **Robotics Engineer:** Develop and maintain robotic systems. **Quality Assurance (QA) Engineer:** Develop and execute tests to ensure quality and performance.	**Strong Mathematics Skills:** Proficiency in algebra, geometry, trigonometry, and calculus. **Physics Knowledge:** A solid understanding of physics, particularly mechanics and electricity **Analytical Thinking:** The ability to analyze complex problems, think critically, and develop logical solutions. **Technical Skills:** Familiarity with computer programming and software tools, such as CAD and PLC can be very beneficial. **Attention to Detail:** Precision is key in automation engineering. **Problem-Solving Skills:** Engineers frequently encounter challenges that require quick and effective solutions. **Creativity and Innovation:** Designing new automated systems and improving existing ones. **Teamwork and Communication:** Automation projects often involve large teams.	**Office-Based Work:** Many engineers spend a significant amount of time in office settings. **Research and Development Labs:** Engineers in R&D labs focus on developing new technologies and improving existing systems. **Manufacturing Plants:** Engineers often work in manufacturing settings. **Fieldwork and Site Visits:** Some roles require engineers to visit sites to observe and address problems. **Telecommunications:** Engineers in this field work on designing and optimizing communication networks. **Government Agencies:** Some engineers work for federal, state, or local government agencies	**KCTCS Campuses** Electrical Technology | BCTC Engineering and Electronics Technology | JCTC Engineering and Electronics Technology | SCC **University Programs** UK - Electrical Engineering Electrical & Computer Engineering (Dept) - J.B. Speed School of Engineering - University of Louisville Electrical and Electronics Engineering Technology - Northern Kentucky University Electrical Engineering - WKU Electrical Engineering Track

Engineering Design CIP 15.1302.00

This pathway is designed for students interested in the various disciplines of engineering. The course sequence will allow students to develop critical thinking skills and an understanding of engineering concepts. Students then apply these skills in conjunction with the multi-step engineering design process to solve real-world problems. Includes instruction in two-dimensional and three-dimensional engineering design software, solid modeling, and engineering animation to solve real-world problems.

Career Choices	Aptitudes Needed	Common Work Environments	Postsecondary Opportunities in Kentucky
Design Engineer: Develop conceptual designs for products and systems. **CAD Drafter:** Convert design plans into technical drawings and blueprints. **Product Designer:** Focus on creating new products or improving existing ones. **Mechanical Designer:** Design mechanical systems and components. **Industrial Designer:** Develop designs for manufactured products, combining art, business, and engineering. **Project Engineer:** Manage engineering projects, coordinating between different teams and stakeholders. **Quality Assurance (QA) Engineer:** Develop and execute tests to ensure the quality and performance of designs and products. **Manufacturing Engineer:** Design and optimize manufacturing processes. **Research and Development (R&D) Engineer:** Work on developing new technologies and improving existing products.	**Strong Mathematics Skills:** Proficiency in algebra, geometry, trigonometry, and calculus. **Physics Knowledge:** A solid understanding of physics, particularly mechanics and electricity **Analytical Thinking:** The ability to analyze complex problems, think critically, and develop logical solutions. **Technical Skills:** Familiarity with computer programming and software tools, such as CAD and PLC can be very beneficial. **Attention to Detail:** Precision is key in automation engineering. **Problem-Solving Skills:** Engineers frequently encounter challenges that require quick and effective solutions. **Creativity and Innovation:** Designing new automated systems and improving existing ones. **Teamwork and Communication:** Automation projects often involve large teams. **Interest in Technology and Design:** A genuine interest in technology, engineering, and design.	**Office-Based Work:** Many design engineers spend a significant amount of time in office settings. **Research and Development (R&D) Labs:** Engineers in R&D labs focus on developing new technologies and improving existing systems. **Manufacturing Plants:** Engineers often work in manufacturing settings, overseeing the production of components and systems. **Fieldwork and Site Visits:** Some roles require engineers to visit sites to observe and address problems. **Collaborative Workspaces:** Engineering design projects often involve collaboration with other engineers, designers, and stakeholders. **Remote Work:** With advancements in technology, many design engineers have the flexibility to work remotely.	**KCTCS Campuses** Engineering Design Technician - Diploma < KCTCS **University Programs** UK-Stanley and Karen Pigman College of Engineering J.B. Speed School of Engineering - University of Louisville The School of Engineering and Applied Sciences | Western Kentucky University Engineering Design Technology | Murray State University Department of Engineering & Technology - Eastern Kentucky University

Mechanical Engineering CIP 14.3501.00

This pathway prepares individuals to apply mathematical and scientific principles to the design, development and operational evaluation of physical systems used in manufacturing and end product systems for specific uses, including machine tools, jigs and other manufacturing equipment; stationary power units and appliances; engines; self-propelled vehicles; housings and containers; hydraulic and electric systems for controlling movement; and the integration of computers and remote control with operating systems. Mechanical Engineers design, develop, build, and test mechanical and thermal sensors and devices, including tools, engines, and machines

Career Choices	Aptitudes Needed	Common Work Environments	Postsecondary Opportunities in Kentucky
Mechanical Engineer: Design, develop, and test mechanical devices, including tools, engines, and machines. **HVAC Engineer:** Specialize in heating, ventilation, and air conditioning systems. **Aerospace Engineer:** Work on the design and development of aircraft, spacecraft, satellites, and missiles. **Automotive Engineer:** Focus on the design, development, and manufacturing of vehicles and their systems. **Biomedical Engineer:** Develop medical devices and equipment, combining principles of engineering and biology. **CAD Technician:** Use computer-aided design software to create detailed 2D or 3D models for manufacturing. **Maintenance Engineer:** Design and implement maintenance strategies. **Energy Engineer:** Work on projects related to renewable and sustainable energy systems. **Robotics Engineer:** Design and develop robotic systems and automation solutions.	**Strong Math Skills:** Proficiency in algebra, geometry, trigonometry, and calculus. **Analytical Thinking:** The ability to analyze complex problems. **Creativity:** Engineering often involves designing innovative solutions. **Attention to Detail:** Precision is important in engineering to ensure designs and calculations are accurate. **Technical Skills:** Familiarity with basic computer programming and software. **Communication Skills:** Engineers need to effectively communicate their ideas and collaborate with others. **Curiosity and Passion for Learning:** A genuine interest in how things work and a desire to continuously learn. **Problem-Solving Skills**: The ability to think critically and solve problems efficiently. **Teamwork**: Ability to work well with others.	**Manufacturing Plants:** Many mechanical engineers work in factories or production facilities. **Research and Development Labs:** Engineers in R&D focus on developing new products and technologies . **Construction Sites:** Mechanical engineers involved in construction projects may work on-site. **Corporate Offices:** Some engineers work in office environments, managing projects. **Consulting Firms:** Engineers in consulting roles provide expert advice to clients. **Energy Sector:** Mechanical engineers in the energy industry may work in power plants **Automotive and Aerospace Industries:** Engineers in these fields often work in specialized facilities, designing and testing vehicles, aircraft, and related components. **Healthcare and Biomedical Facilities:** Mechanical engineers in this sector work on developing medical devices and equipment.	**KCTCS Campuses** Engineering and Electronics Technology < KCTCS **University Programs** UK - Mechanical Engineering | Stanley and Karen Pigman College of Engineering Mechanical Engineering (dept) - J.B. Speed School of Engineering - University of Louisville Department of Engineering & Technology - Eastern Kentucky University Mechanical & Manufacturing Engineering Technology Major: Northern Kentucky University. Mechanical Engineering | Western Kentucky University

Additive Manufacturing CIP 15.1307.00

A program that prepares individuals to apply technical knowledge and skills in using three dimensional (3D) computer technology to create technical illustrations and models used in manufacturing, design, production, and construction. Includes instruction in 3D computer-aided design (CAD), 3D printing, 3D model design and construction, and 3D scanning.

Career Choices	Aptitudes Needed	Common Work Environments	Postsecondary Opportunities in Kentucky
Additive Manufacturing Engineer: Design and optimize 3D printing processes. **Application Engineer:** Work with clients to implement additive manufacturing solutions. **Research and Development Engineer:** Focus on developing new additive manufacturing techniques. **Manufacturing Technician:** Operate and maintain 3D printing equipment. **Quality Assurance Engineer:** Develop and implement quality control processes. **Product Designer:** Use additive manufacturing to create innovative product designs. **Software Engineer:** Develop and improve software tools used in additive manufacturing. Sales and Marketing: Promote additive manufacturing technologies and solutions to potential clients. **Consultant:** Provide expert advice on additive manufacturing strategies.	**Strong Math Skills:** Proficiency in algebra, geometry, and calculus. **Technical Skills:** Familiarity with computer-aided design (CAD) software and basic programming. **Analytical Thinking:** The ability to analyze complex problems and develop logical solutions. **Creativity:** A creative mindset helps in designing innovative products. **Attention to Detail:** Precision is important to ensure the accuracy and quality of 3D printed parts. **Problem-Solving Skills:** The ability to think critically and solve problems efficiently. **Passion for Learning:** A genuine interest in new technologies and a desire to continuously learn and stay updated. **Communication Skills:** Strong written and verbal communication skills are important for collaborating with others.	**Research and Development Labs:** Engineers and scientists work on developing new additive manufacturing technologies. **Manufacturing Facilities:** These environments involve the production of parts and products using 3D printing. **Design Studios:** Professionals use computer-aided design (CAD) software to create detailed models and prototypes. **Healthcare Facilities:** Additive manufacturing is used to create custom medical devices, implants, and prosthetics. **Automotive and Aerospace Industries:** Engineers in these sectors use 3D printing to design and produce components. **Educational Institutions:** Universities and technical schools often have labs and workshops dedicated to additive manufacturing. **Consulting Firms:** Consultants provide expertise to businesses looking to implement or optimize additive manufacturing processes.	**KCTCS Campuses** 3D Printing Technician - Digital Printing Technology | MCC Advanced Manufacturing Technology | BCTC **University Programs** UofL Additive Manufacturing Institute of Science and Technology — Additive Manufacturing Institute of Science & Technology Bachelor of Science in Manufacturing Engineering - Eastern Kentucky University Manufacturing Engineering Technology | Kentucky State University

Automotive Engineering CIP 15.0803.00

This pathway provides the opportunity to blend Career and Technical Education (CTE) courses with Engineering courses to help students apply technical skills along with Science, Technology, Engineering, and Math (STEM) skills to solve real-world problems. This pathway prepares individuals to apply engineering principles and technical skills in support of engineers and other professionals engaged in developing, manufacturing and testing self-propelled ground vehicles and their systems. It includes instruction in vehicular systems technology, design and development testing, prototype and operational testing, inspection and maintenance procedures, instrument calibration, test equipment operation and maintenance, and report preparation.

Career Choices	Aptitudes Needed	Common Work Environments	Postsecondary Opportunities in Kentucky
Automotive Engineer: Work on the design, development, and testing of vehicles. **Manufacturing Engineer:** Develop and optimize manufacturing processes for vehicle production. **Test Engineer:** Conduct environmental, stress, and performance testing on vehicle components and vehicles. **Design Engineer:** Focus on the conceptualization and design of vehicles **Quality Engineer:** Ensure that all products meet company standards. **Materials Development Engineer:** Develop and select new materials to meet the design requirements. **Robotics Engineer:** Design, maintain, and program robotics used in production. **Sales Engineer:** Sell highly technical automotive products or services. **Process Planner:** Coordinate the intake of orders and schedule the production line.	**Strong Foundation in Math and Science:** Proficiency in subjects like physics, chemistry, and mathematics (especially calculus and algebra). **Problem-Solving Skills:** The ability to analyze problems, think critically, and develop solutions. **Technical Aptitude:** Familiarity with tools, machinery, and basic mechanical concepts. **Computer Skills:** Knowledge of computer-aided design (CAD) software and basic programming. **Attention to Detail:** Precision is important in engineering to ensure safety and efficiency. **Teamwork and Communication:** Ability to collaborate effectively and communicate ideas clearly. **Passion for Automobiles:** A genuine interest in cars and how they work can drive motivation. **Time Management and Organization:** Ability to balance coursework, projects, and possibly internships.	**Offices:** Automotive engineers spend a significant amount of time in office settings, where they engage in design, planning, and project management tasks. **Research and Development Centers:** These facilities are dedicated to innovation and testing. **Manufacturing Plants:** In these environments, engineers oversee the production process, ensuring that vehicles are built to specifications. **Workshops & Laboratories:** For testing and prototyping, automotive engineers often work in workshops or labs. **Fieldwork:** Some automotive engineers may need to visit suppliers, customers, or different manufacturing facilities. **Collaborative Spaces:** Given the interdisciplinary nature of automotive engineering, collaboration with other engineers, designers, and technicians is common.	**KCTCS Campuses** Automotive Technology | KCTCS **University Programs** UK - Mechanical Engineering UK - Production Engineering Certificate J.B. Speed School of Engineering - University of Louisville The School of Engineering and Applied Sciences | Western Kentucky University Engineering Technology, B.S. | Morehead State University | Kentucky

Computerized Manufacturing and Machining Engineering CIP 48.0510.00

This pathway provides the opportunity to blend Career and Technical Education (CTE) courses with Engineering courses to help students apply technical skills along with Science, Technology, Engineering, and Math (STEM) skills to solve real-world problems. CMM Engineers design, develop and run programs that direct machines to cut and shape metal or plastic for airplanes, automobiles and other industrial machines. CMM Engineers use blueprints, and three-dimensional computer designs to create programs that produce precisely cut products.

Career Choices	Aptitudes Needed	Common Work Environments	Postsecondary Opportunities in Kentucky
CNC Machinist: Operate and program computer numerical control (CNC) machines. **Machinist:** Set up and operate a variety of machine tools to produce precision parts and instruments. **Tool and Die Maker:** Design and build specialized tools, dies, and fixtures. **Manufacturing Technician:** Work on the production floor to ensure machines are running efficiently and products meet quality standards. **Quality Control Inspector:** Inspect and test products to ensure they meet specified standards and tolerances. **CAD/CAM Programmer:** Use computer-aided design (CAD) and computer-aided manufacturing (CAM) software to create and optimize machining processes. **Maintenance Technician:** Maintain and repair machinery and equipment used in manufacturing. **Production Supervisor:** Oversee the manufacturing process.	**Mathematical Skills:** Proficiency in mathematics, including whole numbers, fractions, decimals, basic algebra, geometry, and some trigonometry. **Attention to Detail:** The ability to focus on intricate details and maintain accuracy. **Mechanical Aptitude:** A natural understanding of how machines and tools work, along with an interest in mechanical systems. **Problem-Solving Skills:** The ability to troubleshoot and solve problems that arise during the manufacturing process. **Computer Skills:** Familiarity with computer-aided design (CAD) and computer-aided manufacturing (CAM) software. **Manual Dexterity:** Good hand-eye coordination and the ability to handle tools and materials with precision. **Work Ethic and Discipline:** A strong work ethic, punctuality, and the ability to follow safety protocols are essential.	**Manufacturing Plants:** Many CMM engineers work in manufacturing facilities where they oversee the production process. **Machine Shops:** These specialized workshops are equipped with various machining tools and CNC machines. Engineers here focus on creating precision parts and components. **Quality Control Laboratories:** In these settings, CMM engineers use coordinate measuring machines (CMMs) to inspect and verify the dimensions and tolerances of manufactured parts. **Research and Development Centers:** Engineers in R&D centers work on developing new machining techniques. **Educational Institutions:** Some CMM engineers work in academic settings, teaching the next generation of machinists and engineers. **Fieldwork:** Occasionally, CMM engineers may need to visit client sites, suppliers, or other manufacturing facilities.	**KCTCS Campuses** **Computerized Manufacturing & Machining - AAS < KCTCS** **University Programs** UK - Mechanical Engineering | Stanley and Karen Pigman College of Engineering Mechanical Engineering (dept) - J.B. Speed School of Engineering - University of Louisville Department of Engineering & Technology - Eastern Kentucky University Mechanical & Manufacturing Engineering Technology Major: Northern Kentucky University. Mechanical Engineering | Western Kentucky University

Construction Architectural Engineering CIP 15.0101.02

This pathway provides the opportunity to blend Career and Technical Education (CTE) courses with Engineering courses to help students apply technical skills along with Science, Technology, Engineering, and Math (STEM) skills to solve real-world problems. This pathway prepares individuals to apply engineering principles and technical skills to support architects, engineers and planners in designing and developing buildings, urban complexes, and related systems. Includes instruction in design testing procedures, building site analysis, model building and computer graphics, structural systems testing, analysis of prototype mechanical and interior systems, report preparation, basic construction and structural design, architectural rendering, computer-aided drafting (CAD), layout and designs, architectural blueprint interpretation, building materials, and basic structural wiring diagramming.

Career Choices	Aptitudes Needed	Common Work Environments	Postsecondary Opportunities in Kentucky
Architectural Engineer: Design and develop building systems, including structural, HVAC, electrical, and plumbing systems. **Construction Project Manager:** Oversee construction projects from start to finish. **Building Services Engineer:** Focus on the design, installation, and maintenance of essential services and equipment. **Architectural Designer:** Work with architects to create visually appealing and functional structures. **Building Engineer:** Oversee and advise on the construction and maintenance of civil engineering projects. **Sustainability Consultant:** Advise on sustainable building practices. **Structural Engineer:** Analyze and design the structural elements of buildings and other structures. **Urban Planner:** Develop plans and programs for land use in urban areas.	**Strong Math Skills:** Proficiency in geometry, algebra, calculus, and trigonometry. **Science Knowledge:** A good grasp of physics is important for understanding concepts like force, compression, and tension. **Attention to Detail:** Precision is vital in both design and construction to ensure safety and functionality. **Problem-Solving**: The ability to think critically and solve complex problems. **Creativity:** An aptitude for creative thinking helps in designing innovative and aesthetically pleasing structures2. **Communication Skills:** Effective communication is important for collaborating with architects, engineers, contractors, and clients. **Technical Skills:** Familiarity with computer-aided design (CAD) software and other tools. **Time Management:** Managing time efficiently to meet project deadlines.	**Construction Sites**: Many spend a significant amount of time on construction sites, overseeing projects. **Architectural and Engineering Firms:** Working in an office setting, these professionals collaborate with architects, engineers, and other stakeholders. **Government Agencies:** Some work for local, state, or federal government agencies. **Consulting Firms:** Providing expert advice on construction projects. **Educational Institutions:** Teaching and conducting research in universities or technical schools. **Manufacturing Companies:** Working with companies that produce construction materials and equipment. **Real Estate Development Companies:** Involved in the planning and development of residential, commercial, and industrial properties.	**KCTCS Campuses** **Architectural Technology | BCTC** **University Programs** Construction Management: Northern Kentucky University Bachelor of Science in Construction Management - Eastern Kentucky University Construction Management | Western Kentucky University

Design Engineering CIP 15.1304.00

This pathway provides the opportunity to blend Career and Technical Education (CTE) courses with Engineering courses to help students apply technical skills along with Science, Technology, Engineering, and Math (STEM) skills to solve real-world problems. Design Engineers have a working knowledge of mechanical parts and computer-aided design (CAD) software such as AutoCAD, Autodesk Inventor, or SolidWorks. Mechanical designers begin a project by meeting with project managers, engineers, and clients to understand the needs and requirements for a new product or mechanical system. For example, designers working on a project to create an automobile engine may consult engineers regarding which structural materials to use or clients regarding engine efficiency requirements. Once materials and specifications have been determined, designers use CAD (computer-aided design) software to plan and develop models

Career Choices	Aptitudes Needed	Common Work Environments	Postsecondary Opportunities in Kentucky
Design Engineer: Develop and improve products, systems, and machinery. **Product Designer:** Focus on the aesthetics, functionality, and user experience of products. **Mechanical Engineer:** Design and analyze mechanical systems and components. **CAD Technician:** Use CAD software to create detailed technical drawings and plans. **Manufacturing Engineer:** Develop and improve manufacturing processes to increase efficiency. **Industrial Designer:** Combine art, business, and engineering to create products. **Systems Engineer:** Design and integrate complex systems, ensuring that all components work together. **Research and Development Engineer:** Focus on creating new technologies and improving existing products.	**Strong Math Skills:** Proficiency in algebra, geometry, calculus, and trigonometry. **Science Knowledge:** A solid foundation in physics and chemistry helps in understanding material properties. **Problem-Solving:** The ability to think critically and solve complex problems. **Creativity:** An aptitude for creative thinking is important for designing new products and improving existing ones. **Attention to Detail:** Precision is crucial in design engineering to ensure accuracy. **Technical Skills:** Familiarity with computer-aided design (CAD) software and other engineering tools. **Communication Skills:** Effective communication is important for collaboration. **Time Management:** Managing time efficiently to meet project deadlines and balance multiple task.	**Office Settings:** Many design engineers work in office environments. **Manufacturing Plants:** Some design engineers work in manufacturing facilities, where they oversee the production process **Research and Development Labs:** In R&D labs, design engineers focus on developing new products and technologies. **Consulting Firms:** Design engineers in consulting firms provide expert advice to clients on various projects **Field Work:** Some design engineers spend time in the field, especially when working on large-scale projects. **Educational Institutions:** Design engineers may also work in academia, teaching and conducting research at universities or technical schools.	**KCTCS Campuses** Engineering Design Technician - Diploma < KCTCS **University Programs** UK Stanley and Karen Pigman College of Engineering J.B. Speed School of Engineering - University of Louisville The School of Engineering and Applied Sciences | Western Kentucky University Mechanical & Manufacturing Engineering Technology Major: Northern Kentucky University. Department of Engineering & Technology - Eastern Kentucky University

Electrical Construction Engineering CIP 15.0303.00

This pathway provides the opportunity to blend Career and Technical Education (CTE) courses with Engineering courses to help students apply technical skills along with Science, Technology, Engineering, and Math (STEM) skills to solve real-world problems. This pathway prepares individuals to apply technical knowledge and skills to install, operate, maintain, and repair electric apparatus and systems such as residential, commercial, and industrial electric power wiring, DC and AC motors, controls, and electrical distribution panels. It includes instruction in the principles of electronics and electrical systems, wiring, power transmission, safety, industrial and household appliances, job estimation, electrical testing and inspection, and applicable codes and standards.

Career Choices	Aptitudes Needed	Common Work Environments	Postsecondary Opportunities in Kentucky
Electrical Engineer: Design, develop, and test electrical systems and equipment. **Project Engineer:** Oversee the installation, commissioning, and maintenance of electrical systems. **Control Systems Engineer:** Design and manage automated systems for manufacturing. **Power Systems Engineer:** Focus on the generation, transmission, and distribution of electrical power. **Electrical Design Engineer:** Create detailed electrical plans for buildings. **Instrumentation Engineer:** Develop and maintain instruments used for measuring and controlling processes. **Energy Consultant:** Advise on energy efficiency and sustainable energy. **Robotics Engineer:** Design and develop robotic systems and automation solutions.	**Mathematical Skills:** A strong foundation in algebra, geometry, and trigonometry is essential. **Problem-Solving Abilities:** The ability to troubleshoot and solve complex problems **Technical Aptitude:** Familiarity with basic electrical concepts, tools, and safety practices. **Attention to Detail:** Precision is important when working with electrical systems. **Analytical Thinking:** The ability to analyze and interpret technical drawings and schematics. **Communication Skills:** Effective communication skills for collaborating with team members. **Manual Dexterity**: Good hand-eye coordination and the ability to work with small components and tools. **Interest in Technology:** A keen interest in emerging technologies and staying up to date with industry trends.	**Construction Sites:** Overseeing the installation and maintenance of electrical systems. **Offices:** Designing electrical systems, preparing project plans, and collaborating with other engineers. **Manufacturing Plants:** Ensuring that electrical systems and machinery are operating efficiently. **Research and Development Labs:** Innovating new electrical technologies and improving existing systems. **Power Plants:** Managing the generation, transmission, and distribution of electrical power. **Telecommunications Facilities**: Working on the installation and maintenance of communication systems. **Field Sites:** Conducting inspections, troubleshooting issues, and ensuring compliance with safety standards	**KCTCS Campuses** Electrical Technology < KCTCS **University Programs** UK-Electrical Engineering | Stanley and Karen Pigman College of Engineering Electrical & Computer Engineering (Dept) - J.B. Speed School of Engineering - University of Louisville Electrical Engineering | WKU Ogden College of Science and Engineering | Western Kentucky University Electrical and Electronics Engineering Technology Major: Northern Kentucky University Department of Engineering & Technology - Eastern Kentucky University Engineering Technology, B.S. | Morehead State University | Kentucky Murray State-Electrical Engineering

Fabrication Engineering CIP 14.1901.0

This pathway provides the opportunity to blend Career and Technical Education (CTE) courses with Engineering courses to help students apply technical skills along with Science, Technology, Engineering, and Math (STEM) skills to solve real-world problems. Fabrication Engineers design parts to engineering specifications to develop metal parts and interior metal structures. Fabrication Engineers work with Sheet Metal Technicians to develop complex geometrical parts. The Fabrication Engineer directly supports the manufacturing industry in designing, fabricating, modifying and developing metal assemblies, components and sub-assemblies.

Career Choices	Aptitudes Needed	Common Work Environments	Postsecondary Opportunities in Kentucky
Fabrication Engineer: Design and improve manufacturing processes. **Metal Fabricator:** Create metal structures and components. **Welder:** Join metal parts using various welding techniques, often working in construction and manufacturing. **CNC Operator:** Operate numerical computer control machines. **Quality Control Inspector:** Ensure that products meet quality and safety standards. **Production Supervisor:** Oversee manufacturing operations. **Industrial Designer:** Develop and design products. **Field Installer:** Install fabricated components and systems on-site. **Laser Cutter Operator**: Use laser cutting machines to create precise parts and components. **Maintenance Technician:** Maintain and repair fabrication equipment to ensure smooth production processes.	**Mathematical Skills:** A solid understanding of algebra, geometry, and trigonometry. **Mechanical Aptitude:** Familiarity with tools, machinery, and basic mechanical concepts. **Problem-Solving Abilities:** The ability to troubleshoot and solve complex problems. **Attention to Detail:** Precision is important when working with materials and machinery. **Technical Skills:** Understanding technical drawings, blueprints, and CAD software. **Manual Dexterity:** Good hand-eye coordination and the ability to work with small components and tools. **Communication Skills:** Effective communication is important for collaborating with team members and understanding project requirements. **Analytical Thinking**: The ability to analyze and interpret data and technical information is necessary.	**Manufacturing Plants:** Overseeing the production of fabricated components and ensuring that machinery operates efficiently. **Construction Sites:** Working on the installation and assembly of fabricated structures and systems. **Research and Development Labs:** Innovating new fabrication techniques and improving existing processes1. **Fabrication Shops:** Creating custom parts and components using various tools and machinery. **Quality Control Departments:** Ensuring that fabricated products meet quality and safety standards through inspections and testing. **Field Sites:** Conducting on-site installations, repairs, and maintenance of fabricated systems. **Design Offices**: Developing detailed plans and blueprints for fabrication projects	**KCTCS Campuses** Fabrication - Certificate < KCTCS **University Programs** UK-Mechanical Engineering | Stanley and Karen Pigman College of Engineering Mechanical Engineering (dept) - J.B. Speed School of Engineering - University of Louisville Mechanical Engineering | Western Kentucky University Department of Engineering & Technology - Eastern Kentucky University Engineering Technology, B.S. | Morehead State University | Kentucky Mechanical Engineering Degree | Murray State University

Industrial Maintenance Engineering CIP 14.4101.00

CIP 14.4101.00 This pathway provides the opportunity to blend Career and Technical Education (CTE) courses with Engineering courses to help students apply technical skills along with Science, Technology, Engineering, and Math (STEM) skills to solve real-world problems. Electrical Engineers apply electrical theory and related knowledge to diagnose and modify developmental or operational electrical machinery, electrical control equipment, and circuitry in industrial or commercial plants and laboratories. Electrical Engineers experiment with motor-control devices, switch panels, transformers, generator windings, solenoids, and other electrical equipment and components according to engineering data and knowledge of electrical principles.

Career Choices	Aptitudes Needed	Common Work Environments	Postsecondary Opportunities in Kentucky
Maintenance Technician: Perform routine maintenance and repairs on machinery and equipment. **Industrial Electrician:** Install, maintain, and repair electrical systems in industrial settings. **Maintenance Supervisor:** Oversee maintenance teams and ensure that all equipment is functioning properly. **Reliability Engineer:** Focus on improving the reliability and efficiency of equipment and systems. **Facilities Manager:** Manage the maintenance and operation of buildings and facilities. **Mechanical Technician:** Work on the maintenance and repair of mechanical systems and machinery. **Instrumentation Technician:** Maintain and repair instruments used for measuring and controlling processes. **Automation Technician:** Work with automated systems and robotics.	**Mathematical Skills:** A solid understanding of algebra, geometry, and basic trigonometry. **Mechanical Aptitude:** Familiarity with tools, machinery, and mechanical concepts. **Problem-Solving:** The ability to troubleshoot and solve complex problems is crucial. **Attention to Detail:** Precision is important when working with machinery to ensure safety and functionality. **Technical Skills:** Understanding technical manuals, blueprints, and schematics. **Manual Dexterity:** Good hand-eye coordination and the ability to work with small components and tools. **Communication Skills:** Effective communication is important for collaborating with team members. **Analytical Thinking:** The ability to analyze and interpret data and technical information is necessary.	**Manufacturing Plants:** Ensuring that production machinery operates efficiently and performs routine maintenance. **Power Generation Facilities:** Maintaining and repairing equipment used in the generation and distribution of electrical power. **Construction Sites:** Working with heavy machinery and equipment, often in outdoor settings with varying weather conditions. **Maintenance Shops:** Conducting repairs and preventive maintenance on a wide range of equipment and machinery. **Research and Development Labs:** Innovating new maintenance techniques and improving existing processes. **Facilities Management:** Overseeing the maintenance of building systems, including HVAC, plumbing, and electrical systems.	**KCTCS Campuses** Industrial Maintenance Technology < KCTCS **University Programs** UK-Mechanical Engineering | Stanley and Karen Pigman College of Engineering Mechanical Engineering (dept) - J.B. Speed School of Engineering - University of Louisville Mechanical Engineering | Western Kentucky University Department of Engineering & Technology - Eastern Kentucky University Engineering Technology, B.S. | Morehead State University | Kentucky Mechanical Engineering Degree | Murray State University

Structural Engineering CIP 14.0803.00

This pathway provides the opportunity to blend Career and Technical Education (CTE) courses with Engineering courses to help students apply technical skills along with Science, Technology, Engineering, and Math (STEM) skills to solve real-world problems. This pathway prepares individuals to apply engineering principles and technical skills to support architects, engineers and planners in designing and developing buildings, urban complexes, and related systems. It includes instruction in design testing procedures, building site analysis, model building and computer graphics, structural systems testing, analysis of prototype mechanical and interior systems, report preparation, basic construction and structural design, architectural rendering, architectural-aided drafting (CAD), layout and designs, architectural blueprint interpretation, building materials, and basic structural wiring diagramming.

Career Choices	Aptitudes Needed	Common Work Environments	Postsecondary Opportunities in Kentucky
Structural Engineer: Design and analyze buildings, bridges, and other structures. **Civil Engineer**: Work on infrastructure projects such as roads, dams, and water supply systems. **Construction Manager:** Oversee construction projects, ensuring they are completed on time, within budget, and according to design specifications. Project Engineer: Manage engineering projects from conception to completion. **Structural Designer:** Create detailed drawings and plans for structures, working closely with architects and engineers. **Building Inspector:** Ensure that construction projects comply with building codes and safety regulations. **Consulting Engineer:** Provide expert advice on structural integrity and design for various projects. **Research Engineer:** Conduct research to develop new materials and methods for structural engineering.	**Mathematical Skills:** A solid understanding of algebra, geometry, and basic trigonometry. **Mechanical Aptitude:** Familiarity with tools, machinery, and mechanical concepts. **Problem-Solving:** The ability to troubleshoot and solve complex problems is crucial. **Attention to Detail:** Precision is important when working with machinery to ensure safety and functionality. **Technical Skills:** Understanding technical manuals, blueprints, and schematics. **Manual Dexterity:** Good hand-eye coordination and the ability to work with small components and tools. **Communication Skills:** Effective communication is important for collaborating with team members. **Analytical Thinking:** The ability to analyze and interpret data and technical information is necessary.	**Construction Sites:** Overseeing the construction of buildings, bridges, and other structures. **Engineering Firms:** Working in an office setting to design and analyze structural plans, collaborate with architects, and prepare detailed drawings. **Government Agencies:** Ensuring public infrastructure projects meet regulatory standards and safety requirements. **Research and Development Labs:** Innovating new materials and methods for structural engineering and conducting tests to improve existing designs. **Consulting Firms:** Providing expert advice on structural integrity and design for various projects. **Educational Institutions:** Teaching and conducting research in structural engineering principles and practices.	**KCTCS Campuses** Architectural Technology | KCTCS **University Programs** UK - Civil Engineering U of L-Civil & Environmental Engineering -J.B. Speed School of Engineering Civil Engineering, Bachelor of Science (534P, 534) < Western Kentucky University Civil Engineering Degree Program at Murray State University Mechanical Engineering Degree | Murray State University

Welding Engineer CIP 15.0614.00

This pathway provides the opportunity to blend Career and Technical Education (CTE) courses with Engineering courses to help students apply technical skills along with Science, Technology, Engineering, and Math (STEM) skills to solve real-world problems. Welding Engineers design and develop metal components for products for the pipeline, automotive, boiler-making, shipbuilding, aircraft and mobile home industries. Welding Engineers must know about cutting processes and gas metal arc welding procedures to develop these industrial processes efficiently.

Career Choices	Aptitudes Needed	Common Work Environments	Postsecondary Opportunities in Kentucky
Welding Engineer: Design, develop, and optimize welding processes and equipment. **Welding Inspector:** Examine welds to ensure they meet industry standards and specifications. **Welding Technician:** Assist in the setup, operation, and maintenance of welding equipment. **Manufacturing Engineer:** Oversee the production process, including welding operations, to ensure efficiency and quality. **Robotic Welding Technician:** Program and maintain robotic welding systems used in automated manufacturing processes. **Quality Assurance Engineer:** Develop and implement quality control procedures for welding operations. **Research and Development Engineer:** Innovate new welding techniques and materials. **Field Service** Engineer: Provide on-site support for welding equipment and processes.	**Mathematical Skills:** A strong foundation in algebra, geometry, and trigonometry is essential for performing precise calculations. **Mechanical Aptitude:** Familiarity with tools, machinery, and basic mechanical concepts. **Problem-Solving Abilities:** The ability to troubleshoot and solve complex problems is crucial in developing and optimizing welding techniques. **Attention to Detail:** Precision is important when working with welding processes to ensure quality and safety. **Technical Skills:** Understanding technical drawings, blueprints, and welding codes. **Manual Dexterity:** Good hand-eye coordination and the ability to work with small components and tools. **Communication Skills:** Effective communication is important for collaborating with team members and understanding project requirements. **Interest in Technology:** A keen interest in emerging welding technologies.	**Manufacturing Plants:** Overseeing welding processes. **Construction Sites:** Working on the welding of structural components for buildings, bridges, and other infrastructure. **Fabrication Shops:** Creating custom parts and components using various welding techniques. **Research and Development Labs:** Innovating new welding techniques and materials and conducting experiments. **Quality Control Departments:** Ensuring that welded products meet quality and safety standards. **Field Sites:** Providing on-site support for welding projects, troubleshooting issues, and ensuring compliance with safety standards. Educational Institutions: Teaching welding techniques, safety practices, and conducting research in welding engineering.	**KCTCS Campuses** Welding Technology < KCTCS **University Programs** UK-Mechanical Engineering | Stanley and Karen Pigman College of Engineering Mechanical Engineering (dept) - J.B. Speed School of Engineering - University of Louisville Mechanical Engineering | Western Kentucky University Department of Engineering & Technology - Eastern Kentucky University Engineering Technology, B.S. | Morehead State University | Kentucky Mechanical Engineering Degree | Murray State University

Wood Manufacturing Engineering CIP 03.0509.00

This pathway provides the opportunity to blend Career and Technical Education (CTE) courses with Engineering courses to help students apply technical skills along with Science, Technology, Engineering, and Math (STEM) skills to solve real-world problems. Wood Manufacturing Engineers design and create interior cabinets and wood products for homes and businesses. Wood Manufacturing Engineers consult with clients and cabinetmakers to cut, shape wood, prepare surfaces, and form a complete product.

Career Choices	Aptitudes Needed	Common Work Environments	Postsecondary Opportunities in Kentucky
Wood Manufacturing Engineer: Design and optimize manufacturing processes for wood products. **CAD Designer:** Use computer-aided design (CAD) software to create detailed plans and specifications for wood products. **Production Manager:** Oversee the production process in wood manufacturing facilities. **Quality Control Inspector**: Ensure that wood products meet industry standards and specifications. **Machinery Maintenance Technician**: Install, maintain, and repair industrial machinery used in wood manufacturing. **Cabinetmaker/Bench Carpenter:** Create custom wood products such as furniture and cabinets. **Product Development Engineer:** Innovate new wood products and improve existing designs, working closely with other engineers and designers.	**Mathematical Skills:** A solid understanding of mathematics, including geometry and algebra. **Technical Skills:** Familiarity with hand tools and power tools, as well as basic woodworking techniques. **Problem-Solving:** The ability to troubleshoot and solve problems that arise during the manufacturing process. **Attention to Detail:** Precision is key in woodworking to ensure high-quality products. **Safety Awareness:** Understanding and adhering to safety protocols. **Communication Skills:** Effective communication is necessary for collaborating with peers & instructors. **Creativity and Design Skills:** An aptitude for design and creativity can help in developing innovative and functional wood products. **Time Management:** The ability to manage time effectively to complete projects within deadlines.	**Manufacturing Plants:** These facilities are where raw wood is processed into finished products. Engineers here focus on optimizing production processes & ensuring quality control. **Furniture Factories:** In these settings, engineers design and oversee the production of furniture.. **Sawmills:** Engineers in sawmills are involved in the initial processing of raw timber. **Research and Development Labs**: Some engineers work in R&D labs, developing new wood products, treatments, and manufacturing technologies.. **Forestry Operations:** Engineers may also work in forestry, managing the sustainable harvesting of timber. **Consulting Firms:** Engineers in consulting roles provide expertise to various clients, helping them optimize their wood manufacturing processes, improve product quality, and implement sustainable practices.	*Note: There are no programs in Kentucky that focus exclusively on Wood manufacturing engineering, though general manufacturing engineering does have components of this aspect of engineering. **KCTCS Campuses** Manufacturing Engineering Technology < KCTCS **University Programs** Bachelor of Science in Manufacturing Engineering - Eastern Kentucky University UK-Stanley and Karen Pigman College of Engineering Manufacturing Engineer | Murray State

FAMILY AND CONSUMER SCIENCES

Consumer and Family Services CIP 19.0403.00

The Consumer and Family Services pathway helps students develop knowledge and skills that span a broad range of Family and Consumer Sciences content areas and are central to career areas involving human services, consumer services, consumer protection, advising, education and training, and social and community services.

Career Choices	Aptitudes Needed	Common Work Environments	Postsecondary Opportunities in Kentucky
Nutritional Aide: Prepares and distributes healthy meals in hospitals, nursing homes, or other care centers. **Family and Consumer Sciences Teacher:** Educates students on topics like nutrition, personal finance, and family management in middle or high schools. **Community Service Manager:** Oversees social service programs and community organizations, working to improve public well-being. **Human Development Specialist**: Works with individuals and families to promote healthy development and relationships. **Consumer Advocate:** Helps consumers understand their rights and navigate issues related to products and services.	**Communication Skills:** Effective verbal and written communication skills. **Empathy and Compassion:** A genuine interest in helping others and understanding their needs. **Problem Solving:** The ability to identify issues and develop practical solutions. **Organizational Skills:** Managing time, resources, and tasks efficiently helps in handling multiple responsibilities. **Financial Literacy:** Basic knowledge of budgeting and managing resources. **Basic Technical Skills:** Familiarity with common software and tools used in the field **Critical Thinking:** Analyzing situations and making informed decisions **Interpersonal Skills:** Ability to build and maintain positive relationships. **Adaptability:** Being flexible and able to adjust to changing situations. **Cultural Awareness:** Understanding and respecting diverse backgrounds and perspectives.	**Educational Institutions:** Working as teachers or administrators in schools, colleges, and universities. **Community Centers:** Providing support and educational programs to enhance the well-being of community members. **Healthcare Facilities:** Working in hospitals, clinics, and nursing homes as nutritional aides, health educators, or family support specialists. **Government Agencies:** Developing and implementing policies and programs that support families and communities. **Nonprofit Organizations:** Offering services and support to specific populations. **Private Practice:** Providing counseling, financial planning, or consulting services. **Corporate Settings:** Working in human resources, employee wellness programs. **Hospitality and Event Planning:** Managing events, coordinating services, and ensuring customer satisfaction.	**KCTCS Campuses** Human Services < KCTCS **University Programs** Kentucky State University | Division of Family and Consumer Sciences UK-Human Development and Family Sciences Child and Family Services, Bachelor of Science (5011) < Western Kentucky University Bachelor of Science in Family and Consumer Sciences Education - Eastern Kentucky University Bachelor of Science in Family and Consumer Sciences Education – Murray State University Bachelor of Science in Family and Consumer Sciences Education – Western Kentucky University

Culinary and Food Services CIP 12.0500.00

The Culinary and Food Services Pathway addresses a skill set necessary for success in the culinary and food service industries. The courses in this pathway will help students develop skills in early career ladder positions and promote continuing education at the postsecondary level, preparing for careers associated with restaurants, institutional food service, hospitality, catering, and food and beverage operations.

Career Choices	Aptitudes Needed	Common Work Environments	Postsecondary Opportunities in Kentucky
Executive/Corporate Chef: Oversees multiple kitchens within an operation. **Chef de Cuisine/Head Chef:** Responsible for overseeing all kitchen operations in a restaurant or other dining facility. **Pastry Chef:** Specializes in creating desserts, pastries, and baked goods and overseeing bakeshop operations. **Sous Chef:** Acts as the second-in-command in the kitchen, assisting the chef with daily operations. **Line Cook:** member of the kitchen brigade who works on a kitchen station to prepare food orders. **Caterer**: Provides food services for events such as weddings, parties, and corporate functions. **Restaurant Manager:** Manages the overall operations of a restaurant. **Food and Beverage Director:** Oversees the food and beverage operations in hotels or large establishments. **Culinary Instructor:** Teaches culinary arts in high schools, culinary schools, community colleges, & private cooking classes.	**Creativity:** The culinary arts involve innovation and creativity. A love for cooking is also necessary. **Attention to Detail:** Precision is crucial in cooking, from measuring ingredients to plating dishes. Attention to detail ensures consistency and quality. **Time Management:** The ability to manage time effectively is essential in a fast-paced kitchen. **Physical & mental stamina:** Working in a kitchen can be physically demanding, requiring long hours on your feet. It also requires the ability to remain focused on multiple tasks and concentrate. **Teamwork:** Kitchens are highly collaborative environments. **Adaptability:** The ability to adapt to changing situations and handle unexpected challenges is crucial **Basic Math Skills:** Understanding basic math including basic algebra is necessary. **Safety and Sanitation Awareness**: Knowledge of kitchen safety and sanitation practices is vital.	**Restaurants:** This is one of the most common settings, ranging from casual to fine dining establishments. **Hotels, Resorts & Cruise Ships:** Culinary professionals in these settings often work in multiple dining venues. **Catering Companies:** Provide food services for events such as weddings, corporate functions, and parties. **Institutional Kitchens:** Schools, hospitals, retirement communities, prisons, and corporate cafeterias employ culinary staff to prepare large quantities of meals. **Bakeries and Pastry Shops:** Specializing in baked goods and desserts. **Food Trucks and Pop-Up Restaurants:** These mobile and temporary dining options offer unique opportunities for culinary creativity and direct customer interaction. **Private Households:** Personal chefs work in private homes, preparing customized meals for individuals or families. **Research and Development**: Work in R&D developing new products, recipes, and cooking techniques.	**KCTCS Campuses** Culinary Arts | KCTCS **University Programs** Culinary Arts Program | Sullivan University UK-Hospitality Management & Tourism Hospitality Management & Dietetics, B.S. - Hotel, Restaurant, & Tourism Management Concentration | Western Kentucky University

Early Childhood Education CIP 13.1210.00

The Early Childhood Education pathway will address a skill set necessary for success in early childhood education so that individuals can teach students from infancy through eight years (grade three), depending on the school system or state regulations. This pathway is targeted at individuals preparing for careers related to early childhood education, such as those associated with childcare, teaching, community-based children's programs, social services or counseling for children, and after-school programs.

Career Choices	Aptitudes Needed	Common Work Environments	Postsecondary Opportunities in Kentucky
Preschool Teacher: Work with children aged 3-5 to develop their social, motor, and cognitive skills. **Childcare Provider:** Provide care and educational activities for children in settings like daycare centers, in-home daycares, or after-school programs. **Teacher's Aide:** Assist lead teachers in the classroom, Implementing lesson plans, grading, and one-on-one student support. **Childcare Center Director:** Oversee the daily operations of a childcare center, including staff supervision, curriculum development, and relationships with parents. **Curriculum Designer:** Develop educational materials and programs tailored to young children. **Instructional Specialist:** Support teachers by providing training and resources to improve classroom practices. **Family Support Specialist:** Work with families to provide resources and support for children's development.	**Patience:** Working with young children requires a lot of patience, as they are still developing their social and emotional skills. **Communication Skills:** Effective verbal and non-verbal communication is crucial for interacting with children, parents, and colleagues. **Creativity:** The ability to create engaging and educational activities that capture children's interest. **Empathy:** Understanding and responding to the needs and emotions of young children. **Organizational Skills:** Managing a classroom, planning lessons, and keeping track of each child's progress requires good organization. **Adaptability:** Being flexible and able to adjust plans based on the needs and behaviors of children. **Observation Skills:** Noticing subtle changes in children's behavior or development can help address issues early on.	**Preschools and Kindergartens:** These are the most traditional settings where ECE professionals teach. **Daycare Centers:** These facilities provide care and educational activities for infants, toddlers, and preschoolers. **In-Home Daycare:** Some ECE professionals choose to run daycare services from their own homes. **Head Start Programs:** These federally funded programs offer comprehensive early childhood education, health, nutrition, and parent involvement. **Elementary Schools:** ECE professionals may work in the early grades (kindergarten through third grade), focusing on foundational skills. **Community Centers/NPO's:** These centers often offer early childhood programs and services. **Hospitals and Clinics:** Some ECE professionals work in pediatric units or clinics, providing educational and developmental support to young children.	**KCTCS Campuses** Interdisciplinary Early Childhood Education - AAS < KCTCS **University Programs** UK-Interdisciplinary Early Childhood Education Early Childhood and Elementary Education — College of Education and Human Development Interdisciplinary Early Childhood Education, Bachelor of Science (526) < Western Kentucky University Bachelor of Science in Child & Family Studies - Eastern Kentucky University Murray State-Early Childhood and Elementary Education Early Childhood Education, B.A. | Morehead State University | Kentucky

Fashion and Interior Design CIP 50.0407.00

The Fashion and Interior Design pathway will address a skill set necessary for success in the fashion industry and a career in the residential housing and furnishings industry. This pathway targets individuals interested in pursuing careers in the following areas: retail and wholesale buying, apparel and textile development and production, fashion and textile design, and visual merchandising, as well as public and private sector housing programs, residential property and facility management, real estate, retail home furnishings, or home decorating and staging.

Career Choices	Aptitudes Needed	Common Work Environments	Postsecondary Opportunities in Kentucky
FASHION DESIGN CAREERS **Fashion Designer:** Create original clothing, accessories, and footwear designs. **Fashion Show Manager:** Coordinate all elements of fashion shows, from planning to execution. **Buyer:** Select and purchase clothing and accessories for retail stores. **Fashion Merchandiser:** Analyze market trends to develop strategies for product placement and sales. **Textile Designer:** Design fabrics and patterns for use in clothing and home decor. **Stylist:** Work with individuals or brands to create cohesive and stylish looks. **Costume Designer:** Design costumes for theater, film, and television productions. **INTERIOR DESIGN CAREERS** **Interior Designer**: Plan and design interior spaces for homes, offices, and other buildings2. **Residential Designer:** Specialize in designing private homes and living spaces. **Commercial Designer:** Focus on designing commercial spaces like offices, hotels, and restaurants. **Exhibit Designer:** Create displays and fixtures for exhibitions, museums, and trade shows. **Set Designer:** Design interior sets for film, television, and theater productions. **Lighting Designer:** Plan and design lighting systems for various spaces.	**Creativity:** The ability to think outside the box and come up with unique designs. **Attention to Detail:** Precision creation of designs in fashion and interior design **Drawing and Sketching:** Proficiency in illustrating design ideas by hand or using digital tools. **Understanding of Textiles (FD):** Knowledge of different fabrics, their properties, and how they can be used in design. **Trend Awareness (FD):** Keeping up with current fashion trends and predicting future styles. **Sewing and Construction Skills:** Basic skills in sewing (FD) and ability to work with building tool (ID) **Spatial Awareness (ID):** The ability to visualize and plan the layout of spaces effectively. **Communication & Problem-Solving Skills:** Ability to communicate ideas and solve problems	**Work Environment:** ***Fashion designers*** may work in design studios, offices, or from home. ***Interior designers*** work in offices, client sites, and sometimes remotely. They often visit construction sites and showrooms. **Hours:** ***Fashion designers*** hours can be long and irregular, especially during fashion show seasons. ***Interior Designers*** typically enjoy flexible work hours but may occasionally need to work evenings and weekends depending on workload and meeting deadlines. Collaboration: Both frequently collaborate with other professionals and clients. Technology: Both use various design software specific to each field. Challenges: Managing tight deadlines, staying updated with trends, and meeting client expectations are common challenges in both fields of endevor.	**KCTCS Campuses** Apparel Graphics and Production - Certificate < KCTCS Residential Designer - Certificate < KCTCS Online Certified Residential Interior Designer from Ashland Community & Technical College **University Programs** **University of Kentucky:** Interiors: Planning/Strategy/Design Merchandising, Apparel & Textiles | Academics **WKU** Interior Design & Fashion Merchandising, B.S. - Fashion Merchandising Concentration | Western Kentucky University **EKU** Apparel Design & Merchandising (ADM) < Eastern Kentucky University Design (DES) < Eastern Kentucky University

Food Science and Dietetics CIP 51.3199.00

The Food Science and Dietetics pathway addresses competencies, and a skill set necessary for success as a pre-professional in a career focusing on food science. It will facilitate employment in early career ladder positions and promote continuing education at the postsecondary level in career areas involving food science, food safety, food quality, food technology, or food preservation and packaging.

Career Choices	Aptitudes Needed	Common Work Environments	Postsecondary Opportunities in Kentucky
Registered Dietitian (RD): Work in hospitals, clinics, or private practice to provide nutritional counseling & create diets. **Food Scientist:** Conduct research and develop new food products, improve food safety. **Nutritionist:** Educate individuals and communities about healthy eating habits. **Food Safety Specialist:** Ensure that food products meet safety standards and regulations. **Clinical Dietitian:** Work in healthcare settings to manage the dietary needs of patients. **Food Service Manager:** Oversee the operations of food service establishments. **Research Scientist:** Conduct studies on the nutritional content of foods. **Health Coach:** Provide personalized guidance and support to individuals. **Quality Control Analyst**: Monitor and test food products to ensure they meet quality and safety standards.	**Strong Science Foundation**: A good grasp of biology, chemistry, and physics is essential. **Mathematical Skills:** Proficiency in math, particularly in statistics for analyzing data and conducting research. **Critical Thinking:** The ability to analyze information, solve problems, and make informed decisions. **Attention to Detail:** Precision is key when conducting experiments or ensuring food safety. **Communication Skills:** Strong written and verbal communication skills are necessary. **Nutrition:** A genuine interest in food, health, and nutrition. **Organizational Skills:** Being organized helps in managing coursework, lab work, and research projects. **Teamwork:** Collaboration with peers & professionals is required. **Technical Skills:** Familiarity with laboratory equipment and computer software used for data analysis.	**Hospitals and Healthcare Facilities**: Dietitians and nutritionists in these settings provide medical nutrition therapy. **Private Practice:** Some dietitians and nutritionists operate independently, offering personalized dietary and nutrition advice to clients. **Community and Public Health Programs:** These professionals work on educating the public about healthy eating habits & developing nutrition programs. **Food Industry:** Food scientists and dietitians in the food industry work with companies to develop and evaluate food products. **Research and Academia:** Many dietitians and food scientists conduct research, teach at universities, and contribute to scientific knowledge in the field of nutrition. **Schools and Educational Institutions**: Nutritionists in schools design healthy meal programs and promote good eating habits. Also support campus sports teams. **Corporate Wellness Programs:** Dietitians and nutritionists promote healthy eating habits	**KCTCS Campuses** Online Nutrition for Optimal Health, Wellness, and Sports from Big Sandy Community & Technical College **University Programs** UK-B.S. in Dietetics | Dietetics and Human Nutrition Department of Agriculture and Food Science | Western Kentucky University Bachelor of Science in Food & Nutrition - Eastern Kentucky University Kentucky State University | Option in Nutritional Sciences & Food Systems Bachelor of Science in Family and Consumer Sciences Education - Eastern Kentucky University Bachelor of Science in Family and Consumer Sciences Education – Murray State University Bachelor of Science in Family and Consumer Sciences Education – Western Kentucky University

Fundamentals of Teaching CIP 13.1308.00

The Fundamentals of Teaching pathway will facilitate employment in early career ladder positions and promote continuing education at the postsecondary level, preparing for careers associated with education and training in public and private school programs, elementary, middle, and secondary schools, after-school programs, higher education, nonprofit, and corporate settings.

Career Choices	Aptitudes Needed	Common Work Environments	Postsecondary Opportunities in Kentucky
Classroom Teacher: Teach at the elementary, middle, high school, or specific content areas such as CTE or special education. **Educational Consultant:** Work with schools and educational organizations to improve curriculum, teaching methods, and student outcomes. **Instructional Coordinator:** Develop instructional material, coordinate its implementation, and assess its effectiveness in schools. **Teacher Mentor:** Support and guide new teachers, helping them develop their teaching skills. **Educational Administrator:** Take on leadership roles such as principal, vice-principal, school counselor, or district administrator, overseeing school operations and policies. **Corporate Trainer:** Develop and deliver training programs for employees in various industries. **Curriculum Developer:** Design educational content and programs.	**Communication & Collaboration:** Strong verbal and written communication skills and the ability to work with others. **Patience**: Teaching requires patience to work with students of varying abilities and backgrounds. **Creativity:** The ability to develop engaging and innovative lesson plans that capture students' interest. **Organizational Skills:** Good organizational skills help in planning lessons, managing the classroom, and keeping track of student progress. **Empathy:** Understanding and being sensitive to the needs and feelings of students. **Adaptability:** The ability to adapt teaching methods to meet the diverse needs of students. **Critical Thinking:** Strong critical thinking skills are necessary for developing effective teaching strategies. **Technological** Proficiency: Familiarity with educational technology and digital tools.	**Traditional Classrooms:** This includes elementary, middle, and high schools where teachers interact face-to-face with students. **Higher Education:** Colleges and universities employ educators to teach undergraduate and graduate courses & conduct research. **Online Learning Platforms:** With the rise of digital education, many educators work in virtual environments. **Private Industry:** Corporate Trainers develop and deliver training programs for employees in various industries. **Educational Consulting:** Consultants work with schools, districts, and educational organizations. **Non-Profit Organizations:** Some educators work for non-profits, developing educational programs. **State & Federal Government:** Educators in this field work on developing policies, provide consulting, and advising legislatures. **Libraries and Museums:** These institutions often employ educators to develop and deliver educational programs, workshops, and tours.	**KCTCS Campuses** Education - AAS < KCTCS **University Programs** UK - College of Education U of L — College of Education and Human Development Kentucky State University - School of Education, Human Development and Consumer Sciences WKU - College of Education and Behavioral Sciences EKU - College of Education & Applied Human Sciences Murray State College of Education and Human Services Morehead State Ernst & Sara Lane Volgenau College of Education NKU - College of Education

Hospitality, Travel, Tourism and Recreation CIP 52.1910.00

The Hospitality, Travel, Tourism and Recreation career pathway prepares individuals to provide services in the hospitality and leisure fields. Includes instruction in hospitality operations, customer sales, marketing techniques, assistance operations and techniques, essential office management, sports, recreation and equipment management, and food and beverage services. The Hospitality, Travel, Tourism and Recreation career pathway is a hybrid pathway that consists of courses within Family and Consumer Sciences Education and Marketing Education. It blends two program areas to help students explore technical skills in the industry.

Career Choices	Aptitudes Needed	Common Work Environments	Postsecondary Opportunities in Kentucky
Hotel Manager: Oversees the operations of a hotel, ensuring guest satisfaction and efficient management of staff and resources. **Event Planner:** Organizes and coordinates events such as weddings, conferences, and corporate meetings. **Travel Agent:** Assists clients in planning and booking travel arrangements, including flights, accommodations, and tours. **Food and Beverage Manager:** Manages the operations of restaurants, bars, and other food service establishments. **Cruise Director:** Plans and oversees activities and entertainment on cruise ships. **Spa Manager:** Manages the operations of a spa, including staff, services, and customer satisfaction. **Hospitality Analyst:** Analyzes data to improve business operations and customer experiences. **Tour Guide:** Leads groups on tours, providing information and insights about the destinations. **Recreation Manager:** Oversees recreational facilities and programs, such as sports complexes, parks, and community centers.	**Communication Skills:** Effective verbal and written communication. **Customer Service Orientation:** A strong focus on providing excellent service and ensuring customer satisfaction **Interpersonal Skills:** The ability to build and maintain positive relationships with a diverse range of people. **Organizational Skills:** Being able to manage time, tasks, and resources efficiently. **Problem-Solving Abilities:** The capacity to handle unexpected situations and find solutions. **Attention to Detail:** Ensuring accuracy in reservations, event planning, and customer interactions. **Adaptability:** The industry can be fast-paced and ever-changing, so being flexible and open to new experiences is beneficial. **Cultural Awareness:** Understanding and respecting different cultures enhances the ability to serve a diverse clientele. **Teamwork:** Many roles require working closely with others, so being a good team player is important. **Technical Proficiency:** Familiarity with industry-specific software and tools.	**Customer-Focused:** These industries are heavily centered around providing excellent customer service. **Fast-Paced and Energetic:** The work can be fast-paced, especially during peak seasons or events. This requires quick thinking and adaptability1. **Team-Oriented:** Collaboration is key, as you'll frequently work with a team to deliver services and manage operations. **Flexible Hours:** Jobs in these fields often require working non-traditional hours, including evenings, weekends, and holidays. **Diverse and Inclusive:** Many workplaces emphasize diversity and cultural sensitivity, creating an inclusive environment that respects and values different backgrounds. **Positive and Supportive:** A positive work environment that promotes employee well-being, satisfaction, and productivity is common. **Technology-Driven:** Increasingly, these industries are leveraging technology for bookings, customer service, and operations management. **Opportunities for Growth:** There are often opportunities for professional development and career advancement.	**KCTCS Campuses** Hospitality Management - Certificate < KCTCS **University Programs** EKU-Global Hospitality & Tourism NKU: Online Hotel Management UK-Hospitality Management & Tourism WKU-Hotel, Restaurant, & Tourism Management Concentration

HEALTH SCIENCE CAREER PATHWAYS

Allied Health CIP 51.0000.01

This pathway is a general, introductory, undifferentiated, or joint pathway in health services occupations that prepares individuals for either entry into specialized training programs or various concentrations in the allied health area. Includes instruction in the basic sciences, research and clinical procedures, and aspects of the subject matter related to various health occupations. *(NOTE: After completing an Allied Health CTE program, graduates can pursue various postsecondary studies. Options include associate degrees in fields like nursing or radiologic technology, certificate programs for quick entry into roles such as medical assisting or EMT, and bachelor's degrees in health sciences, healthcare administration, nursing, or pre-med.)*

Career Choices	Aptitudes Needed	Common Work Environments	Postsecondary Opportunities in Kentucky
Sonographer: Performs ultrasound scans to help diagnose patients. **Phlebotomist:** Draws blood for diagnostic or donation. **Medical Assistant:** Assists with clinical and administrative tasks in healthcare settings. **Health Information Technician:** Manages patient health information and medical records. **Dietitian:** Provides nutritional counseling and develops diet plans. **Medical Technologist:** Conducts laboratory tests to diagnose diseases. **X-ray Technician:** Operates X-ray equipment to create diagnostic images. **Surgical Technician:** Assists in surgical operations by preparing operating rooms and equipment.	**Strong Communication Skills**: Essential for interacting with patients, families, and healthcare professionals. **Attention to Detail:** Important for accurately performing tasks and following protocols. **Empathy and Compassion:** Vital for providing patient-centered care. **Problem-Solving Skills:** Necessary for addressing challenges and making informed decisions. **Technical Proficiency:** Helpful for using medical equipment and technology. **Teamwork:** Crucial for collaborating effectively with healthcare teams. **Time Management:** Important for balancing multiple responsibilities and tasks.	**Hospitals:** Fast-paced and dynamic, hospitals provide exposure to a wide range of medical conditions and treatments. **Clinics:** More structured and focused on outpatient care, clinics offer a more predictable routine. **Rehabilitation Centers:** Specialize in helping patients recover from injuries or surgeries, focusing on long-term care. **Private Practices:** Provide personalized care in a more intimate setting, often with a specific patient population. **Diagnostic Laboratories:** Focus on analyzing medical samples to assist in diagnosis and treatment. **Primary Care Offices:** Offer general healthcare services and preventive care. **Urgent Care Centers:** Provide immediate care for non-life-threatening conditions. **Correctional Facilities:** Deliver healthcare services to incarcerated individuals.	**KCTCS Campuses** The Kentucky Community and Technical College System (KCTCS) offers career paths in a variety of health care fields where a student has a general background in allied health may continue their postsecondary studies. The Program Finder | KCTCS can help you locate specific programs in the health care field. **University Programs** Several Universities in Kentucky offer career paths in a variety of health care fields where a student who has a general background in allied health may continue their postsecondary studies. Too numerous to list here, students should investigate the universities and programs which align to their specific interests.

Biomedical Sciences CIP 26.0102.00

This pathway focuses on the integrative scientific study of biological issues related to health and medicine or a program in one or more of the biomedical sciences that is undifferentiated as to the title. Includes instruction in any basic medical sciences at the research level, biological science research in biomedical facilities, and general studies encompassing various biomedical disciplines.

Career Choices	Aptitudes Needed	Common Work Environments	Postsecondary Opportunities in Kentucky
Biomedical Researcher: Conducts research to develop new medical treatments and technologies. **Clinical Laboratory Technologist:** Performs tests and analyzes samples to help diagnose diseases. **Pharmaceutical Sales Representative**: Promotes and sells medications to healthcare professionals. **Forensic Scientist:** Analyzes evidence for criminal investigations. **Healthcare Administrator:** Manages operations in healthcare facilities. **Public Health Specialist:** Works on improving community health through education and policy. **Medical Writer:** Creates scientific documents and publications. **Biotechnologist:** Develops products and technologies using biological systems. **Environmental Health Officer:** Ensures public health by monitoring environmental factors. **Regulatory Affairs Specialist:** Ensures compliance with healthcare regulations.	**Strong Analytical Skills:** Important for interpreting data and conducting research. **Attention to Detail:** Crucial for accuracy in experiments and data analysis. **Scientific Curiosity:** A natural interest in understanding biological processes and medical advancements. **Problem-Solving Abilities:** Necessary for developing hypotheses and troubleshooting experiments. **Technical Proficiency:** Helpful for using laboratory equipment and software. **Communication Skills:** Essential for writing reports and presenting findings. **Teamwork:** Important for collaborating on research projects and lab work. **Time Management:** Vital for balancing coursework, lab work, and research activities.	**Research Laboratories:** Conducting experiments and studies to advance medical knowledge and develop new treatments. **Hospitals and Clinics:** Working alongside healthcare teams to support patient care and perform diagnostic tests. **Pharmaceutical Companies:** Developing and testing new drugs and medical devices. **Biotechnology Firms:** Innovating and creating products using biological systems and organisms. **Academic Institutions:** Teaching and conducting research in universities and colleges. **Government Agencies:** Working on public health initiatives, regulatory affairs, and policy development. **Forensic Laboratories:** Analyzing biological samples for criminal investigations2.	**KCTCS Campuses** The Kentucky Community and Technical College System (KCTCS) offers a variety of programs related to Biomedical Sciences across its colleges. The Program Finder | KCTCS can help you locate specific programs in Biomedical Sciences. **University Programs** Office of Biomedical Education | Undergraduate | University of Kentucky College of Medicine Integrated Programs in Biomedical Sciences — School of Medicine University of Louisville Biomedical Sciences, B.S. | Morehead State University | Kentucky Bachelor of Science – Biomedical Sciences - Eastern Kentucky University

Clinical Medical Assisting CIP 51.0801.00

Under physicians' supervision, this pathway prepares individuals to provide medical office administrative services and perform clinical duties, including patient intake and care, routine diagnostic and recording procedures, pre-examination and examination assistance, and administering medications and first aid. Includes instruction in basic anatomy and physiology; medical terminology; medical law and ethics; patient psychology and communications; medical office procedures; and clinical diagnostic, examination, testing, and treatment procedures.

Career Choices	Aptitudes Needed	Common Work Environments	Postsecondary Opportunities in Kentucky
Clinical Medical Assistant: Assists physicians with patient care, performs routine exams, and records vital signs. **Medical Administrative Assistant:** Focuses on administrative duties such as scheduling appointments, managing records, and handling billing. **Phlebotomist:** Specializes in drawing blood for tests, transfusions, or donations. **EKG Technician:** Conducts electrocardiograms to monitor heart activity. **Medical Office Manager:** Oversees the daily operations of a medical office or clinic. **Health Information Technician:** Manages patient health records and ensures their accuracy and security. **Clinical Research Coordinator:** Assists in managing clinical trials and research studies.	**Strong Communication Skills:** Essential for interacting with patients, families, and healthcare professionals. **Attention to Detail:** Important for accurately recording patient information and following medical protocols. **Empathy and Compassion:** Vital for providing patient-centered care and support. **Organizational Skills:** Necessary for managing multiple tasks and maintaining patient records. **Technical Proficiency:** Helpful for using medical equipment and technology. **Problem-Solving Abilities:** Useful for addressing patient needs and handling unexpected situations. **Teamwork:** Crucial for collaborating effectively with healthcare teams. **Time Management:** Important for balancing clinical duties and administrative tasks.	**Hospitals**: Fast-paced and dynamic, hospitals provide exposure to a wide range of medical conditions and treatments. **Outpatient Clinics:** More structured and focused on non-emergency care, offering a predictable routine. **Specialty Practices**: Such as cardiology or dermatology offices, where assistants can develop expertise in specific fields. **Primary Care Offices:** Provide general healthcare services and preventive care. **Urgent Care Centers**: Offer immediate care for non-life-threatening conditions. **Community Health Centers:** Serve diverse populations and focus on preventive care and health education. **In-Home Care: P**rovide basic patient care in the comfort of the patient's home for patients who have chronic conditions and are unable to leave their home.	**KCTCS Campuses** Medical Assisting | KCTCS **University Programs** Online Certified Clinical Medical Assistant (CCMA) (Voucher Included) from Eastern Kentucky University

Dental Assisting CIP 51.0601.01

This pathway prepares individuals to provide patient care, take dental radiographs (x-ray photographs), prepare patients and equipment for dental procedures, and discharge office administrative functions under the supervision of dentists and dental hygienists. It includes instruction in medical recordkeeping, general office duties, reception and patient intake, scheduling, equipment maintenance and sterilization, basic radiography, pre- and post-operative patient care and instruction, chairside assisting, taking tooth and mouth impressions, and supervised practice.

Career Choices	Aptitudes Needed	Common Work Environments	Postsecondary Opportunities in Kentucky
Dental Assistant: Assists dentists during procedures, takes X-rays, and manages patient records. **Orthodontic Assistant:** Specializes in assisting orthodontists with braces and other orthodontic treatments. **Oral Surgery Assistant:** Supports oral surgeons during surgical procedures. **Dental Office Manager:** Oversees the administrative operations of a dental practice. **Dental Sales Representative:** Promotes and sells dental products and equipment to dental practices. **Dental Laboratory Technician**: Creates dental prosthetics like crowns, bridges, and dentures	**Manual Dexterity:** Important for handling dental instruments and performing precise tasks. **Strong Communication Skills:** Essential for interacting with patients and dental professionals. **Attention to Detail:** Crucial for accurately recording patient information and following dental procedures. **Empathy and Compassion:** Vital for providing patient-centered care and making patients feel comfortable. **Organizational Skills:** Necessary for managing multiple tasks and maintaining a clean, efficient workspace. **Technical Proficiency:** Helpful for using dental equipment and technology. **Teamwork:** Important for collaborating effectively with the dental team. **Time Management:** Vital for balancing clinical duties and administrative tasks.	**Dental Offices:** The most typical setting, where assistants support dentists during procedures, manage patient records, and perform routine tasks. **Specialty Practices:** Such as orthodontic or pediatric dental offices, where assistants can develop expertise in specific areas of dental care. **Hospitals:** Assisting with oral surgeries and other dental procedures in a fast-paced environment. **Community Health Clinics:** Providing dental care to underserved populations and focusing on preventive care. **Dental Schools:** Supporting dental students and faculty in clinical settings. **Public Health Departments:** Working on community dental health initiatives and education programs.	**KCTCS Campuses** Dental Assisting | KCTCS **University Programs** UK-Dental Assisting | The College of Dentistry

EKG Technology/Technician CIP 51.0902.01

This pathway prepares individuals, under the supervision of physicians and nurses, to administer EKG (Electrocardiogram) and ECG (Electrocardiogram) diagnostic examinations and report results to the treatment team. Includes instruction in basic anatomy and physiology, the cardiovascular system, medical terminology, cardiovascular medications and effects, patient care, EKG (Electrocardiogram) and ECG (Electrocardiogram) administration, equipment operation and maintenance, interpretation of cardiac rhythm, patient record management, & professional standards

Career Choices	Aptitudes Needed	Common Work Environments	Postsecondary Opportunities in Kentucky
EKG Technician: Performs electrocardiograms to monitor and record the heart's electrical activity. **Cardiovascular Technician:** Assists with more advanced cardiovascular procedures, including stress tests and Holter monitoring. **Telemetry Technician:** Monitors patients' heart rhythms remotely, often in a hospital setting. **Cardiac Monitor Technician:** Specializes in observing and interpreting heart rhythms to detect abnormalities. **Medical Equipment Sales Representative:** Sells and provides training on EKG and other medical equipment. **Clinical Research Coordinator:** Manages clinical trials and research studies related to cardiovascular health.	**Attention to Detail:** Crucial for accurately performing and interpreting EKG tests. **Technical Proficiency:** Important for operating EKG machines and related equipment. **Strong Communication Skills:** Essential for explaining procedures to patients and collaborating with healthcare teams. **Empathy and Compassion:** Vital for providing patient-centered care and making patients feel comfortable during tests. **Problem-Solving Abilities:** Necessary for troubleshooting equipment issues and interpreting test results. **Organizational Skills:** Helpful for managing patient records and maintaining equipment. **Teamwork:** Important for working effectively with other healthcare professionals. **Time Management:** Vital for balancing multiple tasks and ensuring timely patient care.	**Hospitals**: Fast-paced and dynamic, hospitals provide exposure to a wide range of cardiac conditions and treatments. **Outpatient Clinics:** More structured and focused on non-emergency care, offering a predictable routine. **Cardiology Offices:** Specialize in heart-related care, allowing technicians to develop expertise in cardiovascular health. **Diagnostic Laboratories:** Focus on conducting and analyzing EKG tests and other diagnostic procedures. **Long-Term Care Facilities:** Provide ongoing monitoring and care for patients with chronic heart conditions. **Rehabilitation Centers:** Assist in monitoring heart health during physical rehabilitation programs.	**KCTCS Campuses** Electrocardiograph Technician - Certificate < KCTCS

Emergency Medical Technology/Technician CIP 51.0904.01

This pathway prepares individuals, under the remote supervision of physicians, to recognize, assess, and manage medical emergencies in prehospital settings and to supervise ambulance personnel. Includes instruction in introductory, intermediate, and advanced EMT procedures; emergency surgical procedures; medical triage; rescue operations; crisis scene management and personnel supervision; equipment operation and maintenance; patient stabilization, monitoring, and care; drug administration; identification and preliminary diagnosis of diseases and injuries; communication and computer operations; basic anatomy, physiology, pathology, and toxicology; and professional standards and regulations

(This pathway requires an agreement with the Kentucky Board of Emergency Medical Services)

Career Choices	Aptitudes Needed	Common Work Environments	Postsecondary Opportunities in Kentucky
Emergency Medical Technician (EMT): Provides immediate care and transport for patients in emergency situations. **Paramedic:** Offers advanced medical care and life-support in emergency settings. **Firefighter:** Combines firefighting duties with emergency medical services. Emergency Room Technician: Assists in hospital emergency departments, supporting doctors and nurses. **Ambulance Dispatcher:** Coordinates emergency response teams and manages communication. **Clinical Research Coordinator:** Manages clinical trials and research studies related to emergency medicine. **Medical Equipment Sales Representative:** Sells and provides training on emergency medical equipment.	**Strong Communication Skills:** Essential for effectively interacting with patients, families, and emergency response teams. **Physical Stamina:** Important for handling the physical demands of emergency care, including lifting and moving patients. **Calm Under Pressure:** Vital for making quick, accurate decisions in high-stress situations. **Problem-Solving Abilities:** Necessary for assessing patient conditions and determining appropriate care. **Empathy and Compassion:** Crucial for providing patient-centered care and offering emotional support. **Attention to Detail:** Important for accurately recording patient information and following medical protocols. **Teamwork:** Essential for collaborating effectively with other emergency responders. **Time Management:** Vital for balancing multiple tasks and ensuring timely patient care.	**Ambulance Services:** EMTs often operate ambulances, responding to 911 calls and providing emergency care on the scene and during transport. **Hospitals**: Some EMTs work in emergency departments, assisting with patient care and supporting medical staff. **Fire Departments:** Many EMTs are also firefighters, providing emergency medical services as part of their duties. **Private Event Services:** EMTs may provide medical coverage at concerts, sports events, and other large gatherings. **Industrial Sites:** EMTs can work in factories or construction sites, ready to respond to workplace injuries. **Remote and Rural Areas:** EMTs in these settings often work with volunteer fire departments or local emergency services.	**KCTCS Campuses** Emergency Medical Technician | KCTCS **University Programs** Bachelor of Science in Emergency Medical Care - Eastern Kentucky University Undergraduate Certificate in Emergency Management Disaster Sciences | Western Kentucky University EMS Education and Training Offerings | Louisville Ky | UofL Health

Medical Administrative Assisting CIP 51.0710.00

This pathway prepares individuals, under the supervision of office managers and other professionals, to perform routine administrative duties in a medical, clinical, or health care facility/system office environment. Includes instruction in general office skills, data processing, office equipment operation, principles of medical record-keeping and business regulations, medical/clinical office procedures, and communications skills.

Career Choices	Aptitudes Needed	Common Work Environments	Postsecondary Opportunities in Kentucky
Medical Administrative Assistant: Manages patient records, schedules appointments, and handles billing in clinics, doctors' offices, and outpatient centers. **Medical Office Coordinator:** Oversees daily operations, including patient scheduling, billing, and communication with insurance companies. **Hospital Unit Assistant:** Coordinates patient admissions, discharges, and interdepartmental communication in hospital settings. **Insurance Claims Assistant:** Processes claims, verifies coverage, and resolves reimbursement issues. **Patient Navigator:** Guides patients through the healthcare system, assisting with scheduling, treatment plans, and resource coordination. **Telehealth Medical Assistant:** Supports virtual consultations by coordinating appointments and managing digital health records.	**Strong Communication Skills**: Essential for interacting with patients, healthcare professionals, and insurance companies. **Organizational Skills:** Important for managing patient records, scheduling appointments, and handling billing tasks. **Attention to Detail:** Crucial for accurately recording patient information and processing insurance claims. **Technical Proficiency:** Helpful for using medical software and office equipment. **Customer Service Skills:** Vital for providing positive experience for patients and addressing their needs. **Problem-Solving Abilities:** Necessary for resolving scheduling conflicts and insurance issues. **Time Management:** Important for balancing multiple tasks and ensuring efficient office operations. **Empathy and Compassion:** Useful for providing patient-centered care and support.	**Doctor's Offices and Medical Clinics:** These are the most common settings, where assistants manage patient records, schedule appointments, and handle billing. **Hospitals:** Assistants in hospitals may work in various departments, coordinating patient admissions, discharges, and interdepartmental communication. **Outpatient Care Centers:** These facilities focus on non-emergency care, such as minor procedures and routine check-ups. Specialty Practices: Such as cardiology or dermatology offices, where assistants can develop expertise in specific medical fields. **Community Health Centers:** Serve diverse populations and focus on preventive care and health education. **Insurance Companies:** Assistants may work on processing claims and verifying coverage. **Telehealth Services:** Supporting virtual consultations by coordinating appointments and managing digital health records.	**KCTCS Campuses** Medical Administrative Assistant - Diploma < KCTCS **University Programs** Bachelor of Science in Health Care Administration - Eastern Kentucky University Bachelor of Science in Health Care Administration | Western Kentucky University

Patient Care Technician CIP 51.1614.00

This pathway prepares individuals for admission to a professional program in nursing. This pathway focuses on caring for patients in an acute care setting.

Career Choices	Aptitudes Needed	Common Work Environments	Postsecondary Opportunities in Kentucky
Patient Care Technician (PCT): Provides direct patient care, assists with daily activities, and monitors vital signs. **Nursing Assistant:** Supports nurses by helping with patient care tasks such as bathing, dressing, and feeding. **Phlebotomist:** Specializes in drawing blood for tests, transfusions, or donations. **Dialysis Technician:** Assists with dialysis treatments for patients with kidney failure. **Telemetry Technician:** Monitors patients' heart rhythms using EKG equipment. **Emergency Room Technician:** Works in emergency departments, providing immediate care and support. **Home Health Aide:** Provides in-home care for patients, helping with daily activities and medical needs.	**Empathy and Compassion:** Vital for providing patient-centered care and offering emotional support. **Strong Communication Skills:** Essential for interacting with patients, families, and healthcare professionals. **Attention to Detail:** Important for accurately recording patient information and following medical protocols. **Physical Stamina:** Necessary for handling the physical demands of patient care, including lifting and moving patients. **Problem-Solving Abilities:** Useful for addressing patient needs and handling unexpected situations. **Technical Proficiency:** Helpful for using medical equipment and technology. **Teamwork:** Crucial for collaborating effectively with healthcare teams. **Time Management:** Important for balancing multiple tasks and ensuring timely patient care.	**Hospitals:** Fast-paced and dynamic, hospitals provide exposure to a wide range of medical conditions and treatments. **Nursing Homes and Long-Term Care Facilities**: Focus on providing ongoing care and support to elderly and chronically ill patients. **Outpatient Clinics:** Offer more structured and routine care for patients who do not require overnight stays. **Rehabilitation Centers:** Assist patients recovering from surgeries or injuries, focusing on physical therapy and rehabilitation. **Home Healthcare:** Provide home care for patients, helping with daily activities and medical needs. **Dialysis Centers:** Specialize in assisting patients undergoing dialysis treatments for kidney failure.	**KCTCS Campuses** Online Patient Care Technician (Voucher Included) from Gateway Community and Technical College

Pharmacy Technician CIP 51.0805.01

Under pharmacists' supervision, this pathway prepares individuals to prepare medications, provide patients with related assistance, and manage pharmacy, clinical and business operations. Includes instruction in medical and pharmaceutical terminology, principles of pharmacology and pharmaceutics, drug identification, pharmacy laboratory procedures, prescription interpretation, patient communication and education, safety procedures, record-keeping, measurement and testing techniques, pharmacy business operations, prescription preparation, logistics and dispensing operations, and applicable standards and regulations.

Career Choices	Aptitudes Needed	Common Work Environments	Postsecondary Opportunities in Kentucky
Pharmacy Technician: Assists pharmacists in dispensing medications and providing customer service in retail or hospital pharmacies. **Lead Pharmacy Technician:** Oversees other pharmacy technicians and manages workflow in a pharmacy setting. **Pharmacy Supervisor:** Manages the daily operations of a pharmacy, including staff supervision and inventory management. **Pharmacy Informatics Specialist:** Focuses on the use of technology and data to improve pharmacy operations and patient care. **Medication Therapy Management Specialist:** Works with patients to optimize their medication regimens and improve health outcomes. **Pharmaceutical Sales Representative:** Promotes and sells medications and medical products to healthcare providers. **Compounding Pharmacy Technician:** Specializes in preparing customized medications for patients.	**Attention to Detail:** Crucial for accurately dispensing medications and managing prescriptions. **Strong Communication Skills:** Essential for interacting with pharmacists, healthcare providers, and customers. **Organizational Skills:** Important for managing inventory, maintaining records, and ensuring efficient pharmacy operations. **Technical Proficiency:** Helpful for using pharmacy software and equipment. **Customer Service Skills:** Vital for providing a positive experience for patients and addressing their needs. **Problem-Solving Abilities:** Necessary for resolving prescription issues and handling insurance queries. **Mathematical Skills:** Important for calculating dosages and preparing medications. **Teamwork:** Crucial for collaborating effectively with pharmacy staff and healthcare teams.	**Retail Pharmacies:** Such as those found in drugstores or grocery stores, where technicians assist with dispensing medications and providing customer service. **Hospitals:** Involves preparing and distributing medications, often requiring more advanced skills like compounding sterile medications. **Long-Term Care Facilities:** Provide medications and support for residents in nursing homes and assisted living facilities. **Mail-Order Pharmacies:** Focus on processing and shipping prescriptions to patients, often involving large-scale operations. **Pharmaceutical Companies:** Work in research and development, quality control, or sales. **Government Agencies:** Such as the Department of Veterans Affairs, providing medications to veterans. **Educational Institutions:** Supporting pharmacy education programs and training future pharmacy technicians.	**KCTCS Campuses** Pharmacy Technology | KCTCS

Phlebotomy Technician CIP 51.1009.01

This pathway prepares individuals, under the supervision of health care professionals, to draw blood samples from patients using a variety of intrusive procedures. Includes instruction in basic vascular anatomy and physiology, blood physiology, skin puncture techniques, venipuncture, venous specimen collection and handling, safety and sanitation procedures, and applicable standards and regulations.

Career Choices	Aptitudes Needed	Common Work Environments	Postsecondary Opportunities in Kentucky
Hospital Phlebotomist: Work in hospitals drawing blood from patients for tests, transfusions, research, or donations. **Medical Laboratory Technician:** Collect and process blood samples in medical labs, often working closely with other healthcare professionals. **Blood Donation Technician:** Work at blood donation centers or mobile blood drives. **Private Practice:** Work in larger private clinics or practices. **Research Lab:** Collect and process blood samples for research purposes in university or private research labs. **Traveling Phlebotomist:** Travel to different locations, such as nursing homes or patients' homes. **Phlebotomy Supervisor:** With experience, you can move into supervisory roles, overseeing other phlebotomists. **Phlebotomy Specialist:** Specialize in areas like pediatric phlebotomy or donor phlebotomy.	**Organizational Skills:** Keeping track of samples, patient information, and maintaining a clean workspace are important aspects of the job. **Manual Dexterity:** Steady hands and good hand-eye coordination are essential for performing venipunctures accurately. **Communication Skills:** Clear communication helps in explaining procedures to patients. **Empathy and Patience:** Being empathetic and patient helps in dealing with nervous or difficult patients, making the process smoother for everyone involved. **Basic Science Knowledge:** Understanding basic biology and anatomy can be very helpful in grasping the concepts taught in the program. **Physical Stamina:** The job often requires standing for long periods and sometimes working in fast-paced environments. **Problem-Solving Skills:** Being able to think quickly and handle unexpected situations, such as difficult veins or patient reactions, is important.	**Hospitals:** Fast Paced and High-Pressure: Hospitals are busy environments. **Clinical Laboratories:** Structured and Detail-Oriented: In labs, the focus is on precision and accuracy. **Blood Donation Centers:** Community-Focused and Supportive: These centers have a more relaxed atmosphere compared to hospitals. **Doctor's Offices and Clinics:** Personalized and Patient-Centric: Smaller settings like clinics allow you to build closer relationships with patients. **Outpatient and Long-Term Care Facilities:** Patient-Focused and Compassionate: These facilities often cater to specific patient groups, such as the elderly or those with chronic conditions. **Home Health Services:** Independent and Flexible: Some travel to patients' homes and provide services. This role requires excellent time management and interpersonal skills.	**KCTCS Campuses** Phlebotomist - Certificate < KCTCS Phlebotomy for the Health Care Worker - Certificate < KCTCS

Pre-Nursing CIP 51.2699.01

This pathway prepares individuals for admission to a professional program in nursing. This pathway focuses on caring for residents in a long-term care facility.

Career Choices	Aptitudes Needed	Common Work Environments	Postsecondary Opportunities in Kentucky
Registered Nurse (RN): After completing a nursing degree, you can work in hospitals, clinics, schools, and other healthcare settings. **Licensed Practical Nurse:** With additional training, you can become an LPN, working under the supervision of RNs and doctors to provide basic nursing care. **Certified Nursing Assistant:** A CNA certification allows you to assist patients with daily activities and provide basic care. **Medical Assistant:** You can work in clinics and doctors' offices, performing both administrative and clinical tasks. **Healthcare Administrator:** With further education, you can move into administrative roles. **Nurse Educator:** After further education and gaining experience, you can teach and train future nurses in academic or clinical settings. **Public Health Nurse:** Focus on community health, working with populations to improve health outcomes.	**Science & Math Skills:** A solid understanding of biology, chemistry, and anatomy. Basic math skills are important for proper calculations. **Critical Thinking:** The ability to analyze situations, make decisions, and solve problems. **Communication Skills:** Clear communication is vital for interacting with patients and healthcare teams. **Empathy:** A genuine concern for others and the ability to empathize. **Attention to Detail:** Precision is important in administering medications, recording patient information, and following medical protocols. **Physical Stamina:** Nursing can be physically demanding, requiring long hours on your feet and the ability to assist patients with mobility. **Time Management:** Efficiently managing time and prioritizing tasks. **Teamwork & Adaptability:** The ability to work well with others & being flexible and able to adapt to changing situations.	**Hospitals:** Fast Paced and High-Pressure: Hospitals are busy environments. **Clinical Laboratories:** Structured and Detail-Oriented: In labs, the focus is on precision and accuracy. **Doctor's Offices and Clinics:** Personalized and Patient-Centric: Smaller settings like clinics allow you to build closer relationships with patients. **Outpatient and Long-Term Care Facilities:** Patient-Focused and Compassionate: These facilities often cater to specific patient groups, such as the elderly or those with chronic conditions. **Home Health Services:** Independent and Flexible: Some travel to patients' homes and provide services. This role requires excellent time management and interpersonal skills.	**KCTCS Campuses** Nursing | KCTCS **University Programs** UK-College of Nursing School of Nursing: Northern Kentucky University School of Nursing and Allied Health | Western Kentucky University Nursing | Morehead State University | Kentucky Nursing | Bellarmine University

Veterinary Assistant CIP 51.0808.00

Under the supervision of veterinarians, veterinary technicians, laboratory animal specialists, and zoological professionals, this pathway prepares individuals to provide patient management, care, clinical procedures assistance, and owner communication. Includes instruction in animal nursing care, animal health and nutrition, animal handling, clinical pathology, radiology, surgical assisting, clinical laboratory procedures, office administration skills, patient and owner management, and applicable standards and regulations.

Career Choices	Aptitudes Needed	Common Work Environments	Postsecondary Opportunities in Kentucky
Veterinary Assistant: Work in veterinary clinics or hospitals, assisting veterinarians with patient care administrative tasks. **Veterinary Technician:** With additional education and training, you can advance to a veterinary technician role, performing more complex tasks. **Specialized Veterinary Assistant:** Focus on specific types of animals, such as exotic pets, large animals, or aquatic species. **Veterinary Receptionist:** Manage appointments, handle client inquiries, and maintain the administrative aspects of a veterinary practice. **Animal Shelter or Rescue Worker:** Work in animal shelters or rescue organizations, caring for rescued animals. **Laboratory Animal Care Technician:** Ensure the ethical treatment and well-being of animals used in scientific research.	**Strong Academic Skills:** A solid understanding of biology, chemistry, and anatomy. Basic math skills are also important for various calculations. **Attention to Detail:** Precision is essential when administering medications, recording information, and performing tests. **Manual Dexterity:** Good hand-eye coordination and steady hands are important for a variety of detailed tasks. **Communication Skills:** Clear communication is vital for interacting with veterinarians, pet owners, and colleagues. **Empathy and Compassion:** A genuine concern for animals and the ability to empathize. **Physical Stamina:** The job can be physically demanding, requiring long hours on your feet and some physical exertion. **Problem-Solving Skills:** The ability to think quickly and handle unexpected situations.	**Fast-Paced and High-Pressure:** In veterinary clinics, animal hospitals, and emergency care facilities, the work environment is often fast-paced and can be high-pressure, especially during emergencies. **Physically Demanding:** Veterinary assisting is physically demanding, involving tasks like lifting animals, cleaning, and standing for long periods. **Emotionally Challenging:** Working with sick or injured animals and dealing with distressed pet owners can be emotionally taxing. **Collaborative:** Veterinary assistants often work as part of a team, collaborating with veterinarians, veterinary technicians, and other staff. **Structured and Routine-Based:** Many tasks are routine and follow strict protocols. **Varied and Dynamic:** In settings like mobile veterinary services or wildlife parks, the work can be more varied and dynamic.	**KCTCS Campuses** Veterinary Technology | KCTCS **University Programs** Veterinary Technology, B.S. | Morehead State University | Kentucky

JROTC

JROTC CAREER PATHWAYS

Career Choices	Aptitudes Needed	Common Work Environments	Postsecondary Opportunities in Kentucky
Military Officer (Army, Navy, Air Force, Marines, Coast Guard): As an officer, you'll lead Soldiers, Sailors, Airmen, or Marines, manage resources, and oversee operations. JROTC provides leadership and discipline, making the transition to an officer role smoother. **Military Non-Commissioned Officer (NCO):** NCOs provide leadership at the operational level, ensuring Soldiers are trained, equipped, and ready for tasks. They serve as mentors to junior ranking enlisted personnel. **Combat Engineer**: These specialists are responsible for constructing and maintaining military infrastructure like bridges, roads, and fortifications. They also assist in demolitions and mine clearance. **Military Police:** Military police officers ensure discipline within the armed forces, manage base security, investigate crimes, and enforce laws on military installations. **Logistics Officer/Non-Commissioned Officer:** In logistics, you'll plan and oversee the transportation of supplies, equipment, and personnel. It's a vital role in ensuring military operations run smoothly. **Aviation Technician (Air Force or Army):** Aviation techs maintain and repair aircraft, ensuring that military planes and helicopters are operational. **Firefighter:** Firefighters protect lives and property from fire, as well as responding to emergencies. Leadership skills and physical fitness gained in JROTC can be beneficial in this career.	**Discipline and Self-Motivation:** The ability to follow rules, maintain a routine, and stay motivated **Physical Fitness**: A good level of physical fitness is important as JROTC involves physical training and activities. **Leadership Skills**: Being able to lead and work well with others is a core component of JROTC. **Teamwork and Collaboration:** Working effectively as part of a team is essential. **Communication Skills:** Clear and effective communication, both verbal and written. **Problem-Solving:** The ability to think critically and solve problems is highly valued. **Respect for Authority:** Understanding and respecting the chain of command is fundamental**.** **Time Management:** Balancing JROTC commitments with academic responsibilities requires good time management skills.	**BASE or GARRISON LIFE:** **Housing:** Officers and enlisted personnel often live on base, with housing ranging from single-family homes to apartment-style accommodations. **Work Facilities:** Bases are equipped with training facilities, administrative buildings, and specialized units for different branches of service. **Support Services:** These include medical and dental clinics, childcare centers, schools, and recreation facilities. **FIELD OPPERATIONS:** **Training Exercises:** These are conducted in remote or rugged terrain to simulate real-world scenarios, testing physical and mental endurance. **Deployment:** Military personnel may be deployed worldwide for peacekeeping missions or combat operations, often in unpredictable conditions. **Remote Locations:** Field operations can take place in areas with limited access to modern amenities, requiring self-sufficiency and adaptability. **OFFICE-BASED ROLES:** **Administrative Tasks:** Some military roles involve working in an office environment, handling logistics, supply chain management, and other administrative duties. **Technical Roles**: These include engineering, communications, and intelligence work, often	**ROTC Programs in Kentucky** Army ROTC | University of Kentucky ROTC Air Force-University of Kentucky Army ROTC-U of L Air Force ROTC-U of L Army ROTC - Eastern Kentucky University. Air Force ROTC-Eastern Kentucky University Military Science | Western Kentucky University Military Science | Morehead State University | Kentucky Military Science (ROTC) | Murray State ROTC: Northern Kentucky University

Police Officer: Police officers maintain law and order, protect citizens, and investigate crimes. JROTC teaches discipline, leadership, and teamwork that are useful in law enforcement. **Emergency Medical Technician (EMT) / Paramedic:** EMTs and paramedics respond to medical emergencies, providing life-saving care on the scene and during transport to medical facilities. **Public Safety Officer:** These officers work for city or state agencies to ensure community safety. They often combine aspects of police and firefighter duties, responding to various public safety needs. **Border Patrol Agent:** These agents monitor and secure the borders of the country to prevent illegal immigration and the trafficking of goods. Leadership and discipline from JROTC are valuable in this role.		requiring specialized skills and training. **DEPLOYMENT TO HOSTILE ENVIROMENTS:** **Combat Zones:** Personnel may be deployed to combat zones, facing high stress and hazardous conditions. **Peacekeeping Missions:** These deployments can involve working in conflict areas to maintain peace and security.	

LAW & PUBLIC SAFETY

Fire Science/Firefighting CIP 43.0203.00

Upon completing the fire science pathway, students will possess knowledge and skills to increase employability/advancement in the fire service. Topics and subjects covered are related to many job performance requirements found in NFPA 1001, Standard for Firefighter Professional Qualifications, Firefighter I level and NFPA 1072, Hazardous Materials Response Personnel Professional Qualifications, Awareness and Operations Levels. Basic First Aid, CPR, and proper utilization of an AED will also be covered in the scope of this pathway.

Career Choices	Aptitudes Needed	Common Work Environments	Postsecondary Opportunities in Kentucky
Firefighter: Respond to emergencies, extinguish fires, and rescue operations. **Fire Inspector:** Examine buildings to ensure they comply with fire codes and investigate the causes of fires. **Fire Investigator:** Determine the origin and cause of fires, often working closely with law enforcement. **Fire Services Administrator:** Manage fire departments, oversee budgets, and develop policies and procedures. **Wildland Firefighter:** Combat wildfires and work on fire prevention in forests and wildlands. **Fire Engineer:** Design and implement fire protection systems and safety measures in buildings. **Emergency Medical Technician (EMT):** Provide medical care in emergency situations, often as part of a fire department. **Hazardous Materials Specialist:** Handle and manage hazardous materials, ensuring safety and compliance.	**Physical Fitness:** Physical health and fitness are crucial in particular strength, endurance, and agility. **Problem-Solving Skills:** The ability to think quickly and solve problems under pressure is essential. **Communication Skills:** Clear and effective communication is vital for coordinating with team members and providing clear instructions. **Teamwork:** Being able to work well with others and understand the importance of each team member's role. **Technical Knowledge:** A basic understanding of science, particularly physics and chemistry. **Attention to Detail:** Being detail-oriented helps in following safety protocols and ensuring that all equipment is properly maintained and used. **Emotional Resilience:** The ability to stay calm and composed in stressful situations. **Commitment to Learning:** Ability to adapt to new techniques, technologies, and safety procedures.	**High Stress Levels:** Firefighting is inherently stressful due to the nature of emergencies and the need to make quick, life-saving decisions. **Team-Oriented Environment:** Firefighters work closely with their team members. Strong camaraderie and trust are essential. **Irregular Hours:** Firefighters typically work long and irregular hours, including 24-hour shifts followed by 48 or 72 hours off. **Physical Demands:** The job is physically demanding, requiring firefighters to be in excellent shape. **Exposure to Hazards:** Firefighters are exposed to various hazards, including fire, smoke, hazardous materials, and structural collapses. **Variety of Tasks:** The work is diverse and can change rapidly. Firefighters might respond to fires, medical emergencies, etc. **Sense of Purpose:** Despite the challenges, many firefighters find the work highly rewarding.	**KCTCS Campuses** Fire Science Technology | KCTCS CPAT | KCTCS **Kentucky Universities** Bachelor of Science in Fire Protection & Safety Engineering Technology - Eastern Kentucky University

Law Enforcement Services CIP 43.0107.00

Students participating in this pathway will learn the basics of our criminal justice system. They will explore our U.S. Constitution and see how it protects citizens and guides law enforcement. Students will also have opportunities to learn crime scene processing, apply criminal law, lead an investigation, dispatch service calls, provide primary emergency medical care and respond to disasters. Students are prepared for careers in law, law enforcement, homeland security, corrections, federal agencies, investigations, forensics, emergency services and similar fields.

Career Choices	Aptitudes Needed	Common Work Environments	Postsecondary Opportunities in Kentucky
Police Officer: Enforcing laws, responding to emergencies, and protecting the community. **Detective/Criminal Investigator:** Investigating crimes, gathering evidence, and solving cases. **Federal Agent:** Working for agencies like the FBI, DEA, or ATF, handling federal crimes and investigations. **Corrections Officer:** Supervising inmates in jails and prisons, ensuring security and order. **Probation/Parole Officer:** Monitoring and assisting individuals on probation or parole to prevent reoffending. **Forensic Science Technician:** Collecting and analyzing physical evidence from crime scenes. **Fish and Game Warden:** Enforcing laws related to wildlife, hunting, and fishing. **Border Patrol Agent:** Securing national borders and preventing illegal entry. **Bailiff:** Maintaining order in courtrooms and assisting judges.	**Critical Thinking:** The ability to analyze situations, make quick decisions, and solve problems. **Communication Skills:** Strong verbal and written communication skills are essential. **Physical Fitness:** Law enforcement officers need to be in good physical condition to manage the physical demands of the job. **Attention to Detail:** Being detail-oriented helps in accurately documenting incidents, gathering evidence, and following procedures. **Ethical Judgment:** A strong sense of ethics and integrity is vital for making fair and just decisions. **Empathy and Interpersonal Skills:** The ability to understand and relate to people from diverse backgrounds is important. **Stress Management:** The ability to remain calm and composed under pressure. **Teamwork:** Being able to work well with others and understand the importance of each team member's role.	**High Stress Levels:** Law enforcement officers often face high-stress situations, including emergencies, confrontations, de-escalation of situations, and community policing. **Team-Oriented Environment:** Officers work closely with their colleagues, relying on teamwork and strong camaraderie. **Irregular Hours:** Law enforcement jobs often involve working irregular hours, including nights, weekends, and holidays. Shift work is common. **Exposure to Hazards:** Officers are frequently exposed to various hazards, including physical danger, hazardous materials, and stressful situations. **Variety of Tasks:** The job involves a wide range of tasks, from patrolling neighborhoods and responding to emergencies to conducting investigations. **Emotional Resilience:** The ability to handle traumatic and emotionally charged situations is important. **Sense of Purpose**: Despite the challenges, many officers find the work highly rewarding.	**KCTCS Campuses** Criminal Justice | KCTCS Physical Agility Test Prep - Kentucky Justice & Public Safety Cabinet **Universities in Kentucky** Bachelor of Science in Criminal Justice - Eastern Kentucky University Criminal Justice (BS) | University of Louisville Criminology | Western Kentucky University Criminal Justice: Northern Kentucky University

Pre-Law Studies CIP 22.0001.00

Students will obtain skills in preparation for legal careers in private law firms, public law offices, courtrooms, mediation, and businesses. Instruction will cover legal vocabulary and writing, ethics, crimes, constitutional rights, the trial process, legal standards in investigations, effective and persuasive communication (oral and written), case and trial preparation, and the state and federal court systems.

Career Choices	Aptitudes Needed	Common Work Environments	Postsecondary Opportunities in Kentucky
Paralegal/Legal Assistant: Assisting lawyers by conducting research, drafting documents, and organizing case files. **Victim Advocate:** Providing support and resources to victims of crime, helping them navigate the legal system. **Human Resources Specialist:** Ensuring compliance with labor laws and handling employee relations. **Compliance Officer:** Ensuring that organizations adhere to laws and regulations, often within corporate settings. **Legislative Assistant:** Working with legislators to research, draft, and analyze legislation. **Court Clerk:** Managing administrative tasks in courtrooms, including maintaining records and assisting judges. **Mediator:** Facilitating negotiations and conflict resolution between parties outside of the courtroom. **Policy Analyst:** Researching and analyzing policies, often for government agencies or think tanks.	**Critical Thinking:** The ability to analyze complex issues, evaluate arguments, and think logically. **Strong Writing Skills:** Clear and effective writing is essential for drafting legal documents, essays, and research papers. **Reading Comprehension:** Law involves a lot of reading, including statutes, case law, and legal texts. **Research Skills:** Proficiency in conducting thorough and efficient research. **Public Speaking:** Confidence and clarity in public speaking are important. **Attention to Detail:** Being detail-oriented helps in understanding the nuances of legal texts. **Ethical Judgment:** A strong sense of ethics and integrity is crucial for making fair and just decisions. **Time Management**: The ability to manage time effectively. **Interpersonal Skills:** Good interpersonal skills are essential for working with peers, professors, and eventually clients.	**High Stress Levels**: Legal professionals often face high-pressure situations, tight deadlines, and significant responsibilities. **Detail-Oriented Work:** Lawyers and paralegals must pay close attention to detail, as accuracy is crucial. **Collaborative Environment:** Legal work often involves collaboration with colleagues, clients, and other professionals. **Long Hours:** Many legal professionals work long hours, including evenings and weekends. **Office Setting:** Most legal work is conducted in office environments **Professionalism and Confidentiality:** Maintaining a high level of professionalism and discretion is essential **Variety of Tasks:** The job involves a wide range of tasks, from legal research and drafting documents to client meetings and court appearances. **Ethical Standards:** Upholding ethical standards and professional conduct is crucial in the legal field.	**KCTCS Campuses** Paralegal Technology | KCTCS **Universities in Kentucky** Pre-Law-University of Kentucky Pre-Law Advising — University of Louisville Pre-Law, Minor < Eastern Kentucky University Pre-Law: Northern Kentucky University Legal Studies, B.A. | Morehead State University | Kentucky Note: Schools of Law accept a variety of undergraduate degrees other than pre-law. Here are some of the most common and beneficial majors for aspiring law students: • History • Business • Political Science • English • Philosophy • Economics These majors are just a few examples, and law schools value a diverse range of academic backgrounds. Further investigation by the student into a specific School of Law is suggested to understand entrance requirements specific to the institution.

MANUFACTURING TECHNOLOGY

Architectural Technology CIP 15.1301.03

Architectural technology utilizes mathematical and scientific principles to draw building layouts, including structural, HVAC, lighting, plumbing and electrical systems, while addressing functionality, safety and economic issues. Architectural drafters must be able to draw designs manually and through computer-aided drafting (CAD). Additional concerns are site considerations

Career Choices	Aptitudes Needed	Common Work Environments	Postsecondary Opportunities in Kentucky
Architectural Technologist: Working with architects to develop detailed construction drawings. **Drafter/CAD Technician:** Creating technical drawings and plans using (CAD) software. **Building Inspector:** Ensuring that construction projects comply with building codes and regulations. **Construction Manager:** Overseeing construction projects from start to finish. **Project Manager:** Coordinating all aspects of a construction project, including planning, budgeting, and scheduling. **Estimator:** Calculating the costs of construction projects, including materials, labor, and equipment. **Interior Designer:** Designing and planning the interiors of buildings, focusing on aesthetics and functionality. **Urban Planner:** Developing plans and programs for land use in urban areas.	**Technical Skills:** A strong foundation in mathematics, particularly geometry and algebra. **Computer Skills:** Proficiency in computer-aided design (CAD) software and other architectural tools is essential. **Attention to Detail:** Being detail-oriented helps in creating accurate and precise architectural drawings and plans. **Creativity:** A creative mindset is important for designing innovative and aesthetically pleasing structures. **Problem-Solving Skills:** The ability to analyze problems and develop effective solutions is crucial. **Spatial Awareness:** A good sense of spatial relationships and the ability to visualize three-dimensional structures from two-dimensional plans is important. **Communication Skills:** Strong verbal and written communication skills are essential.	**Office Environment:** Most architectural technologists work in office settings, often within architectural firms, engineering companies, or construction firms. **Collaborative Atmosphere:** Architectural technologists frequently collaborate with architects, engineers, contractors, and clients. **Detail-Oriented Work:** Attention to detail is crucial in this field. Architectural technologists must ensure accuracy to avoid mistakes. **Project-Based Work:** The work is often project-based, meaning that technologists may work on multiple projects simultaneously. **Site Visits**: While much of the work is office-based, architectural technologists also conduct site visits to monitor construction. **Creative Problem-Solving:** The job involves a significant amount of creative problem-solving, as technologists must find innovative solutions to design challenges.	**KCTCS Campuses** Architectural Technology | BCTC **Universities in Kentucky** Architecture Bachelors-University of Kentucky College of Design WKU Architectural Science | Western Kentucky University

Civil Designer CIP 15.1301.01

Civil Designers apply technical knowledge and skills to develop working drawings and electronic simulations in support of civil engineers, geological engineers, and related professionals. This pathway includes instruction in basic civil engineering principles, geological and seismographic mapping, machine drafting, computer-aided drafting (CAD), pipe drafting, survey interpretation, and blueprint reading.

Career Choices	Aptitudes Needed	Common Work Environments	Postsecondary Opportunities in Kentucky
Civil Designer: Focuses on creating detailed plans and technical drawings for infrastructure projects like roads, bridges, and water systems using CAD software. **CAD Technician:** Uses computer-aided design software to plan and review project designs, ensuring they meet building code specifications. **Surveyor:** Measures and notes property boundaries and locations to determine building site specifications. **Building Engineer:** Provides maintenance and repair services for buildings, ensuring compliance with local fire and building codes. **Water Hygiene Engineer:** Works in water or wastewater treatment plants to oversee system operations and proper treatment protocols.	**Mathematics Proficiency:** Strong understanding of algebra, geometry, trigonometry, and calculus. **Science Knowledge:** Basic knowledge of physics and chemistry, especially related to materials and forces. **Computer Skills:** Familiarity with computer-aided design (CAD) software and basic programming. **Attention to Detail:** Precision in measurements and designs is crucial. **Problem Solving:** Ability to analyze problems and develop practical solutions. **Creativity:** Innovative thinking for designing efficient and effective structures. **Basic Engineering Principles:** Understanding of fundamental engineering concepts. **Communication Skills:** Ability to clearly convey ideas and collaborate with others. **Teamwork:** Civil design often involves working in teams, so being able to collaborate effectively is important.	**Office Environment** **Design and Planning:** Much of a civil designer's work involves creating detailed plans and designs using computer-aided design (CAD) software. This is typically done in an office setting. **Project Management:** Managing project timelines, budgets, and coordinating with other professionals. **Site Visits:** Civil designers frequently visit construction sites to inspect progress, ensure compliance with design specifications, and address any on-site issues. **Environmental Assessments**: For projects involving environmental considerations, civil designers may conduct field assessments to evaluate the impact on natural habitats and other factors. **Client Interaction:** Regular meetings with clients, government agencies, and community stakeholders to discuss project requirements and provide updates. **Adaptability:** The work environment can be dynamic, requiring adaptability to changing weather conditions, tight deadlines, etc.	**KCTCS Campuses** Civil Engineering Technology | KCTCS **Universities in Kentucky** UK - Civil Engineering U of L-Civil & Environmental Engineering Civil Engineering, Bachelor of Science Western Kentucky University Civil Engineering Degree Program at Murray State University

Mechanical Designer CIP 15.1301.02

Mechanical designers have a working knowledge of mechanical parts and computer-aided design (CAD) software, such as AutoCAD and SolidWorks. Mechanical designers work with project managers, engineers, and clients to understand the needs and requirements for a new product or mechanical system. Once materials and specifications have been determined, designers begin using CAD software to plan and develop models.

Career Choices	Aptitudes Needed	Common Work Environments	Postsecondary Opportunities in Kentucky
Mechanical Drafter: Prepare detailed working diagrams of machinery and mechanical devices. **Mechanical Engineering Technician:** Apply theory and principles of mechanical engineering to modify, develop, test, or adjust machinery. **Industrial Engineering Technician:** Apply engineering theory and principles to problems of industrial layout or manufacturing. **Electro-Mechanical Technician:** Operate, test, maintain, or adjust unmanned, automated, servomechanical, or electromechanical equipment. **CAD Technician:** Use computer-aided design (CAD) software to create detailed technical drawings and plans. **Maintenance Engineer:** Ensure that industrial machinery and equipment run efficiently by performing regular maintenance and repairs. **Quality Control Inspector:** Inspect, test, sort, sample, or weigh nonagricultural raw materials or processed, machined, fabricated, or assembled parts or products for defects.	**Mathematical Skills**: A strong foundation in mathematics, particularly in algebra, geometry, and trigonometry. **Analytical Thinking**: The ability to analyze complex problems, break them down into manageable parts, and develop logical solutions. **Attention to Detail:** Precision is vital in mechanical design to ensure that all components fit and function correctly. **Creativity:** Innovative thinking and creativity are important for designing new products and improving existing ones. **Technical Skills:** Familiarity with computer-aided design (CAD) software and other technical tools used in mechanical design is beneficial. **Communication Skills:** Effective communication, both written and verbal, is necessary for collaborating with team members. **Problem-Solving:** The ability to identify problems, troubleshoot issues, and find effective solutions is a key aptitude for success in mechanical design.	**Office Settings:** This is where most of the design work happens. Mechanical designers use advanced software to create and test their designs. **Research and Testing Labs:** In these labs, designers can turn their concepts into reality by experimenting with materials and testing prototypes. **Manufacturing Floors:** Mechanical designers may spend time on the manufacturing floor to oversee the production of their designs. **Field Assignments:** Some projects require designers to be on-site where their designs are being used. **Remote and Hybrid Roles:** With the rise of digital tools, many mechanical designers now have the flexibility to work remotely. **Team Collaboration:** Regardless of the setting, collaboration is key. Mechanical designers often work in multidisciplinary teams, requiring effective communication and coordination.	**KCTCS Campuses** Computer Aided Drafting and Design | KCTCS **University Programs** UK-Mechanical Engineering | Stanley and Karen Pigman College Mechanical Engineering (dept) - J.B. Speed School of Engineering - University of Louisville Mechanical Engineering | Western Kentucky University Program: Mechanical and Manufacturing Engineering Technology, B.S. - Northern Kentucky University Department of Engineering & Technology - Eastern Kentucky University Mechanical Engineering Degree | Murray State University

Computer Numerical Control (CNC) Operator CIP 48.0503.04

CNC operators monitor and operate CNC (computer numerically controlled) machines to cut metal and plastic parts for the manufacturing industry. They select and download CNC programs and perform test operations to ensure the product is made to specifications. The CNC operator may select and set all tools required to produce the final precision part to customer specifications.

Career Choices	Aptitudes Needed	Common Work Environments	Postsecondary Opportunities in Kentucky
CNC Machine Operator: Operates CNC machines to produce parts and components according to specifications. **CNC Machinist:** Sets up, operates, and maintains CNC machines, ensuring precision and quality in the manufacturing process. **CNC Programmer:** Writes and tests programs for CNC machines, translating design specifications into machine instructions. **Tool and Die Maker:** Designs and constructs precision tools, dies, and fixtures used in manufacturing. **Manufacturing Engineer:** Develops and improves manufacturing processes, often involving CNC technology. **Process Engineer:** Focuses on optimizing manufacturing processes, including the use of CNC machines. **Field Service Technician:** Installs, maintains, and repairs CNC machines at various locations. **Quality Control Inspector:** Ensures that manufactured parts meet quality standards and specifications.	**Mathematical Skills:** A strong foundation in mathematics, particularly in geometry, algebra, and trigonometry, is essential. **Technical Aptitude:** An interest in and understanding of how machines and tools work and the ability to read and interpret technical drawings and blueprints. **Attention to Detail:** Precision is crucial in CNC work. Students should be meticulous and able to focus on detailed tasks. **Problem-Solving:** The ability to troubleshoot and solve problems that arise during the machining process. **Computer Skills:** Familiarity with computer operations and software. **Mechanical Skills**: Hands-on experience with tools and machinery and an understanding of mechanics & how machines operate. **Spatial Awareness:** The ability to visualize and understand the spatial relationships between objects. **Manual Dexterity:** Good hand-eye coordination and the ability to handle tools with precision.	**Manufacturing Plants:** CNC professionals often work in large manufacturing facilities. These environments can be fast-paced and require attention to detail. **Machine Shops:** Smaller machine shops provide a more intimate setting for CNC operators. **Research and Development Labs:** In R&D labs, CNC professionals work on developing new machining techniques and improving existing processes. **Educational Institutions:** Some CNC professionals work in educational settings, teaching students about CNC technology and machining processes. **Field Service:** Field service technicians travel to different locations to install, maintain, and repair CNC machines. **Quality Control Departments**: In quality control, CNC professionals ensure that manufactured parts meet specified standards. **Prototyping Shops:** These shops focus on creating prototypes for new products.	**KCTCS Campuses** Computerized Manufacturing and Machining | KCTCS

Machinist Operator CIP 48.0503.02

Machine operators are responsible for producing precision machined parts. They measure parts with precision tools to ensure certain parts meet pre-determined quality and cosmetic standards. When parts have passed inspection, the parts go on to the next production phase. Machine operators are expected to meet production quotas. The level of documentation required varies, depending on the degree of precision needed for the finished product. Machine operators also need to keep track of the number of units that are scrapped due to various errors

Career Choices	Aptitudes Needed	Common Work Environments	Postsecondary Opportunities in Kentucky
CNC Machine Operator: Operates CNC machines to produce parts and components according to specifications. **CNC Machinist:** Sets up, operates, and maintains CNC machines, ensuring precision and quality in the manufacturing process. **CNC Programmer:** Writes and tests programs for CNC machines, translating design specifications into machine instructions. **Tool and Die Maker:** Designs and constructs precision tools, dies, and fixtures used in manufacturing. **Manufacturing Engineer:** Develops and improves manufacturing processes, often involving CNC technology. **Process Engineer:** Focuses on optimizing manufacturing processes, including the use of CNC machines. **Field Service Technician:** Installs, maintains, and repairs CNC machines at various locations. **Quality Control Inspector:** Ensures that manufactured parts meet quality standards and specifications.	**Mathematical Skills:** A strong foundation in mathematics, particularly in geometry, algebra, and trigonometry, is essential. **Technical Aptitude:** An interest in and understanding of how machines and tools work and the ability to read and interpret technical drawings and blueprints. **Attention to Detail:** Precision is crucial in CNC work. Students should be meticulous and able to focus on detailed tasks. **Problem-Solving:** The ability to troubleshoot and solve problems that arise during the machining process. **Computer Skills:** Familiarity with computer operations and software. **Mechanical Skills**: Hands-on experience with tools and machinery and an understanding of mechanics & how machines operate. **Spatial Awareness:** The ability to visualize and understand the spatial relationships between objects. **Manual Dexterity:** Good hand-eye coordination and the ability to handle tools with precision.	**Manufacturing Plants:** CNC professionals often work in large manufacturing facilities. These environments can be fast-paced and require attention to detail. **Machine Shops:** Smaller machine shops provide a more intimate setting for CNC operators. **Research and Development Labs:** In R&D labs, CNC professionals work on developing new machining techniques and improving existing processes. **Educational Institutions:** Some CNC professionals work in educational settings, teaching students about CNC technology and machining processes. **Field Service:** Field service technicians travel to different locations to install, maintain, and repair CNC machines. **Quality Control Departments**: In quality control, CNC professionals ensure that manufactured parts meet specified standards. **Prototyping Shops:** These shops focus on creating prototypes for new products.	**KCTCS Campuses** Computerized Manufacturing and Machining | KCTCS

Electrical Technician CIP 47.0303.02

Electrical technicians apply electrical theory and related knowledge to diagnose and modify developmental or operational electrical machinery, electrical control equipment, and circuitry in industrial or commercial plants and laboratories. They assemble and test experimental motor control devices, switch panels, transformers, generator windings, solenoids, and other electrical equipment and components according to engineering data and knowledge of electrical principles.

Career Choices	Aptitudes Needed	Common Work Environments	Postsecondary Opportunities in Kentucky
Electrical Technician: Works on assembling, testing, and maintaining electrical systems. **Electrician:** Installs, repairs, and maintains electrical systems in residential, commercial, and industrial settings. **Field Service Technician:** Travels to different locations to install, repair, and maintain electrical systems and equipment. **Maintenance Technician:** Ensures that electrical systems and equipment in facilities are functioning properly and performs routine maintenance. **Instrumentation Technician:** Specializes in installing and maintaining instruments and control systems. **Automation Technician:** Works with automated systems and robotics, ensuring they operate correctly. **Cable Technician:** Installs and repairs data, telephone, and security cable networks. **Electrical Inspector:** Inspects electrical systems and installations to ensure they meet safety and code requirements.	**Mathematical Skills:** A solid understanding of algebra, geometry, and basic trigonometry. **Technical Aptitude:** An interest in and understanding of how electrical systems and devices work. **Problem-Solving:** The ability to troubleshoot and diagnose issues with electrical systems and find solutions. **Attention to Detail:** Precision is crucial in electrical work to ensure safety and functionality. **Manual Dexterity:** Good hand-eye coordination and the ability to handle tools and materials. **Computer Skills:** Familiarity with computer operations and software, as modern electrical systems often involve computer-based controls and diagnostics. **Safety Awareness:** A strong understanding of safety protocols. **Mechanical Skills:** Hands-on experience with tools and machinery can be very beneficial.	**Residential Settings:** Electrical technicians often work in homes, installing, repairing, and maintaining electrical systems. **Commercial and Industrial Sites**: These settings include office buildings, factories, and warehouses. **Construction Sites:** Electrical technicians are crucial in new construction projects, where they install wiring and electrical systems from the ground up. **Maintenance Facilities:** In these settings, technicians perform routine maintenance and repairs on electrical systems and equipment. **Field Service:** Some electrical technicians work as field service technicians, traveling to different locations to install, maintain, and repair electrical systems. **Laboratories and Testing Facilities:** In these environments, technicians test and develop new electrical components and systems.	**KCTCS Campuses** Electrical Technology | KCTCS

Maintenance Machinist CIP 47.0303.03

Maintenance machinists set up and operate various machine tools and fit and assemble parts to fabricate or repair machine tools and maintain industrial machines, applying knowledge of mechanics, shop mathematics, metal properties, layout, and machining procedures. They observe, listen to and diagnose operating machinery or equipment to correct machine malfunction and determine the need for adjustment or repair.

Career Choices	Aptitudes Needed	Common Work Environments	Postsecondary Opportunities in Kentucky
Maintenance Machinist: Works on maintaining and repairing machinery, ensuring that all equipment operates efficiently and safely. **CNC Machinist:** Operates and maintains CNC machines, ensuring precision in the manufacturing process. **Industrial Maintenance Technician:** Focuses on the upkeep and repair of industrial equipment, often working in manufacturing plants. **Tool and Die Maker:** Designs and constructs precision tools, dies, and fixtures used in manufacturing. **Mechanical Technician:** Provides technical support for mechanical systems, including installation, maintenance, and troubleshooting. **Field Service Technician:** Travels to different locations to install, maintain, and repair machinery and equipment. **Quality Control Inspector:** Ensures that manufactured parts meet quality standards and specifications3.	**Mechanical Aptitude:** Understanding how machines and tools work that includes knowledge of basic mechanics. **Mathematical and Computer Skills:** Proficiency in math (algebra, geometry, and trigonometry) & familiarity with various computer applications. **Attention to Detail:** Being meticulous and detail-oriented helps in creating accurate parts. **Problem-Solving:** The ability to troubleshoot that involves critical thinking and the ability to diagnose issues and find solutions. **Manual Dexterity**: Good hand-eye coordination and steady hands are necessary for operating machinery and handling tools. **Technical Reading Skills:** The ability to read and understand technical manuals, blueprints, and schematics. **Safety Awareness:** A strong understanding of safety protocols and the ability to follow them. **Physical Stamina:** Machinists often spend long hours standing and operating machinery.	**Manufacturing Plants:** These are often well-lit but noisy environments where machinists maintain and repair machinery that keeps production lines running smoothly. **Maintenance Shops:** These are dedicated areas within larger facilities where machinists perform routine maintenance and repairs. **Construction Sites:** Machinists working on construction sites deal with heavy machinery like bulldozers and cranes. The work is often outdoors, exposing them to varying weather conditions and rugged terrain. **Power Generation Facilities:** In these settings, machinists maintain and repair equipment used in power generation, such as turbines and generators. **Factories:** Similar to manufacturing plants, factories can be noisy and require machinists to work with a variety of machinery. **On-Call and Shift Work:** Many machinists work full-time and may be on call for night or weekend shifts. Overtime is common, especially when urgent repairs are needed.	**KCTCS Campuses** Industrial Maintenance Technology | KCTCS

Maintenance Mechanic CIP 47.0303.01

Maintenance Mechanics perform machine setup, troubleshooting, repairs and preventive maintenance service, including but not limited to mechanical, electrical, pneumatic and hydraulic systems for industrial production and processing machinery and equipment. They read and interpret equipment manuals and work orders to perform required maintenance and service and analyze and inspect equipment, structures, or materials to identify errors, problems or defects.

Career Choices	Aptitudes Needed	Common Work Environments	Postsecondary Opportunities in Kentucky
Industrial Maintenance Technician: Responsible for maintaining and repairing industrial equipment, including machinery used in manufacturing and production. **HVAC Technician:** Specializes in heating, ventilation, and air conditioning systems, ensuring they operate efficiently and safely. **Automotive Service Technician:** Focuses on the maintenance and repair of vehicles, including troubleshooting and fixing mechanical issues. **Facilities Maintenance Technician:** Works in commercial or residential buildings, handling repairs and maintenance tasks such as plumbing, electrical systems, and general upkeep. **Certified Maintenance and Reliability Technician (CMRT):** This role involves preventive, predictive, and corrective maintenance to ensure equipment reliability. **Certified Apartment Maintenance Technician (CAMT):** Specializes in maintaining residential properties, including electrical systems, HVAC, and plumbing.	**Mechanical Aptitude:** An understanding of how machines and tools work, and an interest in fixing and maintaining them. **Problem-Solving Skills:** The ability to diagnose issues and come up with effective solutions. **Attention to Detail:** Precision is crucial when working with machinery to ensure safety and functionality. **Manual Dexterity:** Good hand-eye coordination and the ability to use tools and equipment effectively. **Basic Math Skills:** Understanding measurements, calculations, and basic algebra is important for technical tasks. **Technical Reading Skills:** The ability to read and comprehend technical manuals and schematics. **Physical Stamina:** The job often requires standing for long periods, lifting heavy objects, and working in various environments. **Communication Skills:** Being able to communicate effectively with team members and supervisors	**Manufacturing Plants:** Mechanics work on maintaining and repairing equipment like conveyor belts and robotic arms to keep production lines running smoothly. **Construction Sites:** Mechanics here deal with heavy machinery such as bulldozers, cranes, and excavators. The work is often outdoors, exposing them to varying weather conditions and rugged terrain. **Power Generation Facilities**: These settings involve maintaining and repairing equipment used in power plants. The work can be both indoors and outdoors, requiring adherence to strict safety protocols. **Maintenance Shops:** These are more controlled environments where mechanics work on a variety of equipment brought in for repair. **Service Industry Settings:** This includes hotels, restaurants, hospitals, and office buildings. Mechanics ensure that facilities are functional, safe, and clean, dealing with different equipment and systems daily.	**KCTCS Campuses** Industrial Maintenance Technology | KCTCS

Welding Maintenance Technician CIP 47.0303.06

Welding Maintenance Technicians layout, fabricate, set up and weld metals in all positions. Welding Technicians must operate all types of welding equipment, apply safety first, and comply with all OSHA guidelines and regulations. They read blueprints, apply mechanical skills, calculate shop mathematics and know the metal properties to perform welding procedures to meet industry specifications. Additional skills that enhance employability opportunities are diagnosing operating machinery or equipment to correct machine malfunction and determine the need for adjustment or repair.

Career Choices	Aptitudes Needed	Common Work Environments	Postsecondary Opportunities in Kentucky
Welding Technician: Responsible for setting up, operating, and maintaining welding equipment. **Maintenance Technician:** Focuses on maintaining and repairing industrial equipment, including welding machines. This role often involves preventive maintenance and troubleshooting. **Industrial Maintenance Supervisor:** Oversees maintenance teams and ensures that all equipment, including welding machinery, is functioning correctly. This role requires strong leadership and technical skills. **Fabrication Welder:** Specializes in creating metal structures and components by cutting, shaping, and assembling metal parts. **Field Service Technician:** Travels to different sites to install, maintain, and repair welding equipment. This role often requires problem-solving skills and the ability to work independently. **Quality Control Inspector:** Ensures that welded products meet industry standards and specifications. documenting findings.	**Mechanical Aptitude:** Understanding how machines and tools work and the ability to troubleshoot and repair equipment. **Mathematical Skills**: Basic math skills, including algebra and geometry, are important for measuring, calculating dimensions, and understanding technical drawings. **Attention to Detail:** Precision is key in welding and maintenance work to ensure safety and quality. **Manual Dexterity:** Good hand-eye coordination and steady hands are essential for performing precise welding tasks. Problem-Solving: The ability to diagnose issues and come up with effective solutions. **Physical Stamina:** Welding and maintenance work can be physically demanding, requiring strength and endurance. **Technical Reading Skills:** The ability to read and interpret blueprints, schematics, and technical manuals is necessary for understanding and executing tasks correctly.	**Manufacturing Plants:** These environments are typically indoors and involve maintaining and repairing machinery used in production. **Construction Sites:** Welding maintenance technicians on construction sites often work outdoors, which means they are exposed to varying weather conditions. **Shipyards:** In shipyards, technicians work on the maintenance and repair of ships and other marine vessels. This can involve both indoor and outdoor work, sometimes in challenging conditions such as confined spaces or at heights. **Automotive Industry:** Technicians in this field work on the maintenance of welding equipment used in the production and repair of vehicles. **Aerospace Industry:** Working in aerospace involves maintaining welding equipment used in the production of aircraft and spacecraft. **Oil and Gas Industry:** Technicians in this industry may work on oil rigs, both onshore and offshore	**KCTCS Campuses** Welding Technology | KCTCS

Sheet Metal Technician CIP 48.0506.01

Sheet metal technicians create parts to the specifications required through line development and fabrication. Sheet metal is measured, and sheet metal patterns are cut and formed for the determined available space. Sheet metal technicians must have strong math skills to develop geometrical parts. The Sheet Metal Technician directly supports manufacturing to design, fabricate, modify, and evaluate parts, assemblies, components and sub-assemblies according to specifications

Career Choices	Aptitudes Needed	Common Work Environments	Postsecondary Opportunities in Kentucky
Sheet Metal Worker: Involves fabricating, installing, and maintaining sheet metal products, such as ducts for HVAC systems, roofing, and siding. **HVAC Technician:** Specializes in installing and maintaining heating, ventilation, and air conditioning systems, working with sheet metal ducts and components. **Fabricator:** Works in manufacturing settings to create metal parts and structures. Estimator: Calculates the cost of materials, labor, and time required for sheet metal projects, often working closely with clients and project managers1. **Project Manager:** Oversees sheet metal projects from start to finish, ensuring they are completed on time and within budget. **Quality Control Inspector:** Ensures that sheet metal products meet industry standards and specifications through inspections and testing.	**Mechanical Aptitude:** Understanding how tools and machinery work is crucial. This includes the ability to troubleshoot and repair equipment. **Mathematical Skills:** Basic math skills, including algebra and geometry, are important for measuring, calculating dimensions, and interpreting technical drawings. **Attention to Detail:** Precision is key in sheet metal work to ensure accuracy and quality in fabrication and installation. **Manual Dexterity:** Good hand-eye coordination and steady hands are essential for performing precise tasks with sheet metal. **Problem-Solving:** The ability to diagnose issues and come up with effective solutions is vital in this field. **Physical Stamina:** Sheet metal work can be physically demanding, requiring strength and endurance. **Technical Reading Skills:** The ability to read and interpret blueprints, schematics, and technical manuals.	**Fabrication Shops:** Many sheet metal technicians work in fabrication shops where they cut, bend, and shape metal pieces. **Construction Sites:** Some technicians work on construction sites, installing metal components in buildings. This can involve working at heights and in various weather conditions. **Manufacturing Plants:** In manufacturing settings, sheet metal technicians might be involved in producing parts for machinery, vehicles, or other products. **HVAC Installation:** Technicians working in HVAC (heating, ventilation, and air conditioning) often install ductwork in residential, commercial, and industrial buildings. **Maintenance and Repair:** Some technicians specialize in maintaining and repairing existing metal structures or systems. This can involve troubleshooting and fixing issues on-site, which may require travel.	**KCTCS Campuses** Industrial Maintenance Technology < KCTCS

Welder-Entry Level CIP 48.0508.01

An entry-level welder demonstrates the ability to assist lead welders in fabricating steel and metal structures. Students must perform essential welding functions, calculate dimensions, and operate power equipment, grinders, and other tools. Students must be proficient in reading and interpreting basic blueprints and following work procedure specifications (WPS)

Career Choices	Aptitudes Needed	Common Work Environments	Postsecondary Opportunities in Kentucky
Welder: This is the most direct career path. Welders work in various industries, including construction, manufacturing, and shipbuilding, to join metal parts using different welding techniques. **Welding Inspector:** Inspectors ensure that welds meet industry standards and specifications. They often work for construction companies, manufacturing plants, or government agencies. **Welding Technician:** Technicians assist in the development and testing of welding processes and equipment. They may work in research and development or quality control. **Pipe Welder:** Specializing in welding pipes, these professionals are often employed in the oil and gas industry, water treatment facilities, and power plants. **Structural Welder:** These welders work on large structures such as bridges, buildings, and ships. They often work at heights and in various weather conditions. **Fabricator:** Fabricators create metal structures and components based on blueprints and specifications. They work in manufacturing, construction, and custom metal shops. **Underwater Welder:** This specialized field involves welding underwater, often for the construction and repair of ships, pipelines, and offshore oil rigs.	**Manual Dexterity:** Welding requires precise hand-eye coordination and steady hands to manipulate tools and materials accurately **Attention to Detail:** Being able to focus on small details is crucial for creating strong, high-quality welds and ensuring safety. **Mathematical Skills:** Basic math skills, including geometry and measurements, are important for interpreting blueprints and calculating dimensions. **Technical Aptitude:** An interest in and understanding of how machines and tools work can be very beneficial. **Physical Stamina:** Welding can be physically demanding, requiring strength, endurance, and the ability to work in various positions and environments. **Problem-Solving:** Welders often need to troubleshoot issues and find solutions on the spot. **Safety Awareness:** A strong understanding of safety protocols and the ability to follow them meticulously. **Communication Skills:** Being able to communicate effectively with team members and supervisors is important for collaboration and understanding project requirements. **Willingness to Learn:** A positive attitude towards learning new techniques.	**Indoor Work:** Many welders work indoors in manufacturing plants, automotive shops, and industrial facilities. These environments can be noisy and may expose workers to hazardous fumes, bright lights, and high heat. **Outdoor Work:** Welders working on construction sites, pipelines, or shipyards often work outdoors. This can involve exposure to various weather conditions, working at heights, and sometimes in confined spaces. **Confined Spaces:** Some welding tasks require working in tight or enclosed spaces, such as inside tanks, small compartments, or under water. **Shift Work:** Welding jobs may require working in shifts, including nights and weekends. Overtime is common, and some welders may work up to 12-hour shifts. **Physical Demands:** Welding is physically demanding work that often involves lifting heavy materials, standing for long periods, and working in awkward positions. Physical stamina and strength are important. **Safety Hazards:** Welders are exposed to various hazards, including intense light from the welding arc, hot materials, and the risk of burns and eye injuries.	**KCTCS Campuses** Welding Technology | KCTCS

Wood Manufacturing CIP 48.0703.02

Cabinet makers are specific types of woodworkers who create and install cabinets in bathrooms, kitchens, and other areas of homes or businesses. Typical duties of cabinet makers include designing custom cabinets, making cabinets, installing cabinetry, consulting with clients and other duties as needed. Cabinet makers are responsible for cutting and shaping wood, preparing surfaces and forming a complete product.

Career Choices	Aptitudes Needed	Common Work Environments	Postsecondary Opportunities in Kentucky
Woodworker: Operate tools and machines to manufacture a variety of wood parts and products, including furniture and cabinetry. **Cabinetmaker/Bench Carpenter:** Specialize in creating and assembling cabinets and other wood products. **Machinery Maintenance Technician:** Install, maintain, and repair industrial machinery used in wood manufacturing1. **CAD Designer:** Use computer-aided design (CAD) software to create detailed drawings and plans for wood products and manufacturing processes. **Supervisor:** Lead a team of workers, ensuring that production goals are met, and safety protocols are followed. **Manufacturing Manager:** Oversee the production process, manage staff, and ensure that products meet quality standards. **Operations Director:** Manage the overall operations of a wood manufacturing facility, including production, logistics, and quality control.	**Manual Dexterity:** Working with wood requires precise hand-eye coordination and fine motor skills to operate tools and machinery accurately. **Attention to Detail:** Ability to focus on small details is crucial for creating high-quality wood products and ensuring precision in measurements and cuts. **Mathematical Skills:** Basic math skills, including geometry and measurements, are important for interpreting blueprints and calculating dimensions. **Technical Aptitude:** An interest in and understanding of how machines and tools work. **Physical Stamina:** Wood manufacturing can be physically demanding, requiring strength, endurance, and the ability to stand for long periods and lift heavy materials. **Problem-Solving:** The ability to troubleshoot issues and find solutions is important for maintaining workflow and quality. **Creativity:** A creative mindset can help in designing and crafting unique wood products.	**Indoor Work:** Most wood manufacturing takes place indoors in factories or workshops. These environments can be noisy due to machinery and may have high levels of wood dust. **Physical Demands:** The work can be physically demanding, involving lifting heavy materials, standing for long periods, and operating machinery. **Safety Hazards:** There are several safety hazards in wood manufacturing, including the risk of cuts, amputations, and eye injuries from machinery. **Exposure to Chemicals:** Workers may be exposed to chemicals used in wood finishing, such as stains, varnishes, and adhesives. **Temperature Variations:** Depending on the facility, there may be significant temperature variations. **Repetitive Tasks:** Many tasks in wood manufacturing are repetitive, such as cutting, sanding, and assembling parts. This can lead to repetitive strain injuries if proper ergonomic practices are not followed.	**KCTCS Campuses** Manufacturing Engineering Technology | KCTCS

MEDIA ARTS CAREER PATHWAYS

Cinematography and Video Production CIP 09.0701.00

The Cinematography and Video Production pathway prepares students to communicate dramatic information, ideas, moods, and feelings by making and producing videos and cinematographic expressions. The pathway includes the theory of video, video technology and equipment operation, video production, video directing, video editing, cinematographic art, video and audio technique, and multimedia production. The pathway prepares students to function as staff, producers, directors, and managers of media programming and media organizations. Topics of study in this pathway include writing and editing; performing; media regulations, law, and policy; aesthetic meaning, appreciation, and analysis; construction, development, processing, modeling, simulation, and programming of audio and moving image programs and messages; transmission, distribution, and marketing; contextual, cultural and historical aspects, and considerations

Career Choices	Aptitudes Needed	Common Work Environments	Postsecondary Opportunities in Kentucky
Cinematographer: Also known as a Director of Photography, cinematographers are responsible for capturing the visual elements of a film or video. **Camera Operator:** Operate cameras for film, television, or video productions, ensuring that the shots meet the director's vision. **Video Editor:** Edit raw footage into a polished final product, adding effects, transitions, and sound to create a cohesive story. **Production Assistant:** Assist in various aspects of production, from setting up equipment to managing logistics on set. **Lighting Technician:** Design and set up lighting for film and video productions. **Sound Designer:** Create and manipulate audio elements for film, television, and video productions, ensuring high-quality sound2. **Director:** Oversee the creative aspects of a film or video production. **Motion Graphics Designer:** Create animated graphics and visual effects for film, television, and online content.	**Creativity:** A strong sense of creativity is essential for developing unique visual concepts and storytelling. **Technical Skills:** Familiarity with cameras, lighting equipment, and editing software is important. **Attention to Detail:** Precision is crucial in capturing high-quality footage, editing, and ensuring continuity in scenes. **Visual Awareness:** An eye for composition, color, and lighting helps in creating visually appealing shots. **Communication Skills:** Effective communication is important for collaborating with directors, actors, and crew members. Problem-Solving: The ability to troubleshoot technical issues and find creative solutions. **Passion for Storytelling:** A genuine interest in storytelling and a passion for film and video production.	**On-Location Shooting:** Many cinematographers and camera operators work on location, which can involve traveling to various sites, working outdoors, and dealing with different weather conditions. **Studio Work:** Some work is done in studios, where the environment is more controlled. This can include sound stages for filming and editing suites for post-production work. **Irregular Hours:** The nature of film and video production often requires working irregular hours, including nights, weekends, and holidays. **Physical Demands:** The job can be physically demanding, involving carrying heavy equipment, & standing for long periods **Collaborative Environment:** Film and video production is highly collaborative, requiring effective communication and teamwork with directors, producers, actors, and other crew members.	**KCTCS Campuses** Filmmaking - Cinematic Arts | KCTCS Visual Communication - Cinematography and Video Production | KCTCS **University Programs** UK-Video and Filmmaking | College of Fine Arts Media, Journalism & Digital Storytelling Programs | Asbury University WKU Film | Western Kentucky University

Graphic Design CIP 50.0401.00

The Graphic Design pathway prepares students to apply skills that focus on the principles and techniques for effectively communicating ideas/information and packaging products to business and consumer audiences both in digital and other formats. Topics of study in this pathway include aesthetic meaning, appreciation, and analysis; construction, development, processing, modeling, simulation and programming of interactive experiences; transmission, distribution and marketing; contextual, cultural and historical aspects and considerations.

Career Choices	Aptitudes Needed	Common Work Environments	Postsecondary Opportunities in Kentucky
Graphic Designer: Create visual concepts for advertisements, brochures, magazines, and corporate reports. **Web Designer:** Design and create websites, ensuring they are visually appealing and user-friendly. **UX/UI Designer:** Focus on the user experience and interface design for websites, apps, and other digital products. **Photo Editor:** Modify and enhance photographs for use in publications, websites, and marketing materials. **Brand Identity Designer:** Develop logos, color schemes, and visual styles that represent a company's brand. **Illustrator:** Create original artwork for books, magazines, advertisements, and digital media. **Motion Graphics Designer:** Design animated graphics for videos, television, and online content. **Freelance Designer:** Work independently with various clients on a range of design projects2.	**Creativity:** A strong sense of creativity, an eye for design, and the ability to think outside the box and come up with unique ideas. **Artistic Skills:** Basic drawing and sketching skills and understanding color theory, composition, and typography. **Technical Proficiency:** Familiarity with graphic design software such as Adobe Photoshop, Illustrator, and InDesign. **Attention to Detail:** Precision and attention to detail are essential for creating polished and professional designs. **Communication Skills:** The ability to communicate ideas clearly and effectively, both visually and verbally. This includes listening to feedback and collaborating with others. **Time Management:** Good organizational and time management skills help in meeting deadlines and managing multiple projects. **Adaptability:** Being open to learning new techniques and tools as the field of graphic design is constantly evolving.	**Work Setting:** Most graphic designers work indoors, often in office settings. **Work Hours:** Graphic designers usually work full-time, but part-time and freelance opportunities are also common. They may need to work overtime to meet deadlines. **Social Interaction:** The job involves a high level of social contact. Designers regularly communicate with clients, supervisors, and team members via email, phone, and in person. **Physical Activities:** The work often involves repetitive tasks such as drawing, sketching, and using a computer mouse & keyboard. **Creativity and Flexibility:** Designers have the opportunity to express themselves creatively. They often have some control over the direction of their work, although they must meet client needs and expectations. **Stress and Deadlines:** The job can be stressful due to frequent time pressure and the need to meet strict deadlines. The work environment can be competitive.	**KCTCS Campuses** Graphic Design | BCTC Graphic Design and Library Technology < KCTCS **University Programs** UK-Graphic Design | College of Fine Arts U of L BFA Graphic Design Track — Hite Institute of Art and Design Graphic Design | Western Kentucky University

Interactive Media CIP 10.0304.00

The Interactive Media pathway prepares students to use computer applications and related visual and sound imaging techniques to manipulate images and information originating as video, still photographs, digital copy, soundtracks, and physical objects to communicate messages simulating real-world content. The pathway includes instruction in specialized camerawork and equipment operation and maintenance, image capture, computer applications, dubbing, and applications to specific commercial, industrial, and entertainment needs. Topics of study in this pathway include aesthetic meaning, appreciation and analysis; construction, development, processing, modeling, simulation, and programming of interactive experiences; transmission, distribution and marketing; contextual, cultural and historical aspects and considerations

Career Choices	Aptitudes Needed	Common Work Environments	Postsecondary Opportunities in Kentucky
Social Media Specialist: Responsible for developing and implementing social media strategies to increase brand awareness and engagement. **Animator:** Creates animations and visual effects for various media, including films, video games, and websites. **Video Editor:** Edits and assembles recorded footage into finished products suitable for broadcasting. **Web Designer:** Designs and creates websites, ensuring they are visually appealing and user-friendly. **Digital Advertising Specialist**: Develops and manages online advertising campaigns to promote products or services. **Multimedia Graphic Designer:** Creates visual content for various media, including print, digital, and social media. **Video Game Designer:** Designs the core features of video games, including gameplay mechanics, storylines, and character development.	**Creativity:** A strong sense of creativity and the ability to come up with innovative ideas for interactive content. **Technical Proficiency:** Familiarity with digital tools and software such as Adobe Creative Suite (Photoshop, Illustrator, After Effects), video editing software, and web development tools. **Artistic Skills:** Basic skills in design, and animation and understanding color theory, composition, and typography. **Problem-Solving:** The ability to solve technical and creative problems efficiently is key. **Attention to Detail:** Precision and attention to detail are crucial for creating polished and professional interactive media projects. **Time Management:** Good organizational and time management skills help in meeting deadlines and managing multiple projects. **Interest in Technology**: An interest in technology and staying updated on the latest trends and tech.	**Work Environment:** Interactive media professionals often work in office settings, creative studios, or remotely. The environment is typically collaborative. **Work Hours:** Standard work hours are common, but overtime may be required to meet deadlines. **Physical Demands**: The job usually involves extended periods of sitting and working on a computer. **Social Interaction:** High levels of social interaction are common, as professionals frequently collaborate with colleagues, clients, and stakeholders. **Creativity and Innovation**: The field demands a high degree of creativity and innovation. **Stress and Deadlines:** The job can be stressful due to tight deadlines and the need to deliver high-quality work. **Technology Use:** Proficiency with various digital tools and software is essential.	**KCTCS Campuses** Multimedia | KCTCS **University Programs** UK-Media Arts & Studies Department of Art & Design | Western Kentucky University Visual Communication Design (BA, BFA): Northern Kentucky University

TRANSPORTATION

Automotive Maintenance and Light Repair Technician CIP 47.0604.01

This pathway prepares individuals to apply technical knowledge and skills to repair, service, and maintain all types of automobiles. It includes instruction in brake systems, electrical systems, engine performance, engine repair, suspension and steering, automatic and manual transmissions and drive trains, and heating and air conditioning systems.

Career Choices	Aptitudes Needed	Common Work Environments	Postsecondary Opportunities in Kentucky
Automotive Service Technician: Diagnose, adjust, repair, or overhaul automotive vehicles. **Maintenance Technician:** Perform routine maintenance and minor repairs on vehicles. **Service Advisor:** Act as a liaison between customers and the service department, advising on necessary repairs and maintenance. **Parts Specialist:** Manage and supply automotive parts for repairs and maintenance. **Automotive Glass Installer and Repairer:** Replace or repair broken windshields and window glass in motor vehicles1. **Express Service Technician:** Specialize in quick, routine services such as oil changes, tire rotations, and basic inspections	**Mechanical Aptitude:** A natural interest in how things work and the ability to understand mechanical systems. **Problem-Solving:** The ability to diagnose and troubleshoot issues efficiently. **Attention to Detail:** Precision and attention to detail are important for performing accurate repairs and maintenance. **Technical Proficiency:** Basic knowledge of automotive systems and components, as well as the ability to use diagnostic tools and equipment. **Manual Dexterity:** Good hand-eye coordination and the ability to work with small parts and tools. **Computer Literacy:** Modern vehicles often require the use of diagnostic software and other computer-based tools. **Physical Stamina:** The job can be physically demanding, requiring the ability to lift heavy parts, stand for long periods, and work in various positions. **Time Management:** Good organizational and time management skills help in managing multiple tasks and meeting deadlines.	**Work Environment:** Technicians typically work in repair shops, service centers, or dealerships. These environments can be noisy and busy. **Physical Demands**: The job is physically demanding, requiring technicians to lift heavy parts, stand for long periods, and work in various positions. **Safety Considerations:** Safety is a top priority due to the potential hazards, such as exposure to chemicals, hot surfaces, sharp objects, and heavy machinery. **Work Hours:** Standard work hours are common, but overtime may be necessary, especially during busy periods. **Social Interaction:** Technicians frequently interact with customers, service advisors, and colleagues. **Tools and Technology:** The job involves using a variety of tools and diagnostic equipment. Staying up-to-updated with the latest automotive technology and repair techniques is essential.	**KCTCS Campuses** Automotive Technology | KCTCS

Automobile Service Technology CIP 47.0604.02

This pathway prepares individuals to apply technical knowledge and skills to repair, service, and maintain all types of automobiles. It includes instruction in brake systems, electrical systems, engine performance, engine repair, suspension and steering, automatic and manual transmissions and drive trains, and heating and air conditioning systems.

Career Choices	Aptitudes Needed	Common Work Environments	Postsecondary Opportunities in Kentucky
Automotive Service Technician: Diagnose, repair, and maintain vehicles, ensuring they run efficiently and safely. **Automotive Repair Technician:** Specialize in specific areas of vehicle repair, such as brakes, transmissions, or air conditioning systems. **Heavy Equipment Mechanic:** Work on larger vehicles and machinery, such as trucks, buses, and construction equipment. **Parts Specialist:** Manage and supply automotive parts for repairs and maintenance. **Transmission Technician:** Specialize in the repair and maintenance of vehicle transmission systems. **Service Advisor:** Act as a liaison between customers and the service department, advising on necessary repairs and maintenance. **Automotive Glass Installer and Repairer:** Replace or repair broken windshields and window glass in motor vehicles.	**Mechanical Aptitude:** A natural interest in how things work and the ability to understand mechanical systems. **Problem-Solving:** The ability to diagnose and troubleshoot issues efficiently. **Attention to Detail:** Precision and attention to detail are important for performing accurate repairs and maintenance. **Technical Proficiency:** Basic knowledge of automotive systems and components, as well as the ability to use diagnostic tools and equipment. **Manual Dexterity:** Good hand-eye coordination and the ability to work with small parts and tools. **Computer Literacy:** Modern vehicles often require the use of diagnostic software and other computer-based tools. **Physical Stamina:** The job can be physically demanding, requiring the ability to lift heavy parts, stand for long periods, and work in various positions. **Time Management:** Good organizational and time management skills help in managing multiple tasks and meeting deadlines.	**Work Environment:** Technicians typically work in repair shops, service centers, or dealerships. These environments can be noisy and busy. Additionally, while modern shops are temperature controlled, some older shops may not be. **Physical Demands**: The job is physically demanding, requiring technicians to lift heavy parts, stand for long periods, and work in various positions. **Safety Considerations:** Safety is a top priority due to the potential hazards, such as exposure to chemicals, hot surfaces, sharp objects, and heavy machinery. **Work Hours:** Standard work hours are common, but overtime may be necessary, especially during busy periods. **Social Interaction:** Technicians frequently interact with customers, service advisors, and colleagues. **Tools and Technology:** The job involves using a variety of tools and diagnostic equipment. Staying up-to-updated with the latest automotive technology and repair techniques is essential.	**KCTCS Campuses** Automotive Technology | KCTCS

Automotive Engineering CIP 15.0803.00

This pathway provides the opportunity to blend Career and Technical Education (CTE) courses with Engineering courses to help students apply technical skills along with Science, Technology, Engineering, and Math (STEM) skills to solve real-world problems. This pathway prepares individuals to apply engineering principles and technical skills in support of engineers and other professionals engaged in developing, manufacturing, and testing self-propelled ground vehicles and their systems. It includes instruction in vehicular systems technology, design and development testing, prototype and operational testing, inspection and maintenance procedures, instrument calibration, test equipment operation and maintenance, and report preparation.

Career Choices	Aptitudes Needed	Common Work Environments	Postsecondary Opportunities in Kentucky
Automotive Engineer: Specializes in the design, development, and manufacturing of vehicles. **Design Engineer:** Focuses on the conceptualization and design of vehicles. **Manufacturing Engineer:** Develops and optimizes manufacturing processes to ensure efficient production. **Test Engineer:** Conducts environmental, stress, and performance testing to ensure vehicles meet design requirements. **Quality Engineer:** Ensures that all products meet the company's production standards. **Industrial Engineer:** Improves the efficiency of production methods and oversees quality control standards. **Materials Development Engineer:** Develops and selects new materials to meet design and performance requirements **Process Planner:** Coordinates the intake of orders and schedules the production line.	**Strong Foundation in Math and Science:** Proficiency in subjects like calculus, physics, and chemistry. **Analytical and Problem-Solving Skills:** The ability to analyze complex problems, think critically, to develop innovative solutions. **Mechanical Aptitude:** A natural understanding of how machines and mechanical systems work. **Technical Skills:** Basic knowledge of computer-aided design (CAD) software and other engineering tools. **Attention to Detail:** Precision is important in engineering to ensure designs and systems function correctly and safely. **Creativity and Innovation:** The ability to think creatively and come up with new ideas is valuable for designing and improving automotive technologies. **Time Management and Organization:** The ability to manage time efficiently and stay organized to meet deadlines.	**Office Environment:** Many automotive engineers spend a significant amount of time in an office setting, working on computer-aided design (CAD) software, simulations, and other engineering tools. **Manufacturing Plants:** Engineers often visit manufacturing plants to oversee the production process, troubleshoot issues, and ensure quality control. **Testing Facilities:** Engineers work in testing facilities to conduct performance, safety, and durability tests on vehicles and components. **Research and Development Labs:** In R&D labs, engineers focus on developing new technologies and materials. **Field Work:** Some automotive engineers engage in fieldwork, which involves traveling to different locations to test vehicles in real-world conditions. **Collaboration and Teamwork:** Automotive engineering is collaborative. Work is done in teams with other engineers & designers.	**University Programs** UK-Mechanical Engineering | Academics J.B. Speed School of Engineering - University of Louisville School of Engineering and Applied Sciences < Western Kentucky University Engineering Technology, B.S. | Morehead State University | Kentucky Department of Engineering & Technology - Eastern Kentucky University Mechanical & Manufacturing Engineering Technology Major: Northern Kentucky University

Entry Level Collision Repair Painter CIP 47.0603.01

A program that prepares individuals to apply technical knowledge and skills to repair, reconstruct and finish automobile bodies, fenders, and external features. It includes instruction in damage repair, painting and refinishing techniques, and damage analysis and estimating.

Career Choices	Aptitudes Needed	Common Work Environments	Postsecondary Opportunities in Kentucky
Collision Repair Technician: Specializes in repairing the bodies of vehicles damaged in accidents. **Automotive Painter:** Focuses on painting and refinishing vehicles to restore their appearance after repairs. **Auto Body Shop Manager:** Oversees the daily operations of an auto body shop, managing staff, ensuring quality repairs. **Estimator/Appraiser:** Evaluates the extent of damage to vehicles and provides cost estimates for repairs. **Paint Technician:** Works in manufacturing or custom shops, applying paint to new vehicles or custom projects. **Detailer:** Specializes in the final touches of vehicle restoration, ensuring that the paint and bodywork are flawless. **Insurance Adjuster:** Works for insurance companies to assess vehicle damage claims and determine the appropriate compensation for repairs1.	**Manual Dexterity:** Good hand-eye coordination and the ability to use tools effectively a.. **Attention to Detail:** Precision is important to ensure high-quality finishes and accurate repairs. **Basic Mechanical Skills:** Understanding basic automotive systems and components can be beneficial including vehicle body structures and repair techniques. **Creativity and Artistic Sense:** An eye for color and design can be valuable for custom paint jobs and achieving the desired aesthetic results. **Physical Stamina:** The job can be physically demanding, requiring students to spend a lot of time on their feet, bending, and lifting heavy parts and tools. **Safety Awareness:** Understanding and adhering to safety protocols to prevent accidents and injuries. **Basic Math Skills:** Knowledge of measurements and proportions is important for mixing paint and estimating materials needed for repairs.	**Work Environment:** Most work is done indoors in auto body shops or repair facilities. These shops are often well-ventilated to disperse dust and paint fumes. **Physical Demands:** The job is physically demanding, requiring painters to stand for long periods, bend, stretch, and lift heavy parts and tools.. **Exposure to Chemicals:** Painters are frequently exposed to paint fumes, solvents, and other chemicals. **Attention to Detail:** Precision is crucial in this field. Painters must ensure that surfaces are properly prepared, and that paint is applied evenly and accurately **Teamwork and Communication:** Collaboration with other technicians, estimators, and supervisors is common. **Variable Hours:** Work hours can vary, with some shops requiring overtime or weekend work to meet customer demands and deadlines.	**KCTCS Campuses** Automotive Painter - Certificate < KCTCS Collision Repairer - Certificate < KCTCS

Entry Level Non-Structural Damage and Repair Technician CIP 47.0603.03

A program that prepares individuals to apply technical knowledge and skills to repair, reconstruct and finish automobile bodies, fenders, and external features. It includes instruction in damage repair, non-structural analysis, plastics and adhesives, and damage analysis and estimating

Career Choices	Aptitudes Needed	Common Work Environments	Postsecondary Opportunities in Kentucky
Non-Structural Repair Technician: Specializes in repairing cosmetic and minor damage to vehicle bodies, such as dents, scratches, and minor panel replacements. **Automotive Painter:** Focuses on painting and refinishing vehicles to restore their appearance after repairs. **Auto Body Technician:** Works on repairing and restoring the structural integrity and appearance of vehicles. **Paint Prepper:** Prepares vehicles for painting by sanding, masking, and cleaning surfaces to ensure a smooth and even finish. **Detailer:** Specializes in the final touches of vehicle restoration, ensuring that the paint and bodywork are flawless. **Insurance Adjuster:** Works for insurance companies to assess vehicle damage claims and determine the appropriate compensation for repairs. **Custom Car Builder:** Focuses on creating custom vehicles, often working on unique paint jobs and body modifications to meet client specifications.	**Manual Dexterity:** Good hand-eye coordination and the ability to use tools effectively. **Attention to Detail:** Precision is important to ensure high-quality repairs and accurate work. **Basic Mechanical Skills:** Understanding basic automotive systems and components including familiarity with vehicle body structures and repair techniques. Problem-Solving: The ability to diagnose and troubleshoot issues efficiently is essential. **Physical Stamina:** The job can be physically demanding, requiring students to spend a lot of time on their feet, bending, and lifting heavy parts and tools. **Safety Awareness:** Understanding and adhering to safety protocols to prevent accidents and injuries **Basic Math Skills:** Knowledge of measurements and proportions is important for estimating materials needed for repairs and ensuring accurate work.	**Work Environment:** Most work is done indoors in auto body shops or repair facilities. These shops are often well-ventilated to disperse dust and paint fumes. **Physical Demands:** The job is physically demanding, requiring painters to stand for long periods, bend, stretch, and lift heavy parts and tools.. **Exposure to Chemicals:** Painters are frequently exposed to paint fumes, solvents, and other chemicals. **Attention to Detail:** Precision is crucial in this field. Painters must ensure that surfaces are properly prepared, and that paint is applied evenly and accurately **Teamwork and Communication:** Collaboration with other technicians, estimators, and supervisors is common. **Variable Hours:** Work hours can vary, with some shops requiring overtime or weekend work to meet customer demands and deadlines.	**KCTCS Campuses** Automotive Painter - Certificate < KCTCS Collision Repairer - Certificate < KCTCS

Diesel Medium Heavy Truck Inspection, Maintenance, and Minor Repair Technician
CIP 47.0605.07

This program introduces the student to the tasks/standards included in Inspection, Maintenance, and Minor Repair (IMMR). The tasks included in the Inspection, Maintenance, and Minor Repair option are entry-level technician inspection tasks designed to introduce the student to correct procedures and practices of vehicle inspection in a teaching/learning environment. These courses will instruct the student in the principles, theories, and concepts of Medium/ Heavy Duty Diesel Truck Technology and include instruction in Diesel Engines, Brake Systems, Electrical/Electronic Systems, Suspension and Steering Systems, Drivetrains, Preventive Maintenance, and Engine Performance Systems.

Career Choices	Aptitudes Needed	Common Work Environments	Postsecondary Opportunities in Kentucky
Diesel Technician/Mechanic: Specializes in diagnosing, repairing, and maintaining diesel engines and related systems. **Fleet Maintenance Technician:** Works for companies with large fleets of vehicles, ensuring that all trucks are regularly inspected, maintained, and repaired. **Service Technician:** Employed by dealerships or repair shops to perform routine maintenance, inspections, and minor repairs on diesel trucks. **Mobile Diesel Mechanic:** Provides on-site repair and maintenance services for diesel trucks, traveling to different locations. **Heavy Equipment Technician:** Focuses on the maintenance and repair of heavy machinery. **Diesel Engine Specialist:** Specializes in the repair and maintenance of diesel engines. **Truck Inspector:** Conducts thorough inspections of trucks to ensure they meet safety and regulatory standards, identifying any issues that need to be addressed.	**Mechanical Aptitude:** Understanding how diesel engines and heavy truck systems work including knowledge of engines, transmissions, brakes, and electrical systems. **Problem-Solving:** The ability to diagnose and troubleshoot issues efficiently is essential. **Attention to Detail:** Precision is important to ensure accurate inspections, maintenance, and repairs. **Manual Dexterity:** Good hand-eye coordination and the ability to use tools effectively. **Basic Math and Science Knowledge**: Understanding principles of physics, chemistry, and mathematics. **Physical Stamina:** The job can be physically demanding, requiring students to spend a lot of time on their feet, bending, and lifting heavy parts and tools. **Safety Awareness:** Understanding and adhering to safety protocols to prevent accidents and injuries is crucial in a diesel repair setting.	**Work Environment:** Most technicians work in well-ventilated and sometimes noisy repair shops. These shops are equipped with tools and machinery necessary for repairing and maintaining diesel trucks. **Physical Demands:** The job is physically demanding, requiring technicians to spend a lot of time on their feet, bending, reaching, and lifting heavy parts and tools. **Exposure to Dirt and Fluids:** Technicians frequently work with greasy parts and tools, and exposure to diesel fuel, oil, and other fluids is common **Uncomfortable Positions:** Technicians work in awkward positions, such as reaching, bending, or kneeling. **Teamwork and Communication:** The job involves a lot of collaboration. Technicians work together to diagnose complex problems, share expertise, and assist with labor-intensive tasks. **Variable Hours:** Work hours can vary, with some shops requiring overtime or weekend work to meet deadlines.	**KCTCS Campuses** Medium and Heavy Truck Technician - Diploma < KCTCS

Diesel Medium/Heavy Truck Service Technology Technician (TST) CIP 47.0605.08

This program presents the theory, component identification, operation, diagnosis, and service and repair of Medium/Heavy Duty Truck Diesel Engines, Brake Systems, Electrical/ Electronic Systems, Suspension and Steering Systems, Drivetrain Systems, Engine Performance Systems, and Preventive Maintenance. The instruction will also include identifying and using appropriate tools and testing/measurement equipment required to accomplish specific tasks. The student will also locate and use current reference and training materials from accepted industry publications and resources and write industry-standard work orders.

Career Choices	Aptitudes Needed	Common Work Environments	Postsecondary Opportunities in Kentucky
Diesel Technician/Mechanic: Specializes in diagnosing, repairing, and maintaining diesel engines and related systems. **Fleet Maintenance Technician:** Works for companies with large fleets of vehicles, ensuring that all trucks are regularly inspected, maintained, and repaired. **Service Technician:** Employed by dealerships or repair shops to perform routine maintenance, inspections, and minor repairs on diesel trucks. **Mobile Diesel Mechanic:** Provides on-site repair and maintenance services for diesel trucks, traveling to different locations. **Heavy Equipment Technician:** Focuses on the maintenance and repair of heavy machinery. **Diesel Engine Specialist:** Specializes in the repair and maintenance of diesel engines. **Truck Inspector:** Conducts thorough inspections of trucks to ensure they meet safety and regulatory standards, identifying any issues that need to be addressed.	**Mechanical Aptitude:** Understanding how diesel engines and heavy truck systems work including knowledge of engines, transmissions, brakes, and electrical systems. **Problem-Solving:** The ability to diagnose and troubleshoot issues efficiently is essential. **Attention to Detail:** Precision is important to ensure accurate inspections, maintenance, and repairs. **Manual Dexterity:** Good hand-eye coordination and the ability to use tools effectively. **Basic Math and Science Knowledge**: Understanding principles of physics, chemistry, and mathematics. **Physical Stamina:** The job can be physically demanding, requiring students to spend a lot of time on their feet, bending, and lifting heavy parts and tools. **Safety Awareness:** Understanding and adhering to safety protocols to prevent accidents and injuries is crucial in a diesel repair setting.	**Work Environment:** Most technicians work in well-ventilated and sometimes noisy repair shops. These shops are equipped with tools and machinery necessary for repairing and maintaining diesel trucks. **Physical Demands:** The job is physically demanding, requiring technicians to spend a lot of time on their feet, bending, reaching, and lifting heavy parts and tools. **Exposure to Dirt and Fluids:** Technicians frequently work with greasy parts and tools, and exposure to diesel fuel, oil, and other fluids is common **Uncomfortable Positions:** Technicians work in awkward positions, such as reaching, bending, or kneeling. **Teamwork and Communication:** The job involves a lot of collaboration. Technicians work together to diagnose complex problems, share expertise, and assist with labor-intensive tasks. **Variable Hours:** Work hours can vary, with some shops requiring overtime or weekend work to meet deadlines.	**KCTCS Campuses** Medium and Heavy Truck Technician - Diploma < KCTCS

Aircraft Maintenance Technician CIP 47.0607.00

This pathway prepares individuals to apply technical knowledge and skills to repair, service, and maintain all aircraft components other than engines, propellers, avionics, and instruments. It includes instruction in the layout and fabrication of sheet metal, fabric, wood, and other materials into structural members, parts, and fittings, and replacement of damaged or worn parts such as control cables and hydraulic units. To gain FAA work experience and training requirements, students must log hours and work with approved FAA-rated Airframe and Powerplant Technicians or Inspection Authorized persons

Career Choices	Aptitudes Needed	Common Work Environments	Postsecondary Opportunities in Kentucky
Aircraft Maintenance Technician: Perform routine maintenance, inspections, and repairs on aircraft to ensure they meet safety and performance standards. **Avionics Technician:** Specialize in maintaining and repairing the electronic systems used in aircraft. **Engine Mechanic:** Focus on the maintenance and repair of aircraft engines. **Component Maintenance Technician:** Work on specific aircraft components, such as landing gear, hydraulic systems, and flight control systems. **Line Maintenance Technician:** Perform quick, routine maintenance and inspections on aircraft between flights. **Base Maintenance Technician:** Conduct more extensive maintenance and repairs during scheduled downtime. **Safety and Environmental Specialist:** Focus on maintaining safety standards and environmental compliance within the maintenance operations.	**Mechanical Aptitude**: A natural ability to understand and work with mechanical systems and tools. **Attention to Detail & Problem Solving**: Students should be meticulous and able to follow detailed instructions accurately and be able to diagnose and solve mechanical issues. **Mathematical Skills**: A good grasp of basic mathematics, including algebra and geometry, is important for understanding technical manuals. **Science Knowledge:** A solid understanding of physics and basic principles of aerodynamics can be very beneficial. **Technical Reading and Comprehension:** The ability to read and comprehend technical manuals, blueprints, and schematics. **Manual Dexterity**: Good hand-eye coordination and the ability to use tools and equipment with precision. **Physical Stamina:** Aircraft maintenance can be physically demanding, requiring strength, endurance, and the ability to work in various positions	**Hangars and Repair Stations:** Most AMTs work in indoor hangars or repair stations. **Outdoor Work:** Some tasks may require working outdoors on the tarmac, especially for line maintenance technicians. **Noise Levels:** The work environment can be noisy due to aircraft engines, machinery, and tools. **Physical Stamina:** Technicians need to have good physical stamina to handle long hours and physically demanding tasks. **Work Hours:** AMTs may work in shifts, including nights, weekends, and holidays. Overtime is common, especially during peak travel seasons **Safety Protocols:** Strict adherence to safety protocols and regulations is essential. Technicians often wear protective gear, such as gloves, safety glasses, and ear protection **Complex Systems:** Working with advanced and complex aircraft systems requires continuous learning and staying updated.	**KCTCS Campuses** Aviation Maintenance Technology - AAS < KCTCS

Flight and Aeronautics CIP 49.0102.00

Students will complete the first phase of aviation training leading to a commercial pilot license. They will gain technical knowledge and skills in the flying and navigation of commercial passenger and cargo, agricultural, public service, corporate aircraft flight systems and controls, flight crew operations and procedures, radio communications, navigation procedures and systems, airways safety and traffic regulations, and governmental rules and regulations pertaining to piloting aircraft

Career Choices	Aptitudes Needed	Common Work Environments	Postsecondary Opportunities in Kentucky
Pilot: Work as a commercial or private pilot, flying passengers or cargo. This role requires additional flight training and certification. **Aerospace Engineer:** Design, develop, and test aircraft, spacecraft, and related systems. **Air Traffic Controller:** Manage the safe and efficient movement of aircraft. **Aircraft and Avionics Mechanic:** Maintain and repair aircraft and their electronic systems. **Flight Instructor:** Teach aspiring pilots how to fly and prepare them for certification. **Aviation Safety Inspector:** Ensure compliance with aviation safety regulations and standards. **Airport Operations Manager:** Oversee the daily operations of an airport, including managing staff, coordinating flights, and ensuring safety. **Aerospace Technician:** Assist engineers in developing and testing new aircraft and spacecraft technologies.	**Strong Mathematical Skills:** A solid understanding of mathematics, including algebra, geometry, and trigonometry. **Science Knowledge:** A good grasp of physics, particularly mechanics and flight principles, is crucial. Knowledge of chemistry can also be beneficial. **Technical Aptitude:** An ability to understand and work with technical systems and tools. Problem-Solving: The ability to analyze situations, troubleshoot issues, and find effective solutions. **Attention to Detail:** Precision and accuracy are critical in aviation to ensure safety and efficiency. **Spatial Awareness:** A good sense of spatial orientation and the ability to visualize objects in three dimensions. **Manual Dexterity:** Good hand-eye coordination and the ability to operate controls and instruments. **Physical Fitness:** Maintaining good physical health and stamina.	*Working conditions in the field of Flight and Aeronautics can vary depending on the specific role. Below are some general conditions found in the more common roles within this field. In-depth research will be required for more detailed information.* **Pilots and Flight Crews** Confined Workspaces Irregular Schedules Long Hours Fatigue High Responsibility Extensive Travel (lots of time away from home) Potential for Emergency/Life-Threatening Situations **Air Traffic Controllers** Control Towers Irregular Shifts High Stress Constant Mental Focus Strict Safety Protocols **Aerospace Engineers** Offices and Labs Highly Collaborative Work Regular Working Hours Desk Work Strict Compliance with Regulatory Standards in Design	**KCTCS Campuses** Flight Training - Fixed Wing | KCTCS **University Programs** School of Aviation - Eastern Kentucky University Bachelor of Science in Aviation - Eastern Kentucky University Space Systems Engineering, B.S. | Morehead State University | Kentucky

Program Area Consultants

Branch Manager, Cathy Hoehn-cathy.hoehn@education.ky.gov

Agriculture, Kristan Wright-kristan.wright@education.ky.gov

Business & Marketing, Angela Rush-angela.rush@education.ky.gov

Computer Science, Nathan Lytle-nathan.lyttle@education.ky.gov

Construction, Larry Huckaby-larry.huckaby@education.ky.gov

Education & Training, Camille Overstreet-camille.overstreet@education.ky.gov

Engineering, Roger Taylor-roger.taylor@education.ky.gov

Family & Consumer Sciences, Kayla Howard-kayla.howard@education.ky.gov

Health Science, Joyce Parker-joyce.parker@education.ky.gov

JROTC, Col. Timothy McDonald-timothy.mcdonald@education.ky.gov

Law & Public Safety, Erica Settelen-erica.settelen@education.ky.gov

Manufacturing, Barry Bond-barry.bond@education.ky.gov

Media Arts, Nathan Lytle-nathan.lyttle@education.ky.gov

Transportation, Robert Nolan-robert.nolan@education.ky.gov

Additional OCTE Contacts

Middle School Career Studies Consultant, Sharron Collins- sharon.collins@education.ky.gov

CTE Career Advising/Articulated Credit, John Paise-john.paise@education.ky.gov

Additional Resources

Career Videos

Work-Based Learning - Kentucky Department of Education

TRACK: Tech Ready Apprentices for Careers in Kentucky - Kentucky Department of Education

Registered Apprenticeships - Kentucky Works

Futuriti-Career Exploration in Kentucky

High-Demand Jobs in Kentucky by Region

Statewide Articulation Agreements - Kentucky Department of Education

Dual Credit - Kentucky Department of Education

KHEAA

Kentucky Council on Postsecondary Education

Kentucky Commission on Proprietary Education