



TENNESSEE DEPARTMENT OF

EDUCATION

DIVISION OF CAREER AND TECHNICAL EDUCATION

2014-15 Programs of Study Descriptions

What is a program of study?

A program of study (POS) is a clearly defined, progressive sequence of courses that are grouped by knowledge and skills in the career field and are aligned with postsecondary and industry opportunities. Programs of study are grouped into one of 16 nationally-recognized Career Clusters, and typically contain 3-5 courses.

Which students benefit from CTE courses and programs of study?

CTE courses are for all students, regardless of their postsecondary plans. CTE courses can be used to supplement other elective focus areas, based on student interest. All programs of study lead to postsecondary training, including Tennessee Colleges of Applied Technology (TCATs), community colleges, four-year universities, and on-the-job training and apprenticeships.

For additional information about any courses or programs of study in the 16 Career Clusters, please reach out to the following Career Cluster Consultants or visit the department's CTE webpage at: http://www.tn.gov/education/cte/Career_Clusters/Career_Clusters.shtml.

Agriculture, Food, & Natural Resources (AFNR)

Consultant: Steve Gass, Steven.Gass@tn.gov, (615) 532-2847

Veterinary and Animal Science

Veterinary and Animal Science is designed for students interested in learning more about becoming a veterinarian, vet tech, vet assistant, or pursuing a variety of scientific, health, or agriculture professions. In this program of study, course content covers such topics and skills as principles of health and disease, basic animal care and nursing, clinical and laboratory procedures, and the anatomical/physiological systems of a range of small and large animals. Upon completion of this POS, students will be prepared to pursue further study in the veterinary and animal sciences at the postsecondary level.

Agricultural Engineering and Applied Technologies

Agricultural Engineering and Applied Technologies prepares students for careers or further study in engineering, environmental science, agricultural design and research, and agricultural mechanics. Courses in this program of study address navigation, maintenance, repair, and overhaul of electrical motors, hydraulic systems, and fuel-powered engines. In addition, special emphasis is given to the many modern applications of geographic information systems (GIS) and global positioning systems (GPS) to achieve various agricultural goals, preparing students for immediate application of these skills in a career setting or postsecondary institution.

Agribusiness

The *Agribusiness* program of study teaches students to apply the economic and business principles involved in the sale and supply of agricultural products to a wide range of careers across the industry. In addition to building foundational knowledge of finance and marketing principles as they apply to agricultural businesses, courses in this program of study teach students essential leadership, management, and communications skills to help them succeed in future agribusiness careers. Upon completion of this POS, students will also be prepared for advanced business courses at the postsecondary level.

Food Science

Food Science is a new program of study designed to introduce students to the growing fields of food science and technology. Content covered in this POS includes plant and animal structural anatomy, systems physiology, economics of production, genetics and biotechnology, and other management approaches associated with plant and animal production. Advanced courses explore food safety and sanitation, foodborne pathogens, food-related standards and regulations, characteristics and properties of food products, processing and grading techniques and skills, and food labeling and packaging. Upon completion of this course, students will be equipped with the technical knowledge and skills necessary for further education and careers in food science.

Horticulture Science

Horticulture Science prepares students for future careers in the management of greenhouse operations, horticulture production, landscape design and maintenance, and turf management. Content covered in this POS includes principles of plant health, growth, reproduction, and biotechnology, principles of hydroponics and aquaponics, greenhouse structures, growing media, site analysis and planning, principles of design, and plant selection and care techniques. Upon completion of this POS, students will be prepared to pursue careers or further study in the horticultural sciences.

Environmental and Natural Resource Management

Environmental and Natural Resource Management is designed for students interested in learning more about becoming good stewards of our environment and natural resources, as an environmental scientist, conservationist, forester, or wildlife manager. This program of study covers environmental impacts, energy consumption, environmental public policy, and fundamental science and management of ecosystems, with special attention given to current agricultural practices that support the healthy and sustainable cultivation of major crops. Upon completion of this POS, students will be prepared for a range of careers associated with the science and management of plants, soils, wildlife, and natural resources.

Available courses for elective credit in this cluster: *Introduction to Geographic Information Systems (GIS)*

Architecture & Construction

Consultant: Rachel Allen, Rachel.Allen@tn.gov, (615) 532-2835

Production Design

In the *Production Design* program of study, students learn progressively more advanced skills to produce two-dimensional and three-dimensional scale drawings and orthographic projections using computer-aided drafting (CAD) software. As they progress through the POS, students create increasingly

sophisticated drawings for a variety of applications: engineering drawings (including architectural, civil, or plan drawings), assembly drawings, welding and process drawings, cross sections, 3D representations, bills of materials, and schedules. Upon completion of this POS, students will have had the opportunity to participate in an Entrepreneurship capstone and be prepared to further their study at a postsecondary institution in architecture, engineering, construction, and a number of related fields.

Electrical Systems

The *Electrical Systems* program of study prepares students with substantial knowledge and skills typically required for apprentice electricians. In this POS, course content focuses on both residential and commercial electrical systems, covering concepts and skills such as Ohm's law, conduits, conductors, National Electrical code (NEC) and local codes, overcurrent protection, lighting systems, three-phase motors, motor control circuits, sizing raceways, boxes, and fittings, and connecting distribution transformers. Upon completion of this POS, students will have participated in a laboratory experience conducted in a shop environment, in addition to being prepared for further study at the postsecondary level after taking an Entrepreneurship capstone.

Masonry Construction

Masonry Construction prepares students with the skills and knowledge related to masonry construction in both residential and commercial structures. Course content covers safe practices, interpretation of construction drawings, basic laying techniques, masonry reinforcement, arch construction, accommodations for weather, design of panel and curtain walls, construction planning, and scheduling. Upon completion of this POS, students will have had the opportunity to participate in an Entrepreneurship capstone and will have acquired the skill and knowledge base typically required for apprentice masons.

Concrete Construction

Concrete Construction prepares students with the skills and knowledge related to reinforced concrete construction in residential and commercial structures. Course content covers safe practices, construction drawing interpretation and site layout, composition of concrete, principles of reinforcement, form construction, load analysis, placing, curing, and testing concrete, design of concrete mixes, and design of reinforced concrete members. Upon completion of this POS, students will have had the opportunity to participate in an Entrepreneurship capstone and will have acquired the skill and knowledge base typically required for apprentice concrete artisans.

Plumbing

Plumbing prepares students with the skills and knowledge related to residential and light commercial plumbing. Course content covers concepts and skills such as water distribution processes, installation of hot and cold water systems, cutting and fitting pipe, physics principles, fuel piping systems, pressure reducers, backflow prevention devices, troubleshooting and repair, and DWV piping, vents, and drainage. Upon completion of this POS, students will have had the opportunity to participate in an Entrepreneurship capstone and will have acquired the skill and knowledge base typically required for apprentice plumbers.

Heating, Ventilation, Air Conditioning, and Refrigeration (HVAC/R)

The *HVAC/R* program of study prepares students for entry-level employment or advanced training as a service technician in residential and commercial heating, ventilation, air conditioning, and refrigeration. Course content covers tools and equipment, safety, hazards unique to HVAC/R work, physics principles,

mechanical refrigeration cycle, installation and servicing of HVAC/R systems, electricity, thermodynamics, psychometrics, diagnostics, forced air furnaces, air distribution systems, and heating/cooling load analysis. Upon completion of select courses in this POS, students will be eligible to take the Core, Type I, and Type II technician certifications of the EPA Proper Refrigerant Usage and Handling examination. Additionally, students will have had the opportunity to participate in an Entrepreneurship capstone as well as school-based and work-based learning experiences.

Welding

The *Welding* program of study is designed to prepare and certify students as entry-level welders. Basic arc welding and thermal cutting skills are developed over a series of three courses, which position students to complete a series of industry certification tests. Following the completion of the third-level *Advanced Welding Applications and Certification*, including successful passage of the industry certification tests, students will be certified as an *Entry Level Welder* as defined by American Welding Society QC10.

Carpentry

Carpentry prepares students with the knowledge and skills related to residential and commercial carpentry. Course content covers wood, metal, and concrete building materials, fasteners, hand and power tools, fabrication based on construction plans, framing of platform and post-and-beam structures, stairs, installation and trim of windows and doors, installation and repair of gypsum wallboard, advanced site layout, exterior finish work, thermal and moisture protection, and introduction to welding. Upon completion of this POS, students will have had the opportunity to participate in an Entrepreneurship capstone and will have acquired the skill and knowledge base typically required for apprentice carpenters.

Interior Design

The *Interior Design* program of study is designed for students interested in becoming residential or commercial interior designers. Course content covers concepts and skills such as elements and principles of design, sketching techniques for perspective floor plans, computer-aided drafting, board presentation techniques using textiles samples and three-dimensional sketches, building technology, building codes, product applications, product testing research and development, and project management for the interior design industry. Upon completion of this POS, students will have had the opportunity to participate in a work-based learning internship or similar placement, and will be equipped for further study of interior design at the postsecondary level.

Arts, Audio/Visual Technology, & Communications

Consultant: Rachel Allen, Rachel.Allen@tn.gov, (615) 532-2835

Printing Graphics

Printing Graphics prepares students for employment and/or entry into postsecondary education in the printing industry. Students study principles of design, digital image preparation, image assembly/platemaking, press operation, finishing and bindery operations, book image layout, basic accounting for the printing industry, project management and budgeting, and graphic communications knowledge in a project-learning setting. Upon completion of this POS, students will be positioned to advance in graphic design, digital imaging, and related graphic communications fields.

Design Communications

The *Design Communications* program of study is for students interested in pursuing careers as multimedia artists, animators, graphic designers, and communications specialists. Course content in this POS is designed to develop strong knowledge in communications technologies, animation and software applications, digital graphics, motion graphics, and more for a broad range of business and industry applications. Students will leverage digital tools to gather, evaluate, and use information, and apply design skills in the communication of materials as they would for an organization or company. Upon completion of this POS, students will be prepared to pursue advanced study in graphic design or communications, or seek entry-level employment with such organizations.

Audio Production

Audio Production is designed for students interested in becoming broadcast and sound engineering technicians and related occupations in audio production. In this program of study, students develop skills to conduct complete recording sessions and perform mix-down, mastering, and other post-production techniques. They also gain knowledge of the business behind the music industry in addition to developing the ability to mix audio in both live performance and studio settings. Upon completion of this POS, students will be prepared to enter postsecondary study or entry-level employment in audio engineering, audio broadcast production, music business, and more.

Journalism and Broadcasting

The *Journalism and Broadcasting* program of study is designed for students interested in a range of entertainment and news media fields. Course content centers on production of various broadcasting products, including commercials, music, news, and interactive programming. Students gain insight into the many facets of broadcast production, including but not limited to concept creation, scripting, sound design, visual design, engineering, editing, budgeting, and producing, as well as cameras, lights, sound, and set design. Upon completion of this POS, students will be prepared to seek employment or advanced training as a copywriter, art director, designer, journalist, and many other careers in entertainment and media.

Fashion Design

Fashion Design prepares students for further education and careers in the fashion industry. In addition to learning skills and knowledge related to the elements and principles of design, apparel manufacture and merchandising, basic marketing and product promotion, trend forecasting, and presentation, students complete a capstone project during which they design an original fashion line and create artifacts to include in a professional portfolio. Upon completion of this POS, students will be prepared for postsecondary study and careers in fashion design and fashion merchandising.

Available courses for elective credit in this cluster: *Interactive Multimedia Presentations*

Business Management & Administration

Consultant: Joy Smith, Joy.Smith@tn.gov, (615) 532-6248

Business Management

Business Management prepares students for the dynamic careers of today's business environments. Business Management careers encompass planning, organizing, directing, and evaluating business functions essential to efficient and productive business operations. In this program of study, students gain knowledge and skills in computer applications, accounting principles, business law, business

economics, and management. Upon completion of this POS, students will graduate with strong foundational skills transferrable to virtually any industry, and a broad range of knowledge to further their career, academic, or entrepreneurial goals.

Administrative and Information Support

The *Administrative and Information Support* program of study focuses on the knowledge and skills needed to be effective administrators and support specialists in a variety of business settings. Course content covers word processing, spreadsheet, database, and presentation software; business writing, effective communications, and digital citizenship; and advanced coursework in administrative management and computer applications. Upon completion of this POS, students will be equipped to continue their study of business at postsecondary institutions or seek immediate employment in entry-level positions with business and industry.

Health Services Administration

Health Services Administration introduces students to the growing field of health care informatics, management, and support. Students begin the program of study by learning foundational skills in business, including word processing, spreadsheet, database, and presentation software; they then move on to content related specifically to health science, administration, and the use and management of health information technologies. Upon completion of this POS, students will be prepared to enter a range of careers in the health sciences or business administration fields.

Available courses for elective credit in this cluster: *Interactive Multimedia Presentations, Accounting II, Personal Finance, Entrepreneurship, Financial Planning, and Banking & Finance*

Education & Training

Consultant: Deborah Thompson, Deborah.Thompson@tn.gov, (615) 532-2840

Teaching as a Profession (K-12)

Teaching as a Profession is designed for students interested in becoming an educator. In this program of study, course content covers the components of instruction, teaching strategies, types of assessments, student learning, special populations, educational technology, classroom management, lesson planning, professionalism, and more. Upon completion of this POS, students will have participated in an internship placement and built a professional portfolio in preparation for advanced training as future educators at the postsecondary level.

Early Childhood Education (pre-K-4)

Early Childhood Education is designed to prepare students for careers as an early childhood teacher. Course content covers the components of curriculum planning, student learning, screening and assessing, and many other skills related to teaching younger populations. Upon completion of this program of study, students will have had the opportunity to work alongside educators in an internship experience, compile artifacts for a professional portfolio, and graduate prepared for further training at the postsecondary level.

Educational Support Careers

Educational Support Careers focuses on the skills and knowledge needed for occupations that support the everyday functioning of school environments, such as school counselors. In this program of study, students are exposed to all the critical components of effective teaching and learning at the K-12 level, as well as professional ethics, communication skills, school counseling models, and counseling approaches for a range of ages. Upon completion of this POS, students will have had the opportunity to work alongside educators in an internship experience, compile artifacts for a professional portfolio, and graduate prepared for further study in a variety of educational support fields.

Available courses for elective credit in this cluster: *Lifespan Development*

Finance

Consultant: Joy Smith, Joy.Smith@tn.gov, (615) 532-6248

Banking and Finance

In the *Banking and Finance* program of study, students gain an understanding of the banking and financial industries, beginning with basic economics as the underlying basis of the transfer and growth of money in the financial services system. Content in this POS covers business principles, accounting, and bank services management, ranging from traditional means (savings and loans, credit unions, and local banks) to newer ventures (insurance companies, brokerage houses, and internet-based services). Upon completion of this program of study, students will have gained the skills and knowledge to pursue careers in the various fields of this industry or continue on to postsecondary study.

Accounting

The *Accounting* program of study encompasses careers that record, classify, summarize, analyze, and communicate a business's financial information and business transactions for use in management decision-making. Accounting includes such activities as bookkeeping, systems design, analysis, and interpretation of accounting information. Upon completion of this program of study, students will have achieved the academic knowledge and skills required to pursue the full range of career and postsecondary opportunities available within this industry.

Financial Planning

The *Financial Planning* program of study includes the study of how business financial services function in a company to make policy and strategy for (and the implementation of) capital structure, budgeting, acquisition and investment, financial modeling and planning, funding, dividends, and taxation. Course content includes legal and ethical issues, the examination of investment opportunities, retirement plans, and plans for administering disposition of estate property. Upon completion of this program of study, students will be equipped with the knowledge and skills required to pursue career and postsecondary opportunities in wealth management, financial consulting, and related fields.

Available courses for elective credit in this cluster: *American Business Legal Systems, Entrepreneurship*

Government

Consultant: Sheila Carlton, Sheila.Carlton@tn.gov, (615) 532-2839

Public Management and Administration

Public Management and Administration is designed for students interested in careers in government and civil service. In this program of study, course content covers such topics as philosophies of constitutional government, government provision and administration of services, ethical and legal issues faced by public officials, government funding sources, laws and regulations, budgeting practices, and community planning. Upon completion of this POS, students will be prepared for a wide range of careers in the public and non-profit sectors, or for advanced study in business, public affairs, or public administration at the postsecondary level.

Available courses for elective credit in this cluster: *Court Systems and Practices*

Health Science

Consultant: Sheila Carlton, Sheila.Carlton@tn.gov, (615) 532-2839

Biotechnology Research

The *Biotechnology Research* program of study provides students with the skills and knowledge for the ever-changing world of biomedical science. These students will incorporate the life sciences into the medical sciences by exploring physiological and biochemical functions, anatomy and histological structures, epidemiology, and pharmacology to maintain and promote health in humans. Upon completion of this POS, students will be prepared to move into a postsecondary Biomedical Science course of study to pursue careers in the study of cancer, AIDS prevention, Forensic Science, or other field related to the science of the human body.

Public Health

Americans' overall health is on the decline; students in the *Public Health* program of study examine why and how the increase in chronic conditions affects not only individuals, but the health of their communities and the general public. Course content includes knowledge and skills to better help communities prepare for and respond to disaster; public health problems and strategies for alleviating them; evaluation of the rise in mental health diseases and disorders; and examination of how the health of the United States is related to larger global health issues. Upon completion of this POS, students will be prepared for advanced study at the postsecondary level in the areas of epidemiology, health policy, and similar public-health-related fields.

Diagnostic Services

The *Diagnostic Services* program of study provides students with skills and essential knowledge to investigate an individual's health status through various diagnostic procedures. Students will explore careers in medical laboratory, radiology, cardiovascular service, and pulmonology to determine underlying causes of diseases and disorders. Students can further investigate those careers through Clinical Internship experiences. Upon completion of this POS, students will be prepared to pursue advanced study in pre-med and related medical fields at the postsecondary level.

Health Informatics

Electronic Medical Records and billing are changing rapidly, and with these changes there is a significant increase for health care professionals proficient in health informatics, health information technology, and health information management. Students who complete the *Health Informatics* program of study will learn foundational knowledge and skills for each of these areas. Upon completion of this POS, students can pursue further study at the postsecondary level or enter a medical office as a beginner medical record assistant.

Therapeutic Nursing Services

The *Therapeutic Nursing Service* program of study prepares students to pursue careers or further education and training in nursing directly out of high school. The POS is designed to equip students with knowledge and skills for a range of nursing careers, and students will be given the opportunity to practice their skills on clients/residents/patients in a health care setting. Students who have completed Health Science Education, Medical Therapeutics, and Nursing Education will be eligible to sit for the Certified Nursing Assistant (CNA) examination in addition to learning about other occupations in the nursing fields.

Emergency Services

Emergency Medicine is more than reacting to an emergency situation; it also involves preparation and prevention of emergency situations. The *Emergency Services* program of study provides students with skills and knowledge to plan, prepare, and care for emergencies, and to obtain their Emergency Medical Responder certification after completing the Emergency Preparedness, Anatomy and Physiology, and Emergency Medical Services courses. The program of study also serves as a strong foundation for those seeking advanced study at the postsecondary level.

Therapeutic Clinical Services

The *Therapeutic Clinical Services* program of study courses prepares students for careers in medicine, dentistry, physical therapy, pharmacology, nutrition, and many more established and emerging fields in the healthcare sector. Course content provides foundational knowledge and skills in each of these areas, while also giving students the opportunity to participate in a Clinical Internship. Upon completion of this POS, students will be prepared to pursue advanced training in clinical services at the postsecondary level, or seek entry-level employment in a range of healthcare fields.

Hospitality & Tourism

Consultant: Deborah Thompson, Deborah.Thompson@tn.gov, (615) 532-2840

Culinary Arts

Culinary Arts is designed to prepare students for careers in the culinary field as a personal chef, caterer, executive chef, and food and beverage manager. Course content covers the components of commercial kitchen safety and sanitation, proper tools and equipment, quality food production, and service operation. Upon completion of this program of study, students will gain experience in commercial food production and service operations, while preparing for further training at the postsecondary level.

Hospitality and Tourism Management

Hospitality and Tourism Management focuses on the skills and knowledge needed for careers within the hospitality industry, including hotel management, customer service, and travel advising. In this program

of study, students investigate the impact of the hospitality industry on the local and global economy, marketing foundations and functions, and human resource management. As students progress through the program of study, they will have the opportunity to complete a Work-Based Learning (WBL) experience as they prepare for future training at the postsecondary level.

Sports & Entertainment Management

Sports & Entertainment Management is designed to prepare students for occupations such as sales representative, community relations coordinator, and promotions manager. The course content covers facility design, merchandising and advertising, public relations/publicity, and event marketing. As the students progress through the program of study, they will have the opportunity to complete a Work-Based Learning (WBL) experience as they prepare for future training at a postsecondary level.

Available courses for elective credit in this cluster: *Exploration of Organizational Leadership & Marketing*

Human Services

Consultant: Deborah Thompson, Deborah.Thompson@tn.gov, (615) 532-2840

Childhood Development Services

Early Childhood Education is designed to prepare students for careers as a preschool teacher, nanny, or childcare provider. Course content covers the components of child development, planning age-appropriate activities, learning environments, and many other skills related to teaching younger populations. Upon completion of this program of study, students will get to work along educators with younger populations, compile artifacts for a professional portfolio, and be prepared for further training at the postsecondary level.

Social Health Services

Social Health Services focuses on the skills and knowledge needed for occupations that support the everyday functioning of society, such as social services workers, counselors, and family mediators. In this program of study, students investigate human needs and their impact on lifespan development, an overview of the human and social services fields, communication skills, and the historical and social changes of the modern family. As students progress through the program of study, they will compile artifacts for a portfolio in preparation for future training at a postsecondary level.

Dietetics and Nutrition

Dietetics and Nutrition is designed to prepare students for occupations that focus on nutritional well-being, such as dietitian or nutritional counselor. The course content covers the foundations of human needs, nutritional requirements and issues, nutrients and their relation to disease, and disease prevention. Upon completion of this POS, students will graduate with a professional portfolio and will be prepared for further study or a variety of nutritional career opportunities.

Cosmetology

Cosmetology is designed to prepare students for careers within the personal care industry, including hairstylist, colorist, and nail technician. The courses in the program of study cover the safety procedures in salon environments, principles of hair design, nail structures, and chemistry of color application. Students may acquire hours to transfer to a postsecondary institution to complete the requirements

needed to be eligible to take the Tennessee State Board of Cosmetology examination for a Tennessee Cosmetology License. Upon completion of 300 hours, students are eligible to take the Tennessee State Board of Cosmetology Shampooing examination for a Shampoo Technician License.

Barbering

Barbering focuses on the skills and knowledge needed for individuals interested in careers within the barbering industry. Course content provides students with the opportunity to acquire fundamental skills in barbering theory while applying technical skills related to safety, principles of hair, nail structure, and scalp care. Upon completion and acquisition of 340 hours, students are eligible to take the Tennessee Board of Barbering Examination for a Tennessee Barbering Technician License.

Available courses for elective credit in this cluster: *Personal Finance*

Information Technology

Consultant: Bethany Wilkes, Bethany.Wilkes@tn.gov, (615) 532-2844

Programming and Software Development

The *Programming and Software Development* program of study (POS) is intended for students who wish to pursue careers such as computer programmer, programmer analyst, software engineer, software developer, or video game designer. Course content introduces students to fundamental information technology concepts, then progresses to topics such as object-oriented programming, software development life-cycle, software testing, quality assurance, ethics, and project management. Upon completion of this POS, students will have gained valuable training in the Game Programming or AP Computer Science capstone course, and be prepared for postsecondary study in computer science or management information systems.

Networking Systems

The *Networking Systems* program of study is designed for students interested in careers such as network administrator, network technician, computer systems analyst, information systems operator, or PC support specialist. The course content is competency-based, introducing students to fundamental information technology concepts, then progressing to cover key topics such as industry standards and specifications; troubleshooting, replacing and upgrading computers; designing, managing, and diagnosing network hardware and software; cabling system design; and cabling installations. Upon completion of the POS, students will have an opportunity to gain work-based learning training through the IT Clinical capstone course, and be prepared for postsecondary study in computer networking technology, computer engineering technology, or computer information technology.

Web Design

The *Web Design* program of study is for students who wish to pursue careers such as web designer, web developer, social networking specialist, search engine optimization specialist, or search engine marketing specialist. Course content covers key topics including pixelated and vector-based web design, web graphics, web animation, web hosting, and eCommerce. Upon completion of this POS, students will be prepared to pursue an associate degree or certificate from a postsecondary institution, as well as industry recognized certifications.

Available courses for elective credit in this cluster: *Introduction to Geographic Information Systems (GIS), Interactive Multimedia Presentations*

Law, Public Safety, Corrections, & Security

Consultant: Sheila Carlton, Sheila.Carlton@tn.gov, (615) 532-2839

Law Enforcement Services

Law Enforcement Services prepares students for a range of careers in law enforcement, crime scene analysis, forensic science, public safety, and criminal justice. Course content emphasizes procedures and laws governing the application of justice in the United States, from constitutional rights to crisis scenario management to the elements of criminal investigations. Upon completion of this POS, students will be equipped with strong knowledge and skill preparation for postsecondary or career opportunities in many law- and justice-related fields.

Fire Management Services

The *Fire Management Services* program of study is designed for students interested in becoming a firefighter or fire management professional. The sequence of courses provides comprehensive preparation in firefighter safety, fire behavior, building construction guidelines, use of firefighter equipment, safety with hazardous materials, and more. Upon completion of this POS, students will have acquired the skills and knowledge needed to pursue a career as a Firefighter I, and will be prepared, after graduation, to further their instruction at a training facility.

Legal and Correction Services

Legal and Correction Services is designed for students interested in the legal aspects of law, public safety, and corrections. In this program of study, course content covers a wide range of knowledge and skills related to the criminal court system process, with particular emphasis on the elements and procedures of the justice system. Upon completion of this POS, students will be prepared to pursue advanced study in law and criminal justice, or to enter a variety of careers in law enforcement, public safety, and corrections.

Manufacturing

Consultant: Bethany Wilkes, Bethany.Wilkes@tn.gov, (615) 532-2844

Machining Technology

The *Machining Technology* program of study is designed for students interested in careers such as machinist, computer-numerical-control (CNC) machine operator, machine setter, or tool and die maker. This program is structured to offer students an overview of concepts related to the field of manufacturing. Students will learn concepts and practices needed to be successful in a production environment supported by advanced machining and engineering facilities. Upon completion of this POS, students will have gained experience to pursue postsecondary education and certifications related to the metalworking industry.

Electromechanical Technology

The *Electromechanical Technology* program of study is designed for students who wish to pursue careers related to industrial maintenance, such as electromechanical technician, electromechanical

equipment assembler, maintenance technician, or test technician. The course content is competency-based and focuses on analytical understanding and troubleshooting. Key topics cover the operation and maintenance of electrical, instrumentation, and mechanical systems found in typical manufacturing facilities. Upon completion of this POS, successful students will have learned skills and knowledge needed to enter a postsecondary electromechanical associate degree or technical certificate program.

Mechatronics

The *Mechatronics* program of study is designed for students interested in becoming a mechatronics technician, electrical technician, mechanical engineering technician, robotics technician, or mechatronics engineer. Course content focuses on the components of manufacturing systems, collection and analysis of quality data, electronics, mechanics, fluid power systems, computers and control systems, and technical documentation and troubleshooting. Upon completion of this POS, students will be prepared to pursue industry certification at a technology college or more advanced coursework at a two-year or four-year postsecondary institution.

Available courses for elective credit in this cluster: *Project Lead the Way (PLTW)* courses aligned to Manufacturing, and Robotics and Automation

Marketing

Consultant: Joy Smith, Joy.Smith@tn.gov, (615) 532-6248

Marketing Communication

The *Marketing Communication* program of study is designed for students interested in working in advertising, communications, public relations, and related fields. Course content covers interpersonal and communication skills in business settings, marketing and management, organizational leadership, advanced strategies for promoting products and services, and key concepts such as segmentation and target marketing, social media and digital marketing, market research and data management, and public relations. Upon completion of this POS, students will be prepared to succeed in a variety of marketing-related careers and further their study at the postsecondary level.

Entrepreneurship

The *Entrepreneurship* program of study is for students who want to start, own, and operate their own businesses. Through broad coursework in organizational leadership, marketing and management, and advanced marketing strategies, students progress toward a capstone course in Entrepreneurship and/or Virtual Enterprise International. Upon completion of this POS, students will be equipped with the knowledge and skills to start their own businesses, refine their study at the postsecondary level, or contribute to an existing business in the career path of their choice.

Merchandising

Merchandising is a program of study for students interested in working in retail operations, sales, management, or marketing research. Course content covers the essential principles of marketing, organizational leadership, and professional communications, and then explores economic concepts related to retailing, marketing information systems, distribution strategies and inventory methods, buying and pricing, business plans, and research methods for the collection and analysis of marketing information. Upon completion of this POS, students will be prepared for further study at the

postsecondary level or for entry-level management positions in retail establishments and related businesses.

Available courses for elective credit in this cluster: *Sports and Entertainment Marketing, Hospitality Management, Travel & Tourism, and Personal Finance*

STEM

Consultant: Bethany Wilkes, Bethany.Wilkes@tn.gov, (615) 532-2844

Engineering by Design (EBD)

The *Engineering by Design* POS is a proprietary curriculum package available to districts as an approved CTE program of study. Engineering by Design is a national standards-based model that delivers technological literacy in a STEM context (<http://www.iteea.org/EbD/ebd.htm>). Courses marked EBD may require additional costs and training to implement.

Engineering

Engineering is a new program of study designed for students interested in the various disciplines of engineering and engineering technology. Course content is arranged around four sequenced, progressive courses that provide students with the opportunity to develop critical thinking skills and understanding of engineering concepts. Students then apply these skills in conjunction with the multi-step engineering design process to solve real-world problems. The capstone Engineering Practicum course places students with industry partners to complete a design project, report the results, and present their project before an audience. Students have the option to complete AP Physics as an alternative to the Engineering Practicum course. Upon completion of this POS, students will be prepared to pursue engineering studies at postsecondary institutions.

Technology

The *Technology* program of study is for students who wish to pursue careers in robotics, electronics, and related engineering and technology fields. Course content introduces students to the principles of engineering and the engineering design process, then progresses to apply these skills in the context of robotics, electronics, and automated systems. Upon completion of this POS, students will have gained valuable training in an Engineering Practicum or AP Physics capstone course, and be prepared for advanced study in a variety of STEM fields at the postsecondary level.

STEM Education

STEM Education is a new program of study designed for students interested in the exciting careers available in the high-demand fields of science, technology, engineering, and mathematics. This program of study is uniquely structured to offer students an overview of STEM fields, occupations, and applications in the first year, followed by more specialized study of the scientific inquiry or engineering design process in subsequent years, culminating in a portfolio and internship experience. Upon completion of this POS, students will be prepared to pursue advanced study in the STEM field of their choice at a variety of postsecondary institutions.

Project Lead the Way (PLTW)

The *Project Lead the Way* POS is a proprietary curriculum package available to districts as an approved CTE program of study. Project Lead the Way is a national model for STEM instruction focusing on

activity-, project-, and problem-based learning (<https://www.pltw.org/our-programs>). Courses marked PLTW may require additional costs and training to implement.

Available courses for elective credit in this cluster: *Introduction to Geographic Information Systems (GIS)*

Transportation, Distribution, & Logistics

Consultant: Rachel Allen, Rachel.Allen@tn.gov, (615) 532-2835

Automotive Maintenance and Light Repair

Automotive Maintenance and Light Repair courses prepare students for entry into the automotive service industry as an ASE Certified MLR Technician or other maintenance occupation dealing with automotive technologies. Students study and service automotive HVAC systems, engine performance systems, automatic and manual transmission/transaxle systems, and practice workplace soft skills. Upon completion of this program of study, students will be equipped with the knowledge and skills to be a successful automotive service technician, have satisfied course requirements to meet the National Automotive Technicians Education Foundation (NATEF) standards, and be prepared to pursue further study at a technology center or other postsecondary institution.

Automotive Collision Repair

The *Automotive Collision Repair* program of study prepares students for entry into careers as professional service technicians. Content emphasizes customer service skills, proper use of tools and equipment, safety, shop operations, engine fundamentals, damage analysis, cost estimation, painting and refinishing, and structural and non-structural repair in a hands-on environment. Upon completion of this POS, students will be eligible to take the examination for Automotive Student Excellence (ASE) Student Certification in Collision.

Aviation Flight

Aviation Flight is a completely redesigned pathway intended to prepare students to be successful in a range of aviation careers, such as pilots, aircraft engineers, air traffic control specialists, aircraft mechanics, or airline statisticians. Course content covers the knowledge and skills of all aspects of flight needed to pass the Federal Aviation Administration (FAA) Private Pilot written exam, including aircraft structures, flight environment, procedures and regulations, aerodynamics of flight, judgment training, navigation, communications, and more. Upon completion of this POS, students will be prepared to take the FAA Private Pilot written exam and will be able to advance more quickly through the training hours typically required to solo in an aircraft after graduating. In addition, a range of postsecondary opportunities are available in this pathway within Tennessee and beyond.

Aviation Maintenance

The *Aviation Maintenance* program of study is designed for students interested in careers in aviation that do not involve piloting, air traffic control, or management and coordination of aviation facilities. In this POS, students learn to build, repair, and maintain aircraft structures and parts for the safe and efficient operation of commercial/private flight services. Upon completion of this POS, students will be prepared to continue on to advanced training or postsecondary study in the areas of aerospace engineering, mechanics, and manufacturing.

Distribution & Logistics

The *Distribution & Logistics* program of study prepares students for many management and operations careers in the transportation industry. In this POS, students learn about the dynamics of distribution networks, the managing and tracking of inventory, how distribution and logistics operations fit within the supply chain of a product or a business, and the problem-solving skills to design logistics solutions for businesses. Upon completion of this POS, students will have had the opportunity to participate in a work-based learning experience in a transportation, distribution, and logistics-related business, and be prepared for advanced postsecondary study in business, supply chain management, and related fields.

2-4 Cycle Engines

The *2-4 Cycle Engines* program of study prepares students for entry-level positions or advanced training in 2 & 4 cycle engines. Course content focuses on 2 & 4 cycle engines used on motorcycles, all-terrain vehicles (ATV), jet skis, outboard motors, garden equipment, and outdoor power equipment and vehicles. Students conduct inspections, tests, and measurements for diagnosis, and learn the procedures and skills to perform needed repairs. Courses are meant to simulate small engine industry operations through the use of training aids and modules and through school-based and work-based learning opportunities. Upon completion of this POS, students will have experienced training for a 2 & 4 cycle engine certification from the Equipment and Engine Training Council (EETC).

Diesel Technology

The *Diesel Technology* program of study offers training in the testing and repairing of diesel engines and related systems. Course content focuses on preventative maintenance and study of the electrical/electronic components of diesel systems, including training in testing equipment such as digital multimeters (DMM) and ammeters. In the capstone course, students learn to perform inspections, tests, and measurements for diagnosis as well as repair. Course content prepares students to continue in postsecondary education for advanced training in diesel service technology, for entry-level employment in diesel engine repair, and to take the ASE written examinations for Heavy Truck Preventive Maintenance, Electrical and Electronics in Medium/Heavy Trucks, and Diesel Engine.

Available courses for elective credit in this cluster: *Entrepreneurship*