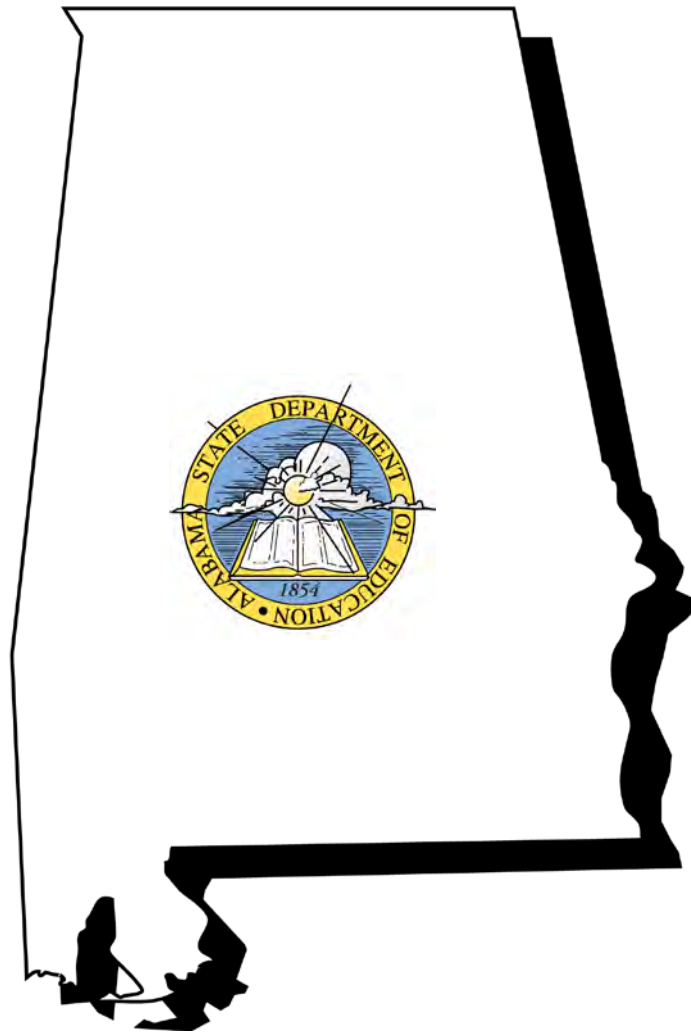


Alabama Course of Study Career and Technical Education



Joseph B. Morton
State Superintendent of Education
ALABAMA DEPARTMENT OF EDUCATION

**STATE SUPERINTENDENT
OF EDUCATION'S MESSAGE**

**MEMBERS
of the
ALABAMA STATE BOARD
OF EDUCATION**

Dear Educator:

The *Alabama Course of Study: Career and Technical Education* presents a sound curriculum designed to prepare students for the career and technical education demands of the future in both the workplace and in the postsecondary education setting. Local school system teachers and administrators will find this document to contain a challenging set of standards for students at each grade level and career interest. I encourage each system to use the document to develop local curriculum guides to determine how local school students will achieve these standards and perhaps go beyond them.

Local system leadership, school leadership, and effective classroom instruction are instrumental in students' success. Important local decisions include **how** students will accomplish these standards, in **what sequence** teachers will address them, and **how much time** will be allotted for instruction of the standards. These decisions are as significant as the identification of **what** students need to know and be able to do.

I heartily endorse the curriculum goal of career empowerment through knowledge and skills. To help students meet current demands, reading, writing, research, mathematical, and critical-thinking skills are emphasized throughout this document in all curriculum areas.

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Alabama Course of Study: Career and Technical Education

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PREFACE

The 2008 *Alabama Course of Study: Career and Technical Education* provides the framework for the Grades 7-12 study of career and technical education in Alabama's public schools. Content standards in this document are minimum and required (*Code of Alabama*, 1975 §16-35-4), fundamental and specific, but not exhaustive. Courses are organized by clusters, which are aligned with national standards. When developing local curriculum, school systems may include additional content standards to reflect local philosophies and needs and add implementation guidelines, resources, and activities.

In developing the minimum required content, the 2007-2008 Career and Technical Education Course of Study Committee and Task Forces made extensive use of the *Alabama Course of Study: Career/Technical Education* (Bulletin 2002, No. 20) as well as national standards documents and certification standards.

In addition, Committee and Task Forces members reviewed information found in professional journals, Internet Web sites, and similar documents from other states. The Committee and Task Forces attended state and national conferences, listened to and read suggestions from interested individuals and groups throughout Alabama, considered suggestions from independent reviewers, sought the advice of advisory councils, and discussed each issue and standard among themselves. Finally, the Committee reached unanimous agreement that the standards contained herein provide a sound and challenging career and technical education curriculum for Alabama's students.

Acknowledgments

This document was developed by the 2007-2008 Career and Technical Education Course of Study Committee and Task Forces composed of middle school, high school, and college educators appointed by the State Board of Education and business and professional persons appointed by the Governor (*Code of Alabama*, 1975, §16-35-1). The Committee and Task Forces began work in March 2007 and submitted the document to the State Board of Education for adoption at the March 2008 meeting.

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ALABAMA'S CAREER AND TECHNICAL EDUCATION CURRICULUM

General Introduction

Alabama's Career and Technical Education curriculum empowers students with the work-readiness skills necessary for success in the twenty-first century. Career-empowered students are productive citizens who are prepared with the knowledge and skills for postsecondary education or for employment. The career and technical education classroom provides an opportunity for all students to combine academics with other high-caliber learning experiences.

This course of study is intended for all students in Grades 7-12 in the general or comprehensive school setting and in specialized career and technical educational center settings. Within these settings, student learning is strongly encouraged by teachers who stimulate their interests and curiosities concerning the world around them. As students grow through adolescence into young adulthood, exposure to career preparedness becomes increasingly important. The Career and Technical Education curriculum focuses on providing students with the knowledge and skills that allow them to reinforce learning of academic content through experiential learning.

The content of this program is based on the sixteen career clusters identified by the United States Department of Education for providing a framework for arranging curriculum and instruction around groups of similar occupations. Within the clusters, separate content standards have been developed for fifty career pathways.

Alabama's Career and Technical Education program is designed to keep abreast of the rapid changes in business and industry by offering students a rigorous array of course work to help prepare them for advanced learning and a wide range of career opportunities. Rigor in the course of study is derived from two primary sources—**academic** and **industry-specific** workplace knowledge and skills. Rigor in the workplace is evidenced by the knowledge and skills required for students to achieve, maintain, and advance in employment in a particular pathway. The level of academic and workplace rigor is a function of the degree to which each career and technical education program prepares students for high-skill, high-wage, or high-demand careers. For select career opportunities, credentials and certifications have been established that validate the rigor of the curriculum to parents, students, and business and industry. In addition, articulation agreements in partnership with postsecondary institutions have been developed to allow for a seamless transition for students pursuing opportunities for continued education.

Alabama's growing economy has created the demand for an increased number of quality employees. The Career and Technical Education program of studies, through the implementation of this course of study, equips students with the life skills and knowledge necessary to meet this and other demands by preparing them for lifelong learning.

ALABAMA'S CAREER AND TECHNICAL EDUCATION CURRICULUM

Conceptual Framework

Alabama's Career and Technical Education program is designed to empower students to meet the daily challenges of the twenty-first century with the work-readiness skills needed for success. This program provides a curriculum wherein students are actively engaged in learning through career-oriented activities.

A graphic representation of the program is shown on the conceptual framework graphic located on page 3 of this document. The framework, represented by a wheel with a hub in the center of the diagram, spokes that extend from the center outward, and three outer rings, depicts in broad terms the sequence of student learning opportunities for pursuing individual career objectives within the Career and Technical Education program.

The goal, *Career Empowerment Through Knowledge and Skills*, is common to all the clusters as represented by its prominent position on the hub of the wheel. The sixteen national career clusters, each of which contains a foundation course embedded with the essential knowledge and skills common to all career and technical education programs, encircle and form the outer rim of the hub. The fifty supported national career pathways are represented on the spokes of the wheel that radiate from the hub to the outer rings. These national career pathways supply a sequence of courses designed to provide students strong backgrounds in specific careers leading to work-based learning, four-year college and university programs, and other postsecondary programs as indicated on the three outer rings of the wheel. The Career and Technical Education curriculum, together with postsecondary and four-year college and university programs, empowers students to become competitive employees and productive citizens.

CAREER AND TECHNICAL EDUCATION



POSITION STATEMENTS

Classroom and Laboratory Environment

The effective career and technical education classroom is equipped with current and emerging technologies and other supplies and materials representative of the content area. In such a classroom, students and teachers utilize equipment to enhance a variety of classroom instruction and learning activities. The career and technical education classroom environment is unlimited and encompasses more than the traditional four walls of the classroom. Students and teachers have access to laboratory environments on and off campus that provide students with practical and real-world experiences in the industry represented.

Technology, Equipment, and Facilities

Adequate classroom equipment must be available, maintained, and upgraded according to a regularly scheduled plan. In addition, other classroom supplies and materials such as textbooks, reference materials, and software should be readily available for student use to support instruction, including access to classroom libraries, reading and research areas, and material centers. Maintaining up-to-date technology enhances students' learning environment as well as readies them for future career opportunities. Sufficient funds must be allocated to support the technology and materials necessary for a superior career and technical education program.

Safety

Student safety is a prime consideration in any location of the learning environment. A written safety plan is an essential part of planning, implementing, and evaluating each career and technical education program. An effective plan may include federal, state, local, school, and program guidelines. Students are required to pass a safety test with one-hundred per cent accuracy.

Professional Development

As technology and instructional methods continue to change, it is essential for teachers to take advantage of professional development and technical training opportunities to stay abreast of current trends and methods pertaining to their content area and the industry represented. Teachers who continually expand their knowledge and skills are able to adjust the learning environment to reflect current and emerging trends in teaching methods and learning styles. Regular assessment by students, educators, administrators, and business and industry also strengthens the instructional program and enhances professional development.

Administrative Support

Administrative support is essential in providing the necessary components for a successful career and technical education program. Administrators should recruit teachers who are highly qualified and who possess appropriate credentials for teaching positions. Time must be provided for professional development activities and for planning for integration of academic content areas into the Career and Technical Education program. Funding must be secured for professional development programs and for industry certification for teachers. In addition, administrators should actively participate in the marketing of the career and technical education programs within the school and within the community.

Instructional Model

In the career and technical education classroom, it is imperative that students apply knowledge, skills, and ideas to solve problems and make decisions. This course of study is designed to address the challenges of a changing, technological, diverse, and global society. Students develop their abilities to analyze, communicate, manage, and lead. The Career and Technical Education curriculum is one that is project-based, process-oriented, and work-based.

The rigorous content standards contained in this document require students to use innovative, critical-thinking skills. Utilization of this document requires teachers to identify the issue or concern addressed in a specific content standard and then to plan appropriate learning experiences. These experiences should be project-based and require higher-order thinking, communication, management, and leadership skills.

The Career and Technical Education curriculum emphasizes the integration of academics. To achieve the solution to a given problem, students must possess an adequate foundation in communication skills for reading, writing, speaking, listening, viewing, and presenting; knowledge and skills in mathematics, science, and social studies; and knowledge of current and emerging technologies.

Students' individual learning styles and interests require the use of various instructional strategies. Individual needs of students must be determined by a variety of assessments that evaluate interests, aptitudes, and abilities. Once individual needs have been determined for special populations, a support service program should be planned cooperatively with the career and technical education teacher and other appropriate personnel. Individual education plans are more effective when developed with career and technical education instructors. Courses and equipment may be tailored to ensure equal access to the full range of learning experiences and skill development in the Career and Technical Education curriculum.

Student Organizations

Nationally affiliated student organizations are an integral part of classroom instruction in each career and technical education program. The focus of these organizations is to help students develop an understanding of all aspects of industry and technology in the program areas while learning teamwork and leadership skills. Goals of student organizations include:

- Developing individual potential;
- Developing effective leadership and citizenship skills through social, economic, scholastic, and civic activities;
- Increasing knowledge and understanding of an ever-changing society;
- Assisting in the exploration of occupational choices;
- Participating in career development events; and
- Serving the school and community through student organization projects.

Business-Industry-School Relationships

Certification

Maintaining relationships with local businesses and industries is vital to the Career and Technical Education program certification process as well as to federal funding through the Carl D. Perkins legislation. Certain elements of Business and Industry Certification (BIC) require local industries to participate in the Career and Technical Education program's adoption of industry standards. Representatives from local businesses and industries interact with school programs to address the ever-changing needs of the competitive global economy. From this interaction, program structure is reviewed to ensure that needs are being met through lesson plans, instructional techniques, facilities, professional development, technical updates, and equipment.

Student Work Experience

As students begin to plan careers, it is essential to provide them with opportunities to visit, tour, and work at local industries and businesses. Real-world experiences such as cooperative education, internships, apprenticeships, and job shadowing are beneficial to enhance classroom learning. Continuous feedback from students and supervisors provides further assessment of the program and facilitates changes necessary to satisfy industry needs.

Advisory Councils and Partnerships

In accord with Alabama Department of Education guidelines, each career and technical education program has an advisory council that may provide opportunities to establish partnerships as a means for professional input regarding equipment needs, curriculum emphasis, technical updates, and problem solving. This external support is a necessary link to business and industry for the potential acquisition of equipment, resource materials, community support, and qualified speakers. These resources include judges for student career development events, program sponsors, financial support, scholarships, field trip sites, and other program needs.

Community Involvement and Service

There are many ways students and teachers become involved with community and service projects. Mentoring activities may include teacher-to-teacher, teacher-to-student, student-to-student, student-to-community resident, and community member-to-students-and-teacher. Local organizations such as community civic clubs, professional educational organizations, youth organizations, and community adult education organizations are valuable resources for career and technical education programs. Open houses, tours, and presentations provide families and other interested citizens with opportunities to become more involved in the education environment.

Postsecondary and Higher Education Articulation

Postsecondary and higher education articulation is a significant element in a student's career clusters. Secondary and postsecondary instructors must communicate on a regular basis to ensure a smooth transition for students and to ensure students are aware of articulation opportunities. Articulation may occur through program alignment with postsecondary programs, early college enrollment, or dual enrollment programs. Students benefit in a variety of ways when cooperation exists between secondary and postsecondary institutions. One of the benefits is the earning of postsecondary credit in conjunction with work done at the secondary level. Postsecondary teachers offer additional

benefits by serving as guest speakers, donating equipment, sharing expertise through professional development activities, and addressing other needs appropriate for the school community.

CAREER CLUSTERS, PATHWAYS, AND COURSE WORK

Alabama’s Career and Technical Education program is representative of the national career and technical education model. The national model includes sixteen career clusters. Career clusters in Alabama’s curriculum include courses that identify academic and technical knowledge and skills needed for students to pursue a wide range of career opportunities. Courses provide rigor and relevance for students by linking school-based learning with career-related experiences. Career clusters provide the framework for what students need to know and be able to do for success in the twenty-first century. The sixteen clusters included in this document are:

- Agriculture, Food, and Natural Resources
- Architecture and Construction
- Arts, Audio-Video Technology, and Communications
- Business, Management, and Administration
- Education and Training
- Finance
- Government and Public Administration
- Health Science
- Hospitality and Tourism
- Human Services
- Information Technology
- Law, Public Safety, Corrections, and Security
- Manufacturing
- Marketing, Sales, and Service
- Science, Technology, Engineering, and Mathematics
- Transportation, Distribution, and Logistics

The following pages contain both a narrative and a chart for each of the sixteen career clusters contained in this document. Each narrative provides an overall description of the cluster. The chart that follows the narrative includes the name of the cluster, information regarding optional and foundation courses, pathways for the cluster, a list of all courses included in each cluster pathway, other related pathways, and cluster elective courses.

Cluster names are located at the bottom of each chart.* Optional courses for students who are beginning their orientation to career and technical education in middle school are listed immediately above the cluster name. These courses provide students with an overview of the clusters and pathways. Immediately above the optional courses are the foundation courses.

Each of the sixteen clusters is composed of one or more pathways that students may pursue within a cluster. Pathway names are found above the middle and junior high school courses in the charts. Listed within each column for the pathways are the courses that students may study in that pathway to achieve mastery in an industry sector. Three hundred courses have been developed to satisfy the pathways contained in this document. At the top of the chart are other related pathways and cluster electives. These are also grouped by pathways.

All career and technical education courses, including the required content for each course, are found on the pages following the career cluster narratives and charts. Courses in this document are listed in alphabetical order rather than grouped by pathway to avoid repetition of courses.

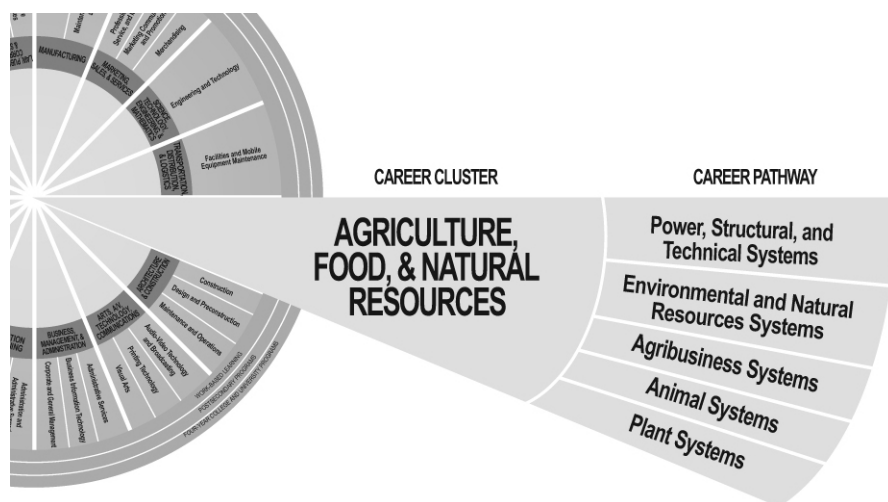
*Career cluster icons on pages 10-40 are used with permission.



States’ Career Clusters Initiative, 2008,

AGRICULTURE, FOOD, AND NATURAL RESOURCES

AGRICULTURE, FOOD, AND NATURAL RESOURCES




In the Agriculture, Food, and Natural Resources cluster, pictured above, students choose one of five pathways—Power, Structural, and Technical Systems; Environmental and Natural Resources Systems; Agribusiness Systems; Animal Systems; or Plant Systems. Specific content standards describe what students should know and be able to do at the end of each course. Middle and junior high school courses are offered in Grades 7 and 8. The foundation course, Agriscience, may be offered to all ninth- through twelfth-grade students, although students are encouraged to take this course before entering a specific pathway.

Students in Grades 7-12 possess varying levels of maturity as well as an array of learning styles. Their backgrounds include diverse family structures and varying social and emotional environments. Throughout these grades, students are adjusting to personal, physical, and emotional changes as well as to social changes taking place in the world around them. Students who select a pathway in the Agriculture, Food, and Natural Resources cluster are interested in the planning, implementation, production, management, or marketing of agriculture, food, and natural resources.

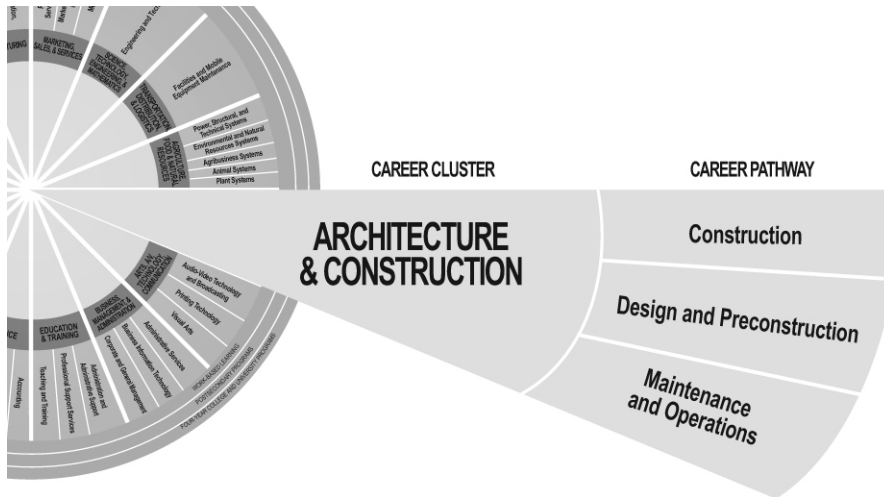
Instruction in the Agriculture, Food, and Natural Resources cluster provides students with the essential knowledge, high-level skills, and training demanded for work in this cluster. Learning activities simulate types of work environments students may encounter, which include opportunities to gain knowledge and skills through coordinated workplace learning experiences such as on-site visits and work shadowing. The classroom and laboratory for this cluster provide a safe and appropriate setting for active, structured, and stimulating student learning and assessment.

Career and technical student organizations are integral, cocurricular components of each career and technical education course. These organizations serve as a means to enhance classroom instruction while helping students develop leadership abilities, expand workplace-readiness skills, and broaden opportunities for personal and professional growth..

Cluster Electives	<ul style="list-style-type: none"> • Workforce Essentials • Entrepreneurship • Personal Finance 				<ul style="list-style-type: none"> • Senior Career Pathway Project • Cooperative Education Seminar 			
Supporting Pathways	<ul style="list-style-type: none"> • Construction Design and Preconstruction Engineering and Technology Facilities and Mobile Equipment Maintenance 		<ul style="list-style-type: none"> • Marketing Communication and Promotion • Professional Sales, Service, and Management • Merchandising 		<ul style="list-style-type: none"> • Design and Preconstruction 			
Cluster Knowledge and Skill-Based Courses	<ul style="list-style-type: none"> • Two- and Four-Stroke Engines • Power Equipment Technology • Construction Site Preparation and Foundation • Construction Framing • Construction Finishing and Interior Systems • Introduction to Metal Fabrication • Introduction to Metal Inert Gas and Flux Cored Arc Welding • Residential and Commercial Power Equipment • Safety and Health Regulations • Residential Wiring • Introduction to Drafting Design • Introduction to Masonry 	<ul style="list-style-type: none"> • Forestry • Urban Forestry • Forestry Equipment • Fish and Wildlife Management • Environmental Management 	<ul style="list-style-type: none"> • Agribusiness Technology • Agribusiness Marketing • Agricultural Communications • Agribusiness Management 	<ul style="list-style-type: none"> • Animal Biotechnology • Aqua Experience • Aquaculture Science • Aquatic Biology • Equine Science • Poultry Science • Introduction to Veterinary Science • Veterinary Science • Animal Science 	<ul style="list-style-type: none"> • Plant Biotechnology • Greenhouse Production and Management • Creative Floral Design • Horticultural Science • Sports Turfgrass Production and Management • Specialty Floral Design and Management • Floral Design and Interiorscaping • Landscape Design and Management • Residential Landscape • Establishment and Maintenance • Nursery Production and Management • Introduction to Drafting Design 			
Foundation Course: Agriscience								
Pathways	Power, Structure, and Technical Systems	Environmental and Natural Resources Systems	Agribusiness Systems	Animal Systems	Plant Systems			
Middle and Junior High School Optional Courses: Introduction to Agriscience, Agriscience Exploration								
Middle and Junior High School Exploration Optional Course: Career Cluster Explorations								
 <p>Career clusters in Alabama include courses that identify academic and technical knowledge and skills needed for students to pursue a wide range of career opportunities. Courses provide rigor and relevance for students by linking school-based learning with career-related experiences. Career clusters provide the framework for what students need to know and be able to do for success in the twenty-first century.</p>								

ARCHITECTURE AND CONSTRUCTION

ARCHITECTURE AND CONSTRUCTION




In the Architecture and Construction cluster, pictured above, students choose one of three pathways—Construction, Design and Preconstruction, or Maintenance and Operations. Course work leads to careers in drafting design; welding; electrical technology; heating, ventilation, air-conditioning, and refrigeration (HVACR); carpentry; cabinetmaking; masonry; plumbing; and pipefitting. Course content includes significant technical depth and incorporates engineering concepts and terminology. Students in Grades 9-12 are required to take a foundation course before entering a pathway in this cluster. Foundation courses from all clusters are accepted for entrance into the pathways in this cluster.

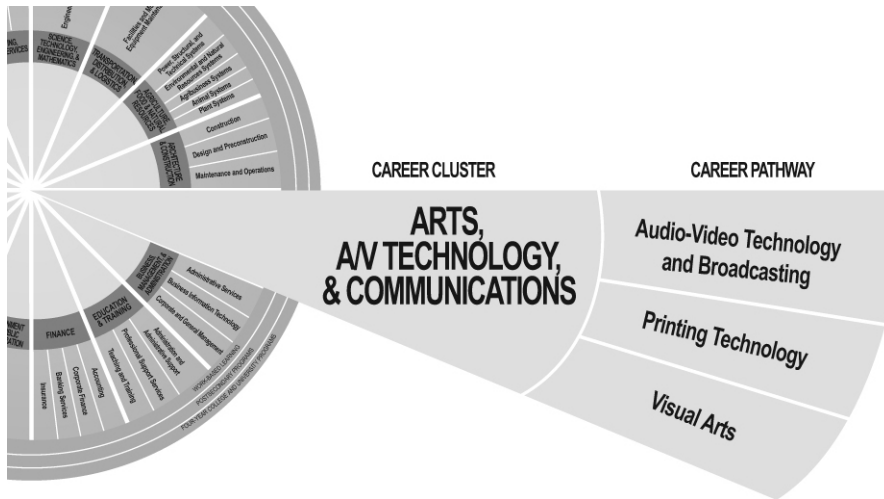
Students in Grades 9-12 possess varying levels of maturity as well as an array of learning styles. Their backgrounds include diverse family structures and varying social and emotional environments. Throughout these grades, students are adjusting to personal, physical, and emotional changes as well as to social changes taking place in the world around them. Students who choose to complete a pathway in the Architecture and Construction cluster enjoy technical, challenging curricula and attention to detail in daily work tasks.

The Architecture and Construction cluster provides students with basic knowledge and skills within a safe and appropriate setting for student exploration and achievement. The active, structured, and stimulating environment simulates the workplace setting and enhances student ability to adapt to an ever-changing job market. Students work together to build a community of learners as their ideas become a source of learning.

Career and technical student organizations are integral, cocurricular components of each career and technical education course. These organizations serve as a means to enhance classroom instruction while helping students develop leadership abilities, expand workplace-readiness skills, and broaden opportunities for personal and professional growth.

Cluster Electives	<ul style="list-style-type: none"> Workforce Essentials Entrepreneurship Personal Finance Senior Career Pathway Project Cooperative Education Seminar 			
Supporting Pathways	<ul style="list-style-type: none"> Power, Structural, and Technical Systems 			
Cluster Knowledge and Skill-Based Courses	<ul style="list-style-type: none"> Construction Site Preparation and Foundations Construction Framing Construction Finishing and Interior Systems Cabinetmaking I Cabinetmaking II Cabinetmaking III Carpentry I Carpentry II Carpentry for Industrial Specialties Carpentry for Commercial Specialties Carpentry for Residential Interiors Carpentry for Residential Exteriors Introduction to Masonry Block Wall Construction Residential Masonry I Residential Masonry II Composite Masonry Construction Commercial Masonry Masonry in High-Rise Construction Masonry Special Applications and Finishes Specialty Masonry Construction Safety and Health Regulations 	<ul style="list-style-type: none"> Electrical Technology Basic Wiring Residential Wiring Industrial Wiring Commercial Wiring Motor Control Advanced Motor Control National Electrical Code and Journeyman's Preparation Direct Current Alternating Current Electromechanical Controls Introduction to Welding Applied Welding I with Plasma Arc Cutting Applied Welding II with Carbon Arc Cutting Applied Welding III Groove Welds and Inspection Applied Welding IV Advanced Groove Welds and Testing Gas Metal Arc Welding Flux Cored Arc Welding Gas Tungsten Arc Welding I Gas Tungsten Arc Welding II 	<ul style="list-style-type: none"> Introduction to Drafting Design Intermediate Drafting Design Advanced Drafting Design Introduction to Architectural Design Intermediate Architectural Design Advanced Architectural Design Three-Dimensional Solid Model Design I Three-Dimensional Solid Model Design II Structural Drafting Safety and Health Regulations 	<ul style="list-style-type: none"> Plumbing and Pipefitting I Plumbing and Pipefitting II Plumbing and Pipefitting III Electrical Technology Basic Wiring Residential Wiring Industrial Wiring Commercial Wiring Motor Control Advanced Motor Control National Electrical Code and Journeyman's Preparation Direct Current Alternating Current Electromechanical Controls Basic Compression Refrigeration Introduction to Heating, Ventilation, Air-Conditioning, and Refrigeration Heating, Ventilation, Air-Conditioning, and Refrigeration Maintenance Introduction to Electricity for Heating, Ventilation, Air-Conditioning, and Refrigeration Systems Heating, Ventilation, Air-Conditioning, and Refrigeration Electrical Components and Controls Refrigerants Commercial Refrigeration Heating and Heat Pump Systems Safety and Health Regulations
Foundation Course: Architecture, Construction, and Manufacturing				
Pathways	Design and Preconstruction	Construction	Maintenance and Operations	
Middle and Junior High School Exploration Optional Courses: Career Cluster Technologies I, Career Cluster Technologies II, Career Cluster Explorations				
		<p>Career clusters in Alabama include courses that identify academic and technical knowledge and skills needed for students to pursue a wide range of career opportunities. Courses provide rigor and relevance for students by linking school-based learning with career-related experiences. Career clusters provide the framework for what students need to know and be able to do for success in the twenty-first century.</p>		


ARTS, AUDIO-VIDEO TECHNOLOGY, AND COMMUNICATION



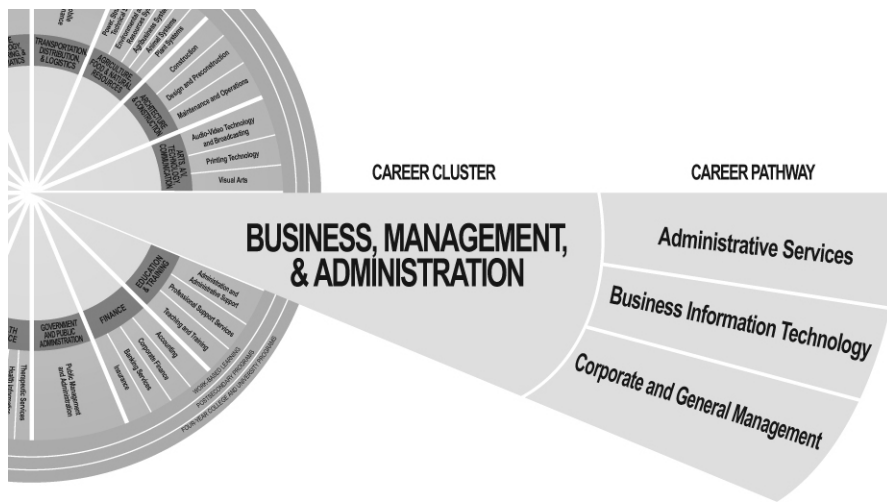
In the Arts, Audio-Video Technology, and Communication cluster, pictured above, students choose one of three pathways—Audio-Video Technology and Broadcasting, Printing Technology, or Visual Arts. Specific content standards indicate what students should know and be able to do upon successful completion of each course. National standards, credentialing opportunities, and course articulation with postsecondary institutions help provide the basis for the content included in each course. The foundation course for this cluster may be offered to all ninth- through eleventh-grade students; however, it is not required for entering a specific pathway.

The Arts, Audio-Video Technology, and Communications cluster engages students in challenging curricula where they are able to develop technical skills in the areas of graphic arts, television production, animation, advertising design, and commercial photography within a safe and innovative setting. Students who choose to complete a pathway in this cluster have the ability to comprehend course materials and complete laboratory work, projects, and assignments related to the cluster. Courses in this cluster provide students with the knowledge and skills for further education and for employment. Students use current and emerging technology, observe modeling and mastery of competencies, and develop and apply skills required for success in their chosen fields. Students work together to build a community of learning where their ideas become a source of learning.

Career and technical student organizations are integral, cocurricular components of each career and technical education course. These organizations serve as a means to enhance classroom instruction while helping students develop leadership abilities, expand workplace-readiness skills, and broaden opportunities for personal and professional growth.

Cluster Electives	<ul style="list-style-type: none"> • Workforce Essentials • Entrepreneurship • Personal Finance 	<ul style="list-style-type: none"> • Senior Career Pathway Project • Cooperative Education Seminar 	
Supporting Pathways			
Cluster Knowledge and Skill-Based Courses	<ul style="list-style-type: none"> • Introduction to Television Production • Television Production—Writing, Producing, and Performing • Television Production—Studio Operations • Television Production—Photography and Editing • Advanced Television Production 	<ul style="list-style-type: none"> • Introduction to Graphic Arts • Digital File Preparation • Advanced Digital File Preparation and Output • Camera, Image Assembly, and Platemaking • Offset Press Operations • Binding and Finishing 	<ul style="list-style-type: none"> • Introduction to Advertising Design • Digital Design • Graphic Illustration • Studio and Portfolio • Introduction to Animation and Visual Communication • Animation Layout • Animation Character Development and Design • Storyboarding • Character Animation • Animated Filmmaking • Advanced Animation Portfolio • Introduction to Commercial Photography • Medium Format Photography • Large Format Photography
Foundation Course: Foundation of Arts, Audio-Video Technology, and Communication			
Pathways	Audio-Video Technology and Broadcasting	Printing Technology	Visual Arts
Middle and Junior High School Optional Courses: Career Cluster Technologies I, Career Cluster Technologies II, Career Cluster Explorations			
 <p>Cluster Course Offerings</p>		<p>Career clusters in Alabama include courses that identify academic and technical knowledge and skills needed for students to pursue a wide range of career opportunities. Courses provide rigor and relevance for students by linking school-based learning with career-related experiences. Career clusters provide the framework for what students need to know and be able to do for success in the twenty-first century.</p>	


BUSINESS, MANAGEMENT, AND ADMINISTRATION



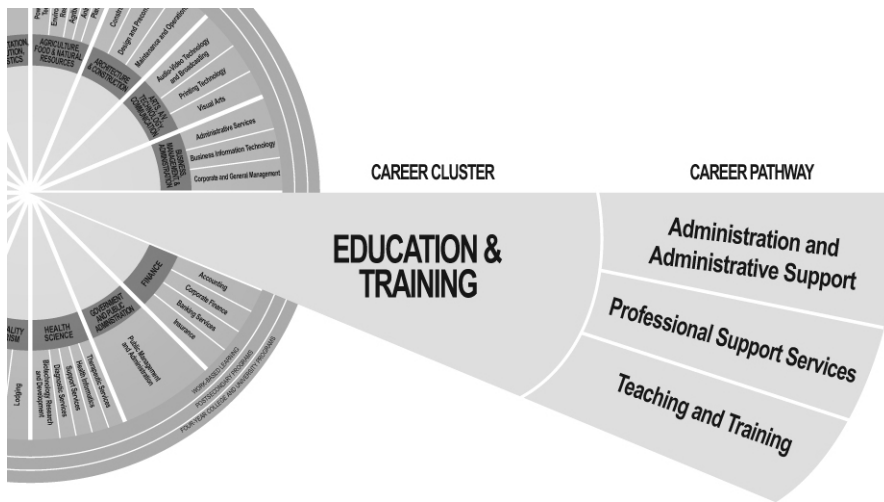
In the Business, Management, and Administration cluster, students choose one of three pathways—Administrative Services, Business Information Technology, or Corporate and General Management. Specific content standards tell what students should know and be able to do at the end of each course. The foundation course may be Business Technology Applications or Business Essentials. For students entering the Business Information Technology pathway, Business Technology Applications is a prerequisite to other courses.

The Business, Management, and Administration cluster prepares students with the fundamental knowledge and skills for careers in planning, organizing, directing, and evaluating business functions essential to efficient and productive business operations. Instruction is flexible and focuses on quality performance in the skill areas of organization, time management, customer service, and communication. In addition, students learn ways in which technology, globalization, and regulatory issues affect the day-to-day operation of businesses. Information is also provided regarding possible credentialing or certification.

Career and technical student organizations are integral, cocurricular components of each career and technical education course. These organizations serve as a means to enhance classroom instruction while helping students develop leadership abilities, expand workplace-readiness skills, and broaden opportunities for personal and professional growth.

Cluster Electives	<ul style="list-style-type: none"> • Workforce Essentials • Entrepreneurship • Personal Finance 	<ul style="list-style-type: none"> • Senior Career Pathway Project • Cooperative Education Seminar 	
Supporting Pathways	<ul style="list-style-type: none"> • Legal Services • Visual Arts • Recreation, Travel, and Tourism 	<ul style="list-style-type: none"> • Visual Arts 	<ul style="list-style-type: none"> • Accounting • Banking Services • Insurance • Marketing Communications and Promotion
Cluster Knowledge and Skill-Based Courses	<ul style="list-style-type: none"> • Commerce Communication • Management Principles • Business Finance • Information Technology Support and Services • Computer Management and Support 	<ul style="list-style-type: none"> • Business Technology Applications—Advanced • Multimedia Design • Information Technology Support and Services • Computer Management and Support 	<ul style="list-style-type: none"> • Commerce Communication • Accounting • Law In Society • Management Principles
Foundation Course: Business Technology Applications or Business Essentials			
Pathways	Corporate and General Management	Administrative Services	Business Information Technology
Middle and Junior High School Optional Courses: Career Cluster Explorations, Computer Essentials			
 <p>Cluster Course Offerings</p>	<p>Career clusters in Alabama include courses that identify academic and technical knowledge and skills needed for students to pursue a wide range of career opportunities. Courses provide rigor and relevance for students by linking school-based learning with career-related experiences. Career clusters provide the framework for what students need to know and be able to do for success in the twenty-first century.</p>		


EDUCATION AND TRAINING



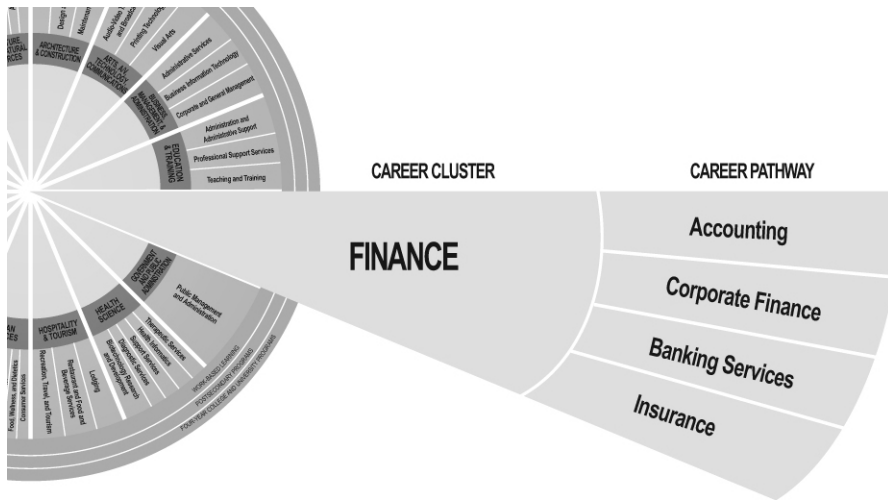
In the Education and Training cluster, students choose one of three pathways— Administration and Administrative Support, Professional Support Services, or Teaching and Training. One required foundation course, five related pathway courses, and six specialized pathway courses are offered in this cluster. Credentialing opportunities and articulation of courses with postsecondary institutions help provide the basis for identifying courses and course content for each pathway. Each course contains specific content standards indicating what students should know and be able to do upon completion of each course. Teen Discoveries and Teen Connections are middle school courses offered to students in Grades 7 and 8. These courses incorporate knowledge and skills related to the Education and Training cluster. The foundation course, Education and Training, is the prerequisite course for entering any pathway within the cluster.

The Education and Training cluster classroom and required laboratories provide safe and innovative settings for student exploration and mastery of required course content. Students selecting this cluster possess the ability to comprehend course materials and complete laboratory work, projects, and assignments related to the Education and Training cluster. In all pathways, students gain knowledge of current technology and information used in specific career pathways, observe and master proficiencies required for success in a chosen career pathway, apply academic and critical- and creative-thinking skills to solve real-world problems, and utilize reading skills required in the content area.

Career and technical student organizations are integral, cocurricular components of each career and technical education course. These organizations serve as a means to enhance classroom instruction while helping students develop leadership abilities, expand workplace-readiness skills, and broaden opportunities for personal and professional growth.

Cluster Electives	<ul style="list-style-type: none"> • Workforce Essentials • Entrepreneurship • Personal Finance 	<ul style="list-style-type: none"> • Senior Career Pathway Project • Cooperative Education Seminar 	
Supporting Pathways			
Cluster Knowledge and Skill-Based Courses	<ul style="list-style-type: none"> • Child Development • Food and Nutrition • Family Wellness • Parenting • Life Connections • Educational Leadership • Education and Training Internship 	<ul style="list-style-type: none"> • Child Development • Food and Nutrition • Life Connections • Family Wellness • Parenting • Professional Support Services in Education • Education and Training Internship 	<ul style="list-style-type: none"> • Parenting • Child Development • Food and Nutrition • Family Wellness • Life Connections • Creative Arts • Teaching I • Teaching II • Education and Training Internship • Early Childhood Education I • Early Childhood Education II
Foundation Course: Education and Training			
Pathways	Administration and Administrative Support	Professional Support Services	Teaching and Training
Middle and Junior High School Optional Courses: Teen Discoveries, Teen Connections			
Middle and Junior High School Exploration Optional Course: Career Cluster Explorations			
 Cluster Course Offerings	Career clusters in Alabama include courses that identify academic and technical knowledge and skills needed for students to pursue a wide range of career opportunities. Courses provide rigor and relevance for students by linking school-based learning with career-related experiences. Career clusters provide the framework for what students need to know and be able to do for success in the twenty-first century.		

FINANCE




In the Finance cluster, students choose one of four pathways—Accounting, Corporate Finance, Banking Services, or Insurance. Courses include specific content standards that tell what students should know and be able to do at the end of each course. A foundation course, Business Technology Applications or Business Essentials, is recommended before students enter a pathway.

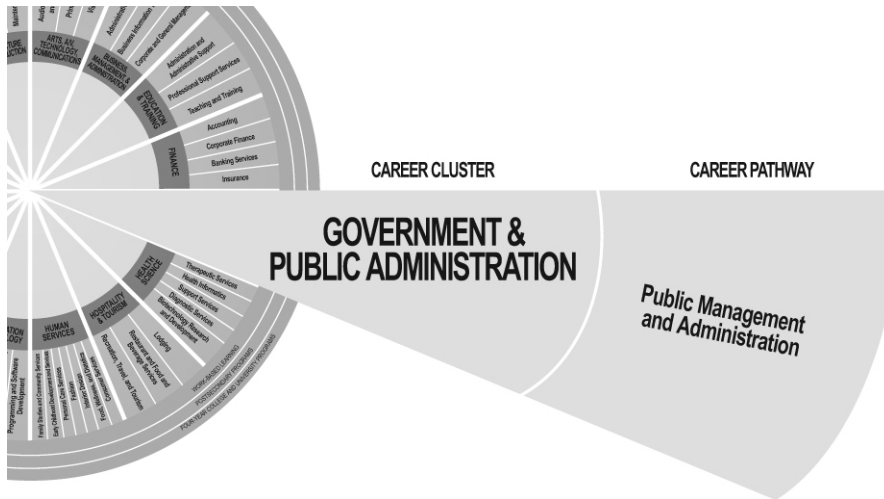
Students in Grades 9–12 possess varying levels of maturity as well as an array of learning styles. Throughout these grades, students are adjusting to personal, physical, and emotional changes as well as to social changes taking place in the world in which they live. Their backgrounds include diverse family structures and varying social and emotional environments. Students who are likely to be successful in careers in the Finance cluster are those who tend to be focused, analytical, and methodical, and who can be trusted with confidential information.

The Finance cluster classroom setting is safe and conducive for student exploration and assessment. The active, structured, and stimulating environment meets students' maturing needs and sophistication levels and includes many workplace simulations and project-based activities. This curriculum provides students with learning experiences that incorporate academic content and work-related skills. Course work focuses on technical skills, basic and specialized business concepts, problem-solving and critical-thinking skills, and effective communication. Information is also provided regarding possible credentialing or certification. All courses in the cluster are business and industry certified with equipment and curriculum meeting industry standards.

Career and technical student organizations are integral, cocurricular components of each career and technical education course. These organizations serve as a means to enhance classroom instruction while helping students develop leadership abilities, expand workplace-readiness skills, and broaden opportunities for personal and professional growth.

Cluster Electives	<ul style="list-style-type: none"> Workforce Essentials Entrepreneurship Personal Finance Senior Career Pathway Project Cooperative Education Seminar 			
Supporting Pathways	<ul style="list-style-type: none"> Public Management and Administration 	<ul style="list-style-type: none"> Public Management and Administration 	<ul style="list-style-type: none"> Accounting Marketing Communications sand Promotion Public Management and Administration Insurance 	<ul style="list-style-type: none"> Public Management and Administration
Cluster Knowledge and Skill-Based Courses	<ul style="list-style-type: none"> Commerce Communication Business Finance Accounting Management Principles Advanced Accounting Financial Management 	<ul style="list-style-type: none"> Commerce Communication Business Finance Financial Management Accounting Management Principles Advanced Accounting 	<ul style="list-style-type: none"> Commerce Communication Business Finance Banking and Financial Services Accounting Advanced Accounting 	<ul style="list-style-type: none"> Commerce Communication Business Finance Insurance Services Accounting Management Principles
Foundation Course: Business Technology Applications or Business Essentials				
Pathways	Accounting	Corporate Finance	Banking Services	Insurance
Middle and Junior High School Optional Courses: Career Cluster Explorations, Computer Essentials				
 <p>Cluster Course Offerings</p>	<p>Career clusters in Alabama include courses that identify academic and technical knowledge and skills needed for students to pursue a wide range of career opportunities. Courses provide rigor and relevance for students by linking school-based learning with career-related experiences. Career clusters provide the framework for what students need to know and be able to do for success in the twenty-first century.</p>			


GOVERNMENT AND PUBLIC ADMINISTRATION



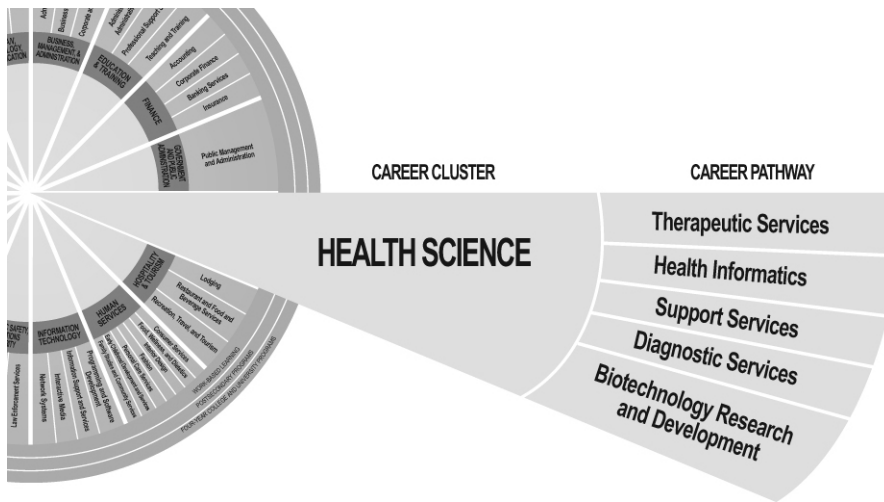
The Government and Public Administration cluster consists of one pathway. This pathway, Public Management and Administration, allows for the attainment of knowledge and skills required for a variety of occupations in this career field. Courses included in this cluster contain specific content standards that describe what students should know and be able to do at the end of each course. Cluster knowledge and skills include academic foundations, communications, problem solving and critical thinking, information technology systems, safety, health and environment, leadership and teamwork, ethics and legal responsibilities, employability and career development, technical skills, and fiscal responsibilities. Information is also provided regarding possible credentialing or certification. The foundation course, Business Technology Applications or Business Essentials, may be offered to all students in Grades 9-12. Students are encouraged to take the foundation course before entering a pathway; however, this course is not required for entering the Public Management and Administration pathway.

The Government and Public Administration cluster focuses on careers that are unique to government and are not contained in another career cluster. Careers in the Government and Public Administration cluster include governance, foreign service, planning, revenue and taxation, regulation, and public management and administration. Entry level employment in this field includes compliance officers; court, municipal, and license clerks; postal service mail carriers; and postal service mail sorters and processors. Careers that may be obtained with advanced degrees or training include commissioner, staff or field officers, administrative officer, management analyst, planner, bank examiner, and chamber of commerce executive.

Career and technical student organizations are integral, cocurricular components of each career and technical education course. These organizations serve as a means to enhance classroom instruction while helping students develop leadership abilities, expand workplace-readiness skills, and broaden opportunities for personal and professional growth.

Cluster Electives	<ul style="list-style-type: none"> • Workforce Essentials • Entrepreneurship • Personal Finance • Senior Career Pathway Project • Cooperative Education Seminar
Supporting pathway	<ul style="list-style-type: none"> • Public Management and Administration • Administrative Services • Corporate and General Management • Administrative Services • Banking Services
Cluster Knowledge and Skill-Based Courses	<ul style="list-style-type: none"> • Commerce Communication • Business Finance • Management Principles
Foundation Course: Business Technology Applications or Business Essentials	
Pathway	Public Management and Administration
Middle and Junior High School Courses: Career Cluster Explorations, Computer Essentials	
 <p>Cluster Course Offerings</p>	<p>Career clusters in Alabama include courses that identify academic and technical knowledge and skills needed for students to pursue a wide range of career opportunities. Courses provide rigor and relevance for students by linking school-based learning with career-related experiences. Career clusters provide the framework for what students need to know and be able to do for success in the twenty-first century.</p>


HEALTH SCIENCE



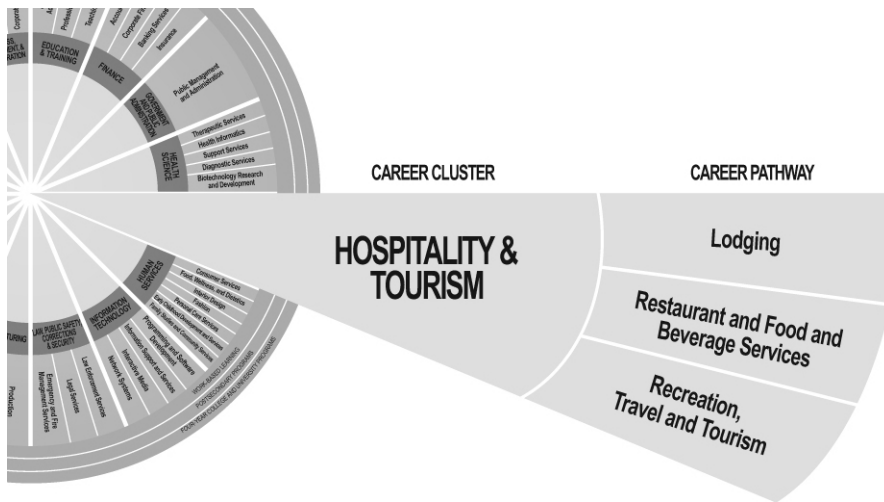
The Health Science cluster provides students with essential knowledge and skills for pursuing a career in health care. Students choose one of five Health Science pathways—Therapeutic Services, Health Informatics, Support Services, Diagnostic Services, or Biotechnology Research and Development. The required foundation course, Foundations of Health Science, is offered to all ninth- through twelfth-grade students. This course, a prerequisite to all pathway courses, provides essential health care knowledge and skills and promotes the application of science and technology. All pathways in the cluster lead to a degree or certificate at the postsecondary level.

The Health Science cluster classroom provides a safe and appropriate setting for student exploration and assessment. The rigorous and challenging content of the Health Science cluster lends itself to a variety of instructional strategies, including contextual applications, virtual classrooms, and the use of multimedia. Competency-based, learner-centered instruction enables students to participate in both classroom and on-site practice of skills necessary for a career path in the area of health science. The Health Science curriculum provides flexibility in meeting the needs of all students by providing a variety of instructional strategies that include project, service, and work-based learning experiences.

Career and technical student organizations are integral, cocurricular components of each career and technical education course. These organizations serve as a means to enhance classroom instruction while helping students develop leadership abilities, expand workplace-readiness skills, and broaden opportunities for personal and professional growth.

Cluster Electives	<ul style="list-style-type: none"> Workforce Essentials Entrepreneurship Personal Finance Senior Career Pathway Project Cooperative Education Seminar 				
Supporting pathways	<ul style="list-style-type: none"> Early Childhood Development and Services Food, Wellness and Dietetics 		<ul style="list-style-type: none"> Law Enforcement Services 	<ul style="list-style-type: none"> Law Enforcement Services Food, Wellness, and Dietetics 	
Cluster Knowledge and Skill-Based Courses	<ul style="list-style-type: none"> Emergency Services Health Promotion and Wellness Introduction to Pharmacy Health Science Internship Dental Assisting Advanced Health Seminar Therapeutic Services 	<ul style="list-style-type: none"> Human Body Structures and Functions Health Informatics Health Science Internship Advanced Health Seminar Support Services 	<ul style="list-style-type: none"> Human Body Structures and Functions Support Services Safety and Health Regulations 	<ul style="list-style-type: none"> Sports Medicine Dental Assisting Health Science Internship Human Body Structures and Functions Advanced Health Seminar Diagnostic Services 	<ul style="list-style-type: none"> Human Body Structures and Functions Health Science Internship Introduction to Biotechnology Advanced Health Seminar
Foundation Course: Foundations of Health Science					
Pathways	Therapeutic Services	Health Informatics	Support Services	Diagnostic Services	Biotechnology Research and Development
Middle and Junior High School Optional Course: Health Explorations					
Middle and Junior High School Exploration Optional Course: Career Cluster Explorations					
 <p>Cluster Course Offerings</p>	<p>Career clusters in Alabama include courses that identify academic and technical knowledge and skills needed for students to pursue a wide range of career opportunities. Courses provide rigor and relevance for students by linking school-based learning with career-related experiences. Career clusters provide the framework for what students need to know and be able to do for success in the twenty-first century.</p>				


HOSPITALITY AND TOURISM

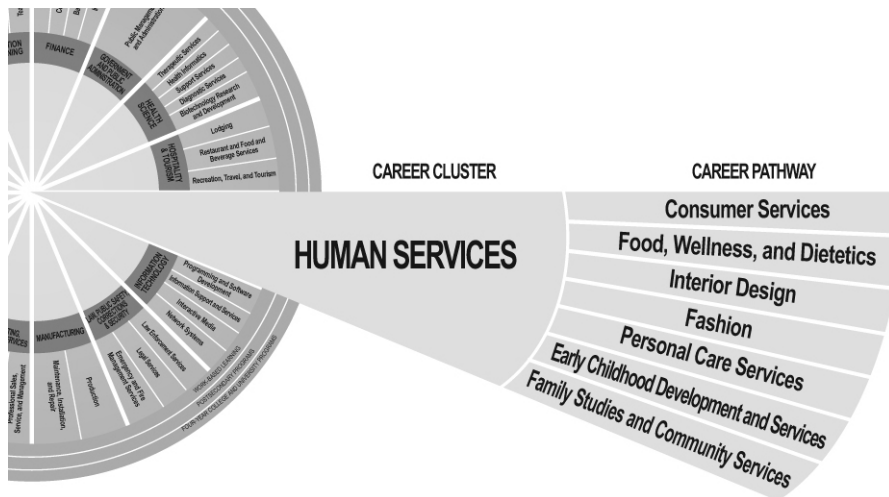


In the Hospitality and Tourism cluster, students choose one of three pathways— Lodging; Restaurant and Food and Beverage Services; or Recreation, Travel, and Tourism. One required foundation course, three related pathway courses, and five specialized pathway courses are offered in this cluster. Credentialing opportunities and articulation of courses with postsecondary institutions help provide the basis for identifying courses and course content for each pathway. Each course contains specific content standards indicating what students should know and be able to do upon completion of each course. Teen Discoveries and Teen Connections are middle school courses offered to students in Grades 7 and 8. The foundation course, Hospitality and Tourism, is the prerequisite course for entering any pathway within the cluster.

The Hospitality and Tourism cluster classrooms and laboratories provide safe and innovative settings for student exploration and assessment. These settings provide structured and stimulating environments designed to meet students’ emerging needs. Students choosing a pathway in the Hospitality and Tourism cluster obtain knowledge about hospitality and tourism industries from challenging curricula, acquire technological expertise required in the field, and participate in daily tasks that utilize skills mandatory for hospitality and tourism professionals. Students choosing to enter one of the pathways should be able to comprehend course materials and complete laboratory work, projects, and assignments related to the Hospitality and Tourism cluster.

Career and technical student organizations are integral, cocurricular components of each career and technical education course. These organizations serve as a means to enhance classroom instruction while helping students develop leadership abilities, expand workplace-readiness skills, and broaden opportunities for personal and professional growth.


Cluster Electives	<ul style="list-style-type: none"> • Workforce Essentials • Entrepreneurship • Personal Finance 	<ul style="list-style-type: none"> • Senior Career Pathway Project • Cooperative Education Seminar 	
Supporting Pathways			
Cluster Knowledge and Skill-Based Courses	<ul style="list-style-type: none"> • Food and Nutrition • Lodging I • Lodging II 	<ul style="list-style-type: none"> • Chemistry of Food • Food and Nutrition • Culinary Arts I • Culinary Arts II 	<ul style="list-style-type: none"> • Food and Nutrition • Life Connections • Travel and Tourism I • Travel and Tourism II
Foundation Course: Hospitality and Tourism			
Pathways	Lodging	Restaurant and Food and Beverage Services	Recreation, Travel, and Tourism
Middle and Junior High School Optional Courses: Teen Discoveries , Teen Connections			
Middle and Junior High School Exploration Optional Course: Career Cluster Explorations			
 Cluster Course Offerings	Career clusters in Alabama include courses that identify academic and technical knowledge and skills needed for students to pursue a wide range of career opportunities. Courses provide rigor and relevance for students by linking school-based learning with career-related experiences. Career clusters provide the framework for what students need to know and be able to do for success in the twenty-first century.		



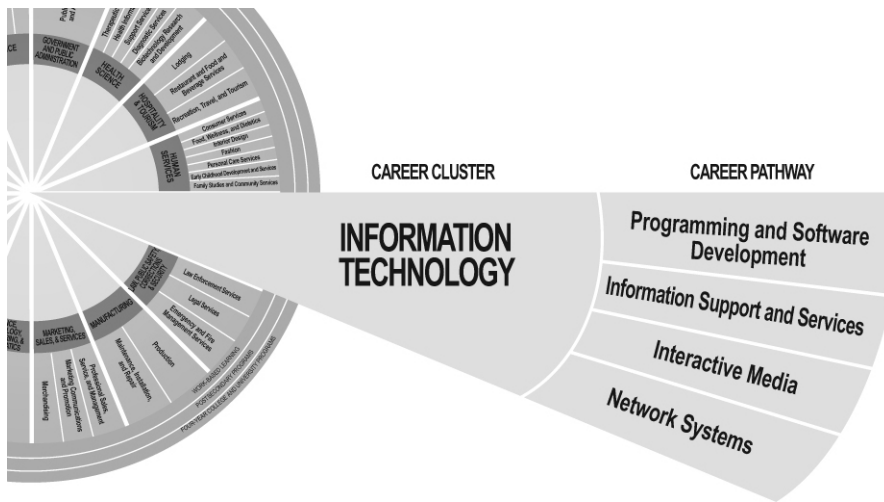
In the Human Services cluster, students choose one of seven pathways—Consumer Services; Food, Wellness, and Dietetics; Interior Design; Fashion; Personal Care Services; Early Childhood Development and Services; or Family Studies and Community Services. One foundation course, ten related pathway courses, and twelve specialized pathway courses are offered in this cluster. Credentialing opportunities and articulation of courses with postsecondary institutions help provide the basis for identifying courses and course content for each pathway. Each course contains specific content standards indicating what students should know and be able to do upon completion of each course. Teen Discoveries and Teen Connections are middle school courses offered to students in Grades 7 and 8. These courses incorporate knowledge and skills related to the Human Services cluster. Family and Consumer Sciences is the foundation course for these pathways, except for the Personal Care Services pathway. The Personal Care Services pathway includes the career fields of cosmetology and tailoring. The required foundation course for cosmetology is Introduction to Cosmetology, and the required foundation course for tailoring is Tailoring Basics. Students are encouraged to take a foundation course before entering a pathway.

Students interested in this cluster should be able to comprehend course materials and complete laboratory work, projects, and assignments related to the Human Services cluster. Students obtain knowledge about family studies and consumer services from challenging curricula, acquire technological expertise required in the field, and participate in daily tasks and skills mandatory for human service professionals. The Human Services cluster classroom and required laboratories provide safe and innovative settings for student exploration and mastery of required course content.

Career and technical student organizations are integral, cocurricular components of each career and technical education course. These organizations serve as a means to enhance classroom instruction while helping students develop leadership abilities, expand workplace-readiness skills, and broaden opportunities for personal and professional growth.

Cluster Electives	<ul style="list-style-type: none"> Workforce Essentials Entrepreneurship Personal Finance Senior Career Pathway Project Cooperative Education Seminar 						
Supporting Pathways					<ul style="list-style-type: none"> Administrative Services Fashion Marketing Communications and Promotion Merchandising Professional Sales, Services, and Management 		
Cluster Knowledge and Skill-Based Courses	<ul style="list-style-type: none"> Personal Finance Fashion Housing Child Development Food and Nutrition Life Connections Family Wellness Consumer Services I Consumer Services II 	<ul style="list-style-type: none"> Food and Nutrition Family Wellness Personal Finance Life Connections Chemistry of Food Dietetics 	<ul style="list-style-type: none"> Housing Creative Arts Personal Finance Life Connections Interior Design I Interior Design II 	<ul style="list-style-type: none"> Fashion Creative Arts Personal Finance Life Connections Fashion Design Fashion Merchandising 	<ul style="list-style-type: none"> Introduction to Cosmetology Hair Coloring Chemical Services Introduction to Spa Techniques Advanced Spa Techniques Application Salon Practices and Management Introduction to Nail Care and Applications Nail Art and Applications State Board Practicum Tailoring Basics Tailoring Custom Tailoring 	<ul style="list-style-type: none"> Child Development Family Wellness Food and Nutrition Life Connections Parenting Personal Finance Child Services I Child Services II 	<ul style="list-style-type: none"> Family Wellness Life Connections Parenting Personal Finance Child Development Food and Nutrition Fashion Housing Family Studies and Community Services I Family Studies and Community Services II
Foundation Course: Family and Consumer Sciences							
Pathways	Consumer Services	Food, Wellness, and Dietetics	Interior Design	Fashion	Personal Care Services	Early Childhood Development and Services	Family Studies and Community Services
Middle and Junior High School Optional Courses: Teen Discoveries, Teen Connections							
Middle and Junior High School Exploration Optional Course: Career Cluster Explorations							
 Cluster Course Offerings	<p>Career clusters in Alabama include courses that identify academic and technical knowledge and skills needed for students to pursue a wide range of career opportunities. Courses provide rigor and relevance for students by linking school-based learning with career-related experiences. Career clusters provide the framework for what students need to know and be able to do for success in the twenty-first century.</p>						

INFORMATION TECHNOLOGY




In the Information Technology cluster, students choose one of four pathways— Programming and Software Development, Information Support and Services, Interactive Media, or Network Systems. Specific content standards describe what students should know and be able to do at the end of each course. All courses include significant technical depth as well as information technology concepts and terminology. Information is also provided regarding possible credentialing or certification. The foundation course, Business Technology Applications, may be offered to all ninth- through twelfth-grade students. Although not required, students are encouraged to take this course before entering a specific pathway. One pathway, Network Systems, has a required course, Networking I, as the first in a series of four courses.

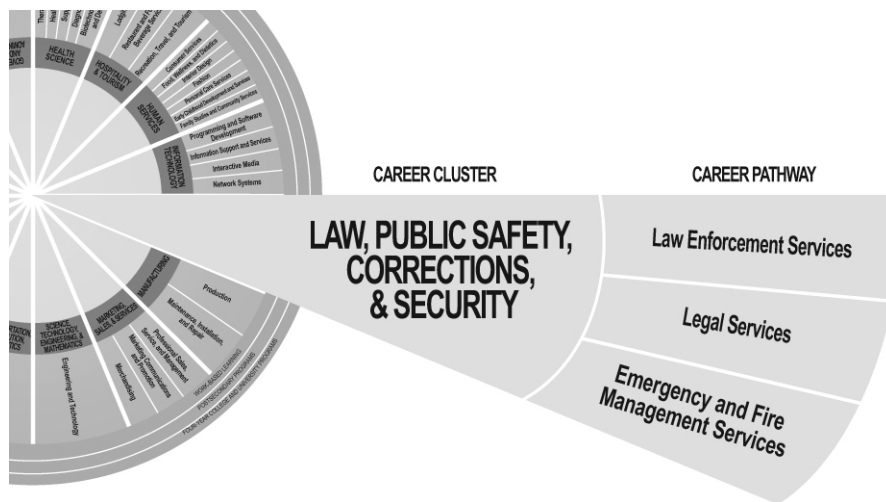
Students in Grades 9-12 possess varying levels of maturity as well as an array of learning styles. Their backgrounds include diverse family structures and varying social and emotional environments. Throughout these grades, students are adjusting to personal, physical, and emotional changes as well as to social changes taking place in the world around them. Students who choose to complete a pathway in the Information Technology cluster enjoy technical, challenging curricula and attention to detail in daily work tasks.

The Information Technology curriculum addresses the development of applied skills focusing on types of work environments students may encounter in this pathway. An active, structured, and stimulating classroom setting is provided for student exploration and assessment. Students work together to build a community of learners wherein their ideas become a source of learning.

Career and technical student organizations are integral, cocurricular components of each career and technical education course. These organizations serve as a means to enhance classroom instruction while helping students develop leadership abilities, expand workplace-readiness skills, and broaden opportunities for personal and professional growth.

Cluster Electives	<ul style="list-style-type: none"> • Workforce Essentials • Entrepreneurship • Personal Finance 	<ul style="list-style-type: none"> • Senior Career Pathway Project • Cooperative Education Seminar 		
Supporting Pathways			<ul style="list-style-type: none"> • Visual Arts 	
Cluster Knowledge and Skill-Based Courses	<ul style="list-style-type: none"> • Information Technology Fundamentals • Database Design I • Database Design II • Software Development • Java Programming • Database Design III 	<ul style="list-style-type: none"> • Information Technology Fundamentals • Information Technology Support and Services • Computer Management and Support 	<ul style="list-style-type: none"> • Information Technology Fundamentals • Multimedia Design • Multimedia Publications 	<ul style="list-style-type: none"> • Information Technology Fundamentals • Networking I • Networking II • Networking III • Networking IV • Computer Management and Support
Foundation Course: Business Technology Applications				
Pathways	Programming and Software Development	Information Support and Services	Interactive Media	Network Systems
Middle and Junior High School Optional Courses: Career Cluster Explorations, Computer Essentials				
 Cluster Course Offerings	Career clusters in Alabama include courses that identify academic and technical knowledge and skills needed for students to pursue a wide range of career opportunities. Courses provide rigor and relevance for students by linking school-based learning with career-related experiences. Career clusters provide the framework for what students need to know and be able to do for success in the twenty-first century.			

LAW, PUBLIC SAFETY, CORRECTIONS, AND SECURITY




In the Law, Public Safety, Corrections, and Security cluster, students choose one of three pathways— Law Enforcement Services, Legal Services, or Emergency and Fire Management Services. Specific content standards identify what students should know and be able to do at the end of each course. Students pursuing this pathway possess adequate knowledge and skills in the areas of mathematics, science, communication, and technology. The foundation course, Principles of Public Service, may be offered to all students in Grades 9-12. Students are encouraged to take this course before entering a specific pathway.

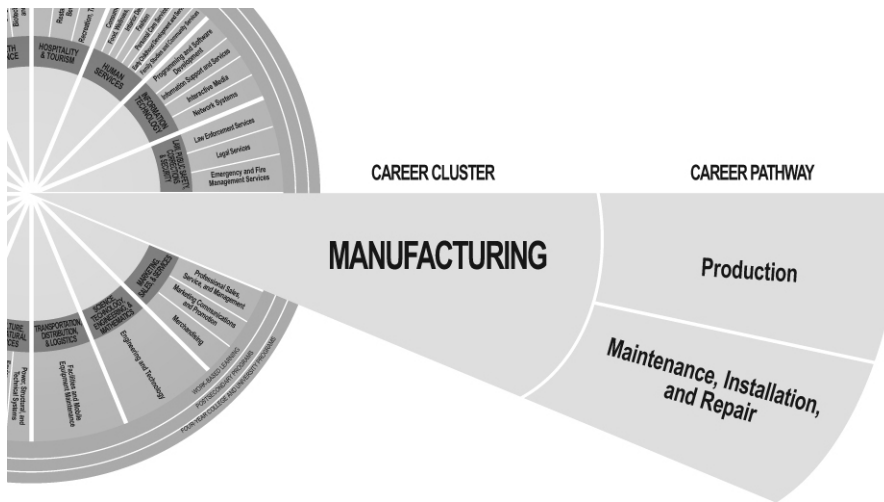
Students in Grades 9-12 possess varying levels of maturity as well as an array of learning styles. Their backgrounds include diverse family structures and varying social and emotional environments. Throughout these grades, students are adjusting to personal, physical, and emotional changes as well as to social changes taking place in the world around them.

Numerous challenging education and training opportunities exist within the highly-skilled world of the Law, Public Safety, Corrections, and Security cluster. Students gain knowledge and skills through an active, structured, and stimulating environment coordinated with simulated workplace learning experiences that include on-site visits and work shadowing. The Law, Public Safety, Corrections, and Security cluster classroom and laboratory provide safe and appropriate settings for student exploration and assessment.

Career and technical student organizations are integral, cocurricular components of each career and technical education course. These organizations serve as a means to enhance classroom instruction while helping students develop leadership abilities, expand workplace-readiness skills, and broaden opportunities for personal and professional growth.

Cluster Electives	<ul style="list-style-type: none"> • Workforce Essentials • Entrepreneurship • Personal Finance 	<ul style="list-style-type: none"> • Senior Career Pathway Project • Cooperative Education Seminar 	
Supporting Pathways		<ul style="list-style-type: none"> • Corporate and General Management 	<ul style="list-style-type: none"> • Therapeutic Services
Cluster Knowledge and Skill-Based Courses	<ul style="list-style-type: none"> • Police Patrol • Forensic and Criminal Investigations 	<ul style="list-style-type: none"> • Introduction to Law and the American Legal System • Introduction to Criminal Justice • Law In Society 	<ul style="list-style-type: none"> • Fire Fighting • Introduction to Fire Science • Emergency Services
Foundation Course: Principles of Public Service			
Pathways	Law Enforcement Services	Legal Services	Emergency and Fire Management Services
Middle and Junior High School Optional Course: Career Cluster Explorations			
		<p>Career clusters in Alabama include courses that identify academic and technical knowledge and skills needed for students to pursue a wide range of career opportunities. Courses provide rigor and relevance for students by linking school-based learning with career-related experiences. Career clusters provide the framework for what students need to know and be able to do for success in the twenty-first century.</p>	
Cluster Course Offerings			

MANUFACTURING




In the Manufacturing cluster, students choose one of two pathways— Production or Maintenance, Installation, and Repair. Twenty-two courses are available within the two pathways. These courses provide the knowledge and skills to equip students for careers in industrial maintenance, manufacturing, electronics, precision machining, and robotics. These courses include significant technical depth and engineering concepts and terminology. A foundation course is offered to all students in Grades 9-12. Students must take a foundation course before entering a pathway in this cluster. Foundation courses from all clusters are accepted for entrance into pathways in the Manufacturing cluster.

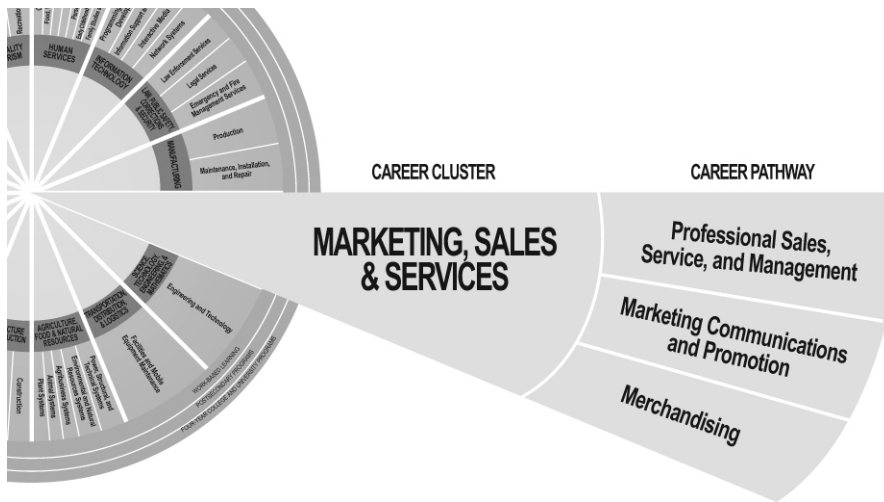
Students in Grades 9-12 possess varying levels of maturity as well as an array of learning styles. Their backgrounds include diverse family structures and varying social and emotional environments. Throughout these grades, students are adjusting to personal, physical, and emotional changes as well as to social changes taking place in the world around them. Students who choose to complete a pathway in the Manufacturing cluster enjoy technical, challenging curricula and attention to detail in daily work tasks.

The Manufacturing cluster provides a safe and appropriate setting for student exploration and achievement. Students gain knowledge and skills through an active, structured, and stimulating environment coordinated with simulated workplace learning experiences.

Career and technical student organizations are integral, cocurricular components of each career and technical education course. These organizations serve as a means to enhance classroom instruction while helping students develop leadership abilities, expand workplace-readiness skills, and broaden opportunities for personal and professional growth.

Cluster Electives	<ul style="list-style-type: none"> Workforce Essentials Entrepreneurship Personal Finance Senior Career Pathway Project Cooperative Education Seminar 		
Supporting Pathways	<ul style="list-style-type: none"> Construction 	<ul style="list-style-type: none"> Construction Operation 	
Cluster Knowledge and Skill-Based Courses	<ul style="list-style-type: none"> Introduction to Computer Numerical Control Intermediate Computer Numerical Control Introduction to Manufacturing Computer-Aided Design and Computer-Aided Manufacturing I Computer-Aided Design and Computer-Aided Manufacturing II Coordinate Measuring Machine Introduction to Robotics Robotics Applications Introduction to Welding Applied Welding I with Plasma Arc Cutting Applied Welding II with Carbon Arc Cutting Applied Welding III Groove Welds and Inspection Applied Welding IV Advanced Groove Welds and Testing Gas Metal Arc Welding Flux Cored Arc Welding Gas Tungsten Arc Welding I Gas Tungsten Arc Welding II Safety and Health Regulations Introduction to Precision Machining Introduction to Lathe Introduction to Milling, Drill Press, and Surface Grinder Intermediate Lathe and Benchwork Intermediate Mill and Surface Grinder Introduction to Manufacturing 	<ul style="list-style-type: none"> Industrial Systems and Maintenance I Industrial Systems and Maintenance II Industrial Systems and Maintenance III Industrial Systems and Maintenance IV Direct Current Alternating Current Semiconductors Digital Electronics Introduction to Precision Machining Introduction to Lathe Intermediate Lathe and Benchwork Introduction to Milling, Drill Press, and Surface Grinder Intermediate Mill and Surface Grinder Electrical Technology Basic Wiring Residential Wiring Industrial Wiring Commercial Wiring Motor Control Advanced Motor Control National Electrical Code and Journeyman's Preparation Electromechanical Controls 	<ul style="list-style-type: none"> Introduction to HVACR HVACR Maintenance Introduction to Electricity for HVACR Systems HVACR Electrical Components and Controls Refrigerants Commercial Refrigeration Heating and Heat Pump Systems Plumbing and Pipefitting I Plumbing and Pipefitting II Plumbing and Pipefitting III Safety and Health Regulations Introduction to Manufacturing Introduction to Welding Applied Welding I with Plasma Arc Cutting Applied Welding II with Carbon Arc Cutting Applied Welding III Groove Welds and Inspection Applied Welding IV Advanced Groove Welds and Testing Gas Metal Arc Welding Flux Cored Arc Welding Gas Tungsten Arc Welding I Gas Tungsten Arc Welding II
Foundation Course: Architecture, Construction, and Manufacturing			
Pathways	Maintenance, Installation, and Repair	Production	
Middle and Junior High School Exploration Optional Courses: Career Cluster Technologies I, Career Cluster Technologies II, Career Cluster Explorations			
 <p>Cluster Course Offerings</p>	<p>Career clusters in Alabama include courses that identify academic and technical knowledge and skills needed for students to pursue a wide range of career opportunities. Courses provide rigor and relevance for students by linking school-based learning with career-related experiences. Career clusters provide the framework for what students need to know and be able to do for success in the twenty-first century.</p>		

MARKETING, SALES, AND SERVICE




In the Marketing, Sales, and Service cluster, students choose one of three pathways—Professional Sales, Service, and Management; Marketing Communications and Promotion; or Merchandising. This diverse career cluster prepares learners for careers in planning, managing, and performing marketing activities to reach organizational objectives. A number of courses, including Marketing Principles, Entrepreneurship, and Sales and Promotion Planning, are included in this cluster along with specific content standards that describe what students should know and be able to do at the end of each course. The foundation courses, Business Essentials or Business Technology Applications, may be offered to all students in Grades 9-12. Although not required, students are encouraged to take one of these courses before entering a pathway.

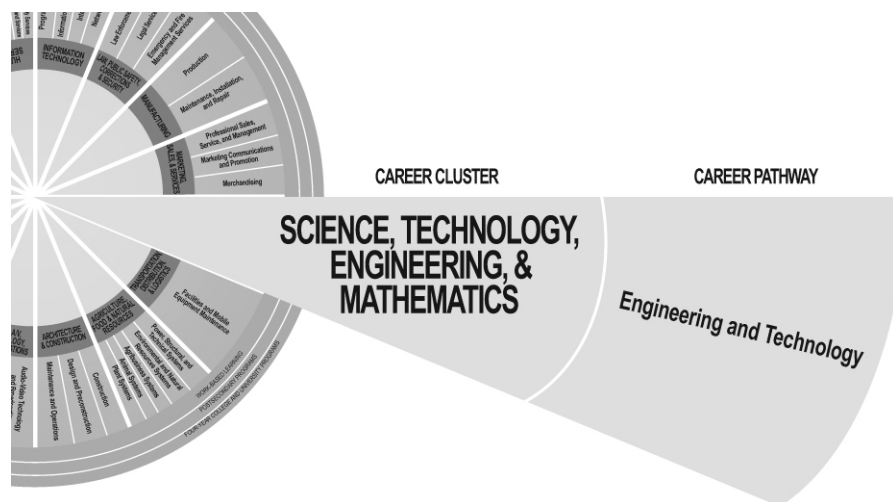
Students in Grades 9-12 possess varying levels of maturity as well as an array of learning styles. Their backgrounds include diverse family structures and varying social and emotional environments. Throughout these grades, students are adjusting to personal, physical, and emotional changes as well as to social changes taking place in the world around them. Students who choose to complete a pathway in the Marketing, Sales, and Service cluster enjoy interesting, challenging curricula and interacting with people on a daily basis.

The Marketing, Sales, and Service cluster classroom provides a safe and appropriate setting for student exploration and assessment. Students gain knowledge and skills in an active, structured, and stimulating environment coordinated with simulated workplace learning experiences.

Career and technical student organizations are integral, cocurricular components of each career and technical education course. These organizations serve as a means to enhance classroom instruction while helping students develop leadership abilities, expand workplace-readiness skills, and broaden opportunities for personal and professional growth.

Cluster Electives	<ul style="list-style-type: none"> • Workforce Essentials • Entrepreneurship • Personal Finance • Senior Career Pathway Project • Cooperative Education Seminar 		
Supporting Pathways	<ul style="list-style-type: none"> • Visual Arts • Corporate and General Management 	<ul style="list-style-type: none"> • Visual Arts • Administrative Services 	<ul style="list-style-type: none"> • Visual Arts • Corporate Finance
Cluster Knowledge and Skill-Based Courses	<ul style="list-style-type: none"> • Marketing Principles • Computer Management and Support • Commerce Communication • Management Principles 	<ul style="list-style-type: none"> • Marketing Principles • Commerce Communication • Sales and Promotion Planning 	<ul style="list-style-type: none"> • Marketing Principles • Commerce Communication • Entrepreneurship
Foundation Course: Business Technology Applications or Business Essentials			
Pathways	Professional Sales, Service, and Management	Marketing Communications and Promotion	Merchandising
Middle and Junior High School Optional Exploration Courses: Career Cluster Explorations, Computer Essentials			
 <p>Cluster Course Offerings</p>	<p>Career clusters in Alabama include courses that identify academic and technical knowledge and skills needed for students to pursue a wide range of career opportunities. Courses provide rigor and relevance for students by linking school-based learning with career-related experiences. Career clusters provide the framework for what students need to know and be able to do for success in the twenty-first century.</p>		

SCIENCE, TECHNOLOGY, ENGINEERING, AND MATHEMATICS




The Science, Technology, Engineering, and Mathematics cluster includes one pathway—Engineering and Technology. This cluster introduces students to foundational principles of engineering and technological literacy in the middle school grades through the career cluster technologies courses that explore the sixteen career clusters, related pathways, and related technologies. The high school engineering courses provide students with the opportunity to gain experience with general engineering design and application as they acquire discipline-specific knowledge that allows them to make informed career choices. Foundation courses for the cluster include Foundations of Engineering and Career Cluster Technologies II.

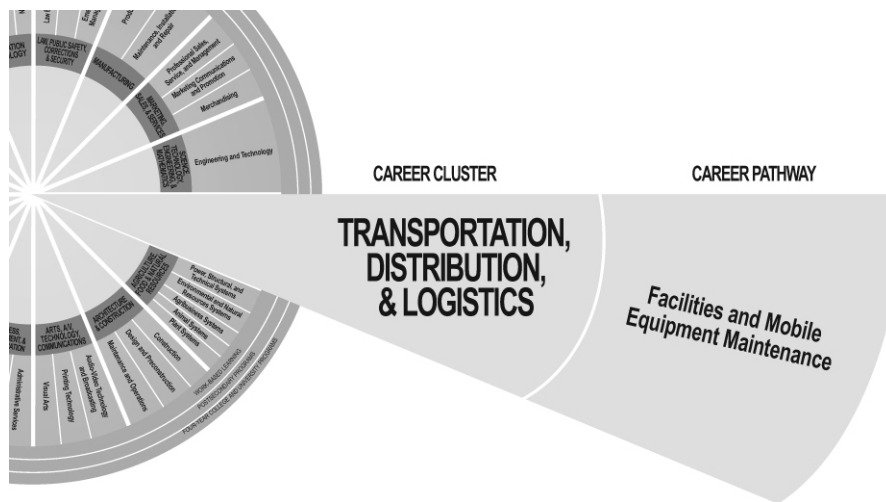
Students choosing to enter this cluster should realize the close relationship of mathematics and science to the engineering and technology disciplines and expect to regularly apply mathematics and scientific principles throughout the courses in this cluster. They enjoy challenging curricula involving practical applications of engineering principles and technological literacy.

Knowledge gained by students in this cluster includes science and mathematics principles applicable to engineering and engineering-related careers. As technology continues its rapid expansion, adequately preparing students for engineering-related careers is essential and serves as the primary purpose of this cluster. The Science, Technology, Engineering, and Mathematics cluster classroom and laboratory provide safe and appropriate settings for student exploration and learning. The structured, yet active environment stimulates students' creativity and helps them develop the necessary skills for future employment.

Career and technical student organizations are integral, cocurricular components of each career and technical education course. These organizations serve as a means to enhance classroom instruction while helping students develop leadership abilities, expand workplace-readiness skills, and broaden opportunities for personal and professional growth.

Cluster Electives	<ul style="list-style-type: none"> • Workforce Essentials • Entrepreneurship • Personal Finance • Senior Career Pathway Project • Cooperative Education Seminar
Supporting Pathways	<ul style="list-style-type: none"> • Design and Preconstruction • Maintenance, Installation, and Repair • Production
Cluster Knowledge and Skill-Based Courses	<ul style="list-style-type: none"> • Engineering Applications • Engineering Research and Design • Engineering Systems
Foundation Course: Foundations of Engineering	
Pathways	Engineering and Technology
Middle and Junior High School Optional Exploration Courses: Career Cluster Technologies I, Career Cluster Technologies II	
Middle and Junior High School Exploration Optional Course: Career Cluster Explorations	
 <p>Cluster Course Offerings</p>	<p>Career clusters in Alabama include courses that identify academic and technical knowledge and skills needed for students to pursue a wide range of career opportunities. Courses provide rigor and relevance for students by linking school-based learning with career-related experiences. Career clusters provide the framework for what students need to know and be able to do for success in the twenty-first century.</p>

TRANSPORTATION, DISTRIBUTION, AND LOGISTICS




The Transportation, Distribution, and Logistics cluster provides students with a range of knowledge and skills that enhance their career opportunities. One pathway is included in this cluster—Facilities and Mobile Equipment Maintenance. This pathway includes specialty areas in aviation, power equipment, automotive service, automotive collision repair, diesel engine maintenance and repair, and marine technology. The curriculum is based on recognized industry and professional standards found in national organizations and federal regulations. Foundations of Transportation, Distribution, and Logistics is the foundation course offered to students in Grades 9-12. Students are encouraged to take this course as early as possible.

Grades 9-12 students are developing, and in many cases possess, a range of interests, aptitudes, and learning skills. Their interests, as well as their capacity and desire to learn, continue to be shaped by a myriad of environmental stimuli that include family, social, and other influences. Students who are successful in this cluster possess a variety of technical, problem-solving, and critical-thinking skills that are foundational to success in many career and life choices.

The Transportation, Distribution, and Logistics cluster learning environment utilizes a variety of physical space to stimulate development of effective cognitive and psychomotor skills. Students experience a wide range of hands-on activities based on authentic representations of expectations found in the workplace. Theory and concepts are taught in proportion to the need for strong application opportunities with emphasis on timely learning experiences that facilitate the transition to skills attainment. Safety, proper tool use, and adherence to procedures are integral components for all student learning experiences.

Career and technical student organizations are integral, cocurricular components of each career and technical education course. These organizations serve as a means to enhance classroom instruction while helping students develop leadership abilities, expand workplace-readiness skills, and broaden opportunities for personal and professional growth.

Cluster Electives	<ul style="list-style-type: none"> • Workforce Essentials • Entrepreneurship • Personal Finance • Senior Career Pathway Project • Cooperative Education Seminar
Supporting Pathways	<ul style="list-style-type: none"> • Power, Structural, and Technical Systems
Cluster Knowledge and Skill-Based Courses	<ul style="list-style-type: none"> • Automotive Engine Performance I • Automotive Engine Performance II • Automotive Engine Repair • Automotive Heating and Air-Conditioning • Automotive Manual Drivetrain and Axles • Automotive Electrical and Electronic Systems I • Automotive Electrical and Electronic Systems II • Automotive Brakes • Automotive Suspension and Steering • Diesel Engines I • Diesel Engines II • Diesel Drive Train • Diesel Electrical and Electronics Systems I • Diesel Electrical and Electronics Systems II • Diesel Brakes • Diesel Suspension and Steering • Marine Technology • Introduction to Maritime Engineering • Advanced Maritime Engineering • Introduction to Navigation Technology • Advanced Navigation Technology • Introduction to Fisheries Technology • Advanced Fisheries Technology • Painting and Refinishing I • Painting and Refinishing II • Painting and Refinishing III • Nonstructural Analysis and Damage Repair I • Nonstructural Analysis and Damage Repair II • Structural Analysis and Damage Repair • Mechanical and Electrical Components I • Mechanical and Electrical Components II • Collision Repair—Metal Welding and Cutting • Two- and Four-Stroke Engines • Recreational Power Equipment Operation • Advanced Power Equipment Technology • Airframe Systems • Aircraft Nonmetallic Structures • Aircraft Theory of Flight and Operation • Aviation Turbine Engine Theory and Inspections • Aircraft Engine and Propeller Theory and Operation • Aircraft Sheet Metal Structures • Aviation Instrument and Hydraulic Systems • Aircraft Welding • Power Equipment Technology • Residential and Commercial Power Equipment • Safety and Health Regulations
Foundation Course: Transportation, Distribution, and Logistics	
Pathway	Facilities and Mobile Equipment Maintenance
Middle and Junior High School Exploration Optional Courses: Career Cluster Technologies I, Career Cluster Technologies II, Career Cluster Explorations	
 <p>Cluster Course Offerings</p>	<p>Career clusters in Alabama include courses that identify academic and technical knowledge and skills needed for students to pursue a wide range of career opportunities. Courses provide rigor and relevance for students by linking school-based learning with career-related experiences. Career clusters provide the framework for what students need to know and be able to do for success in the twenty-first century.</p>

Directions for Interpreting the Minimum Required Content

1. **CONTENT STANDARDS** are statements that define what students should know and be able to do at the conclusion of a course or grade. Content standards in this document contain minimum required content. The order in which standards are listed within a course or grade is not intended to convey a sequence for instruction. Each content standard completes the phrase “*Students will.*”

Students will:

Analyze an engine block for wear and damage to determine corrective action.

(Diesel Engines I – Content Standard 4)

2. **BULLETS** denote content that is related to the standards and required for instruction. Bulleted content is listed under a standard and identifies additional minimum required content.

Students will:

Determine the impact of revenue and expenses on net income and loss.

- Analyzing inflation rates to determine how they affect interest rates

(Business Finance – Content Standard 13)

3. **EXAMPLES** clarify certain components of content standards or bullets. They are illustrative but not exhaustive.

Students will:

Explain shop operations involved in managing a floriculture business.

Examples: conducting sales and service, creating advertising and promotional displays, designing facilities, maintaining equipment

(Specialty Floral Design and Management – Content Standard 7)

Accounting

Accounting is a one-credit course designed to help students understand the basic principles of the accounting cycle. This course provides a comprehensive introduction to basic financial accounting, including analyzing and recording business transactions, preparing and interpreting financial statements, demonstrating generally accepted accounting principles, and performing banking and payroll activities.

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Technology

Students will:

1. Use technologies needed to perform job functions in the field of accounting.
Examples: accounting software, computer numeric keypad, spreadsheets, income tax software

Career Opportunities

2. Determine career and entrepreneurial opportunities, responsibilities, and educational and credentialing requirements related to accounting professions.

Accounting Procedures

3. Differentiate among sole proprietorship, partnership, and corporation accounting operations as they relate to service and merchandising businesses.
4. Apply steps of the accounting cycle for service and merchandising businesses using manual and electronic methods.
5. Analyze the accounting equation for the purpose of relating it to the accounting cycle.
Examples: journalizing and posting transactions, reporting financial statements
6. Interpret data from a variety of financial statements, including verifying data for business reports and creating charts and graphs for accurate reporting.
7. Explain accounting functions of fixed assets and depreciation.
8. Utilize research results to analyze current accounting practices as they relate to service, manufacturing, and merchandising businesses.

Ethics

9. Distinguish between ethical and unethical business decisions in the accounting profession.

Banking and Cash Control Functions

10. Apply banking and cash control functions to checks, deposits, reconciliation, petty cash, online and electronic banking, and related journal entries.

Payroll Functions

11. Apply payroll functions to employee and employer records.
Examples: calculating gross pay and deductions, journalizing and posting tax and payroll entries

Tax Preparation

12. Demonstrate correct procedures for completing federal, state, and local income tax forms.

Generally Accepted Accounting Principles

13. Interpret generally accepted accounting principles (GAAP).
Examples: adequate disclosure, business entity

-

Leadership

14. Demonstrate skills in communication, leadership, and teamwork.
 - Applying problem-solving and critical-thinking skills to resolve workplace conflict

Advanced Accounting

Advanced Accounting is a one-credit course designed to provide students with an increased emphasis on accounting principles and techniques for solving business problems and making financial decisions. This course includes adjusting inventory control systems; applying accounting procedures for revenues, expenses, and loans; and enhancing accounting skills. The prerequisite for this course is Accounting.

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Accounting Procedures

Students will:

1. Apply accounting procedures for calculating, journalizing, and posting entries related to bad debt.
2. Use accounting procedures related to the life cycle of fixed assets.
Examples: recording fixed assets, calculating depreciation and book value
3. Apply the Last In First Out (LIFO), First In First Out (FIFO), and weighted cost methods to estimate the cost of merchandise inventory.
4. Determine accounting procedures for calculating and recording interest and maturity dates for notes payable and notes receivable.
5. Utilize accounting procedures for recording the adjusting, closing, and reversing of entries for accrued revenues and expenses.
6. Demonstrate accounting procedures for paying dividends and acquiring additional capital.
7. Demonstrate accounting practices needed to complete financial statements, analyze cash flow, and critique projected budgets.

Ratios

8. Apply analysis ratios to evaluate solvency and earning power.

Ethics

9. Critique accounting decisions for ethical considerations.

Legal Requirements

10. Explain legal requirements for forming and dissolving various business organizations.
Examples: sole proprietorship, partnership, nonprofit organization

Cost Accounting

11. Apply cost accounting procedures to complete transactions and financial statements for a merchandising business.
12. Use cost accounting procedures to journalize entries for initial investment and for liquidation.

Vouchers

13. Explain the voucher method as it relates to preparation and payment of accounts payable and expenses.

Career Opportunities

14. Determine career and entrepreneurial opportunities, responsibilities, and educational credentialing requirements related to specialized accounting professions.

Current Issues

15. Utilize research results to analyze current accounting issues for their impact on society.
Examples: corporate mergers, interest rate fluctuations, unethical practices

Advanced Animation Portfolio

Advanced Animation Portfolio is a one-credit course that provides students with the opportunity to produce portfolio-quality animation utilizing a variety of techniques. Students critique, judge, and revise previous animation that will be assembled into a final portfolio. Instruction allows students to focus on safety, studio projects, portfolio organization, and employment skills. Students are encouraged to participate in a variety of local, state, and national contests as well as to present their projects to industry professional and postsecondary educators. Successful completion of this course prepares students for postsecondary education and entry-level positions in animation or related fields. Introduction to Animation and Visual Communication, Animation, Layout, Storyboarding, Animation Character Development Design, Character Animation, and Animated Filmmaking are prerequisites for this course.

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Safety

Students will:

1. Apply laboratory safety rules, regulations, and procedures in animation.

Animation Production and Portfolio Assembly

2. Utilize research tools to develop ideas for an animated film.
3. Create portfolio-ready animations that communicate specific concepts, emotions, and intentions.
4. Assemble a portfolio of personal animation samples that includes a concentration in a specific theme or medium.
 - Performing advanced studio photographic techniques
 - Writing an artist's statement for a personal portfolio
 - Creating digital and electronic images to depict animations

Employability Skills

5. Demonstrate professional behavior in the workplace, including working cooperatively with others, demonstrating positive responses to criticism, using time-management skills, and demonstrating healthy habits.
6. Compare career options in animation.
 - Analyzing the job market to determine professional development needs based on animation industry trends
 - Completing a portfolio for targeted career options

Advanced Architectural Design

Advanced Architectural Design is a one-credit course that provides students with instruction regarding more complex design considerations and construction drawings. Topics include fireplace construction, presentation drawings, building specifications, building codes, and light commercial drawing. Upon successful completion of this course, students are able to design and create presentations of residential house plans. This course also provides an introduction to light commercial construction drawings. The prerequisite for this course is Intermediate Architectural Design.

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Fireplace Construction and Layout

Students will:

1. Create a fireplace section and elevation with labels, notes, and dimensions.
 - Identifying components of a masonry fireplace and chimney

Presentation Drawings

2. Prepare a residential presentation drawing.
 - Using various types of presentation drawings
Examples: pictorial, three-dimensional
 - Identifying methods of presentation

Building Specifications

3. Prepare material specification sheets for a residential home design.
 - Determining construction specifications for a residential home design
 - Identifying factors that influence specific requirements of home construction

Building Codes and Interior Design

4. Demonstrate the application of national building codes to residential design.
 - Explaining the effect of codes on exit facilities, light, ventilation, and sanitation requirements
 - Explaining the effect of codes on handicap requirements and room dimensions

Basic Commercial Drafting

5. Draw plans to illustrate basic commercial building types.
 - Identifying common types of commercial drawings
 - Describing how building codes relate to commercial structures

Advanced Digital File Preparation and Output

Advanced Digital File Preparation and Output is a one-credit course that provides students with industry-focused laboratory experiences. Emphasis is placed on digital photography and imaging, file storage and transfer, and computer-to-plate operations. Upon completion of the course, students are able to create logo designs; digital page layouts; and multiple-page jobs with pagination, folds, and guides. The prerequisites for this course are Introduction to Graphic Arts and Digital File Preparation.

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Advanced Digital File Preparation

Students will:

1. Describe the use of digital photography in image capture and digital imaging.
2. Summarize capabilities and functions of imagesetters, platesetters, and digital printers.
3. Compare advantages and disadvantages of various hard- and soft-color proofing systems.
4. Demonstrate current systems, techniques, and imposition software for outputting files computer-to-plate.
5. List uses and capabilities of storage devices for digital files, including network servers.
6. Identify advantages and disadvantages of different storage media, including compact diskette (CD), digital video diskette (DVD), and flash memory.
7. Demonstrate file compression utility for file storage or transfer.
8. Explain differences between Type 1, TrueType, and OpenType font formats.
 - Analyzing various font management activities and processes
9. Create logo designs for integration into a three-panel fold brochure design.
 - Utilizing a scanned template to create a logo
10. Utilize the Pantone Matching System (PMS) to produce a multicolor job that includes scans, text, and spot color artwork.
11. Demonstrate the use of PostScript in digital prepress.
 - Determining strengths and weaknesses of Tagged Information File Format (TIFF), Encapsulated PostScript (EPS), picture (PICT), Joint Photographic Experts Group (JPEG), Portable Document File (PDF), Portable Document Format prepress data exchange (PDF/X-3), and Desktop Color Separations (DCS) in a PostScript environment

12. Apply procedures to produce, modify, and output files to customer-supplied or industry-standard criteria.
13. Use a photo manipulation program to perform basic color correction and image cloning.

Digital File Output

14. Identify safety considerations in computer-to-plate and direct-to-digital press operations, including interpreting Material Safety Data Sheets (MSDS) and demonstrating proper waste disposal methods.
15. Demonstrate the trap to be applied to a digitally created page using page layout, illustration, or trapping software.
16. Apply process control procedures necessary for successful digital file output.
 - Identifying direct imaging technologies on press
 - Utilizing plate scanning and ink key presetting technologies
 - Identifying digital plate materials and types
 - Comparing characteristics of paper and other various printing substrates, including foil and plastic
17. Demonstrate deletions and repairs to an offset plate.
18. Design a folding dummy for a 16-page job with pagination, folds, and guides.
19. Evaluate computer-to-plate operations at a commercial printing operation or facility.

Advanced Drafting Design

Advanced Mechanical Design is a one-credit course for students who are interested in engineering and related mechanical drafting areas that provide more a in-depth study of mechanical design. Emphasis is placed on detailed parts drawings, bill of materials, and assembly drawings. Students are introduced to basic geometric dimensioning and tolerancing (GD&T) applications. Through intersections and development, students acquire basic sheet metal forming knowledge. Using this knowledge, students lay out and form models of geometric figures. Career readiness projects allow students opportunities to research industry standards and practices. The prerequisite for this course is Intermediate Drafting Design Technology.

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Auxiliary Views

Students will:

1. Create drawings of inclined surfaces that incorporate auxiliary sections and secondary auxiliary views.

Working Drawings

2. Create a complete working drawing, including all dimensions, notes, and specifications.
 - Creating assembly drawings
 - Preparing bill of materials

Geometric Tolerancing

3. Demonstrate basic GD&T concepts, with references to American National Standards Institute (ANSI) dimensioning standards, in an advanced drafting design project.

Surface Developments and Intersections

4. Create three-dimensional geometric figures utilizing two-dimensional flat pattern surface development concepts.
 - Developing a layout of geometric figures
 - Cutting geometric patterns
 - Forming and folding geometric patterns

Introduction to Three-Dimensional Solid Model Design

5. Create a basic three-dimensional model of a mechanical part utilizing three-dimensional application software.

Career Readiness Project

6. Develop a career-related project based on research and design of current technology, including conducting Internet research, creating a working drawing, and using computer application software to organize and present the project.

Advanced Fisheries Technology

This is a one-credit course that provides students an in-depth study of modern commercial fisheries throughout the United States and the world. Topics studied in the course include the use of modern harvesting techniques and equipment, shore-side processing facilities, and vessel-to-retail processes. Students also study the import and export of seafood, the effect of commercial fishing on the economy, and rules and regulations involved with each fishery. Introduction to Fisheries Technology is a prerequisite for this course.

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Commercial Species

Students will:

1. Demonstrate fishery technology, including licensure, harvesting, and processing of various commercial fish species.
Examples: tuna, lobster, crab, shellfish
2. Compare different commercially important inshore and offshore fish species.
Examples: redfish, tarpon, snapper, grouper, wahoo
3. Explain components of a marketing plan for the charter and recreational fishing industry.

Charter and Recreational Fishing for Game Fish

4. Explain characteristics of charter and recreational fishing, including licensing requirements for game fish.
5. Interpret state and federal rules and regulations associated with the aquaculture industry.

Aquaculture

6. Compare fisheries technology to aquaculture, including fishery operation, importing and exporting, and licensure requirements.

Advanced Health Seminar

Advanced Health Seminar is a one-credit course that provides an individualized learning experience for students who desire an in-depth study in at least one occupational area in the Health Science cluster. Students who successfully complete Foundations of Health Science and Health Science Internship may select one or more health care areas to prepare for specialization in a health career. This senior-level work-based project is the capstone course for the Health Science cluster and can serve to complete concentration in a pathway.

Advanced Health Seminar provides an opportunity for high school seniors to show what they have learned in a career pathway. It provides rigorous learning experiences whereby students select an area of interest, conduct in-depth research, and demonstrate problem-solving, decision-making, and independent-learning skills. During the project, students work with the coordinating teacher, academic teachers, and industry mentors who have expertise in the student's field of study.

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Project Proposal

Students will:

1. Create a formal project proposal that communicates specific concepts, processes, or products related to a chosen career pathway.
Examples: pathways—Diagnostics Services, Therapeutic Services, Health Informatics, Biotechnology Research and Development

Research

2. Utilize skills needed for independent research related to a chosen health career.
3. Construct graphs, charts, and tables to organize collected data for supporting a project.
4. Utilize communication and technology skills to access, process, and retrieve information related to a selected health career plan.

Project

5. Produce an original project, including conceptualization, refinement of ideas, and evaluation of the process and product.
6. Write a well-organized research paper related to a chosen health career.

7. Develop a presentation using project findings and conclusions.
Examples: producing a digital presentation, making a speech, creating a documentary,
presenting a project model and explanation

Advanced Maritime Engineering

This one-credit course focuses on construction and operation principles of marine diesel engines. Topics include theory and operation of air intake systems, lubrication systems, cooling systems, exhaust systems, and fuel systems. Students learn to identify different parts and functions of a marine diesel engine, review engine systems, and learn basic maintenance operations. Introduction to Maritime Engineering is a prerequisite for this course.

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Safety

Students will:

1. Apply safety rules, regulations, and procedures associated with advanced maritime engineering, including first aid, fire, electricity, tools, and equipment.

Air Intake Systems

2. Analyze factors that affect air intake efficiency in marine engines, including engine design and valve timing.
 - Describing marine engine turbochargers
 - Differentiating among types of marine engine air cleaners

Lubricating Systems

3. Describe components of lubricating systems for marine engines.
 - Differentiating between maritime engine mechanical and electrical pressure indication systems, including maintenance techniques for each system

Cooling Systems

4. Evaluate differences between maritime engine air-cooled and liquid-cooled systems for marine engines.
 - Explaining the operation of marine engine water manifolds and water pumps
 - Demonstrating proper maintenance techniques for marine engines, including hose replacements, radiator cleaning, coolant filters, thermostats, and coolant replacements
5. Explain the purpose of blower fans and radiators on cooling systems of marine engines.

Exhaust Systems

6. Explain components of exhaust systems for marine engines, including exhaust manifold, muffler, piping, and turbocharger.
 - Demonstrating proper maintenance techniques for marine engines

Fuel Systems

7. Explain the operation of fuel systems for marine engines, including maintenance techniques.

Starting Systems

8. Explain the operation and maintenance of starting systems for marine engines.

Engine Overhauling

9. Demonstrate service techniques necessary to overhaul marine engines.

Start-Up

10. Demonstrate various system checks related to start-up activities for marine engines.
11. Demonstrate start-up techniques for electric, air, and hydraulic starting systems in marine engines.
 - Discussing the importance of starting aids, including coolant heaters, oil heaters, and glow plugs for marine engines

Operation

12. Utilize various gauge pressures of marine engines for performance evaluation.

Troubleshooting

13. Demonstrate troubleshooting techniques for marine engines.

Advanced Motor Control

This one-credit course is designed to provide students with the fundamental knowledge and skills needed in the electrical industry. Emphasis is placed on job safety, maintenance, motor components, advanced controls, high voltage terminations, heat tracing, and freeze protection. Upon successful completion of this course, students are able to perform basic tasks related to the electric motor industry.

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Safety

Students will:

1. Demonstrate safety procedures as recognized by governing agencies and approved industry standards when testing and replacing components or installing wiring.
Examples: lockout, tagout
2. Identify electrical hazards, including how to avoid or minimize these hazards in the workplace.

Maintenance

3. Demonstrate maintenance skills, including proper storing, testing, and servicing of motors and generators.
 - Collecting motor data for maintenance monitoring

Motor Components

4. Identify contactors and relays in motor control circuits both physically and schematically.
 - Describing operating principles of motor components
5. Identify pilot devices in motor control circuits both physically and schematically.
 - Describing operating principles of pilot devices
6. Interpret motor control wiring connections and ladder diagrams for industrial usage and application.
7. Select size contactors and relays for use in specific electrical motor control systems according to the *National Fire Protection Association (NFPA 70®): National Electrical Code® (NEC®) Handbook*.*

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Advanced Controls

8. Install solid-state relays for specific application in motor control circuits.
9. Install nonprogrammable and programmable motor circuit protectors in accordance with manufacturer's instructions.
 - Installing solid-state overload relays in various motor circuits
10. Describe the purpose for electric heat tracing equipment used with domestic hot water temperature maintenance systems.

High-Voltage Terminations and Splices

11. Select materials and tools for high-voltage terminations and splices.
 - Preparing high-voltage cable for terminations and splices
 - Testing high-voltage terminations and splices
12. Identify electromechanical and solid-state timing relays for specific applications in motor control circuits.
13. Describe various types of reduced-voltage motor controllers.
14. Apply adjustable frequency drives for controlling a motor in accordance with the manufacturer's instructions.
15. Design special precautions for use when handling and working with solid-state motor controls.
16. Explain operating principles for various types of motor braking.
17. Perform preventive maintenance and troubleshooting tasks in motor control circuits.

Heat Tracing and Freeze Protection

18. Describe the purpose of electric heat tracing equipment used with pipelines and vessels.
19. Install electric heat tracing equipment on selected pipelines and vessels in accordance with manufacturer's instructions and NEC requirements.

Advanced Navigation Technology

This is a one-credit course that provides an in-depth study of marine navigation and how technology has changed the way today's mariners navigate. Topics in this course include advanced plotting techniques, the theory operation, and maintenance and repair of marine very high frequency (VHF), and single-side band radiotelephones. Introduction to Navigation Technology is the prerequisite for this course.

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Advanced Plotting Techniques

Students will:

1. Explain advanced navigation plotting techniques, including dead reckoning, set-and-drift, and compass error.

Chart Correcting

2. Determine requirements for navigation chart correcting.
3. Identify the use of publications associated with navigation.

Electronic Navigation

4. Describe the application of publications governing electronic navigation.
5. Operate instruments that aid in electronic navigation.
Examples: fathometer, radiotelephone, Global Positioning System (GPS), radar navigation
6. Utilize communication equipment and procedures associated with electronic navigation.
 - Demonstrating sending and receiving distress, urgency, and safety calls

Emergency Communication Procedures

7. Describe emergency communication procedures for navigation.
8. Demonstrate use of emergency communication procedures for navigation.

Survival at Sea

9. Describe actions to aid in survival at sea.
10. Demonstrate skills to aid in survival at sea.

Advanced Power Equipment Technology

Advanced Power Equipment Technology is a one-credit course that provides students with specialized classroom and laboratory experiences for diagnosis and repair of two- and four-cycle small engines. Students are provided instruction and practice for the diagnosis of electrical, electronic, fuel system, and mechanical malfunctions. Instruction targets correcting malfunctions through application of technical procedures for system components, part inspections, and engine overhauls. Upon successful completion of the course, students are able to diagnose and repair common engine malfunctions.

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Safety

Students will:

1. Apply safety rules, regulations, and procedures for power equipment operation and maintenance.

Advanced Engine Design and Theory

2. Compare two- and four-cycle engines in operation and application.
3. Explain the relationship between engine parts and components in a four-cycle engine.
4. Explain the relationship between engine parts and components in a two-cycle engine.

Fuel Systems

5. Compare types of fuel systems found in power equipment, including diesel, fuel injection, and carburetion.
6. Analyze fuel system problems relative to engine operation and performance.
7. Demonstrate problem-solving techniques for correcting fuel system problems regarding engine operation and performance.

Ignition Systems

8. Compare types of ignition systems found in power equipment.
9. Diagnose ignition systems by using tools and adjustments to determine corrective action.
 - Performing repair operations

Starter and Charging Systems

10. Analyze starter systems, including batteries, starting circuits, and charging systems to determine corrective action.

Engine Overhaul

11. Demonstrate procedures needed for reconditioning an engine according to manufacturer's specifications.

Small Compact Diesel Engine

12. Explain individual components of a small, compact diesel engine.
13. Demonstrate routine maintenance on various types of power equipment.

Computerized Engine Control Diagnosis and Repair

14. Utilize trouble codes on board diagnostic systems to determine necessary action.
15. Solve repair issues associated with engine system diagnosis.

Advanced Spa Techniques Application

Advanced Spa Techniques Application is a one-credit course that provides students with study and experience in advanced hair removal, cosmetic applications, skin care, and massage techniques. Upon successful completion of this course, students are able to practice safety and sanitary precautions as they apply to the performance of advanced spa techniques and applications. The prerequisites for this course are Introduction to Cosmetology and Introduction to Spa Techniques.

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Hair Removal

Students will:

1. Demonstrate techniques to remove unwanted facial hair, including methods for temporary and permanent removal.
2. Demonstrate safety and infection control for hair removal services.

Corrective Makeup Application

3. Apply makeup used for day and night wear.
4. Identify situations where the application of corrective makeup may be desired.
5. List products and supplies needed for corrective makeup application.
6. Demonstrate how to minimize facial flaws with makeup.

Lash and Brow Procedures

7. Demonstrate procedures for tinting the lash and brow.
8. Demonstrate the application and removal of artificial eyelashes.
9. Apply procedures for shaping eyebrows, including tweezing and hot and cold methods of waxing.

Facials

10. Utilize advanced techniques for facial treatments, including facial machines and steamers, gauze masks, packs, and toners.
11. Identify skin disorders that may be handled in the salon versus disorders that should be referred to a physician.

Advanced Television Production

Advanced Television Production is a one-credit course that provides students with the opportunity to create and market video productions. Students work independently or in groups to create special long-term projects. Students who successfully complete this course are prepared for further study at the college level or for entry-level positions in the television, film, and communications industry. The prerequisite courses for Advanced Television Production are Introduction to Television Production and at least one of the Television Production Courses: Television Production—Writing, Producing, and Performing; Television Production—Studio Operations; or Television Production—Photography and Editing.

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Special Programs and Projects

Students will:

1. Apply safety skills in television production field locations, classrooms, and studios.
2. Demonstrate leadership skills as a member of a television production team.
Examples: organizing content, managing equipment, performing assignment editing
3. Utilize public relations skills in special program and project settings in television production.
Examples: interpersonal communications, correspondence, community relations
4. Apply specialized skills to perform television roles in writing, producing, performing, photographing, editing, and studio operations.
Examples: anchor, producer, actor, camera operator, editor, director
5. Organize subject matter into meaningful, marketable, and expressive video projects.
Examples: promotional videos, instructional videos, commercials
6. Design creative television and film productions, including short films and special presentations.
 - Utilizing video skills in a professional setting
Examples: internships, freelance video work
7. Assemble a portfolio of professional quality video work, including a statement of purpose, for a career in television production.
 - Demonstrating advanced skills in one or more career specializations of photography, editing, writing, producing, performance, or studio operations
Examples: short films, special presentations

Agribusiness Management

Agribusiness Management is a course that provides students with a basis for making effective decisions, setting goals, assessing and solving problems, appraising financial progress and success, evaluating the management of resources, and gaining skills useful in the agricultural industry. Students also evaluate national and international policies, regulations, and values that affect the production and trade of agricultural commodities. Topics include career opportunities, safety, principles of agribusiness economics, financial management, marketing agricultural products, business regulations, and entrepreneurship.

Content standards for this course are not intended to serve as the entire curriculum. Teachers are encouraged to expand the curriculum beyond the limits of these content standards to accommodate specific community interests and utilize local resources. This course encourages critical thinking, use of the scientific method, integration of technology, development of student leadership skills, and application of knowledge and skills related to practical questions and problems. Safety concepts are integrated into instruction to the maximum extent possible.

Agribusiness Management may be offered as a one-credit or half-credit course. For a half-credit course, content standards 1, 2, 3, 4, 8, 11, and 14 must be included.

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Career Opportunities

Students will:

1. Identify career opportunities in agribusiness management.
 - Identifying employer expectations, work habits, and interpersonal skills necessary for careers in agribusiness management

Safety

2. Describe occupational safety practices in agribusiness management.

Principles of Agribusiness and Economics

3. Describe agribusiness partnerships and corporations.
 - Describing agribusiness management techniques
Examples: planning, organizing, directing, coordinating
4. Describe the law of supply and demand as related to the agricultural industry.
 - Evaluating effects of monetary, fiscal, and international policies on the agricultural industry

5. Describe various techniques for measuring the performance of an agribusiness.

Financial Management

6. Differentiate among methods of depreciating capital goods.
Examples: straight line, sum-of-year digits
7. Compare types of accounting systems used in agribusiness.
8. Identify sources for obtaining agribusiness loans.
 - Describing procedures for obtaining an agribusiness loan

Marketing Agricultural Products

9. Compare various market venues for agricultural products.
10. Explain ways the law of comparative advantage affects the agribusiness industry.
11. Identify ways technology is used in agribusiness marketing.
Examples: Web sites, mass e-mail, Web page advertising

Business Regulations and Compliance

12. Explain the impact of government policies and regulations on agribusiness management decisions.
 - Examining benefits of participating in government programs that supplement agricultural production

Entrepreneurship

13. Explain strategies for marketing agricultural products and services.
14. Design an agribusiness entrepreneurial plan, including management and marketing strategies.

Agribusiness Marketing

Agribusiness Marketing is a one-credit course that provides students with the opportunity to develop an understanding of the principles and practices of marketing as they relate to agricultural products and services. Students learn fundamental aspects of developing a business plan as well as establishing and maintaining an effective and profitable business strategy. Course content enables students to explore various aspects of marketing from local market niches to operating in the global arena, including marketing concepts, marketing risks, advertising, agreements, and contracts.

Content standards for this course are not intended to serve as the entire curriculum. Teachers are encouraged to expand the curriculum beyond the limits of these content standards to accommodate specific community interests and utilize local resources. This course encourages critical thinking, use of the scientific method, integration of technology, development of student leadership skills, and application of knowledge and skills related to practical questions and problems. Safety concepts are integrated into instruction to the maximum extent possible.

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Career Opportunities

Students will:

1. Identify career opportunities associated with agribusiness marketing.

Marketing Plans

2. Explain components of a marketing plan.
 - Explaining the role of management in agribusiness
 - Demonstrating the preparation and implementation of a marketing plan

Marketing Concepts

3. Describe characteristics of the free agribusiness market system.
 - Explaining the importance of the free enterprise system in agribusiness marketing
 - Describing consumer influence on agribusiness marketing
4. Explain the role and importance of various marketing concepts in agriculture.
Example: law of supply and demand
5. Identify factors that influence agricultural investment and business decisions.
Examples: present value, future value, simple interest, compound interest, wise use of credit

6. Describe information resources utilized in agribusiness marketing.
Examples: commodity reports, Alabama Cooperative Extension System, Internet, print media, marketing agents and brokers
7. Describe various approaches for sales and marketing in the agribusiness marketing industry.
Examples: global sales and marketing, niche sales and marketing, traditional agricultural sales and marketing, direct-to-consumer sales and marketing
8. Evaluate various entities that ensure product quality in agribusiness marketing systems.
Examples: producer, shipper, processor, distributor, retailer
 - Explaining the role of cooperatives and associations in agribusiness marketing
9. Describe factors to consider in pricing agricultural products and services.
Examples: materials, labor, overhead, profit
10. Identify components of a sales presentation for an agricultural product or service.

Global Marketing

11. Describe the impact of global marketing on agricultural products and services produced in Alabama and in the United States.
 - Assessing the importance of international issues in global marketing
Examples: cultural appeal, market accessibility, tariffs, quotas

Niche Marketing

12. Explain the impact of niche markets on local areas in Alabama.
Examples: peach market in Clanton, tomato market in Slocomb, shrimp market in Bayou La Batre

Marketing Risk

13. Explain the significance of financial position and risk-taking in agribusiness marketing.
 - Evaluating risks in various marketing systems
Examples: stock, bond, and fund markets; future trading and options; global marketing
 - Comparing strategies for market diversification
 - Assessing benefits of marketing agricultural by-products
Examples: selling processed manure as garden fertilizer, selling processed peanut hulls as animal feed

Agreements, Contracts, and Regulations

14. Explain the role of legal counsel in agribusiness marketing, including negotiating agreements and contracts, interpreting marketing regulations, and resolving disputes.
15. Explain the role of negotiation in agribusiness marketing.
Examples: establishing prices for products and services, setting terms for contract and lease agreements
 - Comparing objectives of various parties involved in negotiating agreements and contracts
16. Describe government involvement and influence in agribusiness marketing.
Examples: regulations, programs, policies

Advertising

17. Identify various methods of advertising in agribusiness marketing systems.
Examples: video, Internet, print media, signs, billboards

Technology

18. Describe the use of computer technology in agribusiness marketing.
Examples: market analyzing, sales forecasting, telemarketing, video marketing

Agribusiness Technology

Agribusiness Technology is a one-credit course designed to facilitate student success in careers in agribusiness technology or success in any agricultural field. This course provides students with opportunities to acquire knowledge and skills related to agribusiness technology in the workplace. Topics include careers, safety, agribusiness software, telecommunications, networking, global positioning systems, and electronic control systems.

Content standards for this course are not intended to serve as the entire curriculum. Teachers are encouraged to expand the curriculum beyond the limits of these content standards to accommodate specific community interests and utilize local resources. This course encourages critical thinking, use of the scientific method, integration of technology, development of student leadership skills, and application of knowledge and skills related to practical questions and problems. Safety concepts are integrated into instruction to the maximum extent possible.

Career and technical student organizations are integral, cocurricular components of each career and technical education course. These organizations serve as a means to enhance classroom instruction while helping students develop leadership abilities, expand workplace-readiness skills, and broaden opportunities for personal and professional growth.

Career Opportunities

Students will:

1. Identify career and entrepreneurship opportunities in the field of agribusiness technology.

Safety

2. Explain safety practices in agribusiness technology.

Agribusiness Software

3. Identify software used for agribusiness tasks, including accounting, production management, communications, and marketing.
 - Formulating business reports from spreadsheets
Examples: budget, payroll, cash flow statement, profit and loss analysis, balance sheet, inventory, production records
4. Select a database for organizing agricultural data.
Examples: agricultural data—production records, budget records, market data
 - Explaining relationships among data fields, records, and files
 - Critiquing methods for searching databases to retrieve information
 - Identifying devices for storing and transferring data, including flash drives, portable media players, and personal digital assistants (PDAs)

5. Utilize software to produce an agribusiness publication.
6. Utilize software to create an agribusiness presentation.

Telecommunication

7. Describe telecommunication technology for agribusiness settings.

Networking

8. Describe advantages of computer networking in an agribusiness.

Positioning Systems

9. Explain the history of the global positioning system (GPS) and the geographic information system (GIS).
10. Explain ways GPS and GIS units are used in the agricultural industry.
11. Describe ways GPS and GIS data is merged with agricultural production records.

Electronic Control Systems

12. Explain ways electronic control systems are used in the agribusiness industry.
Examples: thermostat in poultry house, timer in greenhouse

Agricultural Communications

Agricultural Communications is designed to enable students to effectively communicate in agribusiness settings. Topics include career opportunities, effective communication, conflict resolution, group dynamics, goal setting, time management, effective leadership, parliamentary procedure, and supervised agricultural experience programs.

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This course may be taught as a one-credit or half-credit course. For a half-credit course, content standards 1, 3, 8, 11, 12, 13, and 14 must be included.

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Career Opportunities

Students will:

1. Identify occupational opportunities in agricultural communications.
2. Explain the importance of a college education to the agricultural industry.

Effective Communication

3. Demonstrate effective oral and written communication skills.
 - Identifying types of speeches, including persuasive, informative, demonstrative, and commemorative

Conflict Resolution

4. Explain the importance of conflict resolution in an agribusiness.
 - Describing techniques used in resolving conflicts

Group Dynamics

5. Explain the importance of group dynamics in the agricultural industry.
 - Identifying roles of individual team members in reaching group goals

Goal Setting

6. Describe the importance of long- and short-term goals and goal setting in an agribusiness.

Time Management

7. Explain time management techniques in the agricultural industry, including setting priorities and scheduling.

Effective Leadership

8. Describe the importance of leadership in agribusiness.
 - Explaining leadership traits needed for operating an agribusiness
 - Describing personal leadership skills necessary for success in agribusiness
 - Explaining the importance of ethics in agribusiness
9. Differentiate among types of leaders in the agribusiness setting, including authoritarian, democratic, autocratic, and participative.
10. Describe qualities of a strong work ethic in an agribusiness.
 - Explaining reasons for following rules and regulations in the agribusiness setting
11. Evaluate personal attributes, including interpersonal relationship skills and value systems, as they relate to leadership in agribusiness management.
 - Describing behaviors necessary for success in interpersonal relationships in agribusiness
12. Describe ways FFA activities enhance personal leadership skills.

Parliamentary Procedure

13. Demonstrate parliamentary procedure in agribusiness meetings.
Examples: types of motions, voting methods, steps in presenting a main motion, duties of the chairperson

Supervised Agricultural Experience

14. Describe the importance of maintaining records for a SAE program.

Agriscience

Agriscience is a course that provides students with a general overview of the Agriculture, Food and Natural Resources cluster, which contains five pathways—Power, Structure, and Technical Systems; Environmental and Natural Resources Systems; Animal Systems; Plant Systems; and Agribusiness Systems. Students are involved in classroom and laboratory activities in each of the five pathway areas. Topics included in this course include career opportunities, safety, technology applications, agribusiness leadership, environmental science, soil science, plant science, forestry, animal science, aquaculture, wildlife science, pest management, woodworking, metalworking, small engines, electrical wiring, and plumbing.

Content standards for this course are not intended to serve as the entire curriculum. Teachers are encouraged to expand the curriculum beyond the limits of these content standards to accommodate specific community interests and utilize local resources. This course encourages critical thinking, use of the scientific method, integration of technology, development of student leadership skills, and application of knowledge and skills related to practical questions and problems. Safety concepts are integrated into instruction to the maximum extent possible.

This course may be taught as a one-credit or half-credit course. For a half-credit course, content standards 1, 2, 3, 6, 7, 9, 10, 12, 16, 18, and 19 must be included.

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Introduction

Students will:

1. Identify major agricultural commodities in the local area, state, nation, and world.
 - Sequencing major changes and accomplishments in the history of agriculture
 - Describing various agricultural organizations and their roles in the agricultural industry
 - Defining agriculture and major divisions of the agricultural industry

Career Opportunities

2. Determine factors in developing an effective career plan, including procedures for obtaining employment.
 - Identifying various careers in the agricultural industry

Safety

3. Identify tool and equipment safety procedures in woodworking, welding, electrical, small engine, plumbing, and masonry operations.

Technology Applications

4. Utilize technology to access, manage, and integrate information in the agricultural industry.
Examples: Internet, spreadsheets, databases
 - Identifying technological advancements that enhance the agricultural industry

Agribusiness Leadership

5. Apply problem-solving skills to resolve agribusiness issues.
 - Explaining the eight steps in the decision-making process
 - Describing fundamental principles of economics that affect the management of a business, including supply and demand
6. Identify characteristics of a SAE program, including manageability, record keeping, availability of facilities, and financing.
 - Identifying principles of financial literacy
 - Describing factors to be considered in agricultural entrepreneurial opportunities
Examples: risk, reward, business climate, obtaining finances
7. Demonstrate communication skills, including prepared public speaking, extemporaneous speaking, creed speaking, and parliamentary procedure, through career development events (CDEs).
 - Demonstrating leadership and teamwork skills gained through student organization activities
Examples: activities—CDEs, proficiency awards, officer leadership opportunities, teamwork opportunities

Environmental Science

8. Identify methods for conserving the environment.
 - Explaining the importance of natural resources
 - Describing techniques for recycling, reusing, and reducing the use of natural resources

Soil Science

9. Identify major soil areas in Alabama.
 - Identifying layers of soil in a soil profile
 - Determining the texture of various soil samples
 - Determining the land capability class for a given plot of land
 - Explaining how to adjust soil pH

Plant Science

10. Determine characteristics and functions of plants.
 - Explaining plant processes, including photosynthesis, respiration, and transpiration
 - Identifying the sixteen essential elements needed for plant health and growth
 - Identifying various requirements needed to produce successful vegetable gardens, greenhouse plants, and landscape plants
 - Propagating plants sexually and asexually
 - Explaining how agricultural crops can be utilized as alternative fuel sources

Forestry

11. Determine forest management practices.
 - Identifying trees for local, state, national, and global markets
 - Applying mathematics concepts to the measurement of trees and land

Animal Science

12. Identify common breeds of livestock and their characteristics, including cattle, swine, sheep, equine, and poultry.
 - Identifying species-specific terminology used to describe livestock
 - Examples: bovine—bull, cow, heifer, steer, calf
 - equine—stallion, mare, foal, gelding, filly
 - swine—boar, sow, piglet, gilt, barrow
 - Explaining practices used to manage livestock, including handling, breeding, vaccinating, and transporting
 - Determining nutritional requirements for livestock, including cattle, swine, sheep, equine, and poultry

Aquaculture

13. Differentiate among types of aquaculture enterprises in Alabama, including catfish, crawfish, shrimp, and tilapia.

Wildlife Science

14. Assess ethical and legal responsibilities for conduct in wildlife management.
 - Identifying state hunting laws and regulations concerning wildlife
 - Explaining hunter ethics
 - Determining management practices used to enhance wildlife habitats
 - Explaining hunting safety practices

Pest Management

15. Describe the importance of pest management in the agricultural industry.
 - Comparing types of pesticides and how they control pests

Woodworking

16. Apply mathematical, reading, and writing skills used in woodworking.
 - Developing a plan of procedure for a woodworking project
 - Interpreting a plan of procedure for a woodworking project
 - Demonstrating procedures for constructing a woodworking project, including completing a bill of materials, calculating board feet, selecting tools, applying measurements, cutting, assembling, and finishing

Metal Working

17. Demonstrate procedures used in arc welding.

Small Engines

18. Explain the theory of operation for two- and four-cycle small engines.
 - Performing routine care and maintenance on small engines

Electrical

19. Demonstrate procedures used in wiring electrical circuits.

Plumbing

20. Identify procedures for installing and maintaining water and sewage lines for agricultural structures.
 - Demonstrating the installation of plumbing fixtures

Agriscience Exploration

Agriscience Exploration is an exploratory course that provides Grade 8 students the opportunity to gain knowledge and acquire skills relating to the agricultural industry. Topics include career opportunities, safety, aquaculture, animal science, plant science, soil science, ecology, conservation, impact of agriculture, and agrimarketing. Instruction also focuses on agriscience technologies in the areas of woodworking, electricity, and power mechanics.

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This course may be taught as a one-credit or half-credit course. For a half-credit course, content standards 1, 2, 4, 5, 6, 8, 12, 13, 14, and 15 must be included.

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Career Opportunities

Students will:

1. Describe career opportunities in the agricultural industry.
 - Evaluating factors for selecting an agriscience career
Examples: personal interests, abilities, preparation, salary
 - Describing desirable work habits for the agricultural industry
Examples: reporting to work on time, wearing appropriate clothing, following directions, cooperating with coworkers

Safety

2. Describe safety rules and regulations that apply to the agricultural industry.
 - Demonstrating safe use of hand tools
 - Demonstrating safe use of power tools
 - Demonstrating safe techniques for small engine maintenance

Impact of Agriculture

3. Explain the impact of agriculture on a county's economy, utilizing National Agricultural Statistics Service (NASS) information.
 - Describing the impact of an abundant, inexpensive, and safe food supply
 - Examples: abundant—independence from foreign food imports
 - inexpensive—less income spent on food
 - safe—better overall health of populations
 - Comparing United States and world agricultural practices

Supervised Agricultural Experience

4. Identify types of SAEs, including exploratory, research, placement, and entrepreneurship.
 - Describing criteria for selecting an appropriate SAE
 - Examples: years in program, career interests, career advantages

Leadership Development

5. Demonstrate communication skills utilized within an agribusiness.
 - Examples: public speaking, letter writing
 - Demonstrating qualities of leadership, cooperation, and good citizenship within an agricultural organization
 - Demonstrating parliamentary procedures used to conduct agribusiness meetings

Animal Science

6. Identify major body parts of cattle, swine, sheep, equine, and poultry.
 - Describing the impact of selective breeding and cloning on livestock breeds
 - Evaluating selected groups of animals according to confirmation, frame size, muscling, grade, and breed characteristics

Aquaculture

7. Describe methods and facilities used in the production of various aquatic species.

Plant Science

8. Describe structures and functions of major parts of a plant.
 - Comparing photosynthesis and respiration
 - Identifying sexual methods of plant reproduction
 - Illustrating important techniques of asexual plant propagation
Examples: cuttings, division, grafting, layering, tissue culture

Soil Science

9. Identify major components of soil.
 - Comparing soil horizons
 - Relating soil characteristics to uses
Examples: texture, drainage, permeability, organic composition, class capabilities
 - Explaining the importance of soil to agriculture

Ecology and Conservation

10. Relate populations within a habitat to communities, ecosystems, and biomes.
 - Comparing biotic and abiotic components of an ecosystem
 - Identifying limiting factors that affect plant and animal populations in an ecosystem
Examples: food, shelter, water, climate, nutrients, physical space, disease, pollution, natural disasters
11. Evaluate agricultural and nonagricultural sources of pollution.
 - Describing the potential impact of climate change on plants, animals, and land
 - Explaining effective methods of reducing pollution

Woodworking

12. Develop a bill of materials and plan of procedure for a woodworking project.
 - Selecting the hardware required for a woodworking project
 - Calculating the number of board feet required for a woodworking project
13. Construct a woodworking project.

Electricity

14. Identify sources of electrical energy.
 - Explaining the electron theory and its relevance to electrical circuitry
 - Explaining the relationship between electricity and magnetism
 - Describing electrical terms, units, and symbols
 - Applying techniques for making electrical splices

Power Mechanics

15. Perform routine care and maintenance on small engines.

Technology

16. Describe computer skills used in the agricultural industry.
Examples: researching electronic reference sources, managing data, analyzing data, communicating information
17. Explain uses of the geographic information system (GIS) and global positioning system (GPS) as they relate to agriculture.

Agrimarketing

18. Explain ways agricultural products and services are marketed.
 - Describing the role of communication in agricultural marketing

Aircraft Engine and Propeller Theory and Operation

This one-credit course provides students with the basic knowledge and skills associated with aircraft engine and propeller theory and operation. Safety and proper tool use are emphasized throughout this course. Specific topics include engine and propeller theory, aircraft hardware, reciprocation engines, propellers, ground operations, aircraft servicing, tools, and materials. As part of this course, students apply knowledge and skills by performing various tasks related to engine and propeller theory and operation.

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Safety

Students will:

1. Apply safety rules, regulations and procedures for the Aviation Technology program, including safety concerns in the areas of first aid, fire, electricity, equipment, chemicals, and personal protective equipment (PPE).

Foundational Skills

2. Demonstrate computational skills necessary for aircraft engine and propeller theory and operation.
3. Utilize knowledge of the area of physical science as related to aviation technology.
 - Explaining the relationship between temperature and heat
 - Describing methods of heat transfer
 - Describing the relationship of work, force, and power
 - Describing the relationship of pressure, area, and force

Aircraft Hardware

4. Demonstrate proper installation of aircraft hardware.
 - Identifying types, sizes, construction, finishes, and applications of aircraft hardware
 - Applying tools to hardware during installation
Examples: specialized wrenches and tools
 - Utilizing safety wire and cotter-pin torqued threaded fasteners

Reciprocating Engines and Propellers

5. Explain the theory of reciprocating engines.

6. Explain the theory and operation of aircraft propellers.

Aircraft Ground Operation

7. Demonstrate procedures of ground operation.

Aircraft Servicing

8. Describe basic aircraft servicing techniques.

Aircraft Engine and Propeller Tools

9. Demonstrate use and inspection techniques of tools for aircraft engine and propeller maintenance.

Materials

10. Select materials used in aircraft maintenance.
Examples: safety wire, threaded fasteners, spark plugs, Air Force-Navy (AN) fittings, flexible hose, flexible hose fittings, aircraft lubricating oil, aircraft instrument training aids, nails, bell wire, flashlight battery

Projects

11. Disassemble the aircraft reciprocating engine utilizing the aircraft engine manufacturer's overhaul manual, including making measurements to simulate overhaul.
12. Reassemble the aircraft reciprocating engine utilizing the aircraft engine manufacturer's overhaul manual, including making measurements to simulate overhaul.

Aircraft Nonmetallic Structures

This one-credit course provides students with the basic knowledge and skills to inspect and repair aircraft nonmetallic structures. Safety and proper tool use are emphasized throughout this course. Specific topics include mathematics, wood construction and repair, fabric covering, aircraft finishing, composite structure, aircraft hardware, tools, and materials used to perform various activities related to aircraft nonmetallic structures.

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Safety

Students will:

1. Apply safety rules, regulations, and procedures for the Aviation Technology program.
 - Explaining industrial hazards, preventive measures, and safety practices, including safety concerns in the areas of first aid, fire, electricity, equipment, chemicals, and personal protective equipment (PPE).

Foundational Skills

2. Demonstrate mathematics skills necessary for aircraft maintenance.

Wood Construction and Repair

3. Identify use of wood aircraft construction and repair techniques.

Fabric Covering

4. Identify techniques in preparation for covering aircraft surfaces with fabric.

Aircraft Finishes

5. Identify aircraft paint finishes and procedures for inspection, removal, treatment, and application.

Composite Structures

6. Demonstrate techniques in aircraft composite construction and repair.

Tools for Aircraft Nonmetallic Structures

7. Demonstrate use and inspection techniques of tools for aircraft nonmetallic structure maintenance.

Aircraft Hardware

8. Explain uses, care, and installation of aircraft hardware related to nonmetallic structures.

Materials

9. Select materials used in aircraft maintenance, including fasteners; safety wire; aircraft paint finish; sheet metal; rivets; threaded fasteners; aircraft fabric; aircraft dope; rib-stitching cord; wood, plywood, and molding; metal flashing; and tacks.

Projects

10. Construct projects to apply learned theories and skills.
 - Plotting airfoil on graph paper from given x-y coordinates
 - Building airfoil from graphed airfoil using provided instructions, wood materials, sheet metal, glue, and tacks
 - Covering airfoil, using Federal Aviation Administration (FAA) approved procedures listed in AC41 13.1a manual and Supplemental Type Certificate (STC) data
 - Painting airfoil following approved safety procedures, including one FAA approved-size identification letter or number on one side of the airfoil and a student design on the other side
 - Building a composite fiberglass panel with honeycomb, fiberglass cloth, and resins
 - Making repairs using FAA approved procedures
 - Constructing a composite panel of honeycomb and fiberglass cloth using FAA approved procedures
 - Repairing damage to honeycomb and fiberglass panel using FAA approved procedures

Aircraft Sheet Metal Structures

The purpose of this one-credit course is for students to obtain the basic knowledge and skills in maintaining aircraft sheet metal structures. Safety and proper tool use are emphasized throughout this course. Specific topics include required computational skills, interpreting technical data, maintenance procedures and processes, tools, and materials. As part of this course students apply knowledge and skills by performing various projects to fabricate, inspect, and install sheet metal components.

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Safety

Students will:

1. Apply safety rules, regulations, and procedures for the Aviation Technology program, including safety concerns in the areas of first aid, fire, electricity, equipment, chemicals, and personal protective equipment (PPE).

Foundational Skills

2. Demonstrate computational skills necessary for aircraft sheet metal structures, materials, and processes.
3. Interpret technical information.
 - Utilizing data in basic graphs to be used in projects and torque tasks
 - Utilizing symbols, lines, and dimensions used in aircraft schematic diagrams
 - Interpreting blueprint information, including information presented in blueprint title blocks

Aircraft Sheet Metal Structures

4. Demonstrate maintenance procedures for aircraft sheet metal structures.
 - Describing characteristics of aluminum alloy clad sheet
 - Selecting aircraft materials, including aluminum alloys
 - Identifying different nondestructive testing methods
 - Describing treatment for different types of corrosion on aluminum alloys

Processes

5. Explain maintenance processes associated with aircraft sheet metal.

Tools

6. Demonstrate use and inspection techniques of tools for sheet metal structures, materials, and processes.

Materials

7. Select materials used in aircraft maintenance.

Aircraft Corrosion

8. Identify different types of corrosion on aluminum alloys.
9. Describe how to remove and treat corrosion problems on aluminum using approved practices.

Aircraft Hardware

10. Demonstrate the use, care, and installation of various types of aircraft hardware.

Sheet Metal Projects

11. Construct projects to apply learned theories and skills, including fabrication, repair, finishing, and documentation.
Examples: fabricating repair parts, repairing a simulated crack in a simulated aircraft skin, constructing a simulated inspection panel, generating appropriate Federal Aviation Administration (FAA) forms

Aircraft Theory of Flight and Operation

The purpose of this one-credit course is to provide students with knowledge related to the theory of flight and aircraft operation. Students are introduced to various tools, hardware, and materials used to maintain aircraft, including the safe and proper use of tools. Students construct various aircraft models to aid in the transition from theory to application of concepts.

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Safety

Students will:

1. Apply safety rules, regulations, and procedures for the Aviation Technology program, including safety concerns in the areas of first aid, fire, electricity, equipment, tools, chemicals, and personal protective equipment (PPE).
 - Explaining industrial hazards, preventive measures, and safety practices

Foundational Skills

2. Demonstrate basic skills in the areas of technical mathematics and technical physics.

Aircraft Construction

3. Demonstrate techniques of aircraft construction.

Theory of Flight

4. Explain the theory of flight, including Bernoulli's principles of gases leading to airfoils by describing the relationship between pressure and rate of flow of a liquid through an orifice, describing the relationship of air velocity and pressure of the upper surface of an airfoil, and describing the effect of atmospheric temperature and humidity on airfoil lift.
 - Describing basic aircraft structures and aerodynamics for fixed- and rotary-wing aircraft
 - Analyzing the axis of aircraft, including vertical, lateral, and longitudinal
 - Describing control surfaces for each axis, including rudder, elevator, aileron, and secondary flight controls
 - Identifying types of airfoil control surfaces and systems, including related cockpit controls
 - Demonstrating knowledge of forces acting on an aircraft, including angle of attack, angle of incidence, dihedral, and stability
 - Interpreting aircraft instruments
 - Explaining the importance of instruments to aircraft operation
 - Identifying safety practices to be utilized in and around aircraft when performing maintenance

Aviation History

5. Describe historical events in the development of flight.

Examples: early mythology, balloon flight, theory development and Leonardo da Vinci's helicopter and parachute, glider flights, powered flight, rocket flight, war aviation development, airmail and passenger development, general aviation development, space development

Tools

6. Demonstrate use of various types and applications of hand tools used in aviation technology, including inspection and cleaning.
 - Calculating measurements using precision measuring devices, including Vernier calipers, micrometers, depth gages, inside micrometers, dial indicators, and torque wrenches

Aircraft Hardware

7. Explain uses, care, and installation of aircraft hardware.

Materials

8. Select materials to be used in aircraft maintenance.

Aircraft Model Construction and Projects

9. Construct an aircraft model.
 - Relating model construction to aircraft theory of flight, aviation history, aircraft construction, and types of wing and landing gear configurations
 - Developing direction, sketch, and blueprint reading skills
 - Applying basic blueprint reading skills to hands-on tool skill development projects
Examples: doubler project, solid rib drawing, fabrication

Aircraft Welding

This one-credit course introduces students to materials and techniques used for aircraft welding. Safety and proper tool use are emphasized throughout this course. Specific topics include computational skills, physical science concepts, and types of welding tools and their operation. As part of this course, students demonstrate knowledge of gas fuel and electrical arc welding techniques by participating in various aircraft welding activities

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Safety

Students will:

1. Apply safety rules, regulations, and procedures for aircraft welding, including safety concerns in the areas of first aid, fire, electricity, equipment, tools, chemicals, and personal protective equipment (PPE).

Foundational Skills

2. Demonstrate computational skills associated with aircraft welding.
3. Explain physical science topics associated with aircraft welding.

Aircraft Welding Tools

4. Demonstrate the use of various types and applications of tools used in aviation welding technology, including inspection and cleaning.

Materials

5. Select materials and equipment used in aircraft maintenance, including oxygen, acetylene, strikers, soapstone, gas fuel welding goggles, electric arc shields, welding booths, manifold systems and regulators, and various metals.

Gas Fuel Welding

6. Demonstrate practical gas fuel welding techniques.
 - Practicing safety procedures to be utilized in turning on, operating, and securing gas welding equipment, including ensuring of safe operation
 - Interpreting printed directions, including laying out and fabricating repair parts from drawn prints and generating appropriate Federal Aviation Administration (FAA) forms required to install repair parts
 - Using orthographic blueprint procedures, including generating a drawing of a wooden block to simulate production
 - Demonstrating basic gas welding skills with and without a filler rod, including various types of joints utilized in aircraft construction
 - Demonstrating skill in gas fuel cutting procedures
 - Constructing plate projects
 - Constructing tube truss assembly projects

Arc Welding

7. Demonstrate practical electric arc welding techniques.
 - Practicing basic safety procedures to be utilized when operating electric arc welding equipment, including ensuring safe operation
 - Demonstrating basic welding techniques for various types of joints utilized in aircraft construction support welding
 - Utilizing drafting skills in gas fuel welding projects
 - Constructing plate projects utilizing various types of joints
Examples: edge, butt, lap
 - Constructing a square tubing project

Airframe Systems

This one-credit course provides students with basic knowledge and skills related to aircraft systems rigging, and weight and balance. Safety is emphasized throughout this course. Students learn the proper use of tools required for performing tasks associated with airframe systems. At the conclusion of this course, students are able to safely apply techniques to rig and balance aircraft for maintenance activities.

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Safety

Students will:

1. Apply safety rules, regulations and procedures for the Aviation Technology program, including safety concerns in the areas of first aid, fire, electricity, equipment, tools, chemicals, and personal protective equipment (PPE).
 - Explaining industrial hazards, preventive measures, tools, chemicals, and safety practices

Foundational Skills

2. Demonstrate computational skills necessary for airframe systems, rigging, and weight and balance.
3. Explain physical science concepts associated with airframe systems, rigging, and weight and balance.

Airframe Systems Tools

4. Demonstrate the use of various types and applications of tools used in airframe systems, including inspection and cleaning.

Aircraft Hardware

5. Demonstrate the use, care, and installation of aircraft hardware related to airframe systems.
 - Identifying types, sizes, construction and finishes, and applications of aircraft hardware

Materials

6. Select materials used in aircraft maintenance related to airframe systems.

Weight and Balance

7. Demonstrate the use of the aircraft weight and balance manual, Type Certificate Data Sheets (TCDS), and aircraft scales.

Projects

8. Construct projects to apply learned theories and skills.
 - Interpreting aircraft cable tension adjustment charts
 - Performing tension adjustments on cable turnbuckles
 - Assembling safety wire cable turnbuckles
 - Fabricating or repairing rigid tubing
 - Fabricating aircraft cable using a sleeve and thimble technique
 - Computing weight and balance calculations
 - Disassembling wings from an aircraft, moving to shop, and reassembling wings
 - Assessing primary and secondary controls for proper rigging for aircraft according to TCDS
 - Performing weighing of aircraft to determine if aircraft is within allowable limits
 - Performing calculations for various simulated configuration changes
 - Disassembling an aircraft, removing from shop, and reassembling to operable condition on a ramp

Alternating Current

This one-credit course is designed to provide students with the fundamental knowledge and skills needed in the electrical industry. Emphasis is placed on job safety, terminology and symbols, magnetism, electrical quantities, Ohm's law in alternating current circuits, and reactive circuits. Upon successful completion of this course, students are able to perform basic tasks related to the electrical industry.

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Terminology and Symbols

Students will:

1. Explain electrical terms, including alternating current, frequency, period, sine wave, capacitance, and inductance.
2. Interpret electrical symbols.
Examples: unit symbols, schematic symbols

Magnetism

3. Explain terms and principles of electromagnetism, including permeability, retentivity, and inductance.

Electrical Quantities

4. Explain electrical quantities, including frequency, impedance, power, capacitance, inductance, voltage, current, watts, and periods.
5. Measure electrical units, including volts, amperes, ohms, and hertz.
6. Determine electrical quantities utilizing test equipment, including volts, frequency and period, amperes, and power.

Ohm's Law in Alternating Current Circuits

7. Solve problems in electrical circuits using Ohm's law, including voltage, current, impedance, and power.

Reactive Circuits

8. Solve resistive-capacitive circuits.
9. Solve resistive-inductive circuits.
10. Solve resistive-capacitive-inductive circuits.
11. Analyze filter circuits to determine electrical values, including hi-pass, low-pass, band-pass, and band-stop.
12. Demonstrate troubleshooting techniques for evaluating reactive circuits.

Animal Biotechnology

Animal Biotechnology is a one-credit course that provides students with an opportunity to gain knowledge of the principles and practices of animal genetics and biotechnology as they relate to agricultural products and services. Topics include career opportunities, safety, impact of animal biotechnology, and applied genetics and breeding.

Content standards for this course are not intended to serve as the entire curriculum. Teachers are encouraged to expand the curriculum beyond the limits of these content standards to accommodate specific community interests and utilize local resources. This course encourages critical thinking, use of the scientific method, integration of technology, development of student leadership skills, and application of knowledge and skills related to practical questions and problems. Safety concepts are integrated into instruction to the maximum extent possible.

Career and technical student organizations are integral, cocurricular components of each career and technical education course. These organizations serve as a means to enhance classroom instruction while helping students develop leadership abilities, expand workplace-readiness skills, and broaden opportunities for personal and professional growth.

Career Opportunities

Students will:

1. Describe career opportunities associated with animal biotechnology.

Safety

2. List safety considerations and procedures required for working in animal biotechnology.
Examples: considerations—biological, chemical, radiation
 procedures—laboratory requirement

Impact of Animal Biotechnology

3. Trace the historical development of animal biotechnology.
4. Describe the importance of animal biotechnology to humans, including medical, environmental, and product advancements.
Examples: medical advancements—synthesis of medicines
 environmental advancements—animal disease resistance, pest control
 product advancements—increased yield, disease-resistant animals

5. Describe advances in biotechnology that enhance the ability of animal immune systems to fight diseases.
 - Identifying differences in disease resistance and susceptibility in commercial animal groups
 - Examples: animal groups—cattle, swine, poultry, sheep, equine
diseases—brucellosis, anthrax, bovine encephalitis, coccidiosis, avian pneumonia, streptococcus, equine encephalitis
6. Describe ways scientific research, consumer preferences, and advances in biotechnology influence animal development and production.
 - Examples: milk content, egg size, loin eye size
 - Performing a deoxyribonucleic acid (DNA) transformation into bacteria using genetic engineering methods
 - Purifying protein from a transformation experiment
7. Compare cultural and bioethical views of genetic manipulation, including genetic engineering and cloning.

Applied Genetics and Breeding

8. Describe heterogeneity as an important strategy in maintaining health and productivity in animal populations.
 - Describing methods of maintaining heterogeneity in various animal populations
 - Examples: introduction of nonnative animals, managed breeding
 - Identifying desired characteristics in an animal as homozygous or heterozygous
 - Examples: coat color, presence of horns, slick hair
 - Explaining the importance of heterosis for increased productivity in commercial herds
 - Recognizing heritable characteristics of animals
 - Examples: physical structure, chemical composition, behavior
9. Identify desirable characteristics for an animal population.
 - Examples: incorporation of heat tolerance into a cattle herd, improvement of weaning weight and milk production
 - Explaining the importance of selective breeding for an animal population
10. Describe inheritance patterns based on chromosomes, genes, alleles, and gene interaction.
 - Comparing dominant and recessive traits
 - Comparing incomplete dominance and codominance

Animal Science

Animal Science is a course that provides students with instruction regarding this area of the agricultural industry. Students participate in activities related to the animal science field as they engage in the study of topics such as career opportunities, safety, importance of the livestock industry, breed identification and characteristics, nutrition, disease and parasite control, genetics and reproduction, animal rights versus animal welfare, and specialty animal production and animal products.

Content standards for this course are not intended to serve as the entire curriculum. Teachers are encouraged to expand the curriculum beyond the limits of these content standards to accommodate specific community interests and utilize local resources. This course encourages critical thinking, use of the scientific method, integration of technology, development of student leadership skills, and application of knowledge and skills related to practical questions and problems. Safety concepts are integrated into instruction to the maximum extent possible.

This course may be taught as a one-credit or half-credit course. For a half-credit course, content standards 1, 2, 3, 4, 6, 8, and 11 must be included.

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Career Opportunities

Students will:

1. Identify employment opportunities in the livestock industry.
Examples: farm management, livestock production

Safety

2. Describe safety procedures for handling livestock.

Importance of Livestock Industry

3. Trace the domestication of livestock.
4. Identify livestock by common names.
 - Explaining the importance of binomial classification
5. Explain benefits of livestock production to society.
Examples: medicine, food, clothing

Breed Identification and Characteristics

6. Trace the history of major large animal breeds.
Examples: beef, swine, equine, goat, sheep, specialty animal breeds
 - Explaining the economic importance of major large animal breeds
7. Describe facilities used to manage livestock.
Examples: corral, catch pen, head chute

Nutrition

8. Compare digestive systems of large animals.
Examples: nonruminant, ruminant
9. Describe proper nutrition and balanced rations for animals.
 - Differentiating among nutrients affecting the health of livestock
Examples: vitamins, minerals, proteins, fats, carbohydrates, roughages, concentrates, feed additives

Disease and Parasite Control

10. Evaluate methods of disease prevention in livestock.
Examples: parasite control, vaccination, sanitation
 - Categorizing symptoms of animal diseases for diagnostic purposes
Example: black leg symptoms
 - Comparing drugs used to treat animal diseases
Examples: antibiotics, wormers
 - Critiquing environmental factors affecting livestock operations
Examples: soil loss, water quality, air quality

Genetics and Reproduction

11. Describe the structure and function of male and female reproductive systems in livestock.
 - Describing the process of genetic engineering, including the use of recombinant deoxyribonucleic acid (DNA)
 - Assessing the use of biotechnology in animal reproduction
Examples: cloning, genetic engineering, embryo transfer
 - Describing how selective breeding has influenced the improvement of animals
Examples: trimness, muscle expression, structure, size, scale

Animal Rights Versus Animal Welfare

12. Differentiate animal rights from animal welfare.
 - Describing responsible ownership of animals
 - Listing ways the use of animals in research has benefited humans and animals
 - Interpreting laws governing the use of animals for research

Specialty Animals and Animal Products

13. Identify economically important specialty animals and animal products.
Examples: animals—alligators, cashmere goats, quail, ratites, pheasants
animal products—specialty meats, cheeses
14. Compare requirements for specialty animal production with traditional animal production.
Examples: care and feeding, management, marketing, sales

Animated Filmmaking

Animated Filmmaking is a one-credit course that provides students with the opportunity to produce entertaining animated films utilizing a variety of techniques. Topics include visual development, storyboarding preproduction, animation production, and animation technology. Successful completion of this course prepares students for Advanced Animation Portfolio, postsecondary education, and entry-level careers in Animated Filmmaking. Introduction to Animation and Visual Communication, Animation, Layout, Storyboarding, Animation Character Development and Design, Character Animation, or a satisfactory portfolio review by the instructor are prerequisites for this course.

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Safety

Students will:

1. Apply laboratory safety rules, regulations, and procedures in filmmaking.

Orientation to Skill Program

2. Describe the role of film, video, and electronic media in past and present cultures throughout the world.
3. Compare characteristics of visual arts styles from various historical periods.
4. Identify postsecondary education requirements for careers in animated filmmaking.

Visual Development

5. Analyze character and layout designs for animated filmmaking.
 - Researching a variety of environments and styles for layout in animated film
 - Designing characters for various personality types in animated film

Character Design

6. Solve visual arts problems in filmmaking.
 - Interpreting designs through a diverse range of media, techniques, and processes

Storyboarding and Preproduction

7. Apply artistic processes and skills using a variety of media to communicate ideas, themes, emotions, and stories in filmmaking.
 - Using completed story panels to produce animation

Animation Production

8. Analyze physical, emotional, and social dimensions of animated characters.
 - Using necessary technical steps for animating a scene in animated filmmaking
 - Creating characters, environments, and actions that exhibit tension and surprise in animated film
 - Applying advanced animation kinetics and mechanics to produce believable movements in character animation

Animation Technology

9. Use technology to facilitate problem solving, critical thinking, and informed decision making in filmmaking.
10. Apply technology in the production of films.
 - Editing animation for clarity and entertainment in animated film
 - Recording animation for visual review in animated film
 - Creating effects for final film in animated film

Animation Character Development and Design

Animation Character Development and Design is a one-credit course that provides students with the opportunity to develop and design animated characters. Emphasis is placed on anatomy, film archetypes and stereotypes, figure drawing, and costume design. Skills gained in this course prepare students for the Character Animation course, postsecondary education, and entry-level careers in character design. Introduction to Animation and Visual Communication, Animation Layout, Storyboarding, or a satisfactory portfolio review by the instructor are prerequisites for this course.

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Safety

Students will:

1. Apply laboratory safety rules, regulations, and procedures for character development and design.

Introduction

2. Create an education plan for a career in character design that includes postsecondary and apprenticeship requirements.
3. Describe training and responsibilities for various occupations in character design.

Character Development

4. Develop designs that use organizational principles and functions to communicate a story or ideas.
 - Analyzing a story or story idea for clarity and entertainment
 - Researching personality types for animated characters
 - Researching animal behaviors and characteristics for character development
 - Identifying design elements for various character personalities
 - Applying appropriate archetypes and stereotypes to communicate a story or idea

Character Design

5. Solve visual arts problems through a diverse range of media, techniques, and processes.
 - Researching the anatomy of humans and animals for character design
 - Applying canons of proportions to produce character designs with anatomical accuracy
 - Applying rules of perspective to produce solid character designs
 - Using design elements to communicate personality of characters

Costume Design

6. Create costumes employing a diverse range of media, techniques, and processes to communicate an idea or story.
 - Researching characteristics and purposes of a variety of interrelated historical and cultural backgrounds for authenticity of costumes
 - Identifying costume designs based on literary, cultural, and historical backgrounds

Mechanics and Production

7. Use a variety of media and formats to collaborate and interact with peers, experts, and other audiences.
 - Producing inspirational sketches for conceptual designs that communicate ideas
 - Producing turnaround model sheets and gesture expression sheets for critique

Animation Layout

Animation Layout is a one-credit course that provides students with the opportunity to explore illustration as related to settings, locations, and environments for animated film. Students utilize design principles to create believable environments. Topics include life, landscape, and architectural drawings. Successful completion of this course prepares students for the Storyboarding course and for entry-level careers in Animation Layout. Introduction to Animation and Visual Communication or a satisfactory portfolio review by the instructor is the prerequisite for this course.

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Safety

Students will:

1. Apply laboratory safety rules, regulations, and procedures for animation layout.

Introduction

2. Identify occupations in animation layout.
3. Describe training and responsibilities for occupations in animation layout.

Layout and Design

4. Apply artistic processes and skills using a variety of media to communicate meaning and intent in original layouts.
 - Researching information about natural environmental settings to create believable background drawings
 - Creating layouts that use visual elements and design principles to communicate ideas in animation

Decision Making, Problem Solving, and Integrated Academics

5. Solve visual layout problems using principles of design and elements of art to produce visual works of layout and focal points that communicate a variety of ideas, themes, and emotions.
 - Utilizing design principles to effectively convey intentions in a work of art
6. Use screen site formats for specific layouts in animation.
7. Solve design problems in animation visual layout using research, thumbnails, and roughs.

8. Use technology for problem solving, critical thinking, and informed decision making in animation layout.

Mechanics and Production

9. Use a variety of visual media and formats to critique layouts for animation, including producing layout roughs for conceptual designs that appropriately communicate ideas and creating plane view models for appropriate stage direction.

Applied Welding I with Plasma Arc Cutting

This one-credit course provides students with instruction regarding safety and terminology in the shielded metal arc welding (SMAW) process, equipment identification, setup and operation of plasma arc equipment, and reading and interpreting detailed drawings. Emphasis is placed on striking and controlling the arc and proper fitting of weld joints. Upon successful completion of this course, students are able to perform fillet welds in the 1-F and 2-F positions with E6010 and E7018 electrodes in accordance with American Welding Society (AWS) D1.1 codes. Students identify safety hazards, gases, and equipment, and practice the operation of manual plasma arc cutting equipment while observing safety precautions. The prerequisite for this course is Introduction to Welding.

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Safety

Students will:

1. Demonstrate safe welding procedures as related to the SMAW and plasma arc cutting (PAC) processes.

Applied Shielded Metal Arc Welding

2. Demonstrate T-joint techniques with an E7018 and an E6010 electrode in flat fillet welds in the 1-F position and horizontal fillet welds in the 2-F position.
3. Demonstrate lap-joint techniques with an E7018 and an E6010 electrode in flat fillet welds in the 1-F position and horizontal fillet welds in the 2-F position.
4. Demonstrate corner-joint techniques with an E7018 and an E6010 electrode in flat fillet welds in the 1-F position and horizontal fillet welds in the 2-F position.

Plasma Arc Cutting

5. Use manual plasma arc cutting equipment for carbon steel, aluminum, and stainless steel, including setting up equipment.
6. Cut metal to specification using the plasma arc cutting process.

Drawings

7. Explain various notes, including the bill of materials, located on welding drawings.
8. Produce a drawing for a specific welding project.
9. Interpret blueprints to produce a welding project, including laying out, cutting, and welding.

Applied Welding II with Carbon Arc Cutting

This one-credit course introduces students to the proper setup and operation of shielded metal arc welding (SMAW) equipment in the 3-F vertical and 4-F overhead positions. Emphasis is placed on striking and controlling the arc. Proper setup and operation of manual air carbon and gouging and cutting operations on plain carbon steel are addressed. Upon successful completion of this course, students are able to perform fillet welds in the 3-F vertical, and 4-F overhead, positions with E6010 and E7018 electrodes in accordance with American Welding Society (AWS) D1.1 code and produce industry quality cuts with carbon arc cutting equipment. The prerequisite for this course is Applied Welding I with Plasma Arc Cutting.

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Safety

Students will:

1. Demonstrate safe welding procedures related to SMAW and carbon arc cutting (CAC) processes.

Applied Shielded Metal Arc Welding

2. Demonstrate correct T-joint techniques for single and multiple passes with an E7018 and E6010 electrode in vertical fillet welds in the 3-F position and overhead fillet welds in the 4-F position.
3. Demonstrate correct lap-joint techniques with an E7018 and E6010 electrode in vertical fillet welds in the 3-F position and overhead fillet welds in the 4-F position.
4. Demonstrate correct corner-joint techniques with an E7018 and an E6010 electrode in vertical fillet welds in the 3-F position and overhead fillet welds in the 4-F position.

Air Carbon Arc Cutting

5. Demonstrate the setup for manual air carbon arc cutting equipment for carbon steel gouging and cutting.
6. Perform CAC cutting operations according to specifications.
7. Perform CAC gouging according to specifications.

Applied Welding III Groove Welds and Inspection

Applied Welding III Groove Welds and Inspection is a one-credit course that provides students with instruction and demonstration in the shielded metal arc welding (SMAW) process on carbon steel plates with various size E-6010 and E-7018 electrodes in the 1-G flat and 2-G horizontal positions. This course also provides students with inspection skills and knowledge to evaluate welded joints and apply quality control measures as needed. Emphasis is placed on interpreting welding codes, welding procedures, and visual inspection methods. Upon successful completion of the course, students are able to visually identify acceptable weldments as prescribed by the code of welding specification report and are able to make visually acceptable groove weld joints in accordance with the American Welding Society (AWS) D1.1 welding certification procedures. The prerequisite for this course is Applied Welding II with Carbon Arc Cutting.

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Safety

Students will:

1. Demonstrate safety procedures used for the SMAW process.

Groove Welds

2. Describe groove welds with and without backing.
3. Perform tasks needed to prepare carbon steel material for groove welds.
4. Demonstrate correct techniques for groove welding a butt joint with the backing plate in the 1-G flat position and in the 2-G horizontal position.
5. Demonstrate correct techniques for groove welding an open-root butt joint in the 1-G flat position and in the 2-G horizontal position.

Welding Inspection and Testing

6. Prepare the weld coupon for performance testing in 1-G and 2-G positions with and without the backing plate.
7. Interpret applicable codes and standards of welding credential issuing agencies.
Example: AWS

Applied Welding IV Advanced Groove Welds and Testing

Applied Welding IV Advanced Groove Welds and Testing is a one-credit course that provides students with instruction and demonstrations in the shielded metal arc welding (SMAW) process on carbon steel plate with various size E6010 and E7018 electrodes in the 3-G vertical and 4-G overhead positions. Upon successful completion of this course, students are able to make visually acceptable groove weld joints in accordance with American Welding Society (AWS) D1.1 weld certification procedures and prepare a weld coupon for certification. The prerequisite for this course is Applied Welding III Groove Welds and Inspection.

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Safety

Students will:

1. Demonstrate safety procedures used for the SMAW process.

Advanced Groove Welds

2. Demonstrate correct techniques for groove welding a butt joint with the backing plate in the 3-G vertical position and in the 4-G overhead position.
3. Demonstrate correct techniques for groove welding an open-root butt joint in the 3-G vertical position and in the 4-G overhead position.

Welding Inspection and Testing

4. Prepare the weld coupon for performance testing in 3-G and 4-G positions with and without the backing plate.
5. Describe codes, standards, and issuing agencies needed for attaining welding credentials.
6. Prepare the completed coupon for visual inspection.
7. Prepare the coupon for bend testing.

Aqua Experience

Aqua Experience is an aquaculture class designed to enhance student understanding of the aquaculture industry. This course gives students an overview of the scientific research associated with the aquaculture industry and the economic significance aquaculture plays at the local, state, and national levels, including entrepreneurship and related business functions. Additional areas of instruction include career opportunities, safety, water quality management, and system design and maintenance.

Content standards for this course are not intended to serve as the entire curriculum. Teachers are encouraged to expand the curriculum beyond the limits of these content standards to accommodate specific community interests and utilize local resources. This course encourages critical thinking, use of the scientific method, integration of technology, development of student leadership skills, and application of knowledge and skills related to practical questions and problems. Safety concepts are integrated into instruction to the maximum extent possible.

This course may be taught as a one-credit or half-credit course. For a half-credit course, content standards 1, 2, 3, 5, 6, 7, and 11 must be included.

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Career Opportunities

Students will:

1. Identify career opportunities in aquaculture.

Safety

2. Identify safety precautions associated with producing fish.

Introduction

3. Trace the history of aquaculture.

4. Explain extensive, semi-intensive, and intensive aquaculture production.
 - Examples: extensive—low animal density, low economic risk, little or no environmental manipulation, including aeration, feeding, and fertilization
 - semi-intensive—moderate animal density, moderate economic risk, moderate environmental manipulation, including supplemental aeration and supplemental feeding
 - intensive—high animal density, high economic risk, complete environmental manipulation, including continuous aeration, nutritionally complete feeding, and biological waste management
5. Describe the role of scientific research relative to the aquaculture industry.
 - Identifying vaccines, antibiotics, and breeding techniques used in the aquaculture industry
 - Identifying sources of nutrients and feed components used in the aquaculture industry
 - Identifying aquaculture production methods and management strategies for recirculating systems, cages, raceways, ponds, partitioned aquaculture systems, and super-intensive aquaculture systems
6. Explain the economic impact of aquaculture at the local, state, and national levels.

Water Quality Management

7. Differentiate among water quality parameters relative to the culture of aquatic organisms, including ammonia and nitrate toxicity and pH, oxygen, and temperature tolerances.

Business and Economics

8. Explain entrepreneurship opportunities available in the aquaculture industry.
9. Explain results of an aquaculture market survey.
 - Comparing various aquaculture market outlets
Examples: local, regional, national, international
 - Identifying market promotions for the aquaculture industry
10. Construct a budget for an aquaculture operation.

System Design and Maintenance

11. Compare aqua system designs for various aquatic species.
 - Designing a maintenance plan for an aqua system
 - Identifying site specifications, components, and operations for aqua systems

Aquaculture Science

Students in this one-credit course are introduced to practical applications of both physical and biological concepts and skills. While aquaculture is the cornerstone of this course, the program places heavy emphasis on integration of knowledge to solve problems and broaden depth of understanding about topics such as career opportunities, safety, history, water chemistry and management, aquaculture systems, aquatic biology, and health and sanitation.

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Career Opportunities

Students will:

1. Describe various career opportunities in the aquaculture industry.

Safety

2. Describe safety precautions for the aquaculture industry.

History

3. Explain the historical background of aquaculture.
 - Explaining how aquaculture relates to agriculture
 - Describing science and technology related to aquaculture
 - Identifying the economic significance of aquaculture at the local, state, and national levels
4. Differentiate among freshwater, brackish water, and saltwater ecosystems.
 - Identifying chemical, geological, and physical features of aquatic ecosystems
5. Relate geological and hydrological phenomena and fluid dynamics to aquatic systems.
6. Explain the importance of biogeochemical cycles in an aquatic environment.
7. Categorize aquaculture species as cold, cool, or warm water species.

Water Chemistry and Management

8. Determine important properties and content of water as related to aquaculture.
Examples: turbidity, pH, pollutants, dissolved oxygen, high specific heat, density, temperature
 - Describing the influence of water quality on aquaculture
Examples: aquatic plant control, water quality management, recognition and correction of oxygen deficiency, pH control
 - Identifying sources of aquatic pollution
Examples: point and nonpoint pollution, volcanic ash, waste disposal
 - Describing methods of reclaiming wastewater and polluted water
Examples: settling ponds; hydroponics; irrigation water; chemical additives; mechanical, biological, and chemical filtering systems
 - Calculating pH, oxygen, and nitrogen levels in aquatic environments

Aquaculture Systems

9. Describe various structures and equipment used in growing aqua crops.
Examples: open ponds, cages, raceways, tanks, silos
 - Determining the suitability of habitat construction for aquaculture
 - Identifying biological concerns in a recirculating or closed system
10. Describe infrastructure necessary for aquaculture production.
Examples: labor, feed manufacturing, transportation

Aquatic Biology

11. Identify the genotype and phenotype for specific characteristics in aquatic animals resulting from selective breeding.
Examples: disease-resistant fish, rapid maturation rates
 - Explaining the importance of anatomy and physiology in aquaculture
Examples: body systems, internal and external anatomy of fish, basic structure of an oyster
 - Calculating genotypic and phenotypic percentages and ratios for aquatic species
12. Describe adaptations that allow organisms to exist in specific aquatic environments.

13. Describe processes and environmental characteristics that affect growth rates of aquatic animals.
Examples: reproductive habits, feeding habits, interdependence of organisms, overcrowding, seasonal changes
 - Collecting aquatic growth-rate data
14. Determine effects of the fishing industry on the aquatic environment.
Examples: aquaculture, overfishing
 - Describing basic principles involved in fish production
 - Explaining various methods of pond preparation, predator control, and species management
 - Explaining harvesting techniques and methods of transporting fish to market

Health and Sanitation

15. Define concepts associated with health management of aqua crops.
16. Describe the control of diseases and pests in aquatic environments.
Examples: pathogenic microspecies, parasites, predators, trash fish
 - Identifying relationships among pathogen, environment, and host

Aquatic Biology

Aquatic Biology is a one-credit course that explores the aquaculture industry as it relates to biology. Emphasis is placed on scientific concepts involving the use of microscopes and the conversion of unit measurements. Topics include career opportunities, safety, history, aquatic species, water management, health and sanitation, biotechnology, and aquaculture issues.

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Career Opportunities

Students will:

1. Describe various aquatic career opportunities.

Safety

2. Explain safety concepts related to aquatic biology.

History

3. Describe the historical background and technological advancements of aquaculture as it relates to agriculture.

Aquatic Species

4. Classify aquatic species using scientific nomenclature.
 - Describing characteristics of various species of aquatic life
 - Identifying exotic, invasive, and indigenous aquatic species
 - Identifying microscopic and aquatic organisms using dichotomous keys
5. Describe types of aquatic animal production in the United States.
 - Comparing the aquaculture pond to natural aquatic ecosystems, including recreational fish ponds

6. Classify characteristics of ectothermic animals.
 - Describing roles of various aquatic organisms in aquaculture

Water Management

7. Describe concepts of diffusion and osmosis related to aquatic organisms.
Examples: gill function, counter and current gas exchange
8. Interpret water quality data related to natural and artificial aquatic environments.
Examples: temperature, dissolved oxygen, ammonia, nitrate, nitrite, pH
 - Managing water quality parameters
Examples: analysis, treatment

Health and Sanitation

9. Diagnose major diseases and their causes in aquaculture environments.
10. Describe preventive measures for aquatic predators and pests.

Biotechnology

11. Identify contributions of biotechnology to aquaculture.
Examples: gene probes for diagnosing viral infections in shrimp, polymerase chain reactions (PCR) for detecting bacterial pathogens in seafood shipments

Aquaculture Issues

12. Trace biogeochemical cycles through the environment, including water, carbon, oxygen, phosphorus, and nitrogen.
 - Relating natural disasters and climate changes to the dynamic equilibrium of ecosystems
13. Identify agencies responsible for the development of effluent limitations, guidelines, and standards for aquatic production.
 - Identifying effluent treatment methods
14. Identify potential land and water use conflicts in the aquaculture industry.
15. Recognize problems with sustainability in aquaculture production.

Architecture, Construction, and Manufacturing

Architecture, Construction, and Manufacturing is the foundation course for the Architecture and Construction career cluster. This course may be offered to students in Grades 9-12; however, it is not required for entering a specific pathway. Course content provides students with an overview of the Architecture and Construction career cluster, which contains three pathways—Construction, Design and Preconstruction, and Maintenance and Operations. Students who choose to complete a pathway in the Architecture and Construction cluster are engaged in challenging curricula and develop technical skills in the areas of safety, related mathematics, usage of hand and power tools, blueprint reading, basic rigging, and basic employability skills.

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Foundation Core

Students will:

1. Demonstrate effective written and verbal communication skills, including problem-solving and critical-thinking skills.
2. Interpret technical information related to the architecture, construction, and manufacturing industries.
Examples: procedure charts, reference materials, handbooks
3. Utilize information technology tools to access, manage, and integrate information in the architecture, construction, and manufacturing industry.
4. Analyze an organizational structure for its systemic performance.
5. Practice safety standards in the work environment.
6. Demonstrate knowledge and skills gained through student organization activities to enhance leadership and teamwork.
7. Assess ethical and legal responsibilities to provide guidelines for conduct in the architecture, construction, and manufacturing industries.
8. Determine factors to be considered in developing an effective career plan, including procedures for obtaining employment in the architecture, construction, and manufacturing industries.
9. Utilize terminology related to the architecture, construction, and manufacturing industries.
10. Demonstrate financial literacy skills as they relate to career goals and objectives in the architecture, construction, and manufacturing industries.

Basic Safety and Occupational Safety and Health Administration 10-Hour Credential

11. Explain the role that safety plays in the architecture, construction, and manufacturing industries, including completing requirements for the Occupational Safety and Health Administration (OSHA) 10-hour construction course credential.

Construction and Manufacturing Mathematics

12. Solve mathematics problems encountered in the architecture, construction, and manufacturing industries.

Introduction to Hand Tools and Power Tools

13. Demonstrate correct use of hand tools and power tools utilized in the architecture, construction, and manufacturing industries.

Introduction to Blueprints

14. Relate information on blueprints to actual locations on the print, including terms, components, and symbols.

Basic Rigging

15. Describe the use of slings, common rigging hardware, basic hitch configuration, proper connections, and basic load-handling safety practices.

Basic Employability Skills

16. Describe the architecture, construction, and manufacturing industries, including the role of companies that make up these industries and the role of individual professionals in these industries.
17. Explain common uses for computers and computer software in the architecture, construction, and manufacturing industries.
18. Identify various workplace issues.
Examples: sexual harassment, stress, substance abuse

Automotive Brakes

Automotive Brakes is a one-credit course that provides students with classroom and laboratory instruction in electrical accessories and brake system operations, diagnosis, and repairs. Emphasis is placed on accessory diagnosis, hydraulic system diagnosis, disc and drum brake diagnosis, and equipment usage. Upon completion of this course, students are able to repair brake systems. This course incorporates all personal and environmental safety practices associated with clothing; eye protection; hand tools; power equipment; proper ventilation; and the handling, storage, and disposal of chemicals and materials in accordance with local, state, and federal safety and environmental regulations.

This course is required for a program to be certified by Automotive Service Excellence (ASE) and National Automotive Technicians Education Foundation (NATEF) minimum standards. The content standards, task lists, tools and equipment, program hours, and safety standards must meet ASE and NATEF standards, advisory council recommendations, and the No Child Left Behind Act.

Career and technical student organizations are integral, cocurricular components of each career and technical education course. These organizations serve as a means to enhance classroom instruction while helping students develop leadership abilities, expand workplace-readiness skills, and broaden opportunities for personal and professional growth.

Safety

Students will:

1. Demonstrate personal and environmental safety practices, including clothing, eye protection, hand tools, power equipment, and proper ventilation related to automotive brake operation and maintenance.

General Brake System Diagnosis

2. Identify customer concerns regarding the automotive brake system.
3. Apply procedures for determining necessary action for brake system concerns.
 - Utilizing work order procedures
4. Research vehicle and service information, including vehicle service history, technical service bulletins, and interpretation of vehicle and major component identification numbers.
5. Create a work order for general brake system concerns.

Hydraulic System Diagnosis and Repair

6. Practice general hydraulic system diagnosis and repair.

Drum Brake Diagnosis and Repair

7. Demonstrate procedures for diagnosis and repair of drum brakes.

Disc Brake Diagnosis and Repair

8. Demonstrate procedures for diagnosis and repair of disc brakes.

Power Assist Unit Diagnosis and Repair

9. Demonstrate techniques for diagnosing and repairing power assist units.

Antilock Brake and Traction Control Systems Diagnosis and Repair

10. Apply procedures for diagnosing and repairing antilock brake system (ABS) electronic controls and components.
 - Using self-diagnosis and test equipment

Automotive Electrical and Electronic Systems I

This is a one-credit course that provides students with classroom and laboratory instruction in electrical and electronic system operations, diagnosis, and repairs. Emphasis is placed on system operations, circuit diagnosis, wiring diagrams, and equipment usage. Upon successful completion of the course, students are able to diagnose and repair electrical and electronic systems. This course incorporates all personal and environmental safety practices associated with clothing; eye protection; hand tools; power equipment; proper ventilation; and the handling, storage, and disposal of chemicals and materials in accordance with local, state, and federal safety and environmental regulations.

This course is part one of two required courses for a program to be certified by Automotive Service Excellence (ASE) and National Automotive Technicians Education Foundation (NATEF) minimum standards. The content standards, task lists, tools and equipment, program hours, and safety standards must meet ASE and NATEF requirements. Content is designed to incorporate changes in ASE and NATEF standards, advisory council recommendations, and the No Child Left Behind Act.

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Safety

Students will:

1. Demonstrate personal and environmental safety practices associated with clothing, eye protection, hand tools, power equipment, and proper ventilation related to automotive electrical and electronic system operation and maintenance.

General Electrical System Diagnosis

2. Diagnose electrical and electronic system problems.
3. Identify electrical and electronic system concerns.
 - Determining necessary action for electrical and electronic system concerns
4. Research vehicle and service information, including vehicle service history, technical service bulletins, and interpretation of vehicle and major component identification numbers.
5. Create a work order for general electrical system concerns.

Battery Diagnosis and Service

6. Demonstrate battery state-of-charge tests, including inspecting and cleaning battery cables, connectors, clamps, and hold-downs.

Starting System Diagnosis and Repair

7. Explain starting system operations and repair.
 - Performing test procedures for starting systems

Charging System Diagnosis and Repair

8. Explain charging system component operations and repair.

Lighting System Diagnosis and Repair

9. Analyze lighting systems to determine necessary repair.

Gauge, Warning Device, and Driver Information System Diagnosis and Repair

10. Describe gauges, warning devices, and driver information system operations.
 - Demonstrating operation tests for diagnosis and repair of gauges, warning devices, and driver information system operations

Horn, Wiper, and Washer Diagnosis and Repair

11. Demonstrate diagnostic procedures for horn, wiper, and washer control problems.

Accessory Diagnosis and Repair

12. Utilize diagnostic and repair procedures for accessories.

Automotive Electrical and Electronic Systems II

Automotive Electrical and Electronic Systems II is a one-credit course that provides students with classroom and laboratory instruction in electrical components operation, diagnosis, and repairs. Upon successful completion of this course, students are able to perform minimum tasks required by National Automotive Technicians Education Foundation (NATEF) and Automotive Service Excellence (ASE) lists. This course incorporates all personal and environmental safety practices associated with clothing; eye protection; hand tools; power equipment; proper ventilation; and the handling, storage, and disposal of chemicals and materials in accordance with local, state, and federal safety and environmental regulations. The prerequisite for this course is Automotive Electrical and Electronics Systems I.

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Safety

Students will:

1. Demonstrate the handling, storage, and disposal of chemicals and materials in accordance with local, state, and federal safety and environmental regulations.

General Electrical System Diagnosis

2. Evaluate electrical and electronic system diagnosis to determine necessary actions.
 - Verifying customer concerns regarding electrical and electronic systems
3. Justify necessary action for electrical and electronic system concerns.

Battery Diagnosis and Service

4. Compare appropriate tests and battery service procedures for conventional and hybrid electrical systems.

Starting System Diagnosis and Repair

5. Differentiate between electrical and mechanical problems associated with starting system diagnosis.
 - Determining service procedures for starting systems

Charging System Diagnosis and Repair

6. Diagnose charging systems to determine corrective action.

Lighting System Diagnosis and Repair

7. Determine procedures for lighting system repairs.
 - Identifying safety hazards associated with high intensity components

Gauge, Warning Device, and Driver Information System Diagnosis and Repair

8. Diagnose incorrect operation of engine components to determine corrective action.

Horn, Wiper, and Washer Diagnosis and Repair

9. Determine necessary actions for inspecting and repairing malfunctions in horn, wiper, and washer systems.

Accessory Diagnosis and Repair

10. Determine repairs for accessory malfunctions related to automotive electrical and electronic systems.

Automotive Engine Performance I

Automotive Engine Performance I is a one-credit course that provides students with the knowledge and skills regarding general engine diagnosis, computerized engine controls, ignition systems, and emission control systems. Strong emphasis is placed on system and component operations. Upon successful completion of the course, students are able to diagnose and repair engine performance-related systems. This course incorporates all personal and environmental safety practices associated with clothing, eye protection; hand tools; power equipment; proper ventilation; and the handling, storage, and disposal of chemicals and materials in accordance with local, state, and federal safety and environmental regulations.

The content standards, task lists, tools and equipment, program hours, and safety standards must meet Automotive Service Excellence (ASE) and National Automotive Technicians Education Foundation (NATEF) requirements. Content is designed to incorporate changes in ASE and NATEF standards, advisory council recommendations, and the No Child Left Behind Act.

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Safety

Students will:

1. Demonstrate personal and environmental safety practices associated with clothing, eye protection, hand tools, power equipment, and proper ventilation related to basic automotive engine performance.

General Engine Diagnostics

2. Diagnose general automotive engine system problems.
 - Utilizing work order procedures for automotive engine repairs
3. Identify general engine system concerns.
 - Determining necessary action for automotive engine system concerns
 - Researching automotive vehicle and service information
 - Examples: vehicle service history, technical service bulletins, vehicle and major component identification numbers
 - Determining testing and evaluation procedures

Computerized Engine Control Diagnosis and Repair

4. Interpret trouble codes in On-Board Diagnostics I (OBD I) and On-Board Diagnostics II (OBD II) systems.

5. Diagnose computerized engine controls to determine repairs needed.
 - Interpreting digital volt ohm meter (DVOM) readings for computerized engine control
 - Utilizing electronic service equipment for computerized engine control
 - Interpreting vehicle and major component identification numbers
 - Testing power, ground circuits, and connections for computerized engine control
 - Handling static sensitive devices

Ignition System Diagnosis and Repair

6. Inspect ignition system components and circuits for computerized engine control.
 - Testing ignition system components
 - Repairing ignition system components

Fuel, Air Induction, and Exhaust System Diagnosis and Repair

7. Demonstrate diagnosis for fuel, air induction, and exhaust system to determine repair.

Emission Control System Diagnosis and Repair

8. Diagnose positive crankcase ventilation systems to determine repair.
9. Evaluate exhaust gas recirculation and treatment systems to determine repair.
10. Diagnose evaporative emissions control systems to determine repair.

Engine-Related Service

11. Explain automotive engine-related services.
Examples: adjusting valves, replacing timing belt

Automotive Engine Performance II

Automotive Engine Performance II is a one-credit course that provides advanced students with in-depth information regarding general engine diagnosis, computerized engine controls, ignition systems, fuel systems, and emission control systems. Emphasis is placed on system and component operations and diagnosis. Upon successful completion of this course, students are able to diagnose and repair engine performance-related systems. This course incorporates all personal and environmental safety practices associated with clothing; eye protection; hand tools; power equipment; proper ventilation; and the handling, storage, and disposal of chemicals and materials in accordance with local, state, and federal safety and environment regulations. Automotive Engine Performance I is the prerequisite for this course.

This course is the second part of a two-part course requirement for a program to be certified by Automotive Service Excellence (ASE) and National Automotive Technicians Foundation (NATEF) minimum standards. The content standards, task lists, tools and equipment, program hours, and safety standards must meet ASE and NATEF requirements. Content is designed to incorporate changes in ASE and NATEF standards, advisory council recommendations, and the No Child Left Behind Act.

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Safety

Students will:

1. Demonstrate the handling, storage, and disposal of chemicals and materials used in automotive engines in accordance with local, state, and federal safety and environmental regulations.

General Engine Diagnostics

2. Evaluate automotive engine systems diagnoses to determine necessary action.
 - Verifying customer concerns regarding engine system problems
3. Utilize testing and evaluation procedures to determine engine system problems.
4. Justify corrective action associated with general engine system concerns.

Computerized Engine Control Diagnosis and Repair

5. Utilize trouble codes in On-Board Diagnostics I (OBD I) and On-Board Diagnostics II (OBD II) systems to determine necessary action.
6. Solve repair issues associated with computerized engine control diagnostics.

Ignition System Diagnosis and Repair

7. Apply necessary ignition system repairs in accordance with engine system diagnosis.

Fuel, Air Induction, and Exhaust System Diagnosis and Repair

8. Solve repair issues associated with fuel, air induction, and exhaust system diagnosis.

Emission Control System Diagnosis and Repair

9. Practice corrective action for repair of emission control systems.

Engine-Related Services

10. Practice automotive engine-related services.

Automotive Engine Repair

This is a one-credit course that provides students with classroom and laboratory experiences in diagnosing and repairing gasoline engines. Topics include engine disassembly, component identification, inspecting and measuring parts, and engine assembly and repair. Upon successful completion of the course, students are able to diagnose, remove, repair, rebuild, and install an automobile engine. This course incorporates all personal and environmental safety practices associated with clothing; eye protection; hand tools; power equipment; proper ventilation; and the handling, storage, and disposal of chemicals and materials in accordance with local, state, and federal safety and environmental regulations.

This course is optional for automobile service technology programs and is not required for a program to meet National Automotive Technicians Education Foundation (NATEF) minimum standards. The content standards, task lists, tools and equipment, program hours, and safety standards must meet Automotive Service Excellence (ASE) and NATEF standards. Content is designed to incorporate changes in ASE and NATEF standards, advisory council recommendations, and the No Child Left Behind Act.

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General Engine Diagnosis, Removal, and Reinstallation

Students will:

1. Identify automotive engine system concerns.
 - Determining necessary action for engine system concerns
2. Perform diagnosis of general engine systems to determine corrective action.
 - Demonstrating proper work order procedures
3. Research vehicle and service information.
Examples: vehicle service history, technical service bulletins, interpreting vehicle and major component identification numbers
4. Demonstrate procedures for removing, disassembling, and reinstalling both front-wheel and rear-wheel drive engines.

Cylinder Head and Valve Train Diagnosis and Repair

5. Demonstrate procedures involved with cylinder head and valve train service, including removing, inspecting, testing, repairing, installing, resurfacing, measuring, and adjusting components of the cylinder head and valve train.

Engine Block Assembly, Diagnosis, and Repair

6. Demonstrate procedures involved with engine overhaul, including removing, inspecting, testing, repairing, installing, and adjusting components of the engine block assembly.

Lubrication and Cooling System Diagnosis and Repair

7. Demonstrate testing and evaluation procedures regarding lubrication and cooling systems.
8. Demonstrate procedures for removing, inspecting, testing, repairing, installing, and adjusting components of lubrication and cooling systems.

Automotive Heating and Air-Conditioning

This is a one-credit course that provides students with classroom and laboratory experiences regarding system operations, repairs, and service procedures. Topics include electrical, plumbing, and component replacement. Upon successful completion of the course, students are able to remove, install, diagnose, and perform basic heating and air-conditioning repairs. This course incorporates all personal and environmental safety practices associated with clothing; eye protection; hand tools; power equipment; proper ventilation; and the handling, storage, and disposal of chemicals and materials in accordance with local, state, and federal safety and environmental regulations.

This course is optional for automobile service technology programs and is not required for a program to meet Automotive Services Excellence (ASE) nor National Automotive Technicians Education Foundation (NATEF) minimum standards. The content standards, task lists, tools and equipment, program hours, and safety standards must meet ASE and NATEF requirements. Content is designed to incorporate changes in ASE and NATEF standards, advisory council recommendations, and the No Child Left Behind Act.

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Air-Conditioning Diagnosis and Repair

Students will:

1. Identify air-conditioning system concerns.
 - Determining necessary action for air-conditioning system concerns
2. Perform air-conditioning system diagnosis.
 - Utilizing automotive heating and air-conditioning system work order procedures
3. Research vehicle and service information related to heating and air-conditioning, including vehicle service history, technical service bulletins, and vehicle and major component identification numbers.
4. Describe air-conditioning system operations.
5. Apply general air-conditioning system repairs in accordance with air-conditioning system diagnosis.

Refrigeration System Component Diagnosis and Repair

6. Identify refrigeration system components.
7. Demonstrate procedures for diagnosing, inspecting, removing, installing, and adjusting refrigeration components.

Heating Diagnosis and Repair

8. Identify heating system concerns.
 - Determining necessary action for heating system concerns
9. Perform diagnosis of heating system problems.
 - Utilizing heating system work order procedures
10. Research vehicle and service information related to the heating system, including vehicle service history, technical service bulletins, and vehicle and major component identification numbers.
11. Describe heating system operations.
12. Apply procedures for heating system repair.

Refrigerant Charging, Recovering, Recycling, Handling, and Labeling

13. Demonstrate procedures for correcting air-conditioning system refrigerant problems.
Examples: identifying, evacuating, and recycling the refrigerant

Operating System and Related Control Diagnosis and Repair

14. Verify operation of automatic heating, ventilation, and air-conditioning (HVAC) systems to determine necessary action.

Automotive Manual Drivetrain and Axles

This course is designed to provide students with knowledge regarding the construction and operation of manual transmissions and transaxles. Topics include the study of gear ratios, components, clutches, service, and repair. Upon successful completion of the course, students are able to remove, install, and perform basic drivetrain and axle repairs. This course incorporates all personal and environmental safety practices associated with clothing; eye protection; hand tools; power equipment; proper ventilation; and the handling, storage, and disposal of chemicals and materials in accordance with local, state, and federal safety and environmental regulations.

This course is optional for automobile service technology programs and is not required for a program to meet Automotive Service Excellence (ASE) nor National Automotive Technicians Education Foundation (NATEF) minimum standards. The content standards, task lists, tools and equipment, program hours, and safety standards must meet ASE and NATEF standards, advisory council recommendations, and the No Child Left Behind Act.

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Manual Transmission and Axle System Diagnosis and Repair

Students will:

1. Identify manual transmission system concerns.
 - Determining necessary action for manual transmission concerns
2. Perform manual transmission system diagnosis.
 - Utilizing manual transmission system work order procedures
3. Research vehicle and service information related to automotive manual drivetrains and axles, including vehicle service history, technical service bulletins, and vehicle and major component identification numbers.
4. Describe manual transmission operations.
5. Demonstrate procedures for diagnosing manual transmission and axle problems.
6. Demonstrate repair procedures for a manual transmission and axle assembly, including the removal, inspection, testing, and installation of all components.

Clutch Diagnosis and Repair

7. Diagnose manual transmission clutch concerns to determine corrective action.

Driveshaft, Half Shaft, Universal, and Constant-Velocity Joint Diagnosis and Repair

8. Diagnose manual transmission driveline concerns to determine repair needs.

Drive Axle Diagnosis and Repair

9. Diagnose manual transmission ring and pinion, limited slip differential, and drive axle shaft concerns to determine repair needs.

Four-Wheel Drive and All-Wheel Drive Component Diagnosis and Repair

10. Diagnose four-wheel drive and all-wheel drive concerns to determine repair needs.

Automotive Suspension and Steering

This is a one-credit course designed to provide students with a working knowledge of brake assist assemblies, anti-lock systems, suspension systems, and steering systems. Topics include brake diagnosis, steering diagnosis, suspension diagnosis, alignment procedures, and wheel balancing. Upon successful completion of this course, students are able to repair brake suspension and steering systems. This course incorporates all personal and environmental safety practices associated with clothing; eye protection; hand tools; power equipment; proper ventilation; and the handling, storage, and disposal of chemicals and materials in accordance with local, state, and federal safety and environment regulations.

This course is optional for automobile service technology programs and is not required for a program to meet Automotive Service Excellence (ASE) nor National Automotive Technicians Education Foundation (NATEF) minimum standards. The content standards, task lists, tools and equipment, program hours and safety standards must meet ASE and NATEF requirements. Content is designed to incorporate changes in ASE and NATEF standards, advisory council recommendations, and the No Child Left Behind Act.

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Safety

Students will:

1. Demonstrate personal and environmental safety practices associated with clothing, eye protection, hand tools, power equipment, and proper ventilation related to automotive suspension and steering operation and maintenance.

General Suspension and Steering Systems Diagnosis

2. Identify general suspension and steering systems concerns.
3. Demonstrate diagnosis of general suspension and steering systems to determine corrective action.
 - Utilizing general suspension and steering systems work order procedures
4. Research applicable vehicle and service information.
Examples: vehicle service history, technical service bulletins, vehicle and major component identification numbers.

Steering System Diagnosis and Repair

5. Demonstrate repair procedures for servicing components of the steering system, including the supplemental restraint system (SRS).
6. Diagnose steering system problems, including electronically controlled steering systems, to determine repair.

Suspension System Diagnosis and Repair

7. Demonstrate the repair of the front suspension system, including electronically controlled systems, by identifying, removing, inspecting, installing, and adjusting components.
8. Demonstrate the repair of the rear suspension system, including electronically controlled systems, by and identifying, removing, inspecting, installing, and adjusting components.

Wheel Alignment Diagnosis, Adjustment, and Repair

9. Describe the wheel alignment process.
10. Determine techniques necessary for diagnosing and resolving wheel alignment problems.

Wheel and Tire Diagnosis and Repair

11. Demonstrate wheel and tire diagnosis and repair, including pressure-monitoring systems.
 - Diagnosing wheel and tire vibration, shimmy, and noise to determine repair

Aviation Instrument and Hydraulic Systems

This one-credit course provides students with a strong foundation of knowledge and skills related to aircraft instruments and hydraulic systems. Safety and proper tool use is emphasized throughout this course. Specific topics include computational skills, physical science principles, aircraft instrumentation theory and applications, the effect of atmosphere on instruments, theory and application of hydraulic systems, fixed and flexible hydraulic lines, wheel and tire maintenance, installation of aircraft hardware, and various materials and methods for maintaining instruments and hydraulic systems. As part of this course, students apply knowledge and skills through participation in various installation, inspection, and maintenance activities.

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Safety

Students will:

1. Apply safety rules, regulations, and procedures for the Aviation Technology program, including safety concerns in the areas of first aid, fire, electricity, equipment, chemicals, and personal protective equipment (PPE).

Foundational Skills

2. Demonstrate computational skills associated with aviation instruments and hydraulic systems.
3. Demonstrate physical science principles associated with aviation instruments and hydraulic systems.

Basic Aircraft Instruments

4. Explain aircraft instrument theory, application, installation, and plumbing and sources of power, including altimeter, airspeed indicator, compass, gyro compass, artificial horizon, vertical speed indicator (VSI), cylinder head temperature (CHT) indicator, exhaust gas temperature (EGT) indicator, and navigation and communication systems.
5. Describe various characteristics of the atmosphere that affect instrumentation.

Basic Hydraulic Systems

6. Explain hydraulic systems.
 - Explaining landing gear extension and retraction systems
 - Demonstrating brake servicing
 - Differentiating between rigid and flexible lines
7. Describe how physics affects the operation of hydraulic systems within an aircraft.

Wheels and Tires

8. Explain wheel and tire construction.
 - Explaining various types of wheel and tire construction
 - Describing the purpose bearings serve in the wheel assembly

Tools

9. Demonstrate use and inspection techniques of tools for aviation instrument and hydraulic systems.

Aircraft Hardware

10. Demonstrate uses, care, and installation of aircraft hardware.
 - Identifying types, sizes, construction and finishes, and applications of aircraft hardware
 - Analyzing hydraulic fitting installation and flaring of rigid tubing

Materials

11. Select materials for use in aircraft maintenance including fasteners, safety wire, threaded fasteners, metal tubing, Air Force-Navy (AN) military standards fittings, flexible hose fittings, hydraulic fluid, and aircraft instrument training aids.

Projects

12. Demonstrate specific tasks related to aviation instrument and hydraulic systems installation and maintenance.

Aviation Turbine Engine Theory and Inspections

This one-credit course provides students with the basic knowledge and skills associated with aviation turbine engine theory and inspection. Safety and proper tool use are emphasized throughout this course. Specific topics include turbine engine theory, hand tools, inspection techniques, materials used to maintain aircraft, and aircraft hardware. As part of this course, students apply knowledge and skills by performing various tasks related to turbine engine theory and inspection.

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Safety

Students will:

1. Apply safety rules, regulations, and procedures for the aviation technology program, including safety concerns in the areas of first aid, fire, electricity, equipment, tools, chemicals, and personal protective equipment (PPE).

Foundational Skills

2. Demonstrate computational skills associated with aviation turbine engine theory and inspections.

Hand Tools

3. Demonstrate use and inspection techniques of tools for aviation turbine engine theory and inspections.

Materials

4. Select materials used in aircraft maintenance, including safety wire, threaded fasteners, Air Force-Navy (AN) fittings, flexible hose, flexible hose fittings, and aircraft lubricating oil.

Aircraft Hardware

5. Explain uses, care, and installation of aircraft hardware.

Projects

6. Demonstrate specific tasks related to aviation turbine engine theory and inspections.

Banking and Financial Services

Banking and Financial Services is a one-credit course designed to help students develop skills related to banking and related services as they process customer transactions, maintain cash drawer, process documents, and respond to customer requests to provide other customer services. Students employ technical skills to perform data processing functions as well as to perform new account functions. Applicable skills are utilized by practicing lending functions, including aiding the customer in determining the best loan alternative; processing the customer's application to include appropriate information; and processing the loan to complete transactions.

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Marketing

Students will:

1. Analyze marketing strategies utilized by financial institutions to determine how they impact customer base.
Examples: community relations, customer service, advertising

Securities Market

2. Analyze the history and role of the securities market to determine its impact on the global economy.

Loans and Credit

3. Utilize research results to determine ethical and legal issues associated with the banking and financial services industry.
4. Compare credit and loan options provided to consumers by banking and financial institutions.
Example: unsecured loans versus secured loans

Workplace Professionalism

5. Use personal and technical skills needed for entry-level banking and finance occupations.
Examples: money-handling skills, communication skills, money balancing
 - Explain the importance of money-handling skills, including arranging cash drawer, verifying change fund, giving correct funds, balancing cash drawer, and practicing theft control

6. Demonstrate skills needed to provide effective customer services, including assisting customers with essential information to select appropriate services, explaining customer rights and responsibilities, providing feedback to customers in a timely manner, processing customer information efficiently and effectively, and maintaining customer privacy and confidentiality.
7. Analyze various financial services to determine best products for meeting individual customer needs.
Examples: investment banking, commercial banking, cash management, insurance, other corporate and personal services

Accounting Procedures

8. Demonstrate accounting knowledge to perform manual and electronic financial functions as they relate to the financial institution and customer.
Examples: generating financial documents, creating customer accounts
9. Interpret basic financial policies, procedures, and state and federal regulatory guidelines and laws that control financial institutions.
Examples: laws related to Federal Deposit Insurance Corporation (FDIC) insurance, identity theft, interest rate
10. Analyze various expenses associated with consumer loans to determine advantages and disadvantages.
11. Interpret banking financial records.
Examples: deposit reports, bank statements, bad debt reports
12. Calculate debt-to-income ratio to evaluate customer credit.

Federal Reserve Bank

13. Interpret the relationship of the Federal Reserve Bank to local banking institutions.

Career Opportunities

14. Determine career and entrepreneurial opportunities, responsibilities, and educational and credentialing requirements related to banking and financial services.

Basic Compression and Refrigeration

This one-credit course introduces students to different components of refrigeration systems and the function of each component. Emphasis is placed on physical science concepts involved in the operation of a refrigeration system.

Students enrolled in this course exhibit a mechanical aptitude as well as the ability to comprehend both verbal and hands-on instruction. They are able to understand informational reading text and transfer that information to a drawing to illustrate refrigerant flow throughout the refrigeration system. Students apply mathematics skills for converting from one scale to another and perform basic functions used in formulas.

Instruction consists of individual and group classroom instruction and laboratory activities. Students gain knowledge of the theory of thermodynamics and physical science used in the heating, ventilation, air-conditioning, cooling, and refrigeration (HVACR) industry. Upon completion of this course, students draw and label parts of a refrigeration system and explain the operation of each component. The prerequisite for this course is Introduction to HVACR.

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Students will:

1. Demonstrate safety rules, regulations, and procedures for HVACR.
2. Draw a basic refrigeration system, including refrigerant flow, components, and lines.
3. Demonstrate the procedure for installing filter dryers.
Examples: liquid-line filter dryer, suction-line filter dryer
4. Demonstrate the procedure for installing and removing a gauge set.
5. Demonstrate pressure temperature conversion procedures.
6. Determine pressures and temperatures on domestic and commercial refrigeration systems.
7. Demonstrate industry-recognized evacuation procedures for a refrigeration system.
Example: triple evacuation
8. Demonstrate the detection and repair of a refrigerant leak.
9. Demonstrate the process of charging a refrigeration system.
Examples: weigh-in, superheat, subcooling
10. Demonstrate the removal and replacement of a major refrigeration component.
Examples: compressor, metering device, condenser, evaporator

11. Describe the operation of basic components of a refrigeration system.
 - Identifying operation of refrigeration accessories
Examples: accumulators, sight glass

Basic Wiring

This one-credit course is designed to provide students with fundamental knowledge and skills in basic wiring. The course emphasizes safety while addressing topics such as shop rules, job opportunities, safety, tools, hand bending, fasteners and anchors, raceways, boxes, fittings, commercial and industrial wiring, wiring applications, and basic motors. Upon successful completion of this course, students are able to understand circuitry and perform basic wiring patterns. In addition, students understand how to use the National Electric Code (NEC).

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Safety

Students will:

1. Demonstrate use of safety procedures as recognized by governing agencies and approved industry standards when testing and replacing components or installing wiring.
Examples: lockout, tagout
2. Demonstrate how to avoid and minimize electrical hazards in the workplace.

Orientation

3. Explain career and educational opportunities related to the electrical technology industry.

Hand Bending

4. Use mathematics formulas to determine conduit and electrical metallic tubing (EMT) bends.
5. Perform bending of EMT and conduit used in basic wiring applications according to specifications.
Examples: offsets, stub-ups, saddle bends
6. Prepare conduit for installation, including inspecting, cutting, and reaming.

Fasteners and Anchors

7. Install fasteners, anchors, and hardware according to specifications.

Raceways, Boxes, and Fittings

8. Demonstrate installation procedures for electrical boxes, fittings, and raceways used in basic wiring.

Commercial and Industrial Wiring

9. State functions of electrical switches and disconnects commonly used in wiring applications.
10. State functions of receptacles commonly used in basic wiring applications.
11. State functions of limiting devices commonly used in wiring applications.

Wiring Applications

12. Demonstrate the use of conductors and cables in wiring applications.
13. Select materials to complete a specified wiring project.
 - Constructing a wiring project to specification
14. Create written drawings of a project wiring scheme.
15. Estimate material costs for wiring applications based on wiring drawings.

Basic Motors

16. Identify electric motors by construction and frame type.
17. Describe operating characteristics of direct current (DC) shunt, series, and compound motors.
18. Describe dual-voltage motors and their applications.
19. Explain relationships among motor voltage, system voltage, speed, and frequency.
20. Demonstrate how to change the polarity of alternating current (AC) and DC motors.

Binding and Finishing

Binding and Finishing is a one-credit course that offers students training in post-press finishing and binding operations. Students learn safe operation of equipment and proper techniques in paper cutting, folding, perforating, stitching, binding, drilling, and use of various finishing equipment. Students demonstrate problem-solving skills and become proficient in related mathematics. The prerequisite for this course is Introduction to Graphic Arts.

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Safety

Students will:

1. Demonstrate safety considerations and safe work habits in binding operations.
2. Apply correct procedures for binding and finishing.
 - Identifying basic hand tools, equipment, and materials in binding operations
 - Explaining registration and pagination for binding operations

Binding and Finishing

3. Utilize basic paper counting techniques, including measurement by ream, marker, weight, caliper, and counting by hand.
4. Demonstrate the use of folding equipment to produce a single fold, gatefold, accordion fold, right angle fold, slit, perforation, and score.
 - Utilizing folding equipment to produce a high-folio lip signature and a low-folio lip signature
 - Describing advantages of high-folio and low-folio lip signatures
5. Describe methods of operating, maintaining, and changing the blade on a programmable paper cutter.
6. Identify in-line finishing systems for bindery operations.
7. Demonstrate accurate paper cuts using mechanized paper cutters.
 - Explaining dutch cuts and combination cuts
 - Demonstrating safe operation and maintenance of a paper cutter
8. Apply fundamentals of saddle stitching and perfect binding to produce side- and saddle-stitched and stapled products.
 - Identifying spiral binding and wire binding equipment and products
 - Describing common production problems in bindery

9. Demonstrate packaging methods for bindery operations.
 - Identifying packaging and shrink-wrap equipment and materials
10. Utilize United States Postal Service mail class rates and equipment.
 - Explaining situations where bulk and presorted rates may be used
 - Solving problems associated with mail class rates
11. Utilize advanced binding and finishing techniques.
 - Solving problems associated with binding, including quality control
 - Describing components of a case-bound book
 - Describing fundamentals of modern case binding
12. Identify operational procedures for foil stamping and embossing.
 - Describing foil stamping and embossing equipment
 - Identifying common problems encountered in foil stamping and embossing
13. Compare various coating and laminating techniques for binding operations, including advantages and disadvantages of each.
14. Demonstrate paper-handling techniques, including inventory, brick-stacking, storage, waste control and disposal, and recycling.
15. Apply procedures for setup, operation, and maintenance of a paper folder consistent with job specifications.
16. Utilize ancillary equipment for gluing, ink jetting, and wet scoring.
17. Demonstrate a drill job from the setup of a three-hole drill to job completion.

Block Wall Construction

This one-credit course is designed to provide students with the fundamental knowledge and skills for constructing a block wall. Emphasis is placed on job safety, interpretation of drawings and specifications, footing and site preparation, estimation of materials and supplies needed for a block wall construction, and jointing and pointing. Upon successful completion of this course, students are able to perform a variety of masonry techniques.

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Safety

Students will:

1. Apply safety rules, regulations, and procedures for block wall construction.

Blueprints and Layouts

2. Interpret measurements, drawings, and specifications for block wall construction.
Examples: locating building lines, establishing benchmarks
3. Demonstrate the ability to set up a job area for block wall construction.

Footing

4. Demonstrate steps used to prepare for concrete footings.

Construction Techniques

5. Construct block walls using running and stack bond materials in various block sizes and finishes.
Examples: sizes—4-, 6-, 8-, and 12-inch blocks
finishes—broken face, smooth face
6. Utilize various materials to bond doors and windows.
Examples: anchors, ties, expansion and control joints
7. Utilize various formulas for mixing mortar.
 - Determining mixtures for hand-mixed mortar and for machine-mixed mortar

8. Construct block corners using a variety of block sizes and finishes.
Examples: size—4- and 6-inch blocks
finishes—broken face, smooth face
9. Create a stretcher course of block for a block wall construction.

Estimation

10. Determine materials and supplies needed for a block wall construction project.

Business Essentials

Business Essentials is a one-credit foundation course. Students develop an understanding of how academic skills in mathematics, economics, and written and oral communications are integral components of success in commerce and information technology careers. Students examine current events to determine impact on business and industry and legal and ethical behavior, acquire knowledge of safe and secure environmental controls to enhance productivity, determine how resources are managed to achieve company goals, and identify employability and personal skills needed to obtain a career and be successful in the workplace. As students learn about different types of business ownership, they interpret industry laws and regulations to ensure compliance, identify principles of business management, and analyze business practices to determine ethical and social responsibilities.

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Communication and Interpersonal Skills

Students will:

1. Apply oral and written communication skills needed in the workplace, through the use of technology, to facilitate information flow in commerce.
 - Proofreading business documents for clarity and conciseness
 - Interpreting tables, charts, and figures to support written and oral communication
2. Apply conflict management strategies to resolve workplace conflict.

Leadership

3. Demonstrate personal traits needed to develop leadership and teamwork skills.
 - Demonstrating self-initiative through group projects
4. Utilize knowledge and skills obtained through student organizations to enhance leadership.

Entrepreneurship

5. Describe unique characteristics and traits of the successful entrepreneur.

Ethics

6. Analyze roles of consumers and businesses in commerce for ethical responsibility.
Examples: identifying consumers' legal accountability associated with credit, consumerism, and insurance; identifying various liabilities of businesses related to employees and consumers

Business Management

7. Analyze functions of management, including planning and organizing, to determine effects on the business environment.
8. Use terminology commonly associated with business.
9. Distinguish among basic business functions by comparing various forms of business organizations and examining responsibilities of commerce.
 - Distinguishing among ways taxes impact decisions made by individuals, businesses, and government
 - Analyzing an organizational structure for its systemic performance
10. Utilize research results to analyze international trade for its impact on commerce.
 - Comparing the role of the United States in international trade at different times in history

Business Finance

11. Compare several business financial statements to make business decisions.
 - Comparing types of banking services
 - Utilizing correct steps for maintaining an accurate checking account
12. Analyze protection options against risk and financial loss for commerce and consumers.
13. Illustrate the process involved in developing a budget.
Examples: designing a plan for money managements, evaluating information available to make wise buying decisions
14. Create financial records fundamental to business.
Examples: budgets, bank reconciliations, payroll, taxes, invoices, purchase orders

Safety

15. Demonstrate proper safety procedures needed in the workplace.

Legal

16. Analyze legal issues related to government regulations of commerce for the effect on consumers.
Examples: consumer law, sales law, contract law
17. Differentiate among risks involved in operating a business.
 - Determining the need for risk protection

Marketing

18. Demonstrate an understanding of marketing concepts.
 - Identifying the relationship of marketing to consumers and commerce

Career Opportunities

19. Utilize various forms of communication and technology in the successful pursuit of employment.

Business Finance

Business Finance is a half-credit or one-credit course designed to provide students with an overview of the principles of business finance. The curriculum focuses on major areas of study, including economics, marketing, accounting procedures, and the global financial market. An integral component of the curriculum is the application of decision-making skills that enables students to become more responsible consumers, producers, or business entrepreneurs. For a half-credit course, content standards 1, 3, 7, 8, 9, 10, 11, 13, 18, 19 and 20 must be included.

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Economics

Students will:

1. Utilize research results to analyze current events, laws, and regulations to determine impact on the global financial market.
2. Explain costs of manufacturing related to raw materials, labor, overhead, and operating expenses.
3. Explain personnel costs incurred in a business.
Examples: recruiting costs, hiring costs, training costs, fringe benefits
4. Compare currency standards and valuations in a global economy.
 - Analyzing the value of the dollar over time for factors that affect fluctuation

Career Opportunities

5. Explain methods used by companies to screen individuals for employment or promotion.
Examples: drug test, credit check, background check, workplace proficiency
6. Determine career and entrepreneurial opportunities, responsibilities, and educational and credentialing requirements related to business finance professions.

Technology

7. Use cost-efficient technologies to perform job functions in the financial industry.
Examples: financial software, computer numeric keypad, spreadsheets, income tax software, Internet

Accounting Procedures

8. Compare funding sources for new and expanding businesses.
Examples: private funding, venture capital, personal loans, grants
9. Determine the effect of the mark-up rate on the price of an item.
10. Apply payroll procedures to manage employee and employer payroll registers, taxes, and earnings records.
11. Appraise the value of inventory to determine production and selling costs.
12. Apply the basic accounting equation to assets, liabilities, and owner equity.
13. Determine the impact of revenue and expenses on net income and loss.
 - Analyzing inflation rates to determine how they affect interest rates
14. Interpret balance sheets and income statements to determine standard financial ratios.
Examples: inventory turnover, average collection period, fixed-asset turnover, total assets turnover, return on total assets, return on equity
15. Demonstrate accounting procedures for preparing balance sheets and income statements.

Transportation Cost

16. Compare logistical costs of ground, air, and water shipping.

Statistics

17. Analyze statistical data to determine mean, mode, median, frequency, and probability.
18. Interpret statistical data related to finance using bar, line, and circle graphs.
19. Critique various customer payment methods and the impact of each to determine effective business practices.
Examples: credit card, debit card, cash

Management

20. Utilize management and financial skills to develop a business plan.

Business Technology Applications

Business Technology Applications is a one-credit foundation course designed to assist students in developing technological proficiencies in word processing, spreadsheets, databases, presentations, communications, Internet use, ethics, and careers using technology applications. Simulations and projects promoting teamwork, leadership, and workplace skills offer further opportunities for application of knowledge and skills.

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Computer Hardware and Software

Students will:

1. Utilize advanced technology utilities, including compressing files, converting files, importing files, exporting files, and transferring data among applications.
 - Describing networked computer functions
Examples: security, file sharing, collaboration, centralized database
 - Demonstrating electronic file management skills
 - Comparing hardware and software functions
2. Analyze computer hardware to determine software compatibility.
 - Comparing functions of various operating systems
3. Diagnose problems related to technology systems, including advanced network systems, hardware, and software.
 - Demonstrating basic computer and printer preventive maintenance
 - Determining strategies to correct malfunctioning network systems, hardware, and software

Data Input Skills

4. Utilize advanced features of word processing software, including outlining, tracking changes, hyperlinking, creating macros, developing forms, and mail merging.

Word Processing Applications

5. Utilize word processing software to demonstrate professional writing skills by producing and editing business correspondence documents using various data input techniques.
Examples: keyboarding, voice recognition, handwriting recognition, scanning
 - Utilizing e-mail messages in accordance with established business standards by recognizing appropriate electronic communication behavior
 - Demonstrating various manuscript formatting styles in business and correspondence documents
Examples: header and footer, endnotes and footnotes, internal citations, title page, table of contents, works cited
 - Utilizing wizards and templates in business and correspondence documents

Spreadsheet Applications

6. Utilize spreadsheet features, including formulas, functions, sorting and filtering data, templates, charts, and graphs in creating, editing, and printing workbooks.

Database Applications

7. Utilize advanced features of database software, including sorting, filtering, querying and merging data, and creating reports.
 - Organizing database content using formatting, editing, and records tools

Presentation Applications

8. Utilize advanced features of multimedia software, including photo, video, and audio editing, to create and present multimedia presentations using effective communication skills.
9. Utilize digital tools to deliver commerce and information technology curriculum-related content to an audience.
 - Determining effective digital tools for publishing projects
Examples: Web page authoring software, coding, wikis, blogs, podcasts

Internet Applications

10. Critique Internet and digital information for validity, accuracy, bias, and current relevance.
11. Create a product that integrates information from multiple software applications.

Career Opportunities

12. Utilize research results to determine career and entrepreneurial opportunities, responsibilities, and educational and credentialing requirements in commerce and information technology.
 - Determining factors to be considered in developing an effective career plan and procedures for obtaining employment
 - Using terminology commonly associated with commerce and information technology
13. Practice safe, ethical, and legal use of technology systems and digital content.
 - Explaining consequences of unsafe, illegal, and unethical use of technology systems and digital content
 - Interpreting copyright laws and policies with regard to ownership and use of digital content
 - Citing sources of digital content using a style manual
Examples: Modern Language Association (MLA), American Psychological Association (APA)

Ethics

14. Analyze cultural, social, economic, environmental, and political effects and trends of technology to assess emerging technologies and forecast innovations.
 - Recognizing the influence of digital media on audiences
 - Identifying factors that affect access to technology
Examples: socioeconomic level, political climate, geographic location
 - Assessing the impact of networked technology systems on society
 - Comparing capabilities of various technologies to address personal, social, and lifelong learning and career needs

Workplace Skills

15. Apply safe and healthy work standards in the workplace for procedures and conditions, tools, dress, use of technology, emergency procedures, and work area maintenance.
16. Analyze the organizational structure of a business to determine roles and responsibilities of employees and functions of departments or units.
17. Demonstrate knowledge and skills gained through student organization activities to enhance leadership and teamwork.
18. Demonstrate collaborative skills using curriculum-related content in digital environments.
Examples: completing assignments online, interacting with experts and peers in a structured online learning environment
 - Using collaborative digital tools to compare multicultural perspectives on global issues
19. Create simulations using digital tools.
 - Demonstrating programming logic used to create a product
Examples: products—digital game, interactive learning tool

Workplace Skills

20. Explain data encryption procedures.
Examples: encrypt file, send file, decrypt file
21. Utilize interactive models and digital sources to address real-world problems.
Example: using graphic organizing tools
 - Disaggregating data electronically to formulate and defend conclusions

Leadership

22. Demonstrate knowledge and skills gained through student organization activities to enhance leadership and teamwork.

Financial Literacy

23. Critique various ways to become financially literate, including identifying credit card use and misuse; explaining ways to avoid identity theft; identifying reasons for budgeting, saving, and investing; comparing rates of interest as they relate to various time frames in the repayment of loans; and determining how debt influences future employment and purchases.

Business Technology Applications—Advanced

Business Technology Applications—Advanced is a one-credit course that provides students with project-based applications of concepts learned in Business Technology Applications or Business Essentials. Personal computing and business skills are integrated throughout the course as students use a variety of software applications to produce and prepare documents for publication and learn how to select appropriate software for generating information. A major emphasis is placed on guiding students through real-world experiences to aid in the school-to-career transition. The prerequisite for this course is Business Technology Applications or Computer Applications.

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Word Processing Applications

Students will:

1. Construct written communication using correct business format, including letters of application, résumés, and follow-up letters.
 - Identifying types of letters
Examples: request, persuasive, collective, goodwill
2. Demonstrate correct procedures for creating online forms, Web page designs, document sharing, and merging information obtained from a database.

Spreadsheet Applications

3. Design spreadsheets for personal and business use.
Utilizing wizards and templates to create spreadsheets
4. Apply mathematical, statistical, and logical functions to solve problems using spreadsheets.
5. Create charts and graphs to clarify data and share information.
 - Creating formulas manually and with the function wizard
 - Auditing equations and troubleshooting errors
 - Formatting spreadsheets, graphs, and lists for printing

Database Applications

6. Utilize database functions for business and personal use to create tables, forms, reports, and queries.
 - Creating forms that manage data automatically
 - Optimizing the database for easy navigation and data input

Presentation Applications

7. Create a multimedia résumé.
Example: electronic career portfolio
8. Present a self-designed multimedia presentation with visual elements, including using graphics, sound, and on-screen navigation and preparing a slideshow for live presentations and kiosk demonstrations.

Internet Research

9. Utilize various Internet search engines to research business topics.
10. Utilize integrated computer technology for creating projects.
11. Compare uses of information technology as they relate to major business functions, including marketing, accounting and finance, manufacturing, human resources, and management.
12. Apply skills needed to support information technology users, including supporting customer, tutoring information technology users, and assisting information technology users in updating technical skills.
13. Utilize research results to analyze new and emerging business technology applications software.
14. Determine career and entrepreneurial opportunities, responsibilities, and educational and credentialing requirements related to business technology professions.

Electronic Mail Applications

15. Utilize e-mail features safely and effectively.
 - Applying skills for organizing the inbox and filtering junk mail
 - Scheduling meetings, recurring appointments, and tasks
16. Analyze e-mail data obtained from spreadsheets or databases.

Cabinetmaking I

This one-credit course is designed to provide students with the fundamental knowledge and skills for this area of the construction industry. Emphasis is placed on job safety, use of hand tools and stationary power tools, materials and hardware, various types of joinery, and component assembly and installation.

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Orientation

Students will:

1. Identify career opportunities available in the cabinetmaking industry.

Safety

2. Apply safety standards and procedures for the cabinetmaking industry.

Tools

3. Demonstrate the use of hand tools in cabinetmaking.
4. Demonstrate procedures for inspecting, cleaning, and operating stationary power tools in cabinetmaking.

Materials and Hardware

5. Differentiate common types of materials used to make cabinets and countertops.
6. Describe cabinet components and hardware, including classes and sizes of typical base and wall kitchen cabinets.

Joinery

7. Produce various types of joints used in cabinetry and joinery.

Assembly

8. Construct a cabinet from a set of working drawings and specifications.
 - Explaining basic architectural building symbols used in cabinetry
 - Determining dimensions from a detailed cabinet drawing
 - Interpreting building specifications for installing and mounting cabinetry

Installation

9. Install plastic laminate on a cabinet countertop core.

Cabinetmaking II

This one-credit course is designed to provide students with the knowledge and skills for this area of the construction industry. Emphasis is placed on job safety, preparation of surfaces, commonly used sealants and paints, and repairs and remedies.

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Safety

Students will:

1. Apply safety standards and procedures for the cabinetmaking industry.
 - Discussing methods of rigging and care of ladders, scaffolds, swing devices, and other equipment

Surface and Substrate Materials and Conditions

2. Identify tools, materials, and methods used in surface preparation.
3. Determine types of surfaces used in cabinetmaking.
 - Demonstrating appropriate cabinet surfacing techniques
 - Demonstrating the ability to properly prepare surfaces for finishing

Sealants and Repair and Fillers

4. Classify characteristics of commonly used sealants, stains, paints, and laminates used in cabinetmaking.

Painting Failures and Remedies

5. Explain failures of paints and coatings on exterior and interior surfaces.
 - Determining a solution to repair surface failures
6. Explain remedies that may be used to repair physical failures to surface finishes, including scratches, discoloration, and watermarks.
7. Explain the purpose of chemical cleaning and stripping, including how various kinds of chemical cleaners and strippers are used.
8. Explain cabinet refinishing techniques, including low-pressure water cleaning, abrasive blasting, and brushing and rolling.

9. Explain cabinet finishing techniques, including sealants, clear finishes, spray painting, and stains.
10. Describe advantages and disadvantages of various cabinetry products, including durability and availability.

Cabinetmaking III

This one-credit course is designed to provide students with advanced knowledge and skills for this area of the construction industry. Emphasis is placed on job safety, the use of computer numerical control (CNC) software, and the machining process.

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Safety

Students will:

1. Apply safety standards and procedures for the cabinetmaking industry.

Computer Numerical Control Software

2. Describe various types of CNC software and appropriate applications used in cabinetmaking and millworking.
3. Use CNC design features for cabinetmaking and millworking.
4. Use CNC art features for cabinetmaking and millworking.

Machine Setup and Integration

5. Demonstrate CNC machine coding language applications.
6. Explain the troubleshooting process when software setup fails to interface with equipment.
7. Identify CNC machine tooling capabilities.
8. Evaluate the quality of the product produced related to cabinetmaking.

Machining Process

9. Produce various millwork products used in cabinetmaking.

Camera, Image Assembly, and Platemaking

Camera, Image Assembly, and Platemaking is a one-credit course designed to prepare students to become proficient in prepress skills. Emphasis is placed on camera operations to produce quality negatives, halftones, flats, and plates using appropriate chemicals and equipment. Chemistry and mathematics skills are applied to solve related problems. The prerequisite for this course is Introduction to Graphic Arts.

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Prepress Skills and Operations

Students will:

1. Demonstrate techniques for operating a camera to produce high quality line and halftone images.
 - Applying safety considerations in camera, image assembly, and platemaking
 - Demonstrating darkroom layout, use of developing solutions, film usage and characteristics, and darkroom printing
2. Construct various sizes of flats from layout to completion.
 - Utilizing tools and equipment correctly to establish true edge and layout guidelines
 - Applying printing processes, including stripping; work and turn; work and tumble; step and repeat; multiple-page signatures; and tints, halftones, and multiple colors
 - Demonstrating the ability to proofread and make corrections during prepress operations
3. Use various platemakers, including photo direct and direct transfer.
4. Describe components of plates and platemaking, including materials, types, chemicals, methods, and procedures.
5. Demonstrate step scale, rubdown test, additions, deletions, and corrections for metal plate preparation.

Career Cluster Explorations

Career Cluster Explorations is a 70-hour course designed for students in Grade 7 to improve communication skills, learn about the value of work, develop leadership skills, explore career opportunities, and become aware of basic employability skills.

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Technology

Students will:

1. Demonstrate basic technology skills.
Examples: managing files, using the Internet, using application programs

Work Ethics

2. Explain personal and societal benefits of work.

Communication Skills

3. Demonstrate oral presentation skills that sustain listener attention and interest, including eye contact, clear enunciation, and use of visual aids.
 - Preparing support materials to accompany a presentation, including tables and charts
4. Apply active listening skills to obtain and clarify information.
5. Summarize written materials from various career sources clearly, succinctly, and accurately.

Employability Skills

6. Create a personal plan of study to meet career goals and objectives.
7. Demonstrate positive work behaviors and personal qualities, including displaying a willingness to acquire new knowledge and skills, demonstrating integrity in a work situation, and indicating a willingness to follow rules and procedures.
8. Describe employment skills needed for obtaining and maintaining a job.

Leadership

9. Demonstrate interpersonal skills, including teamwork, conflict management, problem solving, and networking.
10. Demonstrate leadership skills for creating an environment that fosters mutual trust and confidence.

Career Opportunities

11. Demonstrate the ability to locate resources to determine job and career opportunities related to the Alabama Career and Technical Education clusters.
 - Describing the nature of each of the Alabama Career and Technical Education clusters
12. Identify employment opportunities to match personal interests and aptitudes.

Career Cluster Technologies I

Career Cluster Technologies I introduces students in Grade 7 to foundational knowledge and processes needed to increase their level of technological literacy. This course is aligned with the International Technology Education Association's *Standards for Technological Literacy* and introduces students to the sixteen career clusters and the pathways associated with each. Students explore technologies related to the clusters through courses that may be taught for a minimum of nine weeks to a maximum of two semesters. For a nine-week or 35-hour rotation course, content standards 1, 2, 4, 7, 8, 9, and 18 must be included. For a semester or 70-hour course, content standards 1, 2, 4, 5, 7, 8, 9, 13, 14, 15, 17 and 18 must be included. All standards must be included in a one-credit or two-semester course.

Students gain knowledge and skills in the application, design, production, and assessment of products, services, and systems in a variety of areas including, but not limited to, medical, agriscience, energy and power, communications, transportation, manufacturing, and construction technologies.

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Nature of Technology

Students will:

1. Describe the scope of technology.
 - Identifying how new products and systems can be developed to solve problems or help do things that require technology
 - Explaining the nature of the development of technology
 - Explaining how technology is linked to creativity and innovation
 - Describing how corporations create demand for a product by utilizing technology for marketing and advertising
2. Explain core concepts of technology.
 - Identifying components of technology systems as input, process, output, and at times, feedback
 - Describing the relationship of parts in systems thinking
 - Comparing open-loop and closed-loop systems
 - Illustrating how technology systems can be connected to one another and how a malfunction of any part of a system may affect the function and quality of the system or related systems
 - Describing effects of requirements on a product or system
 - Explaining the nature of trade-offs and the need for careful compromises among competing factors
 - Explaining that different technologies involve different sets of processes
 - Summarizing the maintenance process of technical systems
 - Explaining how controls serve as mechanisms of change

3. Describe relationships and connections among technologies and other fields.
 - Explaining how a product, system, or environment developed for one setting may be applied to another setting
 - Explaining how knowledge gained from other fields of study has a direct effect on the development of technological products and systems

Technology and Society

4. Describe the role of society in the development and use of technology.
 - Identifying factors that influence the development of technology
 - Summarizing the process in which social and cultural priorities influence invention and innovation and how invention and innovation influence social and cultural priorities
 - Explaining acceptance and use of technological products and systems
5. Summarize cultural, social, economic, environmental, political, and historical effects of technology.
 - Describing ways technology affects humans, including safety, comfort, choices, and attitudes about further development of technology
 - Identifying consequences and ethical considerations of the use of technology products and systems
 - Stating ways that technology development influences economy, politics, and culture
 - Describing how technology is used to manage waste and repair damage in technological systems
 - Recognizing conflicts that may occur between environmental and economic concerns related to advances in technology
 - Describing the evolution of techniques, measurement, and resources used in technology development
 - Recognizing the effect of technology innovations on the specialization of labor needs

Design

6. Describe the role of troubleshooting, research and development, invention and innovation, and experimentation in problem solving.
7. Identify creative attributes of design, including brainstorming, modeling, testing, evaluating, and modifying.
 - Recognizing the purpose for design
 - Recognizing the role of criteria and constraints in a given design
 - Understanding limits of design regarding perfection

Abilities for a Technological World

8. Demonstrate technology design processes for solving problems in and beyond the laboratory and classroom.
 - Specifying criteria and constraints for the design
 - Modeling a solution to a problem in two-dimensional and three-dimensional representations
 - Recognizing that testing and evaluation of the design in relation to preestablished requirements are essential parts of the process
 - Documenting the solution to a given design problem
9. Select correct tools needed to operate and maintain technology products and systems.
 - Using information provided in manuals, protocols, or by experienced people to see and understand how things work
 - Using tools, materials, and machines safely to diagnose, adjust, and repair systems
 - Using computers and calculators in various applications
 - Operating systems to achieve a given purpose
10. Assess the impact of technology products and systems on society.
 - Designing instruments to collect data
 - Using data collected to analyze and interpret trends in order to identify positive and negative effects of a technology
 - Evaluating information for accuracy to determine its usefulness

The Designed World

11. Identify advances and innovations in medical technologies and health care.
 - Recognizing sanitation processes used in the disposal of medical products
 - Recognizing why vaccines are developed for use in immunization
 - Describing how genetic engineering involves modifying the structure of deoxyribonucleic acid (DNA) to produce new genetic designs
12. Identify advances and innovations in agricultural and related biotechnologies.
 - Comparing a wide range of equipment and practices used to improve the production of food, fiber, fuel, and other useful products for the care of animals
 - Recognizing how biotechnology applies principles of biology to create commercial products or processes
 - Contrasting techniques used to provide long-term storage of food, including refrigeration, freezing, dehydration, preservation, and irradiation
13. Identify advances and innovations in energy and power technologies.
 - Defining energy and power
 - Identifying uses of energy and power systems that provide propulsion to other technological products and systems
 - Describing concepts of efficiency and conservation of power and energy

14. Identify advances and innovations in information and communications technologies.
 - Identifying primary modes of information transfer, including human to human, human to machine, and machine to human
 - Describing required components of a basic communications system, including source, encoder, transmitter, receiver, decoder, and destination
 - Identifying factors that affect the design of a message, including intended audience, medium, purpose, and nature of the message
 - Describing elements of common language used to promote clear communications, including symbols, measurements, and drawings
15. Identify advances and innovations in transportation technologies.
 - Identifying functional components that comprise a transportation system
 - Describing transportation subsystems, including structural, propulsion, suspension, guidance, control, and support that must function together for a system to work effectively
 - Describing how government regulations influence the design and operation of transportation systems
 - Explaining how transportation processes, including receiving, holding, storing, loading, moving, unloading, delivering, evaluating, marketing, managing, communicating, and using conventions are necessary for an entire transportation system to operate efficiently
16. Identify advances and innovations in manufacturing technologies.
 - Describing how manufacturing systems use mechanical processes to change the form of materials through separating, forming, combining, and conditioning
 - Classifying manufactured goods as durable or nondurable
 - Explaining the manufacturing process, including designing, developing, producing, and servicing of products and systems
 - Identifying chemical technologies used in manufacturing, including synthetic fibers, pharmaceuticals, plastics, and fuels
 - Explaining techniques used to locate, acquire, and transform raw materials used in manufacturing
 - Summarizing the steps of marketing
17. Identify advances and innovations in construction technologies.
 - Describing factors influencing construction design decisions, including building laws and codes, style, convenience, cost, climate, and function
 - Identifying types of foundations and their uses
 - Classifying structures as temporary or permanent
 - Comparing building subsystems
Examples: waste disposal, water, electrical, structural, climate control, communication
18. Recognize Alabama's sixteen career clusters and associated pathways and their relationships to technology.
 - Describing how pathways lead students through secondary and postsecondary training towards a credential
 - Identifying employment opportunities associated with the clusters
 - Explaining employment skills for securing and keeping a job

Career Cluster Technologies II

Career Cluster Technologies II provides students in Grade 8 with a more in-depth study of the knowledge and processes needed to further increase their level of technological literacy. This course is aligned with the International Technology Education Association's *Standards for Technological Literacy*. It includes instruction in technologies related to the sixteen career clusters and related pathways. Courses may be taught for a minimum of nine weeks to a maximum of two semesters. For a 35-hour rotation course, content standards 1, 2, 4, 7, 8, 10, 11, and 20 must be included. For a 70-hour course, the following standards 1, 2, 4, 5, 7, 8, 10, 11, 15, 16, 17, 18, 19 and 20 must be included. All standards must be included in a one-credit course.

Students gain knowledge of advances and innovations in technology and gain skills in the application of technologies in diverse areas including, but not limited to, medicine, agriscience, energy and power, communication, transportation, manufacturing, and construction technologies.

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Nature of Technology

Students will:

1. Interpret characteristics, core concepts, and the scope of technology.
 - Determining effects of goal-directed research and commercialization on the diffusion of technology into society
 - Explaining how inventions and innovations are the result of specific, goal-directed research
 - Explaining how the development of technologies is driven by the motivation for profit and by demands of the market
2. Identify core concepts of technology.
 - Interpreting systems as building blocks of technology embedded in larger technological, social, and environmental systems
 - Explaining how the stability of a technological system is influenced by all components in a system, especially those in the feedback loop
 - Explaining how the selection of resources involves trade-offs between competing values such as availability, cost, desirability, and waste
 - Describing how new technologies create new processes
 - Explaining the measure and effect of quality control
 - Explaining processes of planning, organizing, and control in work management
 - Classifying layers of control and feedback loops used to provide information in complex systems

3. Interpret relationships among various technologies, including connections between technology and other fields of study.
 - Explaining how technology expands when an existing application is used for a different function
 - Describing how technological innovation occurs when ideas, knowledge, or skills are shared within a technology, among technologies, or across other fields
 - Justifying the use of knowledge protection, including the patent process
 - Recognizing that technological progress promotes the advancement of science and mathematics

Technology and Society

4. Critique cultural, social, economic, environmental, political, and historical effects of technology.
 - Explaining how changes caused by the use of technology can range from gradual to rapid and from subtle to obvious
 - Describing how making decisions regarding the use of technology involves comparing positive and negative effects of trade-offs
 - Describing ethical considerations involved in the development, selection, and use of technologies
 - Explaining how the transfer of a technology from one society to another can cause cultural, social, economic, and political changes affecting both societies
 - Describing how technologies are devised to conserve water, soil, and energy
Examples: reusing, reducing, recycling
 - Illustrating how new technologies reduce the use of nonrenewable resources
5. Appraise the influence of technology on history.
 - Illustrating how most technological development has been the result of a series of refinements to a basic invention
 - Describing how the evolution of civilization has been directly affected by, and has in turn affected, the development and use of tools and materials
 - Explaining the relationship of technological know-how and scientific knowledge in the early history of technology
 - Describing how the development of many technological devices has produced long-lasting effects on technology and society through various historical ages including the Iron Age, the Middle Ages, the Renaissance, the Industrial Revolution, and the Information Age
6. Interpret the role of society in the development and use of technology.
 - Identifying how different cultures develop technologies to satisfy individual and shared needs, wants, and values
 - Describing how the decision to develop a technology is influenced by corporate cultures, societal opinions, and demands
 - Explaining how different factors contribute to the design of and demand for various technologies
Examples: advertising, strength of economy, corporate goals of the company

Design

7. Describe attributes of design.
 - Explaining why design problems are seldom presented in a clearly defined form
 - Explaining the process of refining and improving a design
 - Explaining how requirements of a design compete with each other
Examples: criteria, constraints, efficiency
8. Explain attributes associated with engineering design.
 - Summarizing how established design principles are used to evaluate existing designs, collect data, and guide the design process
 - Explaining how engineering design is influenced by personal characteristics, including creativity, resourcefulness, and the ability to visualize and think abstractly
 - Demonstrating how a prototype of a working model is used to test a design concept by making actual observations and necessary adjustments
 - Explaining the process of engineering design, including factors involved in the process
9. Interpret the role of troubleshooting, research and development, invention and innovation, and experimentation in problem solving.
 - Describing the nature of research and development in business and industry
 - Explaining why technological problems must be researched before they can be solved
 - Explaining why all problems are not technological and why every problem cannot be solved using technology
 - Explaining why many technological problems require a multidisciplinary approach

Abilities for a Technological World

10. Apply the design process to solve problems in and beyond the laboratory and classroom.
 - Specifying criteria and constraints for the design
 - Using two-dimensional and three-dimensional representations of the design solution
 - Explaining how testing and evaluation of the design in relation to preestablished requirements are parts of the design process
 - Developing a product or system with accompanying documentation
11. Utilize tools needed to use, maintain, and assess technological products and systems.
 - Summarizing processes and procedures for communication to different audiences using appropriate oral and written techniques
 - Diagnosing a malfunctioning system using tools, materials, machines, and knowledge
 - Explaining why it is necessary to troubleshoot, analyze, and maintain systems to ensure precision and safe and proper function
 - Arranging operation systems to function according to design
 - Explaining why using computers, calculators, and data collection devices to access, retrieve, organize, process, maintain, interpret, and evaluate data and information for communication is important for system maintenance

12. Assess the impact of products and systems on society.
- Collecting information to evaluate quality
 - Synthesizing data to analyze trends and draw conclusions regarding the effect of technology on the individual, society, and the environment
 - Describing the use of assessment techniques to make decisions about the future development of technology
Examples: techniques—trend analysis, experimentation

The Designed World

13. Interpret advances and innovations in medical technologies.
- Describing how medical technologies of prevention and rehabilitation, vaccines and pharmaceuticals, medical and surgical procedures, and genetic engineering are systems by which health is protected and maintained
 - Describing how telemedicine reflects the convergence of technological advances in the fields of medicine, telecommunication, virtual presence, computer engineering, informatics, artificial intelligence, robotics, materials science, and perceptual psychology health care
 - Describing how the sciences of biochemistry and molecular biology have made it possible to manipulate genetic information found in living creatures
14. Interpret advances and innovations in agriculture and related biotechnologies.
- Describing how agriculture includes a combination of businesses used to produce, process, and distribute food, fiber, fuel, chemicals, and other useful products
 - Explaining how biotechnology has applications in the areas of agriculture, food and beverages, drugs and medicine, energy, the environment, and genetic engineering
 - Identifying components of conservation
Examples: controlling soil erosion, reducing sediment in waterways, conserving water
 - Explaining why engineering design and management of agricultural systems require knowledge of artificial ecosystems and effects of technological development on flora and fauna
15. Interpret advances and innovations in energy and power technologies.
- Explaining the law of conservation of energy
 - Classifying major forms of energy, including thermal, radiant, electrical, mechanical, chemical, and nuclear
 - Describing the second law of thermodynamics
 - Distinguishing renewable and nonrenewable forms of energy
 - Identifying required components of a power system

16. Apply concepts associated with information and communication technologies.
 - Illustrating ways communication systems transfer information, including human to human, machine to human, human to machine, and machine to machine
 - Describing purposes and common uses of communication systems
 - Examples: informing, persuading, controlling, managing, educating
 - Explaining the operation of typical communication system components, including source, encoder, transmitter, receiver, storage, decoder, and destination
 - Demonstrating graphic and electronic means of communications
 - Analyzing elements of common language, including symbols, measurements, conventions, icons, graphic images, and languages for the purpose of promoting clear communications
17. Analyze advances and innovations in transportation services and methods for their effect on lifestyle and a mobile population.
 - Explaining the relationship of transportation to the effective operation of other technologies
 - Describing the nature of designing intermodalism
 - Analyzing the design of intelligent and non-intelligent transportation systems to determine dependence on other processes and to effectively operate a system
18. Interpret advances and innovations in manufacturing technologies.
 - Describing various service processes used to maintain product condition, including installing, troubleshooting, recalling, maintaining, repairing, altering, upgrading, and retrofitting
 - Classifying materials as natural, synthetic, or mixed
 - Distinguishing between durable and nondurable goods
 - Comparing types of manufacturing systems, including customized production, batch production, and continuous production
 - Explaining how interchangeability of parts and international standards increase the effectiveness of manufacturing processes
 - Analyzing chemical technologies to determine their use in manufacturing
 - Describing essentials of marketing a product, including establishing product identity and conducting research on product potential and advertising, product distribution, and product sales
19. Explain concepts associated with construction technologies.
 - Identifying the role of construction technologies in creating infrastructure as the underlying base of a system
 - Explaining how structures are constructed using a variety of processes and procedures
 - Explaining constraints normally associated with construction technologies, including function, appearance, strength, maintenance, available utilities, building codes, safety, style, convenience, and efficiency
 - Describing why ease of maintenance, alteration, and renovation are considerations when designing a structure
 - Selecting prefabricated materials for a given project
20. Describe the relationship of technology to Alabama's sixteen career clusters and associated pathways.
 - Illustrating how pathways guide students through secondary and postsecondary education leading to a credential
 - Identifying employment opportunities associated with the clusters
 - Applying employment skills for securing and retaining a job

Carpentry for Commercial Specialties

This one-credit course is designed to provide students with the fundamental knowledge and skills for this area of the construction industry. Emphasis is placed on job safety, ready plans, site layout, introduction to light-duty equipment, metal building principles, advanced roofing systems, and suspended ceilings.

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Reading Plans and Elevations

Students will:

1. Identify types of commercial construction drawings included in a set of plans and a materials takeoff.
2. Interpret elevation, schedules, sections, details, symbols, and specifications contained in commercial construction drawings.

Site Layout: Distance Measurement and Leveling

3. Convert measurements used in commercial carpentry applications.
Examples: engineering scale, architectural scale
 - Using a transit to determine site and building layout according to specifications

Introduction to Light-Duty Equipment

4. Describe aerial lifts, skid steer loaders, trenchers, generators, compressors, compactors, forklifts, and backhoes.

Welding

5. Demonstrate the setup of equipment for oxyfuel cutting.
6. Identify types of arc welding electrodes.
7. Demonstrate procedures to start, stop, and restart a welding bead.
 - Constructing a lap-joint fillet weld in the overhead position
 - Constructing a T-joint fillet weld in the vertical up position

Metal Buildings

8. Demonstrate installation procedures for interior and end bays of metal buildings.
9. Describe procedures used in leveling, squaring, and determining plumb lines for a metal building.
10. Describe types of walls and wall finishes used on metal buildings.
11. Demonstrate installation procedures for windows and doors in metal buildings.
12. Interpret metal building drawings and schematics.

Advanced Roof Systems

13. Identify types of trusses and joists used in commercial roofing.
14. Demonstrate the installation of panels for a lap-seam metal roof, including the preparation of eaves.
15. Demonstrate installation procedures for a built-up roof.
16. Demonstrate installation procedures for various metal roof systems.
17. Demonstrate the sealing of a side-lap and a standing-seam metal roof.

Interior Finish: Suspended Ceilings

18. Interpret plans and shop drawings related to ceiling layout.
19. Install selected suspended ceilings according to specifications.

Carpentry for Industrial Specialties

This one-credit course is designed to provide students with the fundamental knowledge and skills for this area of the construction industry. Emphasis is placed on job safety, concrete forms and reinforcing materials, foundation and flatwork, and concrete placement and finishes.

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Introduction to Concrete and Reinforcing Materials

Students will:

1. Identify types and sizes of concrete aggregates.
 - Identifying special types of concrete and their uses
 - Identifying types of concrete reinforcement materials
2. Produce volume estimates for concrete quantity requirements.
 - Determining concrete curing times, methods, and materials

Foundation and Flatwork

3. Identify various kinds of footings, including continuous, spread-stepped, pier, and grade-beam.
4. Describe components of footing forms and pier forms.
5. Demonstrate the layout and construction of selected footing forms.
6. Identify continuous-pier, pile-cap, and grade-beam footings.
7. Identify types of concrete structures that require the construction of foundation edge forms.
 - Explaining the purpose of edge forms in foundations
8. Demonstrate the construction and disassembly of slab-on-edge forms.
9. Use grade information to set concrete screeds.

Concrete Forms

10. Identify various types of concrete forms and their components.
11. Demonstrate the construction, plumbing, and bracing of various concrete forms, including basic wall, ganged wall, radius wall, column, beam, shoring, and stair forms.

Reinforcing Concrete

12. Describe purposes of basic processes involved in placing reinforcing bars.
 - Identifying standardized bar bends according to the American Concrete Institute (ACI)
13. Interpret reinforcement bar lists used in selecting concrete reinforcement systems.
14. List types of ties used in securing concrete reinforcing bars.
15. Use selected tools and equipment to cut, bend, and install reinforcing materials.
16. Demonstrate the placement of reinforcement bars in walls, columns, beams, girders, joists, and slabs.
17. Identify lapped and welded splices used for securing concrete reinforcement bars.

Concrete Placing and Finishing

18. Identify the purpose of various types of concrete joints.
19. Recognize factors affecting the quality of concrete placement.
 - Demonstrating methods for concrete placement finishing procedures
20. Identify equipment used to transport concrete.

Carpentry for Residential Exteriors

This one-credit course is designed to provide students with the fundamental knowledge and skills for this area of the construction industry. Emphasis is placed on job safety, exterior finishes, roofing applications, and thermal and moisture protection.

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Exterior Finishing

Students will:

1. Explain the purpose of wall insulation and flashing.
2. Demonstrate the installation of selected common cornices.
3. Demonstrate estimating methods for lap and panel siding.
4. Demonstrate applications of wood siding, including grove, shiplap, board and batten, shake or shingle, plywood, hardwood, and particleboard.
5. Demonstrate the installation of fiber cement siding.
6. Install selected types of vinyl or metal siding.
7. Describe types and applications of stucco and masonry veneer finishes.
8. Demonstrate the installation of selected types of metal or vinyl gutters, downspouts, and accessories.

Roofing Applications

9. Identify materials and methods used in roofing.
 - Illustrating various roofing methods
10. Explain safety requirements for roof applications.
11. Demonstrate the installation of fiberglass shingles on gable and hip roofs.
12. Demonstrate closing a valley using fiberglass shingles.
13. Demonstrate procedures used to make roof projections watertight, including fiberglass shingles and wood shingles.
14. Demonstrate the installation of main and hip ridge caps using fiberglass shingles.

15. Demonstrate the layout, cutting, and installation of a cricket or saddle.
16. Install wood shingles and shakes on roofs.
17. Describe how to close a valley using wood shingles and shakes.
18. Demonstrate the installation of main and hip ridge caps using wood shakes or shingles.

Thermal and Moisture Protection

19. Explain requirements for the installation of thermal and moisture protection materials.

Carpentry for Residential Interiors

This one-credit course is designed to provide students with the fundamental knowledge and skills for this area of the construction industry. Emphasis is placed on job safety; wall covering; drywall finishing; and interior door, ceiling, window, and cabinet installations

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Wall Coverings

Students will:

1. Compare various types of wall coverings used in interior residential carpentry.
2. Use appropriate fastening systems for residential interior applications.
3. Install single and multilayer wall coverings, using a variety of fastener types and installation methods.
4. Install wall coverings over wood and metal studs.
5. Estimate materials needed for a specific wall covering installation project.

Drywall Finishing

6. Explain various degrees of drywall finishing recognized in the construction industry.
 - Describing materials used in drywall finishing, including compounds, joint reinforcing tapes, trim materials, textures, and coatings
 - Demonstrating the ability to finish a drywall with power and hand tools

Interior Finish: Doors

7. Demonstrate door installation procedures in various interior partitions.
8. Demonstrate safe use of hand and power tools needed for installing interior doors.

Interior Finish: Suspended Ceilings

9. Identify various types of suspended ceilings.
 - Interpreting plans and shop drawings related to suspended ceiling layout
10. Formulate a list of materials needed for constructing a suspended ceiling.

Interior Finish: Window, Floor, and Ceiling Trim

11. Describe various types of interior moldings.
12. Practice square and miter cuts used for molding installation.
13. Demonstrate the fabrication of molding using coping joint cuts.
14. Install interior door, window, base, and ceiling trim.

Interior Finish: Cabinet Installation

15. Identify purposes of cabinet components and hardware.
16. Demonstrate the installation of cabinet base and wall units.
17. Install countertops, including plastic, laminate, tile, and granite.

Carpentry I

This one-credit course is designed to provide students with the fundamental knowledge and skills for this area of the construction industry. Emphasis is placed on job safety, use of hand and power tools, building materials, fasteners, adhesives, and flooring systems. Students are introduced to concrete forms and reinforcing materials, blueprint reading, and site preparations.

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Orientation

Students will:

1. Identify responsibilities and skills needed by a successful carpenter.
 - Identifying carpentry training, career, and entrepreneurial opportunities

Hand and Power Tools

2. Demonstrate the safe and proper use of hand and power tools used in carpentry.

Building Materials, Fasteners, and Adhesives

3. Calculate quantities of lumber and wood products using industry-standard methods.
4. Install fasteners, anchors, and adhesives used in carpentry.

Introduction to Concrete, Reinforcing Materials, and Forms

5. Describe properties and composition of concrete.
6. Perform volume estimates for concrete quantity requirements.
7. Identify various types of footing forms used in construction.
8. Construct a simple concrete form with reinforcement, plumbing, and bracing according to specifications.

Reading Plans and Elevations

9. Describe the information found on drawings typically included in a set of construction plans.
Examples: lines; architectural abbreviations; electrical, mechanical, and plumbing symbols
10. Interpret plans, elevations, schedules, sections, and details contained in basic construction drawings.
11. Produce a list of materials needed for a specific construction project.

Site Layout: Distance Measurement and Leveling

12. Convert measurements stated in feet and inches to equivalent measurements stated in decimal feet.
 - Converting decimal feet to feet and inches
13. Perform site layout tasks for a construction project according to specifications.
14. Use a builder's level and differential leveling techniques to determine site and building elevations.

Floor Systems

15. Interpret drawings and specifications to determine floor system requirements.
16. Identify floor and sill framing and support members.
17. Select the proper girder or beam size according to specific floor load and span data.
 - Selecting the proper joist size according to specific floor load and span data
18. Construct a floor assembly to specifications.
Examples: bridging, joists for a cantilever floor, subfloor for a single-floor system
 - Calculating an estimate for materials needed to frame a floor assembly

Carpentry II

This one-credit course is designed to provide students with advanced knowledge and skills for this area of the construction industry. Emphasis is placed on job safety; wall, ceiling, and roof framing; windows; entrance doors; and basic stair layout.

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Framing Metal Studs

Students will:

1. Identify tools and fasteners used in metal stud systems.
2. Demonstrate the installation of a metal stud wall according to specifications.
3. Demonstrate the installation of a metal doorframe according to specifications.
4. Demonstrate the installation of a metal stud radius wall according to specifications.

Wall and Ceiling Framing

5. Identify components of a wall and ceiling layout.
6. Identify common materials and methods used for installing sheathing on walls.
7. Construct exterior walls for a frame building, including laying out, assembling, erecting, and bracing to specifications.
8. Demonstrate wall framing techniques used in masonry construction.
9. Demonstrate the installation of ceiling joists on a wood frame building according to specifications.
10. Calculate an estimate of materials required to frame walls and ceilings.

Roofing Frame

11. Demonstrate methods used to calculate the length of a rafter.
12. Identify various types of trusses used in roof framing.
13. Construct framing for a gable roof with vent openings according to specifications.

14. Construct framing for a roof opening according to specifications.
15. Use trusses to erect a gable roof according to specifications.
16. Estimate materials used in framing and sheathing a roof.

Windows and Exterior Doors

17. Install a pre-hung window.
18. Install a pre-hung exterior door with a lockset.

Basic Stair Layout

19. Demonstrate the installation of stringers, risers, and treads for a stair system according to specifications.
 - Constructing a handrail for a stair system

Character Animation

Character Animation is a one-credit course that provides students with the opportunity to utilize the principles of animation to create animated stories with characters appearing to be self-motivated and possessing individual thought processes. Instruction allows students to focus on figure drawing, pantomime and acting, and advanced mechanics in animation. Skills gained in this course prepare students for the Animated Filmmaking course, postsecondary education, and entry-level positions in animation. Introduction to Animation and Visual Communication, Animation Layout, Storyboarding, and Animation Character Development and Design, or a satisfactory portfolio review by the instructor are prerequisites for the course.

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Safety

Students will:

1. Apply laboratory safety rules, regulations, and procedures in character animation.

Introduction

2. Create an education plan for a character animation career, including postsecondary and apprenticeship opportunities.

Character Design

3. Solve visual arts animation problems through a diverse range of media, techniques, and processes.

Pantomime and Acting

4. Critique physical, emotional, and social dimensions of characters for clarity and entertainment.
 - Using appropriate technical steps for animating a scene
 - Creating characters, environments, and actions that exhibit tension and surprise
 - Performing improvisations by developing, communicating, and sustaining characters
 - Producing believable character animation through advanced kinetics and mechanics

Presentation Format

5. Produce character animation that communicates an idea, theme, or emotion through a variety of media.
 - Creating animation production roughs
 - Producing animation for public display and critique
 - Demonstrating reflection and self-criticism in final character animations

Animation Technology

6. Use technology to facilitate problem solving, critical thinking, and informed decision making in character animation.
7. Utilize technology for an animation task, including editing for clarity and entertainment, recording for visual review, and creating effects for clarity and entertainment.

Chemical Services

Chemical Services is a one-credit course that focuses on the theory of chemical services related to chemical hair texturing. Specific topics include basics of chemistry and electricity, properties of the hair and scalp, and chemical texture services. Students also gain initial practical experience in performing various chemical texturing activities. Emphasis is placed on safety, chemical use and handling, hair and scalp analysis, and client consultation. Upon successful completion of this course, students are able to practice safety and sanitary precautions as they perform these chemical services.

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Basics of Chemistry and Electricity

Students will:

1. Describe chemical and electrical safety considerations related to performing chemical services.
2. Identify safety requirements for handling corrosives and oxidizers.
3. Differentiate between organic and inorganic chemistry.
4. Identify types and benefits of light therapy.

Hair and Scalp

5. Describe the structure and composition of hair.
6. Determine the impact of acids, alkalis, and pH on the hair and scalp.
 - Defining acids and alkalies, including charting chemicals on the pH scale
7. Explain the relevance of porosity, density, texture, elasticity, and disorders of the hair for chemical services.
8. Differentiate between a soft curl and a chemical relaxer.
9. Describe structural changes that take place in hair as a result of permanent waving.
10. Identify factors critical to hair and scalp analysis.
11. Compare chemical texture services and structural changes that occur in the hair.

Chemical Application

12. Demonstrate client consultation, including hair analysis, to determine the appropriate chemical texture service.
13. Demonstrate procedures for permanent waving.
14. Apply techniques used for soft curls and chemical hair relaxing.

Chemistry of Food

Chemistry of Food is a one-credit, specialized area of study that provides an in-depth study of the application of science principles to scientific investigation of the production, processing, preparation, evaluation, and utilization of food. Students apply the scientific method to study scientific concepts and theories in the context of nutrition and foods. While achieving academic standards and competencies in the area of chemistry, biochemistry, biology, and some physics at the analysis, synthesis, and evaluation levels. Students develop critical-reasoning and mathematics and writing skills through a variety of higher-level learning strategies and laboratory experiments that require measuring, recording, graphing, and analyzing data; predicting and evaluating laboratory results; and writing laboratory reports. The course highlights nutrition concepts and explores the various relationships between food science and nutrition.

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Evaluation of Chemical and Physical Changes of Food

Students will:

1. Apply sensory and objective methods to the evaluation of chemical and physical changes in food.

Science Relationships

2. Compare interrelationships among food science, nutrition, and other sciences.

Chemistry

3. Differentiate among pure substances, mixtures, elements, and compounds.
 - Distinguishing between intensive and extensive properties of matter
 - Contrasting properties of metals, nonmetals, and metalloids
 - Distinguishing between homogeneous and heterogeneous forms of matter
4. Describe the structure of carbon chains, branched chains, and rings.
 - Describing the impact of unsaturated, saturated, and supersaturated solutions for sugar crystallization

5. Use the periodic table to identify periodic trends, including atomic radii, ionization energy, electronegativity, and energy levels.
 - Utilizing electron configurations, Lewis dot structures, and orbital notations to write chemical formulas
 - Calculating the number of protons, neutrons, and electrons in an isotope
 - Utilizing benchmark discoveries to describe the historical development of atomic structure, including proelectric effect, absorption, and emission spectra of elements
Examples: Thomson's cathode ray, Rutherford's gold foil, Millikan's oil drop, and Bohr's bright line spectra experiments
6. Describe solubility in terms of energy changes associated with the solution process.
 - Using solubility curves to interpret saturation levels
 - Explaining the conductivity of electrolytic solutions
 - Describing acids and bases in terms of strength, concentration, pH, and neutralization reactions
Example: pH in food preparation
 - Describing factors that affect the rate of solution
 - Solving problems involving molarity, including solution preparation and dilution
7. Use the kinetic theory to explain states of matter, phase changes, solubility, and chemical reactions.
Example: Describing how water at 25 degrees Celsius remains in the liquid state because of the strong attraction between water molecules while kinetic energy allows the sliding of molecules past one another
8. Solve stoichiometric problems involving relationships among the number of particles, moles, and masses of reactants and products in a chemical reaction.
 - Predicting ionic and covalent bond types and products given known reactants
 - Assigning oxidation numbers for individual atoms of monatomic and polyatomic ions
 - Identifying the nomenclature of ionic compounds, binary compounds, and acids
 - Classifying chemical reactions as composition, decomposition, single replacement, or double replacement
 - Determining the empirical or molecular formula for a compound using percent composition data
9. Explain the behavior of ideal gases in terms of pressure, volume, temperature, and number of particles using Charles's law, Boyle's law, Gay-Lussac's law, the combined gas law, and the ideal gas law.

10. Distinguish among endothermic and exothermic physical and chemical changes.
Examples: endothermic physical—phase change from ice to water
endothermic chemical—reaction between citric acid solution and baking soda
exothermic physical—phase change from water vapor to water
exothermic chemical—formation of water from combustion of hydrogen and oxygen
- Describing the impact of water in cooking vegetables
 - Calculating temperature change by using specific heat
Example: explaining heat conduction and convection, radiation, and induction in the preparation of a variety of food products
 - Using Le Châtelier’s principle to explain changes in physical and chemical equilibrium
11. Distinguish between chemical and nuclear reactions.
- Identifying atomic and subatomic particles, including mesons, quarks, tachyons, and baryons
 - Calculating the half-life of selective radioactive isotopes
 - Identifying types of radiation and their properties
 - Comparing fission and fusion
 - Describing carbon-14 decay as a dating method

Food Microbiology

12. Describe positive and negative impacts of microorganisms in food.
Examples: positive—yogurt, sauerkraut, bleu cheese, cheddar cheese, mayonnaise
negative—food spoilage, food contamination, food-borne illnesses

Food Science

13. Describe the chemical makeup of major food nutrients.
Examples: carbohydrates, protein, fats, vitamins, minerals, water
14. Compare safe food-handling practices used in the food industry.
- Describing the government’s role in food safety
 - Analyzing the correct care and safe use of instruments, equipment, and chemicals

Food Preservation

15. Evaluate various food preservation techniques.
16. Evaluate the impact of using food additives in products.

Food Basics

17. Describe major nutrients, including functions and sources of each.

Technology and Careers

18. Assess the impact of technology on the food industry.
Example: supercritical carbon dioxide technology
19. Analyze career options and entrepreneurial opportunities in food science and technology.
Examples: food scientists, food technicians, microbiologists

Child Development

Child Development may be taught as a one-credit or half-credit course. For a half-credit course, content standards 2, 3, 4, 6, 7, 8, 9, 10, 11, 13, 14, 15, and 19 must be included. This course helps students develop skills related to the physical, social, intellectual, and emotional development of children. Course content provides opportunities for exploring benefits of studying children, stages of development, child development theories, child health and safety, behavior management, child abuse, needs of exceptional children, childcare services, community resources, technology, and career opportunities related to working with children. Observational experiences are encouraged in this course.

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Learning about Children

Students will:

1. Assess the importance of child development study.
 - Determining readiness for parenthood
 - Explaining the purpose of observation in child development study
2. Evaluate factors that influence the growth and development of children.
Examples: heredity, environment, nutrition, physical activity, developmental disorders, early brain development, birth defects, exceptionalities
3. Explain contributions of child development theorists.
Examples: Freud, Piaget, Erikson, Skinner, Havighurst, Maslow

Prenatal Development and the Newborn Child

4. Describe stages of prenatal development and labor and potential risks to mother and child during prenatal development, labor, and birth.
 - Describing causes of birth defects and the impact of each
5. Determine physical and emotional needs of the mother and newborn child.

Infants

6. Describe physical, emotional, social, and intellectual developmental needs of the infant.
 - Summarizing developmental milestones during the first year of life
 - Identifying infant care skills required by the caregiver
 - Describing how emotions and temperament develop in the infant
 - Explaining how the infant learns through social interaction
 - Describing ways to stimulate brain development in an infant
 - Explaining how infants develop communication skills

Toddlers

7. Describe physical, emotional, social, and intellectual developmental needs of the toddler.
 - Identifying developmental milestones of children ages one to three
 - Describing how self-care skills are introduced to the toddler
 - Explaining how individual differences affect emotional development in toddlers
 - Explaining the importance of friends and play to a toddler's social development
 - Summarizing the connection between brain research and learning
 - Explaining the importance of reading to the toddler

Preschoolers

8. Describe physical, emotional, social, and intellectual developmental needs of the preschooler.
 - Summarizing developmental milestones of children ages four to five
 - Explaining the importance of providing nutritious meals and snacks for preschoolers
 - Describing how preschool-age children develop self-help and self-care habits
 - Evaluating the impact of building self-confidence in the preschool-age child
 - Describing language development of preschool-age children

School-Age Children

9. Describe physical, emotional, social, and intellectual developmental needs of the school-age child.
 - Analyzing developmental milestones for the six- to twelve-year-old child
 - Explaining personal hygiene of the school-age child
 - Describing the connection between competence and self-esteem in school-age children
 - Determining how relationships with peers change during the ages of six to twelve

Adolescents

10. Describe physical, emotional, social, and intellectual developmental needs of the adolescent.
 - Describing developmental milestones of thirteen- to eighteen-year-old children
 - Summarizing the importance of nutrition, hygiene, exercise, and sleep during adolescence
 - Explaining the need for adolescents to develop their own personal identities
 - Recognizing the importance of adolescents' developing strong personal morals and values

Care and Guidance of Children

11. Explain the importance of consistency when guiding children.
 - Identifying ways to encourage appropriate behavior and correct inappropriate behavior
12. Assess the importance of play and play activities in the lives of children.
 - Explaining the significance of child-adult interaction
 - Identifying enrichment activities that optimize learning
Examples: art, music, science, literature
13. Prepare nutritious meals for children.
 - Practicing safety and sanitation techniques during food preparation
 - Demonstrating safe and correct use of kitchen equipment
14. Determine ways to meet children's health and safety needs, including recognizing safety hazards and devices, selecting safe and age-appropriate toys, identifying the need for regular health check-ups and immunizations, describing care of children with illnesses, and outlining procedures to follow in an emergency situation.
15. Explain procedures for reporting child abuse.
16. Compare factors to consider when selecting child care providers.
 - Describing ways to assist children in transitioning from home to daycare to school
17. Assess community support services and resources available to families with children who have special needs.
 - Identifying needs of special children and ways parents meet those needs
 - Summarizing current approaches to educate children with special needs
18. Determine ways to assist children with stress and family crisis.

Technology and Careers

19. Analyze ways technology impacts and is used to study the growth and development of children.
20. Explain career options related to child development.

Child Services I

Child Services I is a one-credit course that includes content to help students learn about child growth and development and ways to provide services to children. Major topics included in this course are types of child services; career options; roles and functions of individuals engaged in child services occupations; developmental theories; physical, intellectual, social, and emotional development of children; family influences; large and small motor-skill development; safe learning environments; child nutrition; emergency procedures; disadvantaging conditions of children; observation of children; exceptional children; communication skills; local, state, and national agencies supporting children; professionalism and ethics; health and hygiene practices; and technology. Observational experiences are encouraged in this course.

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Child Services

Students will:

1. Determine the role and function of individuals engaged in child services careers.
 - Examining education and training requirements for child services careers
 - Determining factors to consider when providing child services
 - Examining the impact of child services careers to improve the quality of life for children and their families
2. Assess ways technology impacts and is used to provide services to children.

Child Growth and Development

3. Compare child developmental theories to determine implications for child services workers.
4. Determine strategies that advance children's physical and intellectual development, including providing a variety of equipment and activities; implementing an assortment of creative, stimulating learning opportunities; and encouraging children to communicate verbally.
5. Describe strategies that support children's social and emotional development, including encouraging children to develop self-help skills and a sense of independence and guiding children toward socially accepted behavior and acceptance by their peers.
 - Explaining the impact of parenting style to the child's social development
6. Recognize family influences that impact child development.
Examples: culture, religion, child-rearing practices
7. Practice activities, including art and dramatic play, that enable children to develop large and small motor skills.
 - Utilizing well-arranged space to meet developmental needs of children

Child Health and Safety

8. Evaluate a learning environment for children within a child services program to determine compliance with state regulations.
 - Describing how supervision can prevent injuries
 - Identifying general hygiene practices
 - Examples: handwashing, diapering and toileting procedures
 - Recognizing the importance of rest routines
 - Analyzing play areas to determine the presence of age-appropriate toys and stimulating learning activities
9. Explain the impact of nutrition on child growth and development.
 - Preparing healthy snacks and meals for children to promote optimal health and prevent illness
 - Establishing food safety and sanitation practices in food preparation
10. Evaluate emergency procedure plans for facilities within child services programs.
 - Identifying the emergency training needed by child services staff

Disadvantaging Conditions and Intervention

11. Assess the impact of disadvantaging conditions on children and their families.
12. Determine the importance of child services staff exhibiting sensitivity toward children, including children with special needs and children from diverse cultures.
13. Determine situations with children that require crisis intervention.
 - Demonstrating skills for observing, recording, and reporting children's behavior
14. Interpret needs of all children in various child services programs, including gifted, special needs, nondisabled, and disadvantaged children.

Communication and Support Services

15. Utilize effective communication skills to establish productive relationships with children, families, and the community.
 - Encouraging parental involvement in child services programs
16. Determine local, state, and national agencies that provide resources and services to clients and their parents or guardians.
 - Examples: human resources, public health, mental health departments

Management and Professionalism

17. Explain the importance of professional ethics to child services program personnel.
 - Describing ethical responsibilities of child services professionals to clients, colleagues, employers, self, community, and society
 - Identifying documentation and reporting responsibilities of child services staff regarding possible child abuse and neglect of children
 - Explaining the need for child services staff to maintain accurate and confidential documentation
18. Determine basic health practices and prevention procedures to protect workers and clients in child services programs.
19. Determine licensing regulations, accreditation, and legalities associated with child services professions.
20. Utilize technology to manage and operate an effective child services program.

Child Services II

Child Services II is a one-credit course. The prerequisite for this course is Child Services I. The course includes content that helps students learn about the management of child services facilities. Major topics are guidance techniques; parenting philosophies; communications; curriculum development; evaluation of services; first aid and emergency response plans; learning environments; development of policies and procedures; facility design; role of directors and staff; federal, state, and local regulations and licensure requirements; work environments; nutritional needs of clients; budgets; parent and community relationships; professionalism; and entrepreneurial opportunities. Observational experiences are encouraged in this course.

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Group Management

Students will:

1. Apply developmental guidance techniques and strategies when providing services to children, including controlling aggressive behavior and providing and practicing praise and positive and negative reinforcement.
2. Describe the importance of objective observation when assessing children's developmental progress.
3. Describe the impact of various parenting philosophies and their potential impact on child behavior.
4. Determine effective verbal, nonverbal, written, and electronic communication skills used with staff, client, and families.

Curriculum Management

5. Critique a written instructional plan for a child services program that includes a philosophical statement, instructional goals and strategies, and a plan for assessment of the program.

Facility Design and Management

6. Evaluate a child services facility for space arrangement, equipment, toys, supplies, and safety hazards.

Program Organization and Administration

7. Describe the role of the director in managing a child services program.
 - Comparing functions of management, including planning, organizing, implementing, evaluating, and communicating
8. Analyze federal, state, and local regulations for child services programs for use in a facility.
Examples: space per child, number of toilets, fire safety features, sanitation, indoor and outdoor safety features, adherence to Americans with Disabilities Act (ADA) regulations
 - Comparing program accreditation and licensure procedures required for child services programs
9. Describe the importance of a positive work ethic for child services personnel.
10. Practice a first aid and emergency response plan for children and staff of a child services program.
11. Explain policies and procedures that address the issues of facility safety, discipline, transportation, medication, and illness of a child who is participating in a child services program.
12. Determine the use of technology in managing and operating a child services program.

Food Service Management

13. Prepare snacks and meals for children participating in a child services program that meet the United States Department of Agriculture (USDA) Dietary Reference Intakes for children.
 - Practicing safety and sanitation techniques in food preparation
 - Using kitchen equipment safely
 - Analyzing nutritive values and costs of meals and snacks for children
 - Comparing dietary problems among children, including tooth decay, diabetes, and obesity

Financial Management

14. Create a business plan for a child services program, including a start-up budget, operating budget, and funding sources.

Parent and Community Relationships

15. Determine strategies that promote supportive relationships between parents and caregivers.
Examples: establishing a parent reception area; distributing parent handbooks, brochures, bulletins, and newsletters; conducting parent meetings and home visits

Professional Relationships

16. Determine the importance of child services personnel to establish relationships with licensing and certification organizations.
17. Describe the chain of command and responsibilities for each employee working in a child services program.

Collision Repair—Metal Welding and Cutting

This is a one-credit course that provides students with classroom and laboratory experiences in various automotive cutting and welding processes. Emphasis is placed on safety, plasma arc cutting and oxyacetylene cutting, resistance type spot welding, and metal inert gas (MIG) welding. Upon successful completion of this course, students safely perform automotive cutting and welding procedures. This course incorporates all personal and environmental safety practices associated with clothing; respiratory protection; eye protection; tools; power equipment; proper ventilation; and the handling, storage, and disposal of chemicals and materials in accordance with local, state, and federal safety and environmental regulations.

This course incorporates current guidelines and standards set forth by the Automotive Service Excellence (ASE) and the National Automotive Technicians Education Foundation (NATEF), including any updates or changes. Content standards provide students with information regarding task lists, tools and equipment, program hours, laboratory operation, and safety standards.

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Metal Welding

Students will:

1. Identify weldable and nonweldable materials used in collision repair.
2. Identify types of welds for specific situations, including gas metal arc welding (GMAW), resistance spot welding, and gas tungsten arc welding (GTAW).
3. Demonstrate procedures for performing straight-bead, butt-joint, lap-joint, and plug welds using GMAW.
4. Demonstrate procedures for performing straight-bead, butt-joint, and plug welds using GMAW in flat, horizontal, and vertical positions.

Metal Cutting

5. Identify metal cutting equipment for specific situations, including oxyacetylene and plasma arc.
6. Demonstrate procedures for performing layout, straight-line, and spot-removal cuts.
7. Perform metal cutting operations to specification.

Commerce Communication

Commerce Communication is a half-credit or a one-credit course that deals with the operation and management of advertising and promotion functions within the marketing system. Students learn how to utilize standard processes to move, store, locate and transfer ownership of goods and services. Students also learn how to disseminate information about products and services of a company to achieve a desired outcome. Students develop an advertising plan, utilize various forms of publicity to promote a product or service, exhibit an understanding of ethical behavior when promoting a product or service, and use appropriate terminology to exhibit a clear and concise understanding of promotion to market a product or service. The prerequisite for this course is Business Essentials or Business Technology Applications. For a half-credit course, content standards 3, 4, 5, 7, 8, 10, and 12 must be included.

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Written Communication

Students will:

1. Utilize reading strategies to acquire the meaning of technical concepts and to follow directions in the business industry.
 - Interpreting reading materials related to the business industry to apply and communicate information learned from reading to actual practice
2. Demonstrate effective use of written and oral language by using coherent paragraphs and correct grammar.
Examples: using parallel structure, using correct punctuation and sentence structure
3. Demonstrate effective writing techniques used to communicate in the business environment, including enhancing vocabulary and composing concise documents with clarity.
4. Create business documents, including analytical and informational reports, letters, memorandums, minutes, and electronic correspondence to disseminate information.

Oral Communication

5. Demonstrate effective verbal and nonverbal communication in the workplace.
 - Determining appropriate business attire for a given situation
Examples: formal meeting, casual meeting, special occasion
 - Demonstrating proper posture, tone, facial expression, and etiquette in the workplace
 - Demonstrating telephone etiquette
Examples: tone, pitch, courtesy
 - Recognizing effective behavior for meetings
Examples: attentiveness, cellular telephone usage

6. Utilize tables, charts, figures, and graphs to enhance written and oral communication.
7. Deliver formal and informal presentations related to a broad range of business topics.
 - Determining audience and presentation purpose to secure listener attention and interest
 - Explaining the value of support materials for use in oral presentations

Technology

8. Utilize a variety of technology tools to communicate accurately and effectively in the workplace.
 - Interpreting information from secondary, electronic, and real-time references using paraphrasing skills
 - Designing a survey to obtain information
 - Developing a vision and mission statement incorporating data imported from various sources
9. Exchange information via telecommunications software.
Examples: sending and receiving e-mail messages, images, and online information services with supervision
 - Selecting communication methods for various tasks
 - Demonstrating business ethics and correct electronic communication etiquette

Ethics

10. Apply problem-solving techniques needed to resolve business issues related to ethics.

Career Opportunities

11. Determine career and entrepreneurial opportunities, responsibilities, and educational and credentialing requirements related to commerce communication.
12. Explain the employment process, including career research; job source research; résumé preparation; letters of application, acceptance, refusal, and resignation; application form completion; and interview preparation.
 - Creating an employment portfolio
13. Demonstrate effective verbal and written communication skills needed in the workplace.
 - Explaining the communication process
 - Explaining the purpose of communication
 - Determining communication barriers

Commercial Masonry

This one-credit course is designed to provide students with the fundamental knowledge and skills for this area of the construction industry. Emphasis is placed on job safety, blueprint interpretation, foundations and piers, wall construction and bonding, and estimation of material and supplies needed for commercial masonry project completion.

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Safety

Students will:

1. Apply safety rules, regulations, and procedures for commercial masonry construction.

Blueprint and Layout

2. Interpret blueprints used for commercial construction.
3. Use module and spacing scales for commercial masonry construction.

Foundations

4. Construct various foundations, including loading walls, piers, and pilasters.

Walls

5. Construct 8-inch block walls used in commercial construction.
6. Construct partition walls used in commercial construction.
7. Construct decorative walls used in commercial construction.
Examples: broken face, fluted block

Wall Bonding

8. Construct commercial walls using various wall bonding materials.
Examples: ties, anchors, drywall, stucco

Estimation

9. Determine materials and supplies needed for a commercial masonry project.

Commercial Refrigeration

This one-credit course introduces students to different types of commercial refrigeration equipment such as coolers, ice machines, freezers, and some specialty equipment. Students demonstrate skills used in the service and installation of commercial refrigeration equipment, including mechanical skills, basic mathematics skills, appropriate communications skills, and high-level problem-solving skills. These skills enable students to read information, follow flow charts, and troubleshoot problems. Instruction in this course consists of both individual and group classroom and laboratory instruction with emphasis on advanced problem-solving activities. Upon completion of this course, students demonstrate skills used to service and install commercial refrigeration equipment.

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Students will:

1. Demonstrate safety rules, regulations, and procedures for commercial heating, ventilation, air-conditioning, and refrigeration (HVACR).
2. Determine the condition of electrical defrost systems utilized in commercial refrigeration.
3. Apply correct procedures for evacuation and charge of a commercial refrigeration system.
4. Demonstrate how to adjust high- and low-pressure controls of a commercial system.
5. Determine different types of condensers and evaporators used in commercial refrigeration systems.
6. Identify different types of metering devices used in commercial refrigeration systems.
7. Demonstrate the operation of service valves used in commercial refrigeration systems.
Examples: front-seat, mid-position, back-seat, ball-check
8. Apply skills necessary to pump down a commercial refrigeration system.
9. Determine oil pressure in a commercial refrigeration system.

Commercial Wiring

This one-credit course is designed to provide students with the fundamental knowledge and skills for this area of the construction industry. Students learn concepts related to distribution equipment, distribution system transformers, hazardous locations, load calculations for feeders and service, and standby and emergency systems. Upon successful completion of this course, students assist in wiring a commercial building with supervision.

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Safety

Students will:

1. Demonstrate safety procedures as recognized by governing agencies and approved industry standards when testing and replacing components or installing wiring.
Examples: lockout, tagout
2. Identify electrical hazards and how to avoid and minimize them in the workplace.

Distribution Equipment

3. Explain the purpose of switchgears in commercial wiring applications.
4. Describe construction, metering layouts, wiring requirements, and maintenance for switchgears.
5. Describe visual and mechanical inspections and electrical tests associated with low- and medium-voltage cables, busways, and instrumentation.
6. Describe the function of ground fault relay systems used in commercial wiring applications.

Distribution System Transformers

7. Describe the operation and function of Delta and Wye wired transformers.
8. Demonstrate connecting a multi-tap transformer to obtain required secondary voltage.
 - Connecting a control transformer for a given application
 - Calculating the power factor for a given circuit

Hazardous Locations

9. Identify various types of hazardous locations encountered by commercial electricians.
Example: proximity work, limited-access work
10. Select commercial wiring materials and methods for use in hazardous locations.
11. Demonstrate the installation of explosion-proof boxes and fittings as specified by National Electrical Code (NEC) requirements.

Load Calculations for Feeders and Service

12. Select feeder over-current protection devices for continuous and noncontinuous duty loads in commercial wiring applications.
13. Calculate electrical loads for a variety of commercial applications.
Examples: office building, marina, restaurant
14. Calculate motor loads on electrical feeder lines.

Standby and Emergency Systems

15. Describe various types of standby and emergency generators.
 - Describing operating principles of automatic and manual transfer switches

Commercial Electrical Service

16. Demonstrate the installation of a commercial service entrance and load center or panel board.

Composite Masonry Construction

This one-credit course is designed to provide students with the fundamental knowledge and skills for this area of the construction industry. Emphasis is placed on job safety, interpretation of blueprints, estimation of materials and supplies, and demonstration of construction applications.

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Orientation

Students will:

1. Identify career opportunities available in composite masonry construction.

Safety

2. Apply safety rules, regulations, and procedures relative to residential masonry construction.

Blueprint and Layout

3. Interpret blueprints for constructing combination walls.

Construction Application

4. Use modular measurements for 4-inch, 8-inch, and 12-inch block construction.
5. Demonstrate modular measurements in brick construction.
6. Construct hollow piers with brick and block combinations.
7. Construct combination block and brick walls using various patterns and bonds.
8. Construct decorative panels in a composite wall.
Examples: borders, projected and recessed panels, rowlocks

Estimation

9. Determine materials and supplies needed for a composite masonry project.

Computer Essentials

Computer Essentials is a 70-hour course designed for students in Grades 6, 7, or 8 who want to master basic skills in the areas of word processing, database management, spreadsheet applications, multimedia presentations, and Internet research. Reading, mathematics, and communication skills are reinforced throughout this course.

Computer Essentials may be offered as a component of a rotation course allowing students to explore different career fields. If a course contains 35-hour rotations, content standards 1, 3, 4, 5, 8, and 9 from Computer Essentials must be taught.

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Computer Basics

Students will:

1. Exhibit proper use of basic computer components, including hardware, operating systems, software, file management, and network functions.
2. Demonstrate correct procedures for basic computer and printer maintenance, including routine hardware and software problem solving.
Examples: changing printer cartridge, replenishing paper, scanning disk, defragmenting disk, clearing paper jam

Software Application

3. Demonstrate correct data input techniques with acceptable speed and accuracy.
Example: touch method
4. Utilize word processing skills, including creating page layout, proofreading, editing, printing, and saving.
5. Use spreadsheet software to create, save, open, edit, and print a workbook or worksheet.
 - Utilizing formulas for problem solving applicable to a spreadsheet
 - Creating charts to interpret spreadsheet data
6. Create a database file.
Examples: tables, reports, forms, queries
7. Demonstrate procedures for creating, saving, retrieving, and delivering multimedia presentations.

8. Demonstrate use of the Internet in business.
Examples: research, travel, correspondence, advertisement
 - Identifying misuses of the Internet in business
Examples: slamming, spamming, flaming

Career Opportunities

9. Utilize research results to determine career and entrepreneurial opportunities, responsibilities, and educational and credentialing requirements in entry-level information technology professions.

Technology

10. Analyze information technology for its impact on society.

Ethics

11. Describe ethical considerations resulting from technological advances.
Examples: hacking, privacy, restricted sites, copyright and intellectual property rights, viruses, consequences, misuse

Computer Management and Support

Computer Management and Support is a one-credit course that provides students with skills necessary to manage a stand-alone computer on a home network. Topics in this course include computer hardware, computer operating systems, network architecture, network protocols, career opportunities, and network design and security.

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Computer Hardware

Students will:

1. Explain functions of personal computer (PC) hardware components and peripheral devices.
2. Demonstrate procedures for installing a printer to a personal or home computer.
3. Apply procedures for computer optimization, including performing scandisk, performing disk defragmentation, installing random access memory (RAM), and installing and uninstalling programs.
 - Identifying the startup process and other service management components
 - Analyzing disk space for availability
4. Analyze disk space for availability.

Operating Systems

5. Discuss the evolution of computer operating systems.
 - Comparing capabilities and limitations of various computer operating systems
6. Utilize research results to analyze new and emerging operating systems for optimization.
7. Determine procedures for downloading and uploading files to external devices.
8. Utilize file structures to create folders and copy and move files.
9. Demonstrate password, user rights, and folder privileges on a personal computer.
10. Evaluate virus safeguards, firewalls, and security on a personal computer.

Network Architecture

11. Compare types of networks, including copper, fiber-optic, and wireless.
12. Utilize technical research materials to determine the process for customizing user interface on a personal or home computer.
Examples: desktop setup, monitor configuration
13. Identify functions of a protocol.
14. Determine a network address for verifying network connectivity.
15. Determine troubleshooting procedures for problems pertaining to limited or no network connectivity.
16. Compare a variety of network designs, including local area networks (LANs) and wide area networks (WANs).
17. Apply the procedure for constructing a LAN for home use, including selecting network devices and configuring a home network.
18. Configure Internet and e-mail settings.

Career Opportunities

19. Determine career and entrepreneurial opportunities, responsibilities, and educational and credentialing requirements related to computer maintenance and home networking.

Computer-Aided Design and Computer-Aided Manufacturing I

Computer-Aided Design and Computer-Aided Manufacturing (CAD-CAM) I is a one-credit course that provides an introduction to manufacturing processes and job opportunities for students who are pursuing careers in manufacturing. Students use critical-thinking skills and principles of science, mathematics, and safety. This entry level course may be taken in the Manufacturing cluster. Students who choose to enter the Manufacturing cluster must meet academic goals and expectations of business and industry. Topics include CAD-CAM safety, mathematics concepts, computer proficiency, programming CAM software, manufacturing of parts, and creating a two-dimensional design.

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Safety

Students will:

1. Apply safety rules, regulations, and procedures for CAD-CAM equipment.

Advanced Mathematics

2. Practice mathematics skills, including calculating sine, cosine, and tangent, related to precision machining.
3. Demonstrate the use of software for CAD-CAM applications.
4. Demonstrate file management techniques with the CAM program, including creating a folder, saving a file to an existing folder, retrieving a file from an existing folder, and editing a file.
5. Create a two-dimensional design for a mill or lathe and a two-dimensional numeric control operation tool path for a mill or a lathe.
 - Interfacing with the display screen
 - Utilizing frequently used menus and hot keys
 - Analyzing various tools displayed on the status menu
 - Generating a G and M code with a post processor
 - Editing a G and M code from the post processor
6. Construct a specified part using CAD-CAM applications.
 - Utilizing work-holding devices to locate part features
 - Utilizing established manual machining techniques
 - Producing close-tolerance work

Computer-Aided Design and Computer-Aided Manufacturing II

Computer-Aided Design and Computer-Aided Manufacturing (CAD-CAM) II is a one-credit course that provides an introduction to manufacturing processes and job opportunities for students who are pursuing careers in manufacturing. Students use critical-thinking skills and principles of science, mathematics, and safety. This entry-level course may be taken in the Manufacturing cluster. Students who choose to enter the Manufacturing cluster must meet academic goals and expectations of business and industry. Topics include CAD-CAM safety, advanced mathematics concepts, CAD-CAM project development, computer numerical control (CNC) mill and lathe procedures, three-dimensional tool path operations, and verification.

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Safety

Students will:

1. Apply safety rules, regulations, and procedures related to precision machining.
2. Demonstrate skills in mathematics concepts related to precision machining in CAD-CAM programming.

Advanced Mathematics

3. Demonstrate computer proficiency with advanced CNC and CAD programs.
4. Demonstrate file management techniques within a CAD-CAM program.
5. Demonstrate CNC mill procedures utilizing CAD-CAM software.
6. Demonstrate the development of parts using the CAD-CAM program.
7. Demonstrate CNC lathe procedures utilizing CAD-CAM software.
8. Demonstrate the creation and management of a three-dimensional numeric control operation tool path for a lathe.
9. Verify tool paths through simulation on the CNC machining center.

Construction Finishing and Interior Systems

Construction Finishing and Interior Systems is a one-credit course designed to facilitate student understanding of the finishing phase of a structure. Students become familiar with the exterior and interior finishing of a structure. Topics include career opportunities, safety, windows, doors, plumbing, electrical wiring, insulation, wall coverings, storage, and finishes.

Content standards for this course are not intended to serve as the entire curriculum. Teachers are encouraged to expand the curriculum beyond the limits of these content standards to accommodate specific community interests and utilize local resources. This course encourages critical thinking, use of the scientific method, integration of technology, development of student leadership skills, and application of knowledge and skills related to practical questions and problems. Safety concepts are integrated into instruction to the maximum extent possible.

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Career Opportunities

Student will:

1. Describe career opportunities associated with construction finishing.
Examples: construction foreman, painter, carpenter, plumber, electrician

Safety

2. Demonstrate job site safety in the finishing phase of construction.

Windows and Doors

3. Demonstrate the installation of a window in a structure.
 - Identifying various types of windows
Examples: casement, storm, fixed, sliding, double-hung
4. Demonstrate the installation of a door in a structure.
 - Identifying various types of materials used for door construction
Examples: wood, metal, fiberglass
 - Identifying types of doors
Examples: interior, exterior, bi-fold, swinging, sliding
 - Identifying types of thresholds used with exterior doors
 - Installing door hardware
Examples: hinges, locksets, dead bolt locks

Plumbing

5. Design water supply and sewage drainage systems for a structure.
 - Identifying tools used in plumbing
Examples: pipe cutter, pipe wrench, torch, tubing cutter
 - Explaining the selection of specific types of pipe used in plumbing
Examples: steel, copper, polyvinyl chloride (PVC), chlorinated polyvinyl chloride (CPVC), acrylonitrile butadiene styrene (ABS)
 - Explaining the selection of proper fittings for joining various kinds of pipe

Electrical

6. Analyze components needed for wiring a structure.
Examples: power source, wire, connector, circuit breaker, switch, receptacle
 - Identifying tools used for electrical wiring
Examples: wire strippers, wire cutters, lineman's pliers, screwdrivers, test meter
 - Describing how national and local electrical codes affect the wiring of structures
 - Illustrating the use of electrical terms and symbols in electrical diagrams
Examples: alternating current (AC), direct current (DC), voltage, amperage, switch, receptacle, light
7. Demonstrate techniques for making electrical splices and connections for a single-pole switch with light, three-way switch with light, and a duplex receptacle.
 - Utilizing ground fault circuit interrupters where required by code

Insulation

8. Identify criteria for selecting insulating materials for structures.
Examples: resistance-value (R-value), cost, durability
9. Describe procedures for installing various insulating materials for structures.

Exterior and Interior Wall Coverings

10. Demonstrate the installation of exterior and interior wall coverings for structures.
 - Differentiating among types of exterior wall coverings for structures
Examples: wood, vinyl, masonry, metal
 - Differentiating among types of interior wall coverings for structures
Examples: wood, drywall, paneling

Interior Storage

11. Identify materials, hardware, and fasteners used in cabinet construction.
12. Demonstrate the construction of storage units in structures.
 - Designing base- and wall-hung storage units
 - Determining countertop materials for storage units
 - Installing plumbing fixtures
 - Installing shelving

Finishes

13. Identify various finishes for exterior surfaces.
14. Apply finishes to interior surfaces.
 - Examples: paints, lacquers, varnishes, stains, preservatives
 - Preparing interior surfaces for finishing
 - Identifying types of application methods for finishes
 - Examples: pneumatic application, natural bristle brushes, synthetic bristle brushes

Construction Framing

Construction Framing is a one-credit course designed to provide students with an understanding of the framing phase of a structure, including framing components. Topics include career opportunities, safety, lumber, material estimation, floor systems, wall framing, ceiling framing, stair construction, roof framing, and roof materials in various structures.

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Career Opportunities

Student will:

1. Compare various career opportunities associated with frame construction.
Examples: engineer, construction foreman, carpenter

Safety

2. Demonstrate job site safety in frame construction.

Grades and Types of Lumber

3. Compare applications of hardwood and softwood lumber used in framing structures.
 - Identifying grades of lumber
Examples: appearance grade, timber grade, dimension grade
 - Identifying defects that affect lumber grade
Examples: knot, wane, split, check, warp

Estimating Materials

4. Calculate a bill of materials for the framing of a wood structure.

Floor Systems

5. Compare advantages of concrete flooring systems and wood flooring systems.
6. Design a floor framing system for a structure.
 - Describing the purpose of a sill used in structures
 - Demonstrating the layout of joist headers and floor joists used in structures
 - Contrasting various subfloor materials used in structures
Examples: tongue and groove plywood, plywood, oriented strand board, shiplap boards
 - Demonstrating the installation of a subfloor for a structure

Wall Framing

7. Design a wall framing system for a structure.
 - Comparing the use of wood and metal wall framing components
 - Describing the use of a soleplate in structures
 - Demonstrating the construction of corner posts with and without blocking
 - Demonstrating the use and installation of full, cripple, and trimmer studs
 - Demonstrating the installation of a double top plate in structures
 - Demonstrating the installation of rough openings for doors and windows, including headers
 - Demonstrating techniques for bracing a wall
8. Compare various wall sheathing materials for structures.
Examples: foam board, oriented strand board, insulating board, plywood
9. Explain the importance of vapor barriers used in wall framing.
 - Comparing advantages of using plastic and building felt as vapor barriers in walls

Ceiling Framing

10. Design a ceiling framing system for a structure.
 - Demonstrating the installation of ceiling joists
 - Explaining the use of headers in two-story structures
 - Demonstrating the installation of rough openings for stairs, attic access, and chimneys

Stair Construction

11. Identify types of stairs used in structures.
 - Comparing materials used in stair construction
 - Calculating the total rise, number and size of risers, and treads for a stairway
12. Demonstrate the procedure for laying out and cutting stringers for stair construction.
13. Demonstrate the procedure for installing handrails to stairs.

Roof Framing

14. Identify types of roofs used on structures.
Examples: hip, gable, gambrel, shed
15. Compare conventional and truss roof systems for structures.
 - Laying out common, hip, and valley rafters
 - Laying out a truss using a framing square
 - Demonstrating the installation of rough openings for vents, skylights, and chimneys
16. Compare various decking materials for roof systems.
Examples: tongue and groove plywood, plywood, oriented strand board

Roofing Materials

17. Describe types of materials used for roof systems.
Examples: felt, shingles, metal roofing, roll roofing
18. Demonstrate the installation of roofing materials.

Construction Site Preparation and Foundations

Construction Site Preparation and Foundations is a one-credit course designed to facilitate student understanding of the first phases of construction, including types of structures and their uses. Topics include career opportunities, safety, planning, location, layout, concrete and masonry, and foundations of various structures.

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Career Opportunities

Students will:

1. Identify career opportunities in the construction industry.
Examples: draftsman, engineer, construction foreman, carpenter, concrete finisher, plumber, electrician

Safety

2. Demonstrate job site safety concepts required for site preparation and foundation construction.
Examples: personal protection equipment, hand tool safety, power tool safety, electrical safety

Planning Structures

3. Demonstrate the mechanical drawing process used in designing structures.
 - Identifying various mechanical drawing components
Examples: symbols, dimension lines, extension lines, hidden lines, object lines, center lines, lettering
4. Explain local building codes affecting the construction of buildings.
5. Calculate equipment and work space requirements for structures.
6. Identify factors in selecting building materials used in structures.
Examples: cost, availability, suitability

7. Formulate a bill of materials for a specific structure.
Examples: concrete, lumber, fasteners, roofing materials, hardware, electrical supplies, plumbing supplies

Structure Location

8. Identify positive characteristics of a building site.
Examples: proper drainage, location, orientation
9. Explain the importance of conducting property surveys for structures, including the location of property and setback lines.

Structure Layout

10. Demonstrate building layout procedures for a specific structure.
Examples: staking, squaring, constructing batter boards, leveling

Foundations

11. Explain how to lay out and construct pier, edge, and footing forms.
12. Describe the use of concrete reinforcements in structures.

Concrete and Masonry

13. Demonstrate the use of concrete and masonry tools in construction.
14. Demonstrate the process of mixing concrete.
 - Estimating the amount of concrete needed for a project
 - Applying various finishing techniques used with concrete
15. Demonstrate the process of laying block.
 - Estimating the number of concrete blocks needed for a project

Consumer Services I

Consumer Services I is a one-credit course that includes content to help students learn ways to provide services to consumers. Major course are types of consumer services, career options, roles and functions of individuals engaged in consumer services, advocacy, financial services, economic systems, financial planning process, consumer credit, investments, savings, risk management, life transitions, estate planning, financial management plan, product development, product information, market research, current trends in the housing industry, factors affecting housing choice, special housing needs, types of housing, renting or owning a home, lease agreements, factors to consider when matching clients with homes, transportation options and costs, costs of insurance, and technology.

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Consumer Services

Student will:

1. Describe education and training requirements for careers in the field of consumer services.
2. Determine roles and functions of individuals engaged in consumer services careers.
3. Communicate to clients the names of agencies that provide services and protection for consumers.
Examples: private, public, government, education
 - Determining the role of media in consumer advocacy
4. Assess ways technology impacts consumers and consumer services.

Financial Services

5. Evaluate types of financial services and benefits that meet client consumer services needs.
Examples: checking and savings accounts, loans, automated teller machines (ATMs), online banking, cash advances
6. Analyze different types of savings accounts and investment programs offered by financial institutions to meet client needs.
 - Explaining benefits of compound and simple interest
 - Describing annual percentage rate (APR) and annual percentage yield (APY)
 - Comparing money markets and mutual funds
7. Explain the cost of using credit.
Examples: interest, late fee, annual fee

8. Describe factors of the economic system that impact consumers and business organizations.
Examples: scarcity, supply and demand, inflation, interest rates
9. Determine life transitions that influence finances for individuals and families.
Examples: new job, relocation, loss of income, health problems, marriage, death, divorce, alimony, child support, birth, adoption
10. Explain the importance of consumer budgeting, including creating, implementing, and revising the budget.
11. Explain tax liability requirements on income for individuals and families.
Examples: property, inheritance, earned income
12. Describe the financial planning process.
 - Comparing needs, wants, values, goals, and economic resources
 - Determining effects of risk-management strategies
 - Assessing the role of estate planning

Product Development and Marketing

13. Analyze the process of product development.
 - Identifying the pricing of goods and services
 - Explaining the value of market research for product development
 - Interpreting the impact of consumer trends on product development
14. Compare sales techniques used in selling goods and services.
15. Describe the impact of making wise consumer decisions.
Examples: selective shopping, comparative shopping
16. Evaluate market research to determine consumer trends and product development needs.
17. Compare features, prices, product information, styles, and performance of consumer goods for product development and marketing.

Real Estate Services

18. Determine housing options and factors influencing housing choices for individuals and families.
Examples: renting, purchasing, leasing-to-own
 - Assessing current trends in society that affect the housing industryExamples: special needs, location, cost, dwelling options, refinancing
19. Describe services provided by a real estate broker and agent.

Transportation Services

20. Determine factors that influence consumer choices for transportation in the marketplace.

Consumer Services II

Consumer Services II is a one-credit course. The prerequisite for this course is Consumer Services I. The course includes content that helps students learn ways to provide services to consumers and focuses on the relationship with the client. Major topics are types of advocacy services, protection laws for consumers, consumer educational and promotional materials, consumer fraud, investment options for clients, risk management, consumer credit ratings, fraudulent practices, financial management planning, product analysis and testing, sales techniques, real estate services when buying and selling a home, property value assessment, home financing options, and transportation options and costs.

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Advocate Services

Students will:

1. Determine types of advocate services available to individuals and families.
Examples: children, advisory council, disability, senior adult, parental, spousal, family, consumer
2. Evaluate contributions of policy makers that affect manufacturers' guidelines on advocacy.
3. Assess strategies that enable consumers to become advocates.
4. Analyze effects of protection laws for consumers in the marketplace.
Examples: Consumer Product Safety Commission (CPSC), National Safety Council (NSC)
5. Critique educational and promotional materials used by consumer advocates.
6. Determine strategies to reduce the risk of consumer fraud in the marketplace.

Financial Services

7. Analyze investment strategies used by a personal financial planner.
 - Creating a retirement and an estate plan
 - Explaining benefits and risks of the stock market
8. Evaluate types of insurance available to individuals and families.

9. Explain how to maintain a good credit rating.
 - Identifying information needed for a credit report
 - Classifying the three main credit reporting agencies
 - Interpreting a credit score
 - Analyzing consequences of bad credit
 - Identifying ways to avoid identity theft
10. Determine types of deceptive and fraudulent practices associated with financial transactions, including pyramid schemers, medical fraud, deceptive infomercials, and Internet and telemarketing fraud.
11. Determine financial resources to meet needs and wants of individuals and families in the various stages of the life span.
12. Describe the use of technology in managing resources, purchasing products, and obtaining consumer information on goods and services.

Product Development and Marketing

13. Compare features of products to determine product effectiveness.
Examples: household products, vehicles, technological products, food
14. Compare sales techniques used in marketing products.
 - Testing products to determine product effectivenessExamples: stain removal products, paper products
15. Apply statistical analysis to interpret, summarize, and analyze consumer data.
Examples: Statistical Analysis Software (SAS), Statistical Package for the Social Sciences (SPSS), Analysis of Variance (ANOVA), t-test

Real Estate Services

16. Determine transactions and procedures used by real estate agents or brokers to provide services to consumers.
17. Determine procedures used to assess property value.
18. Describe costs a homeowner incurs when purchasing or selling a home.
Examples: closing cost, property survey, insurance, escrow accounts, homeowner insurance, maintenance fees, property taxes, homeowner association fees

Transportation Services

19. Determine transportation choices and costs available to consumers.

Cooperative Education Seminar

Cooperative Education Seminar is a required component of the Cooperative Education work-based experience. Students enrolled in cooperative education programs are required to participate in the seminar one class period per week.

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Career Development and Employability Skills

Students will:

1. Identify components required for a career portfolio.
 - Demonstrating the ability to create or update a career portfolio
Examples: work evaluations, completed job or college applications, work samples
2. Demonstrate skills related to preparation for job opportunities.
Examples: résumé, employment letter, interview skills
3. Apply employment skills necessary to obtain and maintain jobs.
Example: exhibiting positive work attitudes and behaviors

Ethics and Social Responsibility

4. Apply ethical behavior in the workplace.
 - Critiquing workplace issues, including conflict resolution, diversity, attendance, and interpersonal skills
5. Distinguish ethical from unethical actions in the workplace.
6. Identify employment laws and regulations.
Examples: local, state, federal laws and regulations
 - Recognizing specific work-related rules and regulations

Personal Finance

7. Demonstrate skills needed in managing personal finances, including maintaining personal checking and savings accounts, evaluating available credit sources, and preparing state and federal income tax forms.

Leadership and Teamwork

8. Demonstrate leadership and teamwork skills through participation in career and technical education student organization (CTSO) activities.
Examples: setting goals; conducting meetings; chairing committees; participating in conferences, workshops, competitions, and civic and community service activities

Technical Foundation Skills

9. Explain skills required for success in a specific career.
 - Applying relevant mathematics and communication skills in the workplace
 - Identifying opportunities for continuous learning and advancement in the workplace
10. Demonstrate job skills as listed on a personal training plan.
 - Performing job skills to industry standards
11. Demonstrate workplace safety practices.
12. Use correct procedures for maintaining records related to employment.
 - Submitting documentation of required reports, including wage and hour report and work schedules
13. Relate work-based learning experiences to a personal career objective or pathway.
14. Demonstrate skills necessary to obtain a business and industry-recognized work-readiness credential.

Coordinate Measuring Machine

Coordinate Measuring Machine is a one-credit course that provides an introduction to manufacturing processes and job opportunities for students who are pursuing careers in manufacturing. Students use critical-thinking skills and principles of science, mathematics, and safety. This entry-level course may be taken in the Manufacturing cluster. Students who choose to enter the Manufacturing cluster must meet academic goals and expectations of business and industry. Topics include care and safety, setup, analysis of data, and demonstration of proper procedures to inspect parts.

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Safety

Students will:

1. Apply safety rules, regulations, and procedures when operating a coordinate measuring machine (CMM).
2. Demonstrate care of the CMM.
 - Explaining parts of the CMM
 - Locating software applications within the CMM
3. Demonstrate file management techniques within the CMM, including creating a folder, saving a file to an existing folder, retrieving a file from an existing folder or storage system, editing a file, and printing an inspection report.

Operations

4. Differentiate among parts of the CMM.
5. Compare the machine coordinate system and the part coordinate system.
6. Demonstrate alignments on a specified part to be measured by a CMM.
7. Demonstrate datums on a specified part to be measured by a CMM.
8. Demonstrate translations on a specified part to be measured by a CMM.
9. Demonstrate rotations on a specified part to be measured by a CMM.
10. Demonstrate tip compensation for a specified part when using a CMM.
11. Utilize construction features for a specified part when using a CMM.
12. Interpret projections for a specified part when using a CMM.

13. Demonstrate the collection of inspection data, including measuring a point, line, circle, and plan on a specified part.
14. Interpret CMM inspection reports.
 - Analyzing data contained in the inspection report
 - Explaining the machined part, process, or achievement in a brief report

Creative Arts

Creative Arts is a half-credit course designed for students who are interested in acquiring knowledge and skills in art production and design in the areas of culinary arts, fashion design, graphic design, industrial design, and interior design. Course content provides opportunities for students to explore ways to use materials and supplies safely, to produce artwork, to apply the elements and principles of design to works of art, to study cultural and historical time periods, and to become more aware of how art relates to their daily lives.

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Produce

Students will:

1. Create original works of art from direct observation.
 - Organizing spatial relationships utilizing linear and atmospheric perspective
Examples: photo montage, furniture arrangement
 - Creating the illusion of three-dimensional forms through tonal rendering
Examples: sketching a floor plan, creating a diorama from a floor plan
 - Incorporating traditional categories of subject matter into original works of art
Examples: designing a patchwork quilt, creating a landscape design
2. Create original works of art using reflective ideas, personal experiences, and imaginary content.
Example: create a family or personal collage
3. Apply steps artists use in the production of art, including conceptualizing ideas and forms, refining ideas and forms, and reflecting on and evaluating both the process of production and the product.
4. Apply elements of art and principles of design to the production of two- and three-dimensional artwork.
Examples: two-dimensional—sketching clothing
three-dimensional—designing clothing
5. Demonstrate use of traditional, digital, and multimedia techniques to create works of art.
Examples: two-dimensional—creating an interior design or fashion design timeline, designing an advertisement for a food product
three-dimensional—creating a cookbook, creating a window covering
digital—creating a video for prevention of at-risk behaviors
6. Incorporate various subjects, ideas, and symbols from daily life as subject matter for artwork in the appropriate design field.
Examples: designing fabric silhouettes, motifs, rubbings

7. Demonstrate safe and responsible handling of art materials, including cleanup, storage, and replenishment of supplies where applicable.
 - Identifying safety and environmental regulations

Respond

8. Describe personal, sensory, emotional, and intellectual responses to visual qualities of a work of art.
Examples: critiquing display windows, critiquing architectural and landscape designs
9. Evaluate selected works of art to determine effectiveness of organization.
 - Describing the subject matter, elements of art, principles of design, media, technique, and style used in selected works of art
Examples: presentation board, consumer advertising, designer line of clothes
 - Analyzing the formal organization of subject matter, elements of art, and principles of design in selected works of art to determine structural relationships
 - Interpreting expressive intentions and purposes in selected works of art
Examples: designing jewelry, creating a woven wall hanging
 - Describing the effectiveness of expressive and meaningful communication in selected works of art
Example: creating an advertisement for a product
 - Identifying aesthetic components and formal qualities in man-made and natural objects
Examples: comparing Paul Cézanne's *Astonishing Apples* painting to apples, comparing Paul Poiret's fashions to current lines of fashion
10. Compare works of art with functional and natural objects, aesthetic components, and formal qualities.
Examples: stylized lines in furniture; shapes and forms of appliances; shape, line, form, volume, and color of an apple

Understand

11. Utilize specialized terminology from art history, aesthetics, criticism, and production in discussions of works of art.
 - Defining visual arts terminology, including elements of art and principles of design
 - Describing intrinsic qualities of a work of art
Example: comparing handmade furniture to factor-made furniture

12. Describe historical themes, symbols, and styles associated with works of art from various cultures, times, and places, including major periods and movements.
- Identifying the style associated with selected works of major artists
Examples: Frank Lloyd Wright—organic architecture
Ray Halston Frowick—pillbox hat
Ludwig Mies van der Rohe—Barcelona chair
 - Describing extrinsic context qualities of a work of art
Examples: optical color mixing theory—newspaper images, television resolution
 - Using digital processes or media to identify symbols and styles associated with works of art from various periods
Examples: using the Internet to view, collect, or find examples of art and architecture in fashion and interior design industries

Technology and Careers

13. Analyze ways technological and scientific advances in the arts and other disciplines, including humanities, sciences, and mathematics, determine the influence of the creation of artwork and products in an appropriate design field.
Example: silk screen prints
14. Utilize technology to create artwork and products in an appropriate design field.
15. Analyze careers to determine options and entrepreneurial opportunities related to the world of art, art design, and the appropriate design field.

Creative Floral Design

Creative Floral Design is a one-credit course designed to inspire students to use creative capabilities in the floriculture industry. Topics include career opportunities, safety, design mechanics, floral designs, creative designing, and visual marketing.

Content standards for this course are not intended to serve as the entire curriculum. Teachers are encouraged to expand the curriculum beyond the limits of these content standards to accommodate specific community interests and utilize local resources. This course encourages critical thinking, use of the scientific method, integration of technology, development of student leadership skills, and application of knowledge and skills related to practical questions and problems. Safety concepts are integrated into instruction to the maximum extent possible.

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Career Opportunities

Students will:

1. Describe careers in creative floral design.
2. Identify professional florist associations.

Safety

3. Apply safety precautions involved in creative floral design.

Design Mechanics

4. Demonstrate the use of design mechanics in creative floral designs.
Examples: wiring and taping techniques, interpreting progressive color theory, analyzing floral design forms

Floral Designs

5. Demonstrate design techniques used in creating contemporary arrangements, including basing, clustering, pillowing, layering, bundling, and wrapping.
6. Design abstract and interpretive arrangements using both natural and man-made materials.
7. Create period designs, including southwest, colonial, country, oriental, and European.

Creative Designing

8. Describe factors involved with balloon decorating.
 - Creating symmetrical and asymmetrical balloon designs
9. Create tabletop floral arrangements for special events.
10. Construct various specialty arrangements, including dish gardens, topiaries, jardinières, and *pot-de-fleur*.
11. Demonstrate the ability to dry and preserve flowers and foliage.
 - Designing a dried flower arrangement
12. Identify various types of permanent flowers.
Examples: silk, plastic, paper

Visual Marketing

13. Create window and in-store displays, including radiation, step, pyramid, and zigzag designs.
 - Critiquing window displays for visual balance, harmony, lighting, and aesthetics

Culinary Arts I

Culinary Arts I is a one-credit course. The prerequisite for this course is Hospitality and Tourism. Culinary Arts I introduces students to basic food production, management, and service activities in both the back- and front-of-the-house. Emphasis is placed on sanitation, safety, and basic food preparation. Skills in mathematics, science, and communication are reinforced in this course. The required school-based laboratory for the Hospitality and Tourism cluster is a commercial food service kitchen with a food-serving and dining area. School-based laboratory experiences are essential for students to develop skills in the hospitality and tourism industry.

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Food Service and Hospitality Business Practices

Students will:

1. Determine personnel and fiscal management factors related to the food service and hospitality industries.
Examples: personnel—staffing, supervising, scheduling, setting goals, determining policies and procedures
fiscal—budgeting, keeping records, controlling inventory, receiving food products, purchasing
 - Explaining liability laws regarding property management
 - Identifying customer service, public relations, and promotion programs as marketing strategies for the food service and hospitality industries
2. Create a business plan for a food service establishment.
3. Describe the importance of planning, coordinating, and supervising production in the food laboratory.
4. Identify credentialing requirements for the food service and hospitality industries.

Safety, Health, and Environment

5. Outline compliance requirements for sanitation and health inspections, including proper appearance and hygiene, use of protective gloves and clothing, correct food handling techniques, and correct use of knives and kitchen equipment.
6. Explain procedures for maintaining a safe work area, including first aid and cardiopulmonary resuscitation (CPR), types of fires and containment procedures, fire evacuation procedures, proper lifting and carrying procedures, electric and mechanical hazards, and procedures for reporting accidents.

Menus

7. Design various menus based on supply and demand, including the use of cycle and computer-based menu skills.
8. Demonstrate cost control measures when setting menu prices for food.
9. Identify factors to be considered when planning menus, including current food trends, nutritional information, and availability of seasonal and regional foods.
 - Calculating as purchased (AP) and edible portion (EP) amounts

Food Preparation

10. Define food preparation and service terms, including kitchen brigade titles, salamander, lowboy, hot station, and china cap.
11. Apply basic industrial cooking techniques, including using scales; determining recipe yields; applying mise-en-place; using spices and herbs; and utilizing dry, moist, and combination heat methods.
12. Evaluate quality of food products, including taste, texture, aroma, and appearance.
13. Prepare grade manager, main entrees, stocks, soups, sauces, gravies, and baked products and desserts.
 - Examples: grade manager—salads; emulsified salad dressings; hors d’oeuvres; closed, open-faced, grilled, and fried sandwiches
 - main entrees—egg dishes, milk products, cheese, fruit, vegetables, pasta, grains, cereals, rice, legumes, vegetarian items, beef, poultry, seafood, game dishes
 - stocks—bouquet garni, mirepoix, sachet de piece, white, brown, fish, vegetable
 - soups—clear, thick, specialty
 - sauces—espagnole, béchamel, roux, tomato, hollandaise, velouté
 - gravies—reconstituted broken sauces
 - baked products and desserts—pancakes, crêpes, waffles, yeast products, cookies, cakes, glazed icings, pies, pastries, meringues, custards, chiffon fillings, candies, poached fruits, mousses, soufflés, pastry creams, Bavarian creams
14. Determine procedures for setting up rooms for special occasions and various styles of food.
15. Evaluate the applicability of convenience food items in various menus.
16. Compare different methods of heat transfer in food preparation.
 - Examples: convection, conduction, radiant heat, microwave
17. Analyze ways the nutritive value of food is altered by time, water, preparation, cooking, and storage.

Food Presentation

18. Demonstrate effective food presentation techniques, including plating, portioning, garnishing, and packaging.

Banquet and Catering Service

19. Demonstrate procedures used to plan, prepare, and provide banquet and catering services.
20. Evaluate equipment and procedures used for packing and transporting food, utensils, and equipment for catering.

Culinary Arts II

Culinary Arts II is a one-credit course. The prerequisite for this course is Culinary Arts I. Culinary Arts II provides advanced experiences in food production, management, and service. Topics include food service operations, advanced food production, and professionalism. Skills in mathematics, communication, creative thinking, and entrepreneurship are reinforced in this course. The required school-based laboratory for the Hospitality and Tourism cluster is a commercial food service kitchen with a food-serving and dining area. School-based laboratory experiences are essential for students to develop skills in the hospitality and tourism industry.

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Food Service Operations

Students will:

1. Exhibit skills related to property, personnel, and fiscal management in the food service and hospitality industries.
Examples: determining need for repairs and maintenance; following current laws and environmental regulations; determining staffing procedures; controlling food, labor, and culinary equipment costs; evaluating a business plan
 - Critiquing strategies for marketing products in the food service and hospitality industries
2. Evaluate the physical plant of a food services business for efficiency, safety, productivity, and profitability.
Examples: location and layout design
 - Developing a reconfiguration plan for an existing facility with possibilities for a food service and hospitality business
3. Use technology in the preparation and service of food and beverages and the management of a food establishment.

Advanced Culinary Food Production

4. Set production standards for a catering event.
5. Prepare a market order for food and consumable supplies for a food laboratory project.
6. Apply principles and elements of design to increase aesthetics and profitability of a culinary setting.

7. Plan artistic food displays for serving lines, including buffets, soup and salad bars, and special events.
8. Demonstrate the use of advanced cutting tools and techniques in a culinary setting.
9. Compare fresh and dry herbs and spices for their effects on flavor, nutrition, and shelf life.
10. Prepare appropriate accompaniments for selected entrees.
11. Prepare meals for special dietary needs.
12. Apply principles of meat identification and fabrication, including beef, poultry, and fish.
13. Apply principles of advanced pastry production.
14. Describe the history and cultural development of various cuisines.
15. Prepare foods from national and international cuisines.
16. Prepare food items for special occasions.

Food Entrepreneurship

17. Design an entrepreneurial project for the food services and hospitality industries, including location, type of facility, and budget.
Example: private catering business

Professionalism

18. Determine the importance of participating in professional organizations in the food service and hospitality industries.
19. Compare apprenticeship programs and credentialing options available in the food service and hospitality industries.

Custom Tailoring

Custom Tailoring is a one-credit course. The prerequisite for this course is Tailoring. Course content provides opportunities for students to explore custom fashion and pattern making, garment alterations and adjustments, elements of fashion, and careers related to the tailoring business.

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Custom Fashion and Pattern Making

Students will:

1. Create an original design for a garment according to professional standards.
2. Create a garment pattern in muslin.
 - Analyzing a garment pattern of muslin for fit and proportion
3. Compare techniques for pattern making.
 - Interpreting pattern marking symbols
4. Compare basic sewing techniques practiced in haute couture houses around the world.
5. Demonstrate couture garment construction by using couture techniques.
Examples: hand stitches, seam types, pocket construction, pressing, hemming, embellishments
6. Compare couture and expensive ready-to-wear garments to determine differences in construction and quality.
7. Analyze types and uses of closures for garments.
Examples: zippers, buttonholes
8. Analyze pattern layout procedures required for special fabrics.
9. Compare detailing options for traditional and contemporary garments.

Garment Alterations and Adjustments

10. Determine alterations that solve fitting problems for customers with special needs.

Elements of Fashion

11. Demonstrate various sewing techniques used in the tailoring industry.
Examples: interfacing, twill taping, lining, chest and shoulder shaping, set-in sleeves
 - Describing characteristics of types of fabrics
12. Analyze a creative fashion design to determine designer concept, technique, and style.
13. Trace the history of tailoring, including the influence of trends, cultures, and technology.
14. Create a coordinated collection in muslin.
15. Determine appropriate computer-aided design (CAD) software for tailoring.

Business Practices

16. Describe personnel management policies and procedures necessary to operate a tailoring business.
17. Determine management policies and marketing services, including advertising needs used in a tailoring business.

Database Design I

Database Design I is a one-credit course designed to provide students with technical, analytical, and business skills that support the pursuit of professional careers and advanced study. Students learn the fundamentals of Structured Query Language (SQL) database technology, including creating, sorting, querying, and preparing reports.

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Software Development

Students will:

1. Explain the history of computing and database development.
2. Design conceptual and physical models to create databases.
3. Prepare visual and written documentation of a database model.
4. Compare SQL and basic select statements to determine results.
5. Evaluate system and software requirements to meet needs of a database.
6. Explain the restricting and sorting of data.
Examples: functions, average, minimum, maximum
7. Use basics of single row functions to query information in a database.
8. Explain steps of the software development process.
9. Design a database software application that includes mathematics.

Customer Service

10. Interpret an entity-relationship diagram (ERD) to match the business model.
11. Demonstrate different relationship types and transferability to match the business model.
12. Design an ERD for a business concept.
13. Implement the basic mapping of an ERD to meet customer needs.
14. Analyze quality assurance tasks to produce quality products.

Career Opportunities

15. Determine the nature of work, responsibilities, and educational and credentialing requirements related to entry-level database design career opportunities.

Database Design II

Database Design II is a one-credit course in which students implement an advanced Structured Query Language (SQL) database, including writing the code, performing testing, and debugging the database. The prerequisite for this course is Database I.

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Advanced Software Development

Students will:

1. Compare advanced SQL and basic select statements to determine results.
2. Explain functions and expressions in SQL to build a database.
3. Utilize research results to interpret and evaluate system and software requirements for an advanced database.
4. Demonstrate the restricting and sorting of data in tables.
5. Use basics of single row functions to perform an advanced query.
6. Design a simple software program following the development process using mathematics.
7. Use multi-row sub-queries to produce data.
8. Manage tables for database applications.
9. Implement an advanced database, including writing the code, performing testing, and debugging the database.
10. Apply software testing skills to produce quality assurance.

Customer Service

11. Design an advanced software application to meet customer needs.
12. Manage constraints to follow the business model.
13. Manage views to follow the business model.
14. Evaluate maintenance of object privileges to control user access.

Career Opportunities

15. Determine nature of work, responsibilities, and educational and credentialing requirements related to database design career opportunities.

Database Design III

Database Design III is a one-credit course designed to provide student learning through a project-based approach. Students analyze software packages, evaluate system and software requirements, implement an advanced database design project, and construct various kinds of conditional and iterative control statements. The prerequisite for this course is Database Design II.

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Customer Services

Students will:

1. Compare Structured Query Language (SQL) to other languages to determine needs of the client.
2. Analyze predefined software packages for uses and benefits.
3. Implement an advanced database design project.
4. Determine how to handle errors and utilize the troubleshooting process.

Advanced Software Development

5. Analyze declaring variables, SQL functions, and trapping exceptions to build an advanced database.
6. Construct different kinds of conditional and iterative control statements.
7. Use cursors in multiple rows of tables.
8. Demonstrate the use of stored procedures and functions.
9. Demonstrate the procedure for accessing objects in the data dictionary.
10. Utilize mathematics skills in evaluating system and software requirements for database designs.
11. Create Programming Language/Structured Query Language (PL/SQL) packages parts, including specification and body.
12. Describe procedures of creating database triggers.
13. Implement Data Management Language (DML) components as used with triggers.

14. Construct objects to meet program requirements.
15. Demonstrate steps of the software development process.
16. Demonstrate the use of large object (LOB) data types in a database design.
17. Describe implications of procedural dependencies.

Career Opportunities

18. Utilize research results to determine career and entrepreneurial opportunities, responsibilities, and educational and credentialing requirements in specialized database design.

Dental Assisting

Dental Assisting is a half-credit course that introduces students in Grades 10-12 to the dental profession. Course content specifies core knowledge and skills needed by workers in a dental office. The content emphasizes careers in dental care, the history and use of dentistry, infection control, and dental care procedures. Upon successful completion of this course, students may choose to continue studies in Advanced Health Seminar or Work-Based Experience Seminar. Foundations of Health Science is a prerequisite course.

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Dental Personnel

Students will:

1. Compare roles of the dentist, dental hygienist, and dental assistant.
2. Describe personal characteristics required in the dental workplace.
Examples: displaying positive attitudes, maintaining ethical behavior, adhering to dress code

Dental Laws

3. Demonstrate communication skills needed while counseling clients, documenting care, and communicating through various forms of electronic media.
4. Recognize state laws and regulations pertaining to dentistry.
Examples: confidentiality, patient information, legal rights

Dental Equipment

5. Demonstrate correct use of x-ray machines, dental instruments, dental chairs, and sterilizer equipment in the dental laboratory.
6. Organize a dental treatment room, including preparing procedure trays, seating the dental client, providing chair-side assistance, and demonstrating departure procedures.

Anatomy

7. Explain the anatomy of the head and neck, including the teeth and their surfaces.

Infection Control

8. Apply principles of preventive oral hygiene, including brushing teeth, flossing teeth, and maintaining a healthy diet.
9. Demonstrate infection control procedures used in a dental office.
Examples: sterilizing, disinfecting, using barrier techniques

Dental Procedures

10. Construct impressions for diagnostic and opposing models of teeth, including preparing for an alginate dental impression and a dental impression with plaster of paris.

Diagnostic Services

Diagnostic Services is a one-credit course designed to inform students of the rapid changes in business and industry by offering a rigorous array of course work and work-based experiences to help prepare them for advanced learning and a wide range of health career opportunities. This course is designed to provide the local education agency flexibility to meet healthcare demands in the community. Students are introduced to careers in diagnostic services including, but not limited to, electrocardiograph technician, medical laboratory technologist, radiography technician, pathologist, cardiovascular technician, and others.

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Career Opportunities

Students will:

1. Trace the history of selected diagnostic services careers.
2. Compare roles and responsibilities of various diagnostic services careers.
Examples: job description, salary, education and training, occupational outlook
3. Assess safe practices necessary in diagnostic services.
Examples: infection control, radiation protection, laboratory safety

Legal and Ethical Aspects

4. Apply legal and ethical behaviors necessary in diagnostic services careers.
Examples: informed consent, confidentiality

Anatomy

5. Identify human structures and functions as they relate to diagnostic services.
Examples: structures—gastrointestinal (GI) system, cardiovascular systems
diagnostic services—upper GI series, echocardiogram

Diseases and Disorders

6. Identify diseases and disorders commonly associated with diagnostic services careers.
Examples: streptococcus pharyngitis, cardiac arrhythmias, fractures

Mathematics Concepts

7. Use mathematics concepts in diagnostic settings, including numeric conversions, ratios, and proportions.

Medical Procedures

8. Explain medical procedures related to diagnostic services careers.
Examples: arteriogram, transtelephonic monitoring
9. Demonstrate clinical and technical skills necessary in diagnostic services.
Examples: performing a rapid strep test, recording an electrocardiogram, measuring visual acuity
10. Utilize technology in a therapeutic career setting.
Examples: transtelephonic monitor, wireless computer

Diesel Brakes

This course is designed to provide students with in-depth knowledge and skills for servicing diesel brake systems. Safety and proper tool use are emphasized throughout this course. Specific topics include diagnosis and repair of air supply and service systems for air brakes and hydraulic brake system components. As part of this course, students participate in various activities that enhance knowledge and skills in servicing diesel brake systems. This course must follow the guidelines and standards set forth by Automotive Service Excellence (ASE) and National Automotive Technicians Education Foundation (NATEF) minimum standards.

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Safety

Students will:

1. Demonstrate personal and environmental safety practices for diesel brake maintenance associated with clothing; eye protection; hand protection; proper lifting practices; hand tools; power equipment; proper ventilation; and the handling, storage, and disposal of fuels, chemicals, and materials in accordance with federal, state, and local regulations.

Air Brake Diagnosis and Repair

2. Diagnose problems associated with air brake supply and service systems, including mechanical and foundation problems and parking brakes.
3. Apply repair procedures in accordance with air brake diagnosis.

Hydraulic Brake Diagnosis and Repair

4. Diagnose problems associated with the hydraulic brake system, including mechanical and foundation problems, power assist units, air and hydraulic antilock brake systems (ABS), and automatic traction control (ATC).
5. Solve repair issues associated with the diagnosis of the hydraulic system, including mechanical and foundation problems, power assist units, air and hydraulic ABS, and ATC.

Diesel Drivetrain

This course is designed to provide students with in-depth knowledge and skills for diesel drivetrain operation and repair. Safety and proper tool use are emphasized throughout this course. Specific topics include diagnosis and repair of clutch assemblies, transmission, universal joints, and drive axels. As part of this course, students participate in diagnostic and repair activities associated with diesel drivetrain systems components. This course must follow guidelines and standards set forth by Automotive Service Excellence (ASE) and National Automotive Technicians Education Foundation (NATEF) minimum standards.

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Safety

Students will:

1. Demonstrate personal and environmental safety practices for diesel engine drivetrain maintenance associated with clothing; eye protection; hand protection; proper lifting practices; hand tools; power equipment; proper ventilation; and the handling, storage, and disposal of fuels, chemicals, and materials in accordance with federal, state, and local regulations.

Clutch Diagnosis and Repair

2. Demonstrate diagnosis of the diesel engine clutch system.
3. Apply corrective action procedures in accordance with a clutch problem diagnosis.

Transmission Diagnosis and Repair

4. Demonstrate diagnosis of a diesel engine transmission system.
5. Apply corrective action procedures in accordance with a transmission problem diagnosis.

Driveshaft and Universal Joint Diagnosis and Repair

6. Demonstrate diagnosis of diesel engine driveshaft and universal joint systems to determine corrective action.
7. Apply corrective action procedures in accordance with the driveshaft and universal joint diagnosis.

Drive Axle Diagnosis and Repair

8. Apply corrective action procedures in accordance with the drive axle diagnosis.
9. Utilize standard diagnosis procedures to determine the nature of a drive axle problem.
10. Compare repair and replacement alternatives for solving a drive axle problem.

Diesel Electrical and Electronic Systems I

Diesel Electrical and Electronic Systems I is designed to provide students with the foundational knowledge and skills to perform maintenance on diesel electrical and electronic systems. Safety and proper tool use are emphasized throughout this course. Specific topics include diagnostic and maintenance procedures for general electrical systems; batteries; starter systems; charging systems; lighting systems; gauges and warning devices; and horn, wiper, and washer systems. Information is also provided regarding task lists, tool and equipment lists, program hours, laboratory operation, and safety standards. Content incorporates current guidelines and standards set forth by the Automotive Service Excellence (ASE) and the National Automotive Technicians Education Foundation (NATEF), including any updates or changes. In addition, students participate in hands-on activities to enhance diagnostic and service skills.

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Safety

Students will:

1. Demonstrate personal and environmental safety practices for diesel engine electrical and electronic system maintenance associated with clothing, eye protection, hand tools, power equipment, and proper ventilation.

General Electrical System Diagnosis

2. Demonstrate diagnostic procedures in electrical and electronic systems.
 - Demonstrating proper work order procedures
3. Identify electrical and electronic system concerns.
 - Determining necessary action for electrical and electronic system concerns
4. Research applicable vehicle and service information.
Examples: vehicle service history, technical service bulletins, interpretation of vehicle and major component identification numbers

Battery Diagnosis and Service

5. Demonstrate procedures for testing and servicing batteries.
Examples: performing battery state-of-charge test; inspecting and cleaning battery cables, connectors, clamps, and hold-downs

Starting System Diagnosis and Repair

6. Explain starting system components and operations.
 - Performing test procedures for starting systems

Charging System Diagnosis and Repair

7. Explain charging system components and operations.

Lighting System Diagnosis and Repair

8. Analyze lighting systems to determine necessary action.

Gauge, Warning Device, and Driver Information System Diagnosis and Repair

9. Describe diesel electronic system gauges, warning devices, and driver information system operations.
 - Demonstrating component operations tests for diesel electronic systems

Horn, Wiper, and Washer Diagnosis and Repair

10. Demonstrate accuracy in diagnostic procedures for horn, wiper, and washer controls.

Accessory Diagnosis and Repair

11. Utilize proper diagnostic procedures for accessories to determine necessary action.

Diesel Electrical and Electronic Systems II

This course is designed to provide students with in-depth knowledge and skills to perform maintenance on diesel electrical and electronic systems. Safety and proper tool use is emphasized throughout this course. Specific topics include complex diagnostic and maintenance procedures on various critical electrical and electronic systems found in diesel equipment. As part of this course, students participate in advanced hands-on activities designed to enhance knowledge and skills related to diesel electrical and electronic systems. This course must follow guidelines and standards set forth by Automotive Service Excellence (ASE) and National Automotive Technicians Education Foundation (NATEF) minimum standards.

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Safety

Students will:

1. Demonstrate the handling, storage, and disposal of diesel electrical system chemicals and materials in accordance with local, state, and federal safety and environmental regulations.

General Electrical System Diagnosis

2. Diagnose diesel electrical and electronic system problems to determine necessary actions.
 - Verifying customer concerns regarding diesel and electrical system problems
3. Justify necessary action for diesel electrical and electronic system concerns.

Battery Diagnosis and Service

4. Compare battery tests and battery service procedures for conventional and hybrid electrical systems.

Starting System Diagnosis and Repair

5. Differentiate between electrical and mechanical problems associated with diesel starting system diagnosis.
 - Determining service procedures for diesel starting systems

Charging System Diagnosis and Repair

6. Diagnose diesel charging system problems to determine corrective action.

Lighting System Diagnosis and Repair

7. Determine procedures for diesel lighting system repairs.
 - Identifying safety hazards associated with high-intensity diesel lighting components

Gauge, Warning Device, and Driver Information System Diagnosis and Repair

8. Diagnose the cause of operational problems for diesel gauges, warning devices, and driver information systems.

Horn, Wiper, and Washer Diagnosis and Repair

9. Demonstrate the inspection and repair of horn, wiper, and washer system malfunctions.

Accessory Diagnosis and Repair

10. Demonstrate the repair of diesel accessory malfunctions.

Diesel Engines I

This course is designed to provide students with the foundational knowledge and skills for maintaining diesel engine safety and exhibiting proper tool use. Specific topics include engine diagnostic techniques, servicing cylinder heads, analyzing engine block wear, and the operation theory of various engine systems. As part of this course, students apply knowledge and skills by participating in various diesel engine diagnostic and service activities. This course must follow guidelines and standards set forth by Automotive Service Excellence (ASE) and National Automotive Technicians Education Foundation (NATEF) minimum standards.

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Safety

Students will:

1. Demonstrate personal and environmental safety practices for beginning diesel engine maintenance associated with clothing; eye protection; hand protection; proper lifting practices; hand tools; power equipment; proper ventilation; and the handling, storage, and disposal of fuels, chemicals, and materials in accordance with federal, state, and local regulations.

General Engine Diagnosis

2. Demonstrate accuracy in the diagnosis of general engine systems to determine corrective action.
 - Utilizing proper work order procedures

Cylinder Head and Valve Train Diagnosis and Repair

3. Explain common techniques used to service cylinder heads.

Engine Block Diagnosis and Repair

4. Analyze an engine block for wear and damage to determine corrective action.

Lubrication System Diagnosis and Repair

5. Explain the operation of the lubrication system.

Cooling System Diagnosis and Repair

6. Explain the operation of the cooling system.

Air Induction and Exhaust System Diagnosis and Repair

7. Explain the operation of diesel air induction and exhaust systems.

Fuel System Diagnosis and Repair

8. Explain the operation of the fuel diesel engine supply system, including mechanical and electronic fuel management systems.

Engine Brakes

9. Inspect diesel engine compression and exhaust brakes to determine corrective action.

Diesel Engines II

This course is designed to expand student knowledge and skills for servicing diesel engines and related systems. Safety and proper tool use are emphasized throughout this course. This information, along with foundational information gained in previous courses, enables students to develop a general comprehension of operation and maintenance procedures. Specific topics include engine diagnostic techniques, servicing cylinder heads, analyzing engine block wear, and the operation and servicing of various diesel engine systems. In addition, students apply knowledge and skills by participating in various diesel engine diagnostic and service activities. This course must follow guidelines and standards set forth by Automotive Service Excellence (ASE) and National Automotive Technicians Education Foundation (NATEF) minimum standards.

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Safety

Students will:

1. Demonstrate personal and environmental safety practices for intermediate diesel engine maintenance associated with clothing; eye protection; hand protection; proper lifting practices; hand tools; power equipment; proper ventilation; and the handling, storage, and disposal of fuels, chemicals, and materials in accordance with federal, state, and local regulations.

General Engine Diagnosis

2. Diagnose diesel engine system malfunctions.
 - Verifying customer concerns regarding diesel engine problems
3. Justify corrective action associated with general diesel engine system concerns.
4. Utilize testing and evaluation procedures to determine diesel engine problems.

Cylinder Head and Valve Train Diagnosis and Repair

5. Utilize various techniques to service diesel engine cylinder heads.
Examples: removing, cleaning, inspecting, repairing, installing

Engine Block Diagnosis and Repair

6. Demonstrate service procedures for diesel engine block repair.

Lubrication System Diagnosis and Repair

7. Demonstrate service procedures for the diesel engine lubrication system.

Cooling System Diagnosis and Repair

8. Demonstrate service procedures for the diesel engine cooling system.

Air Induction and Exhaust System Diagnosis and Repair

9. Demonstrate service procedures for diesel engine air induction and exhaust systems.

Fuel System Diagnosis and Repair

10. Demonstrate service procedures for the diesel engine fuel supply system, including mechanical and electronic fuel management systems.

Engine Brakes

11. Demonstrate service procedures for the diesel engine compression and exhaust brakes.

Diesel Suspension and Steering

This course is designed to provide students with in-depth knowledge and skills for servicing diesel suspension and steering systems. Safety and proper tool use are emphasized throughout this course. Specific topics include diagnosis and repair of steering systems; suspension systems; wheel alignment, adjustment, and repair; wheel and tire maintenance; and frames. As part of this course, students participate in servicing activities associated with suspension and steering systems. This course must follow guidelines and standards set forth by Automotive Service Excellence (ASE) and National Automotive Technicians Education Foundation (NATEF) minimum standards.

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Safety

Students will:

1. Demonstrate personal and environmental safety practices for diesel engine suspension and steering system maintenance associated with clothing; eye protection; hand protection; proper lifting practices; hand tools; power equipment; proper ventilation; and the handling, storage, and disposal of fuels, chemicals, and materials in accordance with federal, state, and local regulations.

Steering System Diagnosis and Repair

2. Diagnose problems associated with the diesel engine steering column, steering units, and linkage.
3. Apply repair procedures in accordance with the steering system diagnosis.

Suspension System Diagnosis and Repair

4. Diagnose problems associated with diesel engine suspension systems.
5. Solve problems associated with diesel engine suspension systems.

Wheel Alignment Diagnosis, Adjustment, and Repair

6. Diagnose problems associated with diesel engine wheel alignment.
7. Solve problems associated with diesel engine wheel alignment and adjustment.

Wheel and Tire Diagnosis and Repair

8. Diagnose problems associated with diesel engine wheels and tires.
9. Apply repair procedures in accordance with diesel engine wheel and tire system diagnosis.

Dietetics

Dietetics is a one-credit course that provides students with advanced knowledge and skills used in nutrition and dietetics. Major topics include nutrition, meal planning, safety, food science, and professional behavior

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Nutrition

Students will:

1. Assess the influence of various factors on food and nutrition choices.
Examples: socioeconomic, psychological, physiological, cultural, religious
2. Describe major nutrients and functions of these nutrients in the human body.
3. Determine nutrient deficiency diseases common throughout the world.
4. Determine food modifications required with special diets.
Examples: vegetarianism, sports nutrition, diabetes, lactose intolerance, food allergies
5. Assess the long-term effects of food choices on a healthy lifestyle.

Meal Planning

6. Evaluate various types of menus used in meal planning.
Examples: cycle, nonselective, selective, single use
7. Use dietary guidelines to plan menus that meet nutritional needs of clients throughout the life span.
8. Assess common therapeutic diets for suitability.
Examples: liquid, soft, bland, diabetic, calorie-restricted, calorie-controlled, fat-restricted, sodium-restricted
9. Explain the importance of food preparation techniques that conserve nutrients.

Safety

10. Recognize principles and procedures of the Hazard Analysis and Critical Control Point (HACCP) system for food handling and processing.

11. Determine microorganisms that cause foodborne illnesses and conditions required for growth of each.
12. Analyze symptoms and preventive measures for common foodborne illnesses.

Food Science

13. Describe the chemical makeup of major food nutrients.
Examples: carbohydrates, proteins, fats, vitamins, minerals, water
14. Use sensory methods to evaluate food products.

Professional Behavior

15. Determine the importance of participating in nutrition and dietetic professional associations.
 - Describing ethical behavior in the field of dietetics
16. Interpret local, state, and federal legislation, regulations, and licensure laws related to dietetics and nutritional services.
17. Evaluate nutrition resources, services, and agencies available in the community.
18. Determine human relation skills required for interacting with the general public.

Technology and Careers

19. Describe technology used in providing dietetics and nutrition services.
20. Determine career and entrepreneurial opportunities in dietetics and nutrition services.
 - Identifying required credentials for dietetics and nutrition services

Digital Design

Digital Design is a one-credit course designed for students who have successfully completed the Introduction to Advertising Design course or have completed one credit in Visual Arts. Digital Design provides students with hands-on experiences addressing a variety of components of information design. Instruction includes information regarding various computer operations, applications and procedures, type styles, desktop publishing, layout and design techniques, mechanical production files, formats, and technology in the work place. Skills gained in this course prepare students for the Graphic Illustration course, the next level of study in the Advertising Design program.

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Safety

Students will:

1. Apply personal and shop safety rules, regulations, and procedures for using media in a safe and responsible manner, including cleaning, storing, and replenishing supplies.

Computer Technology

2. Demonstrate various computer operations using industry standard software for word processing, illustrating, photo manipulating, and scanning.
 - Utilizing vector and raster graphics, Universal Serial Bus (USB), fire wire, digital camera, printers, data video projector, digital video recorder (DVR)

Typography

3. Explain the history and development of typography, including the classification of type families, the historic evolution of type, type selection, spacing, and the manipulation of the letterform.
 - Explaining styles, selection, production, and psychology of typography
 - Demonstrating knowledge of manuscripts, spacing, proofreading, headlines, and copy fitting

Advanced Design

4. Demonstrate advanced application of the digital design process.
 - Using proper procedures and theory in composition for digital design
Examples: elements, principles, marketing strategies, color theory, audience identification, cost analysis

Advanced Visualization

5. Utilize drawing and rendering techniques and advanced illustration skills for digital design.

Advanced Digital Imagery

6. Create digital designs while refining desktop publishing skills.
 - Determining appropriate files and file formats for various digital imagery
Examples: Tagged Image File Format (TIFF), graphic interchange format (GIF), Joint Photographic Experts Group (JPEG)
 - Creating entrepreneurship desktop publishing projects
Examples: creating a business, producing a school newspaper or newsletter

Advanced Conceptual Process

7. Formulate ideas from a concept to a marketable digital design product.

Digital Electronics

This one-credit course is designed to provide students with the fundamental knowledge and skills for this area of the electrical industry. Emphasis is placed on job safety, characteristics of digital circuit signals, logic gates, logic devices, and digital circuits. Upon successful completion of this course, students perform basic tasks related to the electrical industry.

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Orientation

Students will:

1. Explain career opportunities in the field of digital electronics.
2. Apply safety rules, regulations, and procedures related to the digital electronics field.

Characteristics of Digital Circuit Signals

3. Explain digital principles, including electrical signal types.
Examples: digital, analog
4. Utilize digital number systems, including binary, octal, decimal, hexadecimal, and Boolean operations.

Logic Gates

5. Interpret logic gate symbols, including standard form and alternate form.
6. Determine the truth table for each logic gate used in digital electronics.

Logic Devices

7. Identify types of logic devices.
Examples: multivibrators, encoders, converters, memory storage devices
8. Interpret logic device symbols.

Digital Circuits

9. Utilize breadboarding techniques in construction of digital circuits, including simple logic and combinational logic.

10. Demonstrate skills related to troubleshooting digital circuits.

Microprocessors

11. Utilize terminology related to microprocessor system components.
12. Explain principles and operation of a microprocessor system.

Digital File Preparation

Digital File Preparation is a one-credit course providing practical application of skills in desktop publishing, page layout, and graphics. Upon completion of this course, students are able to prepare layouts for newsletters and other publications, solve related problems using appropriate mathematics skills, and demonstrate manipulation of text and graphics to meet standards of the graphic arts industry. The prerequisite for this course is Introduction to Graphic Arts.

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Orientation

Students will:

1. Identify basic principles of design for graphic arts.
2. Identify digital image file types and resolutions.
3. Demonstrate techniques involved in the selection and use of word processing, illustration, image editing, and page layout software.
4. Interpret print production information from job ticket or jacket.
5. Explain techniques used to produce high-quality line and halftone images.
6. Demonstrate preflighting applications involved with various digital image file structures and types.
 - Utilizing transform tool to adjust layer sizes
 - Evaluating layer masking of digital image file

Type

7. Explain attributes and characteristics of various type styles and their uses.
Examples: X-height, serif, spacing

Page Layout

8. Demonstrate appropriate use of page layout software for desktop publishing.

Image Capture

9. Compare various methods of image capture, including scanner, digital camera, and file downloads.

Illustrations

10. Create original illustrations using appropriate design, tracing, and photography manipulating software.

Portable Document Format

11. Explain why portable document format (PDF) has become an integral part of the printing industry.
12. Create a PDF file from a native application file.

Direct Current

This one-credit course is designed to provide students with the fundamental knowledge and skills for this area of the electrical industry. Emphasis is placed on job safety, sources, terminology and symbols, components of a basic circuit, electrical quantities and measurements, characteristics of resistors, Ohm's law in direct current circuits, circuit construction, and troubleshooting. Upon successful completion of this course, students perform basic tasks related to the electrical industry.

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Sources

Students will:

1. Identify structure and characteristics of the atom.
2. Explain the relationship of the atom to an electrical charge, including electrostatic field and law of charges.
3. Identify sources of electricity, including chemical, mechanical, and solar.
Examples: chemical—battery
mechanical—generator

Terminology and Symbols

4. Explain electrical terms, including direct current (DC), voltage, resistance, power, conductors, and insulators.
5. Interpret electrical symbols.
Examples: unit symbols, schematic symbols

Components of a Basic Circuit

6. Explain components of a basic circuit, including source, load, and conductor.

Electrical Quantities and Measurements

7. Explain electrical quantities and units of measure, including voltage, current, resistance, and power.
8. Determine electrical quantities of volts, ohms, and amperes utilizing appropriate test equipment.

Characteristics of Resistors

9. Identify different types of resistors, including fixed and variable resistors.
10. Determine resistance values using the standard resistor color code.
11. Determine electrical and physical characteristics of resistors.
Examples: resistance, power rating, wattage

Ohm's Law in Direct Current Circuits

12. Solve problems in electrical series, parallel, and combination circuits using Ohm's law to determine voltage, current, resistance, and power.

Circuit Construction

13. Demonstrate the fabrication of specified DC circuits, including the use of soldering, breadboards, and wiring techniques.

Troubleshooting

14. Demonstrate troubleshooting techniques for circuits, including opens, shorts, and grounds.

Early Childhood Education I

Early Childhood Education I is a one-credit course. The prerequisite for this course is Education and Training. Course content is designed to help students learn ways to direct and operate an early childhood education program. Major topics are organizational structure; personnel policies, rules, and regulations; liability issues; principles of human growth and development; human development theories; observation techniques; interpersonal skills for promoting positive and productive relationships with children and their families; developmentally appropriate activities; individual and group activities; organization of teaching materials and supplies; learning activity centers; lesson plans; smooth transitions between routines and activities; teaching aides; operating equipment; play and recreational activities; dietary needs of children; preparation of snacks and meals; child health and safety; parental involvement; community resources; technology; and careers. An early childhood education facility with children is required and essential for students to develop skills in teaching children.

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Early Childhood Education Programs

Students will:

1. Design an early childhood education program utilizing child development theories.
2. Determine the need for early childhood education programs.
3. Interpret requirements of a quality early childhood education program.
4. Compare by age and stages of development the grouping of children in early childhood education programs.
5. Evaluate types of early childhood education programs.
Examples: public; private, including church-sponsored programs

Guidance of Children

6. Demonstrate positive techniques for guiding the behavior of children in an early childhood education program.
7. Demonstrate communication skills and behaviors that support the building of self-esteem, self-help skills, and healthy practices.
8. Describe strategies for providing information to parents regarding issues and concerns that impact the child's development.
9. Interpret local and state requirements for reporting suspected child abuse and neglect.

Learning Environment

10. Determine procedures for establishing and maintaining a safe, clean, and healthy learning environment for children.
Examples: reporting accidents, conducting emergency drills, adhering to playground and transportation safety, administering medication, isolating children with illnesses
11. Determine practices that relate to infectious disease control.
12. Describe techniques for encouraging healthy eating habits for children.
13. Demonstrate interpersonal skills by promoting productive relationships with children and their families.
14. Assess types of furnishings, equipment, technology, and supplies used in early childhood education facilities.

Teaching and Learning

15. Develop unit or thematic lesson plans that include developmentally appropriate activities for an early childhood education program.
Examples: plans that include sensory integration, physical and cognitive development, language and literacy, creative social play, recreational activities
16. Design developmentally appropriate activities for a diverse population, including special needs children.
17. Practice evidence-based teaching strategies used in teaching young children.
18. Create across-the-curriculum developmental teaching aids for early childhood education programs.
19. Assess ways technology is used to impact an early childhood education program.
20. Analyze career options related to the field of early childhood education.

Early Childhood Education II

Early Childhood Education II is a one-credit course. The prerequisite for this course is Early Childhood Education I. The course provides students with advanced knowledge and skills used in the field of education. Major topics are the impact of caregivers on the development of children, personnel tasks and responsibilities, legal issues and liability, licensure standards, policies for providing early childhood education programs, physical facility layout, management systems, facility maintenance, scheduling, child growth and development theories, brain research, risk management, factors contributing to at-risk children, observation records, guidance techniques, curriculum development, age-appropriate learning activities, children with exceptionalities, motivational techniques, special events and field trips, recreational activities, dietary needs of children, food choices, professionalism, health screening and health assessment, emergency evacuation procedures, rules and regulations, technology, and careers. An early childhood education facility is required and essential for students to develop skills in teaching children.

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Human Development

Students will:

1. Develop a philosophy for an early childhood education program based on child development theories.
2. Explain to parents and other caregivers current trends in brain-based learning research and development of young children.
3. Assess circumstances and factors that contribute to a child's risk of developmental delays.
4. Collect observational data on growth and development of children in an early childhood education program.

Business Practices

5. Interpret laws and legislation relating to early childhood education facilities.
Examples: child abuse and neglect, liability
6. Analyze functions related to the organization and management of early childhood programs.
Examples: personnel policies and procedures, rules and consequences for children, schedules
7. Develop a financial management system for maintaining early childhood programs.
Examples: budgeting, accounting, compensation, purchasing

Teaching

8. Design a unit of thematic curriculum for various age groups and populations.
Examples: diversity in the community, children with exceptionalities
 - Revising lesson plans based on positive and negative feedback
9. Create developmentally appropriate learning activities in language arts, mathematics, science, music, art, and for special events.
10. Utilize a variety of motivational techniques that encourage children to participate in an early childhood education program.
11. Evaluate classroom management strategies used in an early childhood education program.

Health and Safety of Children

12. Prepare nutritious snacks for children at various stages of development.
13. Implement basic health practices and prevention procedures for workers and children regarding childhood illnesses and communicable diseases.
Examples: health-screening and assessment, hand-washing
14. Demonstrate emergency evacuation procedure drills for early childhood education programs.
15. Analyze observations, records, and reports to explain the behavior of children.

Professionalism

16. Analyze early childhood education professional associations to determine importance to teaching.
17. Demonstrate skills needed to communicate with all early childhood education stakeholders.

Technology and Careers

18. Utilize technology to manage, organize, and teach in an early childhood education program.
19. Analyze the field of early childhood education for career options, entrepreneurial opportunities, and required credentials.

Education and Training

Education and Training is a one-credit course. This course is the prerequisite for all pathways included in the Education and Training cluster. The course is designed for students who are interested in pursuing careers in education. Course content includes the organizational structure of education, careers, the role of the teacher, characteristics of effective teachers, communication skills, the teaching and learning processes, learning styles, research, characteristics of positive classroom environments, human growth and development, curriculum development, student characteristics, teaching techniques, learning activities, educational initiatives, technology, and careers. Observational experiences are a required component of this course.

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Foundation

Students will:

1. Apply mathematical, reading, writing, critical-thinking and problem-solving skills to effectively perform in the educational setting.
2. Describe standards, policies, and procedures for an educational setting to ensure safe and healthy environments, including managing, reporting, and documenting emergency situations.
3. Explain the impact of goal-setting, teamwork, and required skills in the field of education.
 - Recognizing the importance of FCCLA programs to the field of education
4. Interpret the Alabama Quality Teaching Standards and the Alabama Educator Code of Ethics for professional guidance.
5. Determine professional organizations that impact the education profession.

Field of Education

6. Analyze the organizational structure and funding sources for education in the United States at the national, state, and local level.
7. Identify the history, current trends, initiatives, and issues in education within the United States.
Examples: character education, reading, financial literacy, school safety
8. Evaluate the impact of the physical, emotional, social, and intellectual development of learners of various ages on the teaching and learning processes.
Examples: preschool, elementary, intermediate, middle school, high school, college, adult

Faculty and Staff

9. Critique the role of the teacher, administrator, and professional support personnel in the educational system.
10. Analyze characteristics of teachers, administrators, and professional support personnel for effectiveness in the educational system.
11. Describe effective communication skills required in the teaching, administration, and professional support services professions.

Teaching

12. Determine steps utilized in the teaching and learning processes.
13. Describe an environment conducive to learning.
14. Analyze learning styles and teaching methods to determine impact on student achievement.

Curriculum

15. Compare differences in student characteristics that impact the way in which curricula is planned, implemented, assessed, and revised.
16. Analyze the process of designing curricula for achieving student excellence.
17. Compare types of data used to assess student achievement and to plan curricula.

Technology and Careers

18. Determine the impact of technology on the field of education.
19. Utilize information technology to assess, manage, and integrate effective data communication and documents in the field of education.
 - Utilizing charts and graphs to summarize data
20. Analyze career options, credentials, and entrepreneurial opportunities related to the field of education.

Education and Training Internship

Education and Training Internship is a one-credit course. Students who have completed Teaching II, Early Childhood Education II, Professional Support Services in Education, or Educational Leadership courses are eligible to enroll in Education and Training Internship. The internship course is for students who are interested in pursuing careers in the education field. The internship allows students to spend time in a classroom or school setting on a regular basis with a teacher within the school system who teaches the subject-matter area of interest to the student intern, a staff member in the appropriate professional support services area, or a principal or vice-principal. This course provides students with a context in which they can make a personal assessment of their commitment to pursue a teaching, professional support services, or educational leadership career. The school-based laboratory for the internship is an actual classroom or school that provides instruction in the subject-matter area or career area related to the student's interest.

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Classroom Teaching

Students will:

1. Determine procedures for starting and ending the school year.
2. Assist the classroom teacher with preparing and distributing materials, setting up equipment for instructional purposes, and aiding with clerical matters.
3. Tutor students individually or in small groups.
4. Develop units of instruction, including the preparation of lesson plans.
5. Demonstrate teaching, including the use of equipment, technology, and supplies used in the instructional program.
6. Evaluate classroom management procedures and the learning climate.
7. Formulate ways to meet needs of diverse student populations.
8. Demonstrate integration of curriculum and instruction to meet student developmental needs and interests.

Professional Traits

9. Describe desirable teacher characteristics, including exhibiting poise, self-confidence, initiative, and enthusiasm while teaching.
10. Develop an internship portfolio.

11. Analyze roles of professional support staff to determine responsibilities of each.
12. Assess roles of administrators in meeting organizational goals and creating a positive school and system climate.
13. Describe the importance of communicating high expectations and encouraging active student learning in the classroom.
14. Demonstrate techniques for collaborative relationships with students and their families.
15. Recognize warning signs of child abuse and neglect, including procedures for reporting and strategies for prevention.
16. Demonstrate teamwork skills in community and workplace settings.
17. Analyze the field of education for career options, entrepreneurial opportunities, and required credentials.

Educational Leadership

Educational Leadership is a one-credit course. The prerequisite for this course is Education and Training. This course is for students who are interested in pursuing careers in the education field. Major topics are communication skills, organizational structure, instructional programs, demographics and student assessment, management of faculty and staff, building operations, resource management, and political leadership skills.

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Instructional Leadership

Students will:

1. Describe the educational organization as a complex social, cultural, and economic system.
 - Recognizing the importance of creating a vision of success to inspire all learners, teachers, and other stakeholders
2. Determine strategies that foster a positive organizational structure and learning culture for accelerating student achievement and teacher morale.
3. Assess school demographics and student assessment data to determine instructional goals that meet individual student needs and interests.
4. Describe evidenced-based instructional practices that lead to student achievement.
5. Determine instructional resources and technology used for meeting organizational and instructional goals.

Managerial Leadership

6. Describe strategies for enhancing personnel performance and motivation.
 - Researching the mentoring program for teachers
 - Identifying strategies for recruiting and retaining school personnel
7. Describe the importance of communicating expectations clearly and in a timely manner to faculty and staff.
8. Explain factors involved in managing school building operations.
Examples: evaluating cost and benefits, developing a procedures and policies manual, adhering to safety and security guidelines
9. Determine the importance of securing adequate resources to meet organizational objectives.
 - Researching grant opportunities available to teachers and schools

10. Assess the impact of technology on the administration of educational programs.
11. Analyze the importance of evaluating faculty and staff to determine effectiveness in meeting organizational and instructional goals.
 - Researching methods used to evaluate faculty and staff
12. Evaluate facility plans to meet organizational goals and to ensure safety and security of students and personnel.

Political Leadership

13. Describe the importance of creating stakeholder partnerships to meet organizational objectives and to encourage participation.
14. Describe the impact of advocacy groups on the educational system.
15. Determine educational resources used to respond to community issues.
Examples: violence, drugs, sexually transmitted diseases (STDs), teen pregnancy
16. Determine strategies for negotiating within political, social, economical, legal, and cultural contexts to meet organizational objectives.

Electrical Technology

This one-credit course is designed to provide students with the fundamental knowledge and skills for this area of the construction industry. The course emphasizes safety while addressing basic electrical theory, National Electrical Code (NEC), terminology, conductors, circuit construction, basic alternating current, reactive circuit, and troubleshooting circuits.

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Electrical Safety

Students will:

1. Demonstrate safety procedures as recognized by governing agencies and approved industry standards when testing and replacing components, or installing wiring.
Examples: lockout, tagout
2. Explain electrical hazards in the workplace.
 - Demonstrating how to avoid electrical hazards
 - Minimizing electrical hazards in situations where elimination is not possible

Basic Electrical Theory

3. Utilize formulas derived from Ohm's law and the Power law to calculate unknown electrical values.
4. Utilize various meters to measure voltage, current, and resistance.
Examples: voltage ohm millimeter (VOM), ammeter clamp-on, multimeter
5. Verify the amount of power used by an electrical circuit.
6. Use Kirchoff's current law to calculate the total current in series, parallel, and combination circuits.
7. Use Kirchoff's voltage law to calculate the total voltage drop in series, parallel, and combination circuits.
8. Verify various electrical values using assorted test equipment.

Introduction to the National Electrical Code

9. Describe the purpose of the NEC.
10. Utilize the NEC handbook to reference specific information.

Terminology and Symbols

11. Define electrical terms and symbols, including load, alternating current (AC) voltage, direct current (DC) voltage, current, resistance, capacitance, inductance, frequency, and hertz.
 - Interpreting symbols for inductance, power supply, and resistance
 - Recognizing the relationship between alternating current and frequency
 - Recognizing the relationship between capacitance and sine wave form
 - Interpreting symbols for inductance, power supply, and resistance

Conductors

12. Identify conductor insulation and jacket types according to application and condition.
13. Interpret all markings and ratings on conductors and cables.
14. Install conductors in electro-metallic tubing and rigid conduit to specification.

Circuit Construction

15. Draw circuits according to a written description of circuit function.

Troubleshooting Circuits

16. Describe the logical sequence and techniques used to identify and correct discrepancies in circuit function.

Basic Alternating Current

17. Explain the relationship of volts, amperes, ohms, watts, hertz, and periods in AC circuits.
18. Demonstrate measurement of electrical quantities in AC circuits.
Example: measuring current in an energized circuit

Reactive Circuits

19. Explain electrical properties of a resistive-capacitive-inductive circuit.
20. Solve for various electrical values in a resistive-capacitive-inductive circuit.

Electromechanical Controls

This one-credit course is designed to provide students with the fundamental knowledge and skills for this area of the electrical industry. Emphasis is placed on job safety, electronic control systems, programmable logic controllers, and robotics. Upon successful completion of this course, students perform basic tasks related to the electrical industry.

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Electronic Control Systems

Students will:

1. Identify electronic control systems, including closed loop and open loop.
2. Interpret symbols used in control circuit diagrams.
Examples: switches, relays, motors
3. Explain input and output devices used in electronic control systems, including switches, sensors, transducers, relays, timers, counters, motors, and actuators.
4. Interpret control ladder logic circuits.

Programmable Logic Controllers

5. Identify uses of programmable logic controllers.
6. Install programmable logic controllers with input and output devices.
7. Program a controller to perform specific tasks.

Robotics

8. Interpret construction, electrical, and mechanical blueprints related to a variety of automated systems.
9. Use input and output devices for performing automated and robotic tasks.
10. Explain the operation of fluid power systems related to a variety of automated systems.
11. Construct a robot to perform a specific task.
12. Evaluate robotic activities, including identifying problems and making necessary repairs.

Emergency Services

Emergency Services is a one-credit course that introduces students to the emergency medical profession. Course content emphasizes safety, human structure and function, assessment of emergency clients, ethical behavior, and emergency care procedures. Foundations of Health Science is the prerequisite for this course. Upon successful completion of this course, students may choose to continue studies in Advanced Health Seminar or Work-Based Experience Seminar.

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Career Opportunities

Students will:

1. Compare roles and responsibilities of emergency medical personnel.
Examples: emergency medical technician (EMT), paramedic, registered nurse
2. Demonstrate workplace readiness skills in emergency medicine.
Examples: well-being of the EMT, positive personal qualities and interpersonal skills, acute assessment skills to act promptly, ability to manifest leadership skills to manage a situation, demonstration of teaching skills to direct others in an emergency situation

Communication Skills

3. Describe an initial assessment of emergency clients.
4. Describe various communication skills used in an emergency situation.
Examples: documentation, interpretation of medical orders

Safety

5. Assess safe practices in emergency medical situations.
Examples: evaluating scene, lifting and moving client, using standard precautions

Legal and Ethical

6. Describe legal and ethical behaviors required for emergency situations.
7. Use mathematics concepts in emergency medical settings, including calculating fluid rates and drug dosage conversions.

Anatomy

8. Describe human structures and functions as they relate to emergency medical procedures.
Example: respiratory system—maintaining an open airway

Medical Skills

9. Describe various skills required in emergency medical settings, including emergency birth, poisoning, drug overdose, shock, allergic reactions, and bleeding.
10. Identify common medications used in emergency situations.

Engineering Applications

Engineering Applications is a one-credit course designed to explore the application of engineering principles in various technological areas including construction, transportation, communication, manufacturing, and bioengineering. Students gain knowledge and experience needed to effectively improve processes and systems in each of these areas.

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Materials and Processes

Students will:

1. Analyze a specific engineering design that involves live and dead loads for tension, compression, shear, and torsion.
2. Explain engineering properties of materials used in structures, including elasticity, plasticity, thermal conductivity, and density.

Construction

3. Describe processes, procedures, common tools, and measurement devices used in construction, including working drawings and procedural lists.
4. Identify factors that affect the design and construction of structures, including zoning laws, building codes, and professional standards.

Transportation

5. Describe interrelationships between transportation and technology.
 - Explaining the interconnectedness of manufacturing, communications, construction, and infrastructure as they relate to transportation
 - Identifying advances in various transportation modes that lead to more efficient delivery of goods and services
 - Comparing intelligent and nonintelligent transportation system designs

Communications

6. Critique components of digital and analog communication systems for effectiveness, including source, encoder, transmitter, media, receiver, decoder, storage, retrieval, and destination.

7. Illustrate use of laser and fiber-optic technologies in communications.
 - Explaining properties of light, including reflection, refraction, dispersion additive, and subtractive color theory

Manufacturing

8. Explain manufacturing processes of casting and molding, forming, separating, conditioning, assembling, and finishing of various engineering products.
9. Demonstrate safe use and selection of tools, procedures, and equipment in the manufacturing process of products, including hand tools, power tools, computer-aided manufacturing (CAM) techniques, and three-dimensional modeling.
10. Explain the process of programming a robotic action utilizing multiple axes of movement.
11. Describe the operation and programming of computer numerical control (CNC) machines.

Biotechnical

12. Describe the historical development of biotechnical engineering and its integration with scientific principles to improve society.
13. Explain how biotechnically engineered products have applications in agriculture, the environment, and medicine.

Engineering Research and Design

Engineering Research and Design is a one-credit, capstone course in the engineering field recommended for students in Grades 11–12. The course enables students to make an informed career choice through the study and application of mechanical, electrical, and other engineering systems. Students conduct research and design engineering projects to enhance abilities and expand interest in the field of engineering. Projects reinforce the application of communication, mathematics, and science. Computer technology applications are utilized extensively in this course to enable students to visualize, model, prototype, solve, and report comprehensive design problems.

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Engineering Pathway

Students will:

1. Explain professional, legal, and ethical responsibilities in the field of engineering, including the need for a diverse work force.
2. Demonstrate effective skills for seeking employment in a specific engineering pathway, including attributes that contribute to a successful engineering career.
 - Preparing a résumé using personal, educational, and professional information
 - Conducting a job search in a specific engineering field using Internet resources, including education requirements, potential earnings, and need

Project Proposal

3. Create a formal, narrative proposal for an engineering design brief.

Research

4. Conduct independent research related to a chosen engineering design brief.

Design and Evaluation

5. Demonstrate the engineering design process, including defining the problem, developing and selecting solutions, constructing prototype testing, evaluating and documenting results, and redesigning as needed.
6. Apply a standard experimental method to the evaluation process of a given engineering design.

Product and Process

7. Create a written technical report and a multimedia presentation for an engineering design problem, concept, or issue using industry recognized guidelines.
8. Demonstrate correct use and selection of tools, materials, procedures, and equipment in the construction of models, prototypes, and finished products.
9. Apply correct drafting techniques using computer-aided design (CAD) programs to produce plans, diagrams, and working drawings for the construction of models, prototypes, and final products.
10. Design a project portfolio that includes all project-related documentation.

Engineering Systems

Engineering Systems is a one-credit course designed to enable students to explore systems involved in the engineering research and design process. Topics include fluid, thermal, mechanical, and electrical systems. Students gain knowledge of each type of system and common interactions among them. The prerequisite for this course is Algebra II.

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Fluid Systems

Students:

1. Describe applications for fluid systems and components.
Examples: valves, cylinders, pressure regulators, orifices, pipes and tubing, filters
2. Demonstrate basic scientific principles and laws of fluid systems including Bernoulli's principle, Pascal's law, and Boyle's law.
Examples: Bernoulli's principle—practical applications of airfoil design
Pascal's law—sources of resistance and change of velocity for changing pipe types and diameters
Boyle's law—reasons for pop-off valves in pneumatic systems

Thermal Systems

3. Categorize thermal transfer in terms of conduction, convection, and radiation.
Examples: heating and cooling a house, cooking, interrupting of current by a circuit breaker
4. Explain control components and properties of materials used in thermal systems.
Examples: control components—thermostats, sensors, valves
properties of materials—resistance value (R-value) of attic insulation

Electrical Systems

5. Explain electrical theory at the atomic level, including sources of electromotive force.
6. Compare relationships between alternating current (AC) and direct current (DC) systems.
 - Demonstrating the use of instruments to measure resistance, voltage, and current in AC and DC circuits
 - Describing the operation of typical AC and DC system components
 - Calculating voltage, current, resistance, and power in AC and DC circuits

7. Propose solutions to given electrical system problem statements utilizing fundamental digital electronics, including logic gates, Boolean logic, flip-flops, and other digital components.
8. Select electrical components for a given application including, but not limited to, temperature control, identification of presence and position of objects, motor control, and speed control.

Mechanical Systems

9. Describe devices used to transfer, convert, change direction, transmit mechanical energy, and overcome friction.
10. Describe primary characteristics associated with mechanical systems, including physical quantities, motion, and energy.
Examples: physical quantities—gravity, inertia, friction
motion—linear, rotary, oscillating
energy—work, power, efficiency, mechanical advantage

Entrepreneurship

Entrepreneurship is a one-credit course designed to provide students with skills needed to effectively organize, develop, create, and manage a business. This course includes business management and entrepreneurship, communication and interpersonal skills, economics, and professional development foundations. Instructional strategies may include the development of a business plan, a school-based enterprise, computer and technology applications, real and simulated occupational experiences, or projects related to business ownership.

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Entrepreneurship

Students will:

1. Evaluate social and civil responsibilities of business ownership.
Examples: environmental issues, ethical issues, employment issues
2. Describe typical behavioral characteristics of an effective entrepreneur.
 - Identifying personal strengths and weaknesses to determine the need for additional information
3. Critique a variety of business classifications, including retailers, wholesalers, servicers, and manufacturers, to determine potential business ventures.
4. Compare types of business ownership.
Examples: sole proprietorship, franchise, partnership, limited liability corporation (LLC), corporation
5. Determine technological needs of a small business, including hardware, software, networking, and telecommunications.
6. Explain risk factors that affect entrepreneurs, including financial, psychological, and physiological aspects.

Finance

7. Analyze national and international economic fluctuations to determine effect on business markets of interest.
8. Develop a business plan, including identifying an executive summary; conducting a marketing and competitive analysis report; and developing a marketing, management, and financial plan.
9. Analyze credit and collection policies to determine consumer credit plans.

10. Explain taxes associated with business ownership and employment, including local, state, and federal taxes.
11. Use mathematics skills to analyze profit and loss margins for a business.

Legal Implications

12. Analyze government regulations to identify impact on business ownership.
13. Explain laws and regulations related to hiring and retaining employees.

Marketing

14. Determine marketing functions needed for effective business ownership.
15. Interpret research data to determine market-driven problems faced by entrepreneurs.
Examples: research data—business journals, stock market reports, newspapers, international trends

Career Opportunities

16. Determine career opportunities, responsibilities, and educational and credentialing requirements related to various entrepreneurship ventures.

E-Business

17. Identify advantages and disadvantages of Internet entrepreneurial opportunities.
 - Creating an effective e-business site
 - Designing a customer survey for an e-businessExamples: customer needs and satisfaction survey, demographics survey, products survey

Environmental Management

Environmental Management is a one-credit course that provides students with the opportunity to develop an understanding of the principles and practices of environmental management. Topics include career opportunities, safety, importance of natural resources, waste management, water quality, soil science, air quality, pesticide management and use, ecology, and energy conservation.

Content standards for this course are not intended to serve as the entire curriculum. Teachers are encouraged to expand the curriculum beyond the limits of these content standards to accommodate specific community interests and utilize local resources. This course encourages critical thinking, use of the scientific method, integration of technology, development of student leadership skills, and application of knowledge and skills related to practical questions and problems. Safety concepts are integrated into instruction to the maximum extent possible.

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Career Opportunities

Students will:

1. Recognize career opportunities related to environmental stewardship.

Safety

2. Identify safety considerations required for working in environmental management.

Natural Resources

3. Explain the importance of conserving natural resources and the environment.

Waste Management

4. Describe methods of managing various types of waste.
Examples: recycling, reusing, reducing
 - Describing factors to be considered in preparing a waste management plan

Water Quality

5. Describe properties of water that make it a universal solvent.
 - Describing uses of water in agricultural operations
Examples: consumption, irrigation, cleaning, heating and cooling, transporting agricultural products
6. Identify sources of local drinking water.
 - Determining the quality of freshwater using chemical testing and bioassessment
 - Describing the use of chemicals and microorganisms in water treatment
 - Describing water conservation methods
 - Describing the process of underground water accumulation, including the formation of aquifers
 - Identifying major residential, industrial, and agricultural water consumers
 - Identifying principal uses of water
7. Identify reasons coastal waters serve as an important resource.
Examples: economic stability, biodiversity, recreation
 - Classifying biota of estuaries, marshes, tidal pools, wetlands, beaches, and inlets
 - Comparing components of marine water to components of inland bodies of water
8. Describe factors to be considered in preparing a water conservation or management plan for groundwater and surface water resources.
Examples: water availability, water quality, water source
9. Identify major contaminants in water resulting from natural phenomena, housing, industrial waste, and agricultural pollutants.
 - Describing the eutrophication of water by industrial effluents and agricultural run offs
 - Classifying sources of water pollution as point and nonpoint

Soil Science

10. Describe the composition of soil profiles and soil samples of varying climates.
 - Identifying various processes and activities that promote soil formation
Examples: weathering, decomposition, deposition
 - Relating particle size to soil structure and type of sand, silt, or clay
11. Describe land use practices that promote sustainability and economic growth.
Examples: no-till planting, crop rotation
 - Defining various types and sources of waste and their impact on the soil
Examples: types—biodegradable and nonbiodegradable, organic, radioactive, nonradioactive;
sources—pesticides, herbicides
 - Identifying ways to manage waste, including composting, recycling, reusing, and reclaiming

12. Describe agents of erosion, including moving water, gravity, glaciers, and wind.
 - Describing methods of preventing soil erosion
Examples: planting vegetation, constructing terraces, providing barriers

Air Quality

13. Identify the impact of pollutants on the atmosphere.
 - Identifying layers of the atmosphere and the composition of air
 - Describing the formation of primary, secondary, and indoor air pollutants
 - Relating pollutants to smog and thermal inversions
 - Investigating the impact of air quality on the environment
 - Interpreting social, political, and economical influences on air quality

Pesticide Management and Use

14. Compare effects of various pesticides on the environment.

Ecology

15. Describe short- and long-term climatic conditions and their importance in agricultural production.
16. Identify the influence of human populations, technology, and cultural and industrial changes on the environment.
 - Describing the relationship between carrying capacity and population size
17. Identify positive and negative effects of human activities on biodiversity.
 - Identifying endangered and extinct species locally, regionally, and worldwide
 - Identifying causes for species extinction locally, regionally, and worldwide
18. Analyze agricultural activity for its impact on the ecosystems of Alabama.

Energy Conservation

19. Evaluate various fossil fuels for effectiveness as energy resources.
 - Describing the formation and use of nonrenewable fossil fuels
 - Identifying by-products of the combustion of fossil fuels, including particulates, mercury, sulfur dioxide, nitrogen dioxide, and carbon dioxide
 - Identifying chemical equations associated with the combustion of fossil fuels
 - Describing benefits of abundant, affordable energy to mankind
 - Identifying effects of fossil fuel by-products on the environment, including ozone depletion, formation of acid rain, brown haze, greenhouse gases, and concentration of particulates in heavy metals

20. Evaluate other sources of energy for effectiveness as alternatives to fossil fuels.
- Comparing nuclear fission and nuclear fusion reactions in the production of energy
 - Comparing energy production and waste output in generating nuclear energy
 - Differentiating among renewable and nonrenewable energy resources
 - Identifying local energy resources
Examples: landfill gas, wind, water, sun
 - Identifying ways the law of conservation of energy relates to fuel consumption
Examples: development of hybrid cars, construction of energy-efficient homes

Equine Science

Equine Science is a course that enables students to become knowledgeable in the areas of caring for and managing horses. Topics include career opportunities, safety, history and development, anatomy and physiology, nutrition, health, and selection and conformation. Students also learn about tools, tack, and facilities necessary for the proper care of horses.

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Career Opportunities

Students will:

1. Describe career opportunities in the equine industry.

Safety

2. Identify safety techniques to be considered when handling horses.
Examples: approaching a horse from the front and side, avoiding sudden movement, speaking quietly
 - Describing horse behavior that can cause injuries to the horse and to the handler
Examples: submission to some members of the herd, dominance over some members of the herd, fight-or-flight behaviors

History and Development

3. Differentiate characteristics of light horses, draft horses, and ponies, including structure, muscling, color, and shape of head and neck.
 - Listing various breeds of light horses, draft horses, and ponies
Examples: breeds of light horses—Quarter Horse, Appaloosa, Thoroughbred, Arabian, Morgan, American Saddlebred, Tennessee Walking Horse, Paint
breeds of ponies—Welsh, Shetland, Pony of the Americas, American Walking Pony
 - Describing historical roles of horses in transportation and recreation

Anatomy and Physiology

4. Describe the external anatomy of a horse.
Examples: withers, crest, poll, forehead, muzzle, point of shoulder, pastern, coronet, fetlock
5. Describe structures and functions of the equine digestive system.
6. Explain functions of the equine circulatory system.
7. Identify parts and functions of equine male and female reproductive systems.
 - Describing factors in an equine breeding program
Examples: heat cycle, gestation, lactation, artificial insemination, fertility

Nutrition

8. Analyze equine feed ingredients to determine nutritional value.
Examples: grain, roughage, vitamins, minerals
 - Identifying possible problems associated with feeding equine
9. Explain the balance of rations used in feeding equine.
 - Explaining nutritional requirements at various stages of equine development

Health

10. Describe causes of major equine diseases and methods for prevention.
Examples: disease—equine encephalitis
method of prevention—improved management practices
11. Differentiate among internal and external parasites prevalent in equine.
Examples: internal—ascarids, strongyles, pinworms
external—deerflies, lice, mites, ringworm, ticks, botflies
12. Describe hoof problems in equine.
 - Recognizing symptoms of lameness in equine
13. Diagnose conditions that require the assistance of a farrier.
Examples: farrier assistance—trimming, shoeing
 - Identifying tools used by a farrier
Examples: apron, hoof gauge, hoof knife, hoof pick, anvil, rasp, hoof nippers, nail clincher

14. Categorize normal equine ranges for vital signs, critical and noncritical injuries, and treatment of wounds.
- Examples: vital signs—heart rate, respiratory rate
critical injuries—broken bones
noncritical injuries—cuts
treatment of wounds—cleaning, applying ointments, applying bandages, stitching

Selection and Conformation

15. Distinguish factors in selecting horses for a particular use.
- Example: draft horses for pulling heavy loads
- Describing procedures for determining the age of a horse
Example: checking size of teeth
 - Describing factors to consider in judging equine halter and performance classes
 - Evaluating various equine training techniques

Facilities and Tack

16. Describe equine barn styles and facilities.
- Examples: barn styles—gambrel, gable
facilities—round pen, stables
- Identifying various tack and equipment used in the horse industry
 - Analyzing environmental issues to maintain and care for horses
Examples: waste management, overgrazing

Family and Consumer Sciences

Family and Consumer Sciences is a one-credit course that serves as the foundation course for the Human Services cluster, except for the Personal Care Services pathway. Course content provides opportunities for students to explore the core content included in the Family Studies and Consumer Sciences; Early Childhood Development and Services; Fashion; Interior Design; Food, Wellness, and Dietetics; and Consumer Sciences pathways. Major topics are marriage and family life, parenting and caregiving, consumer services, apparel, housing, food and nutrition, and technology and careers. This course is not a prerequisite for courses included in all pathways within the cluster; however, students are encouraged to take the course before entering a pathway.

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Foundations

Students will:

1. Apply mathematical, reading, writing, critical and creative thinking, decision-making, and problem-solving skills to effectively perform the work of the family and provide services to consumers.
2. Explain the impact of goal setting and teamwork on personal, family, work, and community life.
 - Recognizing the importance of FCCLA programs
3. Describe qualities of healthy relationships, including effective communication skills, conflict resolution techniques, and refusal skills.

Marriage and Family

4. Describe stages of the family life cycle and issues that influence family life at each stage.
 - Explaining the significance of the dating and engagement period
5. Interpret customs, traditions, and legislation that affect marriage and family life.
6. Evaluate the impact of demands in the home, workplace, and community on marriage and family life.

Parenting and Caregiving

7. Determine characteristics of a quality caregiver.
8. Evaluate the impact of parenting roles on the well-being of the child and family.
 - Determining physical, mental, emotional, and social needs of children

Consumer Sciences

9. Describe consumer issues related to meeting needs and wants of individuals and families.
Examples: budgeting, establishing credit, purchasing insurance, investing and saving, reporting taxes
10. Interpret rights and responsibilities of consumers.
 - Proposing alternative solutions for filing a consumer complaint
 - Comparing advertising techniques used to influence consumers

Apparel

11. Determine elements and principles of design used in selecting apparel and accessories.
12. Compare methods for the care and storage of apparel and accessories.
13. Demonstrate basic sewing techniques.
 - Utilizing sewing equipment in a safe and correct manner

Housing

14. Evaluate housing options, living space, and storage space to meet individual and family housing needs across the life span.
15. Demonstrate the selection and placement of furniture, accessories, and equipment using elements and principles of design in the home to meet individual and family needs.

Food and Nutrition

16. Compare the nutritive value and cost of restaurant meals to home-cooked meals.
17. Demonstrate food preparation using safe and correct use of equipment and sanitation practices.
 - Identifying a variety of table settings and appropriate etiquette for various occasions
18. Demonstrate skill in planning, preparing, serving, and storing food.

Technology and Careers

19. Evaluate the impact of technology on the family.
 - Determining the impact of technology on services provided to consumers
20. Determine factors to be considered in the development of an effective career plan.
 - Describing procedures for obtaining employment in careers related to family and consumer sciences and human services

Family Studies and Community Services I

Family Studies and Community Services I is a one-credit course designed for students who are interested in acquiring skills for providing service to families and in preparing for a variety of careers related to family and human services. Content standards guide students in discovering how to work with family and human services clients through topics that include the role and function of individuals engaged in family and human services; career options; educational training; agencies, organizations, and resources; laws and trends in the field; disadvantaging conditions of individuals and families; client rights, responsibilities, and support services; basic life skills; workplace professionalism; professional associations; confidential record keeping; workplace safety; communication skills; developmental needs of clients; health and wellness management plans; older adults; intergenerational living; services for older adults; crisis intervention and management; coping strategies and stress management; advocacy; abuse and neglect; and technology.

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Family and Human Services

Students will:

1. Determine roles of personnel employed in family and human services careers.
 - Examining education and training requirements for employees in family and human services careers
 - Describing personal benefits of employment in the family and human services field
2. Analyze agencies, organizations, services, and other resources available through family and human services to meet the needs of clients throughout the life span.
 - Describing characteristics of clients in need of assistance from family and human services
 - Summarizing current laws, trends, and issues that impact family and human services provided to clients
3. Explain the impact of disadvantaging conditions encountered by individuals and families.
Examples: poor health, lack of transportation, lack of income, limited mobility, loss of home, loss of spouse
 - Describing modifications needed to accommodate individuals with disadvantaged conditions
 - Describing the need for informing clients of their rights and responsibilities, including services available
4. Determine methods used in family and human services programs to equip clients with basic life skills.
5. Evaluate ways technology is used to provide services to clients.

Workplace Professionalism

6. Determine major roles and responsibilities necessary to manage family and human services programs.
7. Evaluate professional work behaviors, skills, and knowledge needed to provide services to clients, including confidentiality, professional behavior, teamwork, and maintaining accurate records.
 - Explaining the value of participation in professional family and human services organizations
8. Evaluate safety practices used in the family and human services workplace, including first aid, cardiopulmonary resuscitation (CPR), and procedures for hazardous conditions.
9. Identify interpersonal, verbal, and nonverbal communication skills needed in family and human services careers.

Client Developmental Needs

10. Compare physical, intellectual, social, and emotional developmental needs of clients throughout the life cycle.
 - Explaining theories of human development
 - Analyzing various formal and informal assessment tools to determine client needs
 - Identifying developmentally appropriate activities for clients based on needs
 - Explaining methods and techniques used to promote positive well-being and emotional stability of clients
11. Explain ways nutrition, exercise, and other lifestyle choices impact the health and wellness of clients.
Examples: dangers of substance abuse, health and wellness issues
12. Develop a health and wellness management plan for clients.
 - Explaining how clients are informed regarding implementation of a health and wellness management plan

Older Adult Services

13. Describe the impact of aging on the physical, mental, social, and emotional characteristics of the older adult population.
14. Determine major concerns and issues faced by older adults.
Examples: health, safety, housing, loss of independence, finances, social and intellectual needs
15. Describe the impact of intergenerational living on older adults and families.
16. Appraise characteristics of a quality program for providing services to older adults.

Intervention

17. Determine client situations requiring crisis intervention.
18. Analyze coping strategies and stress management practices for clients and family members that require intervention.
19. Evaluate strategies used to overcome diverse challenges faced by family and human services clients.
20. Describe ethical responsibilities regarding suspected abuse and neglect of clients.

Family Studies and Community Services II

Family Studies and Community Services II is a one-credit course. The prerequisite for this course is Family Studies and Community Services I. The course includes content that helps students learn ways to determine client needs through the use of assessments and to provide intervention services. The physical, social, emotional, and intellectual stages of clients from infancy to older adults are addressed throughout the course. Additional topics include licensure requirements; age-appropriate activities; curriculum development; hobbies and recreational activities; transitions and life changes of clients; the aging process; assisted-living facilities; technology; resources, agencies, and services for clients; disadvantaging conditions; assessments; making informed choices; crisis intervention; and abuse and neglect.

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Client Developmental Needs

Students will:

1. Evaluate services provided by a family and human services program for infants and toddlers in relation to their physical, social, emotional, and intellectual developmental stages, including licensure requirements for child care facilities and employees.
2. Critique services provided by a family and human services program for preschool age children in relation to their physical, social, emotional, and intellectual developmental stages.
 - Developing a curriculum unit for preschool-age children, including hands-on activities, dramatic play, art and music appreciation, and motor skill development
3. Analyze services provided by a family and human services program for school-age children in relation to their physical, social, emotional, and intellectual developmental stages.
 - Developing a parent education and program participation plan
4. Assess services provided by a family and human services program for adolescent children in relation to physical, social, emotional, and intellectual developmental stages, including coping skill, conflict resolution, and decision-making programs.
5. Compare services provided by various family and human services programs for older adults in relation to physical, social, emotional, and intellectual developmental stages, including daily living skills.
 - Differentiating between signs of aging and diseases affecting mental abilities of individuals
 - Analyzing how the aging process impacts the nutritional, socioeconomic, health, recreational, and housing needs of older adults
 - Assessing guidelines for establishing a program for older adults
 - Explaining life adjustments encountered by older adults
6. Compare types of assisted-living facilities and services provided for clients based on physical, psychological, and financial needs.

7. Describe how technology is utilized in managing and providing services to clients.

Intervention

8. Determine resources, agencies, services, and organizations to assist in resolving disadvantaging conditions of clients.
Examples: Medicaid; Medicare; assisted-living facilities; Women, Infants, and Children (WIC) program; departments of public health; shelters; food banks
9. Describe ways to assist clients in understanding factors leading to a better quality of life throughout the life span.
10. Critique educational programs available to meet the needs of clients seeking assistance from a family and human services program.
11. Assess agencies and organizations that promote advocacy for clients.
12. Describe skills needed to advise and counsel individuals and families with a variety of disadvantaging conditions.
13. Discriminate between situations that require personal prevention or intervention and those situations that require professional assistance.
14. Explain strategies to assist clients to make informed choices, assess resources and support, and follow through on responsibilities.
15. Evaluate characteristics of a physically and psychologically healthy environment for providing counseling and other services.

Assessment

16. Describe formal and informal assessment practices used to determine client strengths, needs, preferences, and interests.
17. Describe the importance of maintaining accurate and confidential documentation.
18. Determine ways to evaluate client willingness to participate in a counseling or treatment program.

Abuse and Neglect

19. Describe types of abuse and neglect found in the home.
20. Assess resources and services available to abused and neglected individuals.

Family Wellness

Family Wellness is a half-credit course designed for students interested in health issues that impact individuals, families, and communities. Content provides opportunities for students to explore family health throughout the stages of the life span. Topics include personal and family health goals; health promotion; health risks; communication skills needed in healthy relationships; consumerism; advocacy; mental and emotional health; relationship between nutrition and health; emergency care, first aid, and home safety; disease prevention; chronic health issues; substance abuse; technology used in health services; and careers related to individual and family health and wellness.

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Community Health

Students will:

1. Determine a variety of health services provided by school and community health professionals that impact the health and wellness of individuals and families, including health activities that influence and support others to work cooperatively for healthy communities.
Examples: mental health counseling, physical health screening, immunizations, public information seminars and services, drug prevention programs, school nurses, STOP the Violence—Students Taking on Prevention project, programs such as Students Against Destructive Decisions (SADD), health fairs
2. Analyze cultural influences on health behaviors, including social norms, laws and regulations, family traditions, and stereotypes that impact the health and wellness of individuals and families.
Examples: knowledge, attitudes, and beliefs related to family eating habits; Alabama’s graduated driver license to promote safe driving

Consumer Health

3. Differentiate between positive and negative health messages portrayed in the media.
Examples: negative—attractive models advertising products such as tobacco and alcohol, sexual images used to promote products
positive—public service announcements about parent-child communication, advertisements promoting the use of sunscreens
4. Evaluate positive and negative impacts of technology on health.
Examples: positive—improved diagnosis, prevention, and treatment of diseases and disorders
negative—decreased level of health-enhancing physical activity, inflationary expense of health care services

5. Explain valid and essential information for the safe use of consumer goods and health products.
Examples: using over-the-counter medications as directed, using herbals safely, recognizing fraud and fads, checking product labeling

Environmental Health

6. Analyze factors that affect community health, including comparing the rights of individuals or special interest groups regarding the environment with those of the community.
Examples: air pollution—breathing problems
noise pollution—hearing loss
chemical pollution—water quality
bio-terrorism—disease
rights of individuals or groups—community action to prevent landfill construction near neighborhoods or noise abatement near airports, rights of smokers versus nonsmokers in public places

Family Health

7. Explain the impact of personal health behaviors on family life, parenting, and child development, including attending to financial responsibilities associated with pregnancy, childbirth, and childrearing.
Examples: waiting to become a parent until physically, socially, and emotionally mature and having gained employment
8. Determine common causes of disability and premature loss of life across life stages.
Examples: Sudden Infant Death Syndrome (SIDS), unintentional and intentional injury, cardiovascular disease, diabetes, cancer, inadequate prenatal care

Personal Health

9. Analyze the relationship of dimensions of health and wellness, including emotional, intellectual, physical, social, environmental, and spiritual factors that impact the health and wellness of individuals and families.
 - Applying decision-making strategies to achieve and improve personal health goals
Examples: participating regularly in physical activity, avoiding sexual risk-taking, preventing abuse, practicing water safety, operating motor vehicles safely
10. Apply refusal skills used by individuals and families to abstain from risky situations.
Examples: saying “no,” walking away, offering alternatives, making excuses, finding solutions
11. Assess the impact of positive and negative personal health behaviors on the functioning of body systems.
Examples: identifying effects of health behaviors on the endocrine, cardiovascular, nervous, reproductive, digestive, skeletal, and muscular systems

Mental and Emotional Health

12. Identify symptoms, methods of treatment, and ways to manage mental illnesses or disorders such as depression, eating disorders, and suicide, including proposing potential solutions to health concerns.
Examples: recognizing problems with substance or child abuse and seeking help with prevention through family counseling; requesting referrals for drug, alcohol, or suicidal peer problems; participating in intervention seminars; using methods for working cooperatively with parents, school personnel, and peers; seeking assistance from responsible adults
13. Describe the impact of significant events on the physical and emotional health of individuals and families.
Examples: birth or death of a loved one, marriage, childbirth, adoption, divorce, chronic or infectious illness, victimization, relocation, end of relationship

Nutrition

14. Predict the impact of positive nutrition-related changes in behavior.
Examples: eating versus skipping breakfast, knowledge of the food pyramid, following doctor-recommended diet restrictions

Injury Prevention and Safety

15. Demonstrate cardiopulmonary resuscitation (CPR) and first aid skills.
16. Design home safety guidelines.
Examples: establishing family emergency plans for inclement weather, fire safety, personal safety, water safety, and accidental poisoning
17. Explain consequences of health behaviors that are harmful to self or others.
Examples: personal injuries, diseases and illnesses, monetary and property losses, legal liabilities

Prevention and Control of Disease

18. Determine symptoms, methods of prevention, and strategies for controlling communicable infestations, diseases, and infections.
Examples: symptoms—fever, itching, chills
strategies for preventing or controlling—abstinence, vaccinations, universal precautions
19. Explain methods of treating and managing chronic health problems.
Examples: diabetes; stress; asthma; allergies; depression; attention deficit hyperactivity disorder (ADHD); addiction to alcohol, tobacco, or other drugs; physical or cognitive impairment

Substance Use and Abuse

20. Explain laws and regulations related to substance use and abuse.

Fashion

Fashion may be taught as a one-credit or half-credit instructional-hour course. For a half-credit course, content standards 1, 3, 5, 8, 9, 10, 12, 13, 16, and 17 must be included. This course introduces students to the selection and care of clothing and accessories for individuals and families. Content provides opportunities for students to explore factors that influence apparel choice, apparel history, current fashion trends, proper care and maintenance of apparel, laws and legislation regarding the apparel industry, apparel design, apparel repair and construction, wardrobe planning, technology in the apparel and textiles industries, and career options in the apparel and textile industries.

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Clothing Decisions and Acquisition

Students will:

1. Determine factors that influence consumer decision-making practices for individual and family clothing choices throughout the life span.
Examples: age, gender, career, special needs, quality, fashion styles and trends, economics, climate, care requirements
2. Interpret laws and regulations regarding the apparel and textile industries.
3. Determine various sources for acquiring clothing to meet individual and family needs across the life span.
Examples: shopping mall; tailor or dressmaker shop; online, catalog, television network sales
4. Analyze the impact of consumer information and advertising for the clothing industry.
5. Describe benefits of a well-planned wardrobe.
6. Determine how clothing satisfies certain physical, psychological, and social needs.
7. Assess the cost of constructing, manufacturing, altering, or repairing textile products.

Apparel History

8. Determine factors that influence the evolution of fashion.
Examples: original clothing, fabrics, early civilizations, politics, religion, technology
9. Compare styles of clothing and types of fashion throughout history.
Examples: styles of clothing—dresses, shirts, skirts, pants, jackets, coats
types of fashion—classic, fad, retro, vintage

10. Describe features and styles of garments developed in the apparel industry, including styles of dresses, shirts, skirts, pants, coats, jackets, necklines, collars, and sleeves.
11. Describe the fashion designer's role in the apparel industry.

Apparel Design

12. Interpret effects of color on design and personal selection of clothing.
13. Explain elements and principles of design used to choose and create apparel.
Examples: line, shape, space, texture, pattern, balance
14. Compare natural and manufactured fibers used in clothing.

Clothing Care and Construction

15. Describe procedures for care of clothing and accessories.
Examples: laundry, stain removal, storage of clothing and accessories
16. Practice safe use of equipment for constructing clothing and accessories.
17. Demonstrate skills for producing, altering, and repairing a garment.
18. Evaluate a variety of methods for recycling and redesigning apparel.

Technology and Careers

19. Analyze the impact of technology for the apparel and textiles industries.
20. Distinguish career options and entrepreneurial opportunities in the apparel and textiles industries.

Fashion Design

Fashion Design is a one-credit course designed for students interested in fashion, fashion design, and apparel and textile design technology. Content provides opportunities for students to explore historic costumes, research current fashion styles and trends, analyze fibers and textiles, design clothing and accessories, utilize technology in fashion design, and explore career options in apparel and textiles industries.

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Apparel and Textile Industries

Students will:

1. Define terminology used in the apparel and textile industries, including haute couture, avant-garde, composite garments, tailored garments, and draped garments.
2. Analyze the impact of national and international regulations and legislation for fashion.
3. Describe the impact of the apparel and textile industries on the United States and world economies.
4. Analyze roles of trade associations and publications to determine influence on the apparel and textile industries.
5. Define types of products in the apparel and textile industries.
6. Evaluate the influence of history on fashion, including the impact of historical costumes and the achievements of famous fashion designers.
 - Interpreting the impact of fashion cycles on fashion
7. Compare theories of various fashion movements.
Examples: trickle-down, trickle-up, trickle-across

Apparel Production

8. Explain how fabric selection affects the cut and style of garments.
9. Evaluate the impact of design labels, manufacturers, and types of stores on the marketing and sales of the apparel and textile industries.
10. Distinguish between classifications of apparel used in the fashion industry.
Examples: children, sportswear, young men
11. Analyze styles of garments for their effect on various body types.

12. Critique the construction, care, and maintenance of apparel in relation to textile characteristics.

Fashion Design

13. Analyze space, tools, equipment, and furnishing requirements for a design studio.
14. Explain the process that leads to fashion design.
Examples: inspiration, research, idea, sketch, sample, revision
15. Demonstrate fashion illustration skills to design a fashion line, including sketching fashion figures and apparel, using varied media and techniques, and applying basic and complex color schemes.
16. Apply elements and principles of design to create fashion.
Examples: line, shape, space, texture, pattern, balance
17. Demonstrate draping and flat pattern-making techniques.
18. Demonstrate techniques used to create new designs from an original garment, accessory, or textile product.
19. Design fashions to meet special needs of clients.
20. Utilize technology to design and create fashion.

Fashion Merchandising

Fashion Merchandising is a one-credit course for students who are interested in the fashion and retail industry. Content provides opportunities for students to explore factors related to the retail industry, examine structure and organization of fashion business operations, study merchandising techniques, utilize technology in fashion merchandising, and explore career options in fashion and retail industries.

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Retail Industry

Students will:

1. Explain the impact of globalization on the fashion industry.
2. Critique design and buying centers of the fashion industry.
3. Assess the impact of fashion cycles on the fashion industry.
4. Compare factors affecting fashion trends and fads.
5. Interpret fashion styles and trends as they relate to a designer's line.
6. Analyze consumer behavior and attitudes toward shopping in relation to the retail industry.
7. Analyze the cycling process of forecasting, planning, and buying for the retail industry.

Fashion Business Operations

8. Compare the structure and organization of various retail operations, including factors related to customer service, safety, and security in the fashion industry.
9. Describe factors to consider when preparing financial and merchandise assortment buying plans.
 - Identifying divisions within companies of apparel manufacturers and retailers
10. Interpret effects of security and inventory control strategies, cash and credit transition methods, laws, and worksite policies on loss prevention and store profit.
11. Describe principles and practices involved with human resource management in the retail industry.
12. Assess ways technology impacts fashion design, apparel distribution, and marketing.

Fashion Merchandising

13. Describe various merchandising techniques used in retail operations.
14. Evaluate various store layout designs, including types of merchandise displayed within each type of layout.
15. Explain the importance of visual merchandising, advertising, and special events to retail sales.
16. Compare factors that determine the price of products sold in the fashion industry.
17. Evaluate principles of marketing and the importance of the marketing mix to a retail operation.
Examples: price, promotion, product, place, television, print, radio, Internet
18. Explain methods used by the fashion retailer to determine products to be marketed, including product planning.
19. Determine research strategies used by manufacturers and retailers to help with market segmentation.
20. Compare current trends in non-store retail merchandising.
Examples: Internet shopping, catalogs

Financial Management

Financial Management is a one-credit course designed to provide students with an overview of financial and investment planning procedures. Students interpret financial data to develop short- and long-term budgetary plans, produce accurate reports, and make informed business decisions. Students develop product knowledge related to financial and investment planning by examining characteristics for distinguishing among stocks, bonds, and commodities and between insurance and annuity products.

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Budgeting

Student will:

1. Analyze financial data to develop budgetary plans and interpret financial data.
 - Creating charts, graphs, and tables using financial data
 - Analyzing budgets to determine future financial needs
 - Determining cash flow, profit margin, and cost-benefit analysis
2. Evaluate income, savings, and investment opportunities to create a budget that meets short- and long-term goals.

Investments and Risk Management

3. Evaluate risk management options available to consumers and entrepreneurs for protection against financial loss.
4. Utilize mathematics skills to analyze risk, interest rate return, and liquidity for savings and investment alternatives.

Communication

5. Demonstrate skills needed to effectively organize and communicate financial information.
Examples: formal and informal presentations, memoranda

Financial Management

6. Apply organizational skills to complete and manage financial operations.
Examples: synchronizing schedules and calendars, scheduling work priorities to meet deadlines

7. Explain how agencies that regulate national and international financial markets protect investors.
 - Using financial statements to analyze a company's financial situation
 - Forecasting business profit
 - Critiquing ways domestic and international financial markets influence interest rates, trade deficits, and unemployment
8. Analyze the decision-making process needed to develop and maintain a financially stable business plan.
9. Determine how effective debt and credit management practices affect insurance costs, job opportunities, and interest rates.
 - Analyzing alternative sources of credit for suitability to a particular situation
10. Analyze international, federal, state, and local regulations for impact on financial management decisions.
 - Describing effects of tax structure on business decisions
 - Comparing legal rights and responsibilities of various types of businesses
 - Interpreting the role of the United States Securities and Exchange Commission in regulating financial decisions

Career Opportunities

11. Utilize research results to determine career and entrepreneurial opportunities, responsibilities, and educational and credentialing requirements related to financial management and investment planning.

Tax Liability

12. Determine tax liability on income.
Examples: property, inheritance, earned income

Fire Fighting

Fire Fighting is a one-credit course designed to provide students with information regarding career possibilities in fire fighting, including instruction in techniques of fire fighting. Topics include career opportunities, safety, fire prevention and control, hazardous materials, sprinkler systems, first responder, and public relations.

Content standards for this course are not intended to serve as the entire curriculum. Teachers are encouraged to expand the curriculum beyond these minimum required content standards to accommodate specific community interests and utilize local resources. This course encourages critical thinking, use of the scientific method, integration of technology, development of student leadership skills, and application of knowledge and skills related to practical questions and problems. Safety concepts are integrated into instruction to the maximum extent possible.

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Career Opportunities

Students will:

1. Describe career opportunities in fire fighting.

Safety

2. Interpret local, state, and federal regulations pertaining to fire safety issues.

Fire Prevention

3. Assess the importance of fire prevention.
 - Identifying common causes of fires and their prevention
 - Describing fire inspection procedures for private dwellings
 - Practicing school fire drill procedures
 - Conducting a building fire-safety survey
 - Describing smoke, heat, and flame detection alarm systems

Sprinkler Systems

4. Evaluate fire control sprinkler systems, including pendant, upright, and sidewall designs.
 - Identifying sprinkler system control valves
5. Identify fire control procedures for all classes of fires.

Fire Control

6. Describe loss control procedures for fire-damaged property.

Hazardous Materials

7. Assess dangers of various hazardous materials.
 - Comparing the three parts of the incident management triangle as outlined in the National Fire Protection Association (NFPA) 472: Standard for Professional Competence of Responders to Hazardous Materials
 - Defining strategic goals, tactical objectives, and tactical methods as outlined in the NFPA 472 document
 - Describing sources used to identify specific hazardous materials
 - Defining common physical and chemical properties of hazardous materials

First Responder

8. Describe roles and responsibilities of a first responder.
Examples: assessing vital signs of a sick or injured person, assessing environmental threats, demonstrating basic life support (BLS) procedures, assessing for spinal injury

Public Relations

9. Develop a public relations program for promoting fire prevention and safety.

Fish and Wildlife Management

Fish and Wildlife Management is a course that provides students with the opportunity to gain knowledge regarding the management of natural resources. Topics included in the course are career opportunities, outdoor safety, history, issues, classification, fish and wildlife ecology, fish and wildlife management, endangered species, fish and wildlife pest management, and outdoor recreation.

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This course may be taught as a one-credit or half-credit course. For a half-credit course, content standards 1, 2, 3, 4, 5, 6, and 8 must be included.

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Career Opportunities

Student will:

1. Describe career opportunities in fish and wildlife management.

Outdoor Safety

2. Determine principles of hunting, boating, and recreational vehicle safety.
 - Identifying survival and first aid techniques related to outdoor recreation

Fish and Wildlife Management

3. Explain the history of fish and wildlife management.
 - Describing the impact of sport hunting in Alabama
Examples: economy, wildlife population
4. Describe laws that protect fish and wildlife.
5. Compare habitat needs of selected fish and wildlife species native to Alabama.
Examples: water, shelter, food
 - Designing a wildlife management plan
 - Explaining methods used to improve fish and wildlife habitats

Fish and Wildlife Issues

6. Analyze human activities for positive and negative effects on fish and wildlife.
Examples: positive—planting sea grass, conserving habitats
negative—polluting, filling wetlands
 - Explaining environmental effects of introducing nonnative species into an area
 - Describing economic damage to crops caused by wildlife
 - Evaluating issues concerning endangered and threatened species of fish and wildlife
Example: recovery strategies

Fish and Wildlife Classification

7. Distinguish game from nongame wildlife species.
 - Comparing classes of wildlife, including mammals, birds, reptiles, amphibians, and fish
8. Identify common fish and wildlife species indigenous to Alabama.

Fish and Wildlife Ecology

9. Compare aquatic and terrestrial ecosystems.
Examples: wetlands, woodlands, grasslands
 - Identifying methods used to correct an unbalanced ecosystem
 - Describing interdependence between biotic and abiotic components of a wildlife ecosystem

Fish and Wildlife Pest Management

10. Identify pests and diseases affecting fish and wildlife species.

Outdoor Recreation

11. Identify outdoor recreational opportunities in Alabama.
 - Identifying methods of developing and managing outdoor recreational enterprises
12. Describe differences among state parks in Alabama.

Floral Design and Interiorscaping

Floral Design and Interiorscaping is a one-credit course designed to introduce students to the floral industry. Topics include career opportunities, safety, floral design, and interiorscaping.

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Career Opportunities

Students will:

1. Identify career opportunities in the floral industry.

Safety

2. Practice safe usage of tools and supplies in floral design and interiorscaping.

Floral Design

3. Create floral arrangements using basic line designs.
4. Differentiate among flowers, foliages, and plants used in the floriculture industry.
 - Demonstrating procedures for handling foliage and flowers
5. Identify common floral arrangements used in the floral design industry.

Examples: corsages, boutonnieres, bud vases, centerpiece arrangements

 - Demonstrating various floral construction techniques
Examples: wiring flowers, making bows
 - Preparing potted plants for sale
 - Calculating the cost of floral arrangements
Examples: ratio mark-up, variable ratio mark-up, percentage mark-up

Interiorscaping

6. Compare effects of light, temperature, air, and water on plant growth in interiorscaping.

7. Differentiate among drainage characteristics of various growing media.
8. Describe disease and insect control methods used in interiorscaping.
9. Compare major plant fertilizers used in interiorscaping.
 - Identifying symptoms of common nutrition disorders in plants
10. Explain principles of interior landscape design.
Examples: use of line, form, texture, and color
 - Demonstrating dynamics of arranging plant materials in interior settings
Examples: balance, size, relationships of plants
11. Design a maintenance schedule for interiorscape sites.
12. Design interiorscapes for commercial clients.

Flux Cored Arc Welding

This is one-credit course that introduces students to the flux cored arc welding (FCAW) process. Emphasis is placed on safe operating practices and on handling and storage of compressed gases. Topics include safety, equipment setup, joint design and preparation, and gas flow rates. Students demonstrate manual welding skills on carbon steel using the FCAW process in the 1-F flat fillet, 2-F horizontal fillet, 3-F vertical fillet, and 4-F overhead fillet weld positions. Upon successful completion of this course, students are able to make quality welds in the 1-F, 2-F, 3-F and 4-F positions. Students may, with the teacher's permission and according to local industry needs, begin this course upon successful completion of the prerequisite course, Applied Welding I with Plasma Arc Cutting.

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Safety

Students will:

1. Describe safety precautions for the FCAW process.

Equipment

2. Demonstrate techniques for setting up, adjusting, and selecting materials for various types of FCAW machines and equipment.

Welds

3. Utilize the FCAW process to demonstrate proper T-joint fillet weld techniques for single and multiple passes, including flat fillet welds in the 1-F position, horizontal fillet welds in the 2-F position, vertical fillet welds in the 3-F position, and overhead fillet welds in the 4-F position.
4. Utilize the FACW process to demonstrate proper lap-joint fillet weld techniques for single and multiple passes, including flat fillet welds in the 1-F position, horizontal fillet welds in the 2-F position, vertical fillet welds in the 3-F position, and overhead fillet welds in the 4-F position.
5. Use the FCAW process to demonstrate proper corner-joint fillet weld techniques for single and multiple passes, including flat fillet welds in the 1-F position, horizontal fillet welds in the 2-F position, vertical fillet welds in the 3-F position, and overhead fillet welds in the 4-F position.

Food and Nutrition

Food and Nutrition may be taught as a one-credit-or half-credit course. For a half-credit course, content standards 2, 3, 4, 5, 6, 9, 11, 12, 13, and 18 must be included. Topics include the impact of daily nutrition and wellness practices on long-term health and wellness; physical, social, and psychological aspects of healthy nutrition and wellness choices; selection and preparation of nutritious meals and snacks based on United States Department of Agriculture (USDA) Dietary Guidelines and Food Guide Pyramid; safety, sanitation, storage, and recycling processes and issues associated with nutrition and wellness; impacts of science and technology on nutrition and wellness issues; and nutrition and wellness career paths.

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Food

Students will:

1. Analyze national and international food production and distribution systems to determine the influence of each on the food supply.
2. Explain how food choices and food production are influenced by psychological, social, cultural, nutritional, economical, global, environmental, geographical, and technological factors.
3. Interpret legislation and regulations related to food production and consumption.

Nutrition

4. Determine nutritional and fitness needs of individuals and families across the life span.
5. Analyze nutritional standards in planning recipes and menus to meet nutritional needs of individuals across the life span.
Examples: USDA Dietary Guidelines for Americans, USDA Food Guide Pyramid
6. Evaluate the impact of diet fads, food addictions, and eating disorders on fitness and wellness.
7. Describe the impact of daily food choices on health and wellness.
8. Determine current trends and issues in health, wellness, and nutrition.

Meal Management and Service

9. Prepare a nutritious menu.
 - Interpreting recipes in food production
 - Demonstrating safe and correct use of equipment
 - Practicing food safety in food production, handling, service, and storage
 - Using correct hygiene and health procedures
 - Organizing kitchen space
 - Demonstrating a variety of creative food presentation techniques
10. Compare the cost and nutritive value of preparing food at home versus purchasing fast food.
 - Describing savings through bulk food purchasing
11. Apply management principles when planning, purchasing, preparing, storing, and serving food.
12. Judge the quality of prepared food.
13. Demonstrate etiquette, manners, and proper table settings for various occasions.

Cuisine

14. Analyze recipes and menus from other countries for nutritional values.
15. Demonstrate food preparation techniques used in national and international cuisines.

Special Occasions

16. Demonstrate food preparation techniques required when preparing food for special occasions.
 - Analyzing methods of serving food for special occasions
Examples: receptions, luncheons, buffets
17. Demonstrate a variety of creative food presentation techniques.

Technology and Careers

18. Determine the impact of technology on food production, choices, and nutrition.
Examples: biotechnology, hormone injection
19. Identify careers and entrepreneurial opportunities in the field of food and nutrition.

Forensic and Criminal Investigations

Forensic and Criminal Investigations is a rapidly developing area of the Law, Public Safety, Corrections, and Security cluster. Forensic and criminal investigators provide assistance to fire fighters and law enforcement officers as well as the criminal justice system. This one-credit course focuses on career opportunities, safety, history of forensic science, criminal investigation, forensic serology and dextoxyribonucleic acid (DNA) testing, forensic studies in anthropology, toxicology, fingerprinting, firearms, physics, and document examination.

Content standards in the course are not intended to serve as the entire curriculum. Teachers are encouraged to expand the curriculum beyond these minimum required content standards to accommodate specific community interests and utilize local resources. This course encourages critical thinking, use of the scientific method, integration of technology, development of student leadership skills, and application of knowledge and skills related to practical questions and problems. Safety concepts are integrated into instruction to the maximum extent possible.

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Career Opportunities

Students will:

1. Explain career opportunities in forensic and criminal investigations.

Safety

2. Identify safety precautions for forensic and criminal investigators.

History of Forensic Science

3. Describe the history of forensic science.

Criminal Investigations

4. Explain criminal investigation procedures, including purpose and types.
5. Describe responsibilities of various personnel involved in crime scene investigations.
Examples: police, detectives, laboratory specialists, medical examiners
 - Explaining techniques for searching, sketching, and recording data from a crime scene

6. Explain ways to collect and preserve evidence from a crime scene.
 - Distinguishing between physical evidence and witness evidence
 - Comparing the three main pattern types that combine to form an individual's unique fingerprint
 - Explaining different methods of latent fingerprint development
 - Identifying origins of impressions, including footwear and tire tread
 - Describing ways to identify hair, fiber, and blood evidence

Forensic Serology and Deoxyribonucleic Acid Testing

7. Describe presumptive and confirmatory forensic tests.
Examples: blood type comparison, DNA testing
8. Describe the importance of genetic information to forensics.
 - Using the process of gel electrophoresis for DNA fingerprinting

Forensic Anthropology

9. Describe the decomposition process.
 - Using rigor mortis to determine corpse position
 - Describing decomposition by-products used to determine cause of death
 - Using entomological life cycles to determine time of death
10. Identify the importance of skeletal remains in forensics.
 - Comparing bones and skulls based on age, sex, and race
 - Using forensic dentistry to establish identity

Forensic Toxicology

11. Describe general categories of drugs and poisons, including their effects on humans.
 - Explaining ways poisons are detected during autopsy

Fingerprinting

12. Explain fingerprinting methods and identification techniques.

Firearm Forensics

13. Distinguish between class and individual characteristics of firearms.

Physics in Forensics

14. Use laws of physics to explain forensic evidence.
 - Analyzing blood splatter patterns to determine speed, height, and direction
 - Tracking trajectories of collected evidence

Document Examination

15. Describe techniques used to determine the validity of forensic documents.
Examples: fiber and handwriting analysis, ink chromatography

Forestry

Forestry is a course designed to enable students to become knowledgeable of forestry and wood technology. Students acquire an appreciation for increased emphasis on managing and conserving forests for the future. Topics include career opportunities, safety, history, dendrology, tree measurement, mapping, silviculture, forest products, and forest protection.

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This course may be taught as a one-credit or half-credit instructional-hour course. For a half-credit course, standards 1, 2, 3, 4, 5, 6, 8, 9, 11, and 13 must be included.

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Career Opportunities

Students will:

1. List employment opportunities in forestry.

Safety

2. Identify potential hazards in Alabama forests, including topographical hazards, stinging insects, venomous spiders and snakes, and poisonous plants.

History

3. Describe historical events that have influenced forestry in Alabama and the United States.
 - Comparing roles of Alabama forestry agencies

Dendrology

4. Describe major parts of a tree and their functions.
5. Identify common forest trees of Alabama.
 - Comparing hardwood and softwood trees
 - Comparing gymnosperms and angiosperms

Tree Measurement

6. Demonstrate the use of tree measurement tools.
Examples: Biltmore stick, hypsometer, clinometer, tree calipers, tree diameter tape
 - Describing techniques for measuring diameter at breast height (DBH)
 - Describing techniques for measuring total tree height
 - Describing techniques for measuring pulpwood at marketable height
 - Describing techniques for measuring sawlogs
7. Determine the volume of standing timber.
Examples: using Doyle Log Rule, Scribner Log Rule, and International Log Rule
 - Calculating forest product value using cords, board feet, and cubic feet
8. Describe various methods for cruising timber.
Examples: line plot, strip, total
 - Grading a tree for defects, size, and type to determine possible products
 - Determining techniques for timber stand improvement (TSI)

Mapping

9. Interpret map characteristics and features.
 - Locating various positions on a map
 - Using a scale to determine distance on maps
 - Identifying markings on a map
Examples: colors, symbols, contour lines
10. Demonstrate the use of mapping tools, including direction, elevation, and distance-reading tools.
 - Locating land corners and boundaries
 - Determining acreage using a legal land description, topographic map, and a hand compass
 - Describing how topographical maps combined with aerial photographs are used to identify the location of specific property
 - Describing uses of a global positional system (GPS) in forestry
 - Describing a legal land description, including townships, ranges, and sections
 - Comparing systems of land surveying
Examples: rectangular, metes and bounds

Silviculture

11. Compare methods of harvesting timber, including seed tree cutting, clear cutting, selection cutting, and shelter wood cutting.
 - Identifying common harvesting techniques in forestry
Examples: felling, bucking, skidding, loading

12. Compare artificial and natural reforestation methods.
 - Identifying sources of tree seedlings
 - Selecting methods for the handling and care of seedlings
 - Evaluating tree planting methods
13. Explain the importance of prescribed burning.

Forest Products

14. Describe chemical and physical properties of wood.
15. Identify lumber, timber, and paper products produced from wood.
 - Describing the process by which various forest products are made
16. Analyze characteristics of lumber to determine grade.
Examples: decay splits, milling defects, knots, stains
17. Describe wood treatment processes.
Examples: preservative oils, water-borne salts, pressure treatment techniques

Forest Protection

18. Identify causes of forest fires.
 - Identifying fire-fighting tools and methods

Forestry Equipment

Forestry Equipment is a one-credit course designed to enable students to become knowledgeable in the maintenance and safe operation of all equipment used in the forestry industry, including types of gasoline and diesel engines. Topics include career opportunities, safety, large equipment, small equipment, engine maintenance, and hydraulics.

Content standards for this course are not intended to serve as the entire curriculum. Teachers are encouraged to expand the curriculum beyond the limits of these content standards to accommodate specific community interests and utilize local resources. This course encourages critical thinking, use of the scientific method, integration of technology, development of student leadership skills, and application of knowledge and skills related to practical questions and problems. Safety concepts are integrated into instruction to the maximum extent possible.

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Career Opportunities

Students will:

1. Examine careers in sales and service of forestry equipment.

Safety

2. Recognize the need for safety clothing and gear used in the forestry industry.
 - Identifying safe practices in the forestry mechanics industry
 - Describing the safe operation and maintenance of forestry equipment

Large Equipment

3. Compare uses of tree-harvesting equipment.
Examples: skidder, loader, cutting machine, delimber
4. Identify road and fire lane maintenance equipment.
Examples: bulldozer, road grader

Small Equipment

5. Demonstrate the use of forestry hand tools, including pruning saws, bow saws, loppers, and brush cutters.
6. Identify sharpening techniques for chain saws, axes, pruners, and pole saws.

7. Identify types of urban forestry equipment, including tree-climbing equipment and tree-moving equipment.
8. Explain common techniques of chain saw maintenance.
 - Identifying major components of a chain saw
 - Differentiating types of chains used on a chain saw

Engine Maintenance

9. Identify systems that require inspection before engine operation.
10. Describe preparation of forestry equipment for storage.
Examples: draining fluids, lubricating

Hydraulics

11. Describe uses of hydraulic systems in the forestry industry.
 - Identifying basic components of a simple hydraulic system
 - Comparing advantages and disadvantages of using a hydraulic system

Foundations of Arts, Audio-Video Technology, and Communication

Foundation of Arts, Audio-Video Technology, and Communication is a one-credit course designed to introduce students to the areas of advertising design, animation, commercial photography, graphic arts, and television production. Classroom, laboratory, and real-world experiences promote teamwork, leadership, and further opportunities for application of knowledge and skills.

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Foundation Core

Students will:

1. Use mathematical, decision-making, and problem-solving skills needed to perform the management, compositional layouts, and other design calculations in the arts, audio-video technology, and communications industry.
2. Use reading, writing, and communications skills needed to convey themes, ideas, and concepts in research and public presentation for arts, audio-video technology, and communication projects.
3. Utilize information technology tools to access, manage, and integrate information in the communication industry.
4. Analyze an organizational structure for systemic performance in the arts, audio-video technology, and communications industry.
5. Practice safe and healthy standards in the arts, audio-video technology, and communication environments.
6. Demonstrate leadership and teamwork skills gained through student organization activities in the communication industry.
7. Assess communications ethics and legal responsibilities to provide guidelines for conduct.
8. Determine factors to be considered in developing an effective career plan and procedures for obtaining employment in the communications industry.
9. Describe visual communication processes used to convey messages to a variety of audiences through various art forms, audio-video technology, and the media.
10. Communicate ideas and information to convey messages to coworkers and other audiences.
11. Analyze the history and evolution of the arts, audio-video technologies, and communications in society and the economy.

12. Demonstrate processes that provide team building.
Examples: brainstorming, group projects, interpersonal communication

Technical Skills

13. Analyze communication concepts for ways they are interpreted and influenced through various forms of art, audio-video technology productions, and the media.
14. Interpret the influence of elements of time and place on visual characteristics, content, purposes, and messages of works of art.

Foundations of Engineering

Foundations of Engineering is a one-credit course designed to offer students an overview of the engineering profession and fundamental skills utilized in general engineering. Students investigate various engineering disciplines and related career paths. They develop communication and teamwork skills as well as increase their understanding of basic scientific and mathematics principles used in problem solving through the engineering design process. Career Cluster Technologies be used as a substitute for this course. Students may take one or the other but not both.

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Students will:

1. Demonstrate skills for employment in the engineering field, including preparing job résumés and applications.
 - Researching engineering pathways, including main disciplines, education requirements, job responsibilities, and potential earnings
 - Researching current and future engineering job opportunities
 - Demonstrating interpersonal skills, work habits, and ethical behavior for successful interviewing, employment, and job changes
2. Explain positive and negative impacts of engineering on society, including ethical, professional, and legal considerations.
 - Differentiating between engineering, technology, and science
 - Critiquing significant contributions of leaders in engineering
3. Apply the systems model of input, process, output, feedback, and impact.
 - Analyzing an engineering design brief to determine a course of action
 - Demonstrating team problem-solving skills as they apply to individual and collective responsibilities of each member of an engineering team
 - Developing projects, reports, and oral presentations related to engineering designs
 - Utilizing mathematics concepts in engineering designs
4. Demonstrate the use of analog and digital precision measuring instruments utilized in engineering.

Examples: micrometers, calipers, indicators, rulers, protractors, multimeters

 - Explaining the purpose and history of measurement systems
 - Defining customary and metric measurement systems
 - Utilizing conversion factors of customary and metric measurements
 - Practicing the use of significant digits

5. Classify basic engineering drawings and their components, including sketches and mechanical and computer-aided (CAD) drafting techniques.
 - Practicing thumbnail sketches, two-dimensional and three-dimensional sketches, and CAD drawings
 - Classifying multi-view sketches and drawings
 - Identifying orthographic and isometric sketches and drawings
6. Practice computer modeling and prototyping for an engineering design.
7. Utilize information technology as it relates to engineering, including spreadsheets, databases, word processing, audiovisual presentations, and Internet research.
8. Describe engineering systems and processes, including mechanical systems, fluid systems, thermal systems, electrical systems, manufacturing processes and materials, and quality assurance.
9. Apply appropriate safety and health procedures for engineering classroom and laboratory situations.
 - Utilizing tools and equipment safely
 - Identifying environmental safety requirements for specific applications
 - Recognizing functional safety concerns in engineering designs
10. Demonstrate leadership and teamwork skills gained through student organization activities.
11. Identify patterns, relations, and functions of an engineering organization or workplace.
12. Identify terminology associated with Engineering pathways.
13. Identify characteristics of sound financial management for engineers and engineering companies.
Example: preparing a budget

Foundations of Health Science

Foundations of Health Science is a required one-credit course that introduces students to a wide range of health careers. Integrated academics combined with health care knowledge and skills provide the framework for a strong health care delivery system in the twenty-first century. This course is the prerequisite for all the health science courses. It is recommended for students who want to prepare for further study in an array of health-related fields at the postsecondary level.

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Career Opportunities

Students will:

1. Describe health science pathways and careers.
Examples: therapeutic services, health informatics, support services, biotechnology research and development, diagnostic services
2. Describe roles and responsibilities of individuals as members of a health care team.
Examples: communication, leadership, adaptability, diversity

Safety

3. Compare health care delivery systems for services, types of facilities, and access to care.
4. Demonstrate safe work practices in health care, including adherence to Occupational Safety and Health Administration (OSHA) standards, observance of emergency procedures and protocol, and knowledge of body mechanics as related to the field of ergonomics.
Examples: washing hands, using personal protective equipment, preparing for fire safety

Medical Terminology

5. Identify basic medical symbols and terms, including pronunciation, abbreviations, prefixes, suffixes, and root words.

Anatomy Overview

6. Describe basic structures and functions of human body systems.

Communication Skills

7. Use effective communication skills in the field of health care, including addressing clients respectfully.
8. Use information technology applications required for health science careers.
Examples: using the Internet, transcribing, communicating information

Employability Skills

9. Demonstrate employability traits needed in health science careers.
Examples: personal appearance and hygiene, interpersonal skills, interview skills, completion of job applications

Legal and Ethical Implications

10. Recognize legal responsibilities, limitations, and implications within the health care delivery setting.
Examples: Patients' Bill of Rights, legal documentation requirements, Health Insurance Portability and Accountability Act (HIPAA)
11. Explain ethical practices and issues required within the health care setting.

Health and Wellness

12. Describe fundamentals of health promotion and wellness.
Examples: disease prevention, exercise, proper diet, avoiding at-risk behaviors

Technical Skills

13. Demonstrate common technical skills required in the health care industry.
Examples: assessing vital signs, demonstrating cardiopulmonary resuscitation (CPR), administering first aid, practicing infection control
14. Use mathematics concepts in a health-related setting.

Financial Literacy

15. Create a personal career plan in a chosen health science pathway.
 - Identifying skills needed for personal financial literacy

Gas Metal Arc Welding

This is a one-credit course that provides instruction regarding various transfer methods of gas metal arc welding (GMAW) fillet welds. Topics include safety, equipment setup, joint design and preparation, and gas flow rates. Upon successful completion of this course, students are able to perform 1-F flat fillet, 2-F horizontal fillet, 3-F vertical up-and-down fillet, and 4-F overhead fillet weld positions. While students are encouraged to continue welding courses in sequence, students may, with teacher permission and in accordance with local industry needs, begin this course after successful completion of the prerequisite course, of Applied Welding I with Plasma Arc Cutting.

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Safety

Students will:

1. Explain safety precautions for the GMAW process.

GMAW Equipment

2. Demonstrate techniques for setting up GMAW equipment.
 - Explaining types of metal transfer specific to the GMAW process
 - Selecting filler wire and gas combinations for the GMAW process
 - Adjusting the GMAW machine with various controls and settingsExamples: spray arc, short arc

GMAW Welds

3. Demonstrate fillet welds with the GMAW process for carbon steel.
4. Utilize the GMAW process to demonstrate proper T-joint fillet weld techniques for single and multiple passes, including flat fillet welds in the 1-F position, horizontal fillet welds in the 2-F position, vertical up-and-down fillet welds in the 3-F position, and overhead fillet welds in the 4-F position.
5. Utilize the GMAW process to demonstrate proper lap-joint fillet weld techniques for single and multiple passes, including flat fillet welds in the 1-F position, horizontal fillet welds in the 2-F position, vertical up-and-down fillet welds in the 3-F position, and overhead fillet welds in the 4-F position.
6. Utilize the GMAW process to demonstrate proper corner-joint fillet weld techniques for single and multiple passes, including flat fillet welds in the 1-F position, horizontal fillet welds in the 2-F position, vertical up-and-down fillet welds in the 3-F position, and overhead fillet welds in the 4-F position.

Gas Tungsten Arc Welding I

This is a one-credit course that provides students with instruction and hands-on activities utilizing the gas tungsten arc welding (GTAW) process for producing fillet welds in the 1-F flat and 2-F horizontal positions using both ferrous and non-ferrous metals according to American Welding Society (AWS) D1.1 code. Topics include safety of operation and setup of GTAW equipment and the selection of tungsten, polarity, shielding gas, and filler metals. Upon successful completion of this course, students are able to produce fillet welds on ferrous and non-ferrous metals using the GTAW process according to AWS D1.1 code. Prerequisites for this course are Gas Metal Arc Welding and Flux Cored Arc Welding.

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Safety

Students will:

1. Apply safety regulations, procedures, and precautions of the GTAW process.

Equipment

2. Demonstrate correct techniques for setting up, adjusting, and selecting materials for various GTAW machines and equipment, including tungsten electrodes, machine controls and settings, and shielding mixtures of gases.

Welds

3. Demonstrate correct techniques for joint designs used in the GTAW process.
4. Demonstrate correct welding techniques for carbon steel in the 1-F flat position and in the 2-F horizontal position.
5. Demonstrate correct welding techniques for aluminum in the 1-F flat position and in the 2-F horizontal position.
6. Demonstrate correct welding techniques for stainless steel in the 1-F vertical position and in the 2-F horizontal position.

Gas Tungsten Arc Welding II

This is a one-credit course that provides students with instruction and hands-on activities utilizing the gas tungsten arc welding (GTAW) process for producing fillet welds in the 3-F vertical and 4-F overhead positions, using both ferrous and non-ferrous metals according to American Welding Society (AWS) D1.1 code. Topics include safe of operation of GTAW equipment; equipment setup; and selection of tungsten, shielding gas, and filler metals. Upon successful completion of this course, students are able to produce fillet welds on ferrous and non-ferrous metals using the GTAW process according to AWS D1.1 code. The prerequisite for this course is Gas Tungsten Arc Welding I.

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Safety

Students will:

1. Demonstrate safety procedures used in the GTAW process.

Welds

2. Demonstrate correct welding techniques for carbon steel in the 3-F vertical position and in the 4-F overhead position.
3. Demonstrate correct welding techniques for aluminum in the 3-F vertical position and in the 4-F overhead position.
4. Demonstrate correct welding techniques for stainless steel in the 3-F vertical position and in the 4-F overhead position.
5. Prepare completed coupons for visual inspection.
6. Prepare coupon for destructive certification testing.
7. Prepare coupon for nondestructive certification testing.

Graphic Illustration

Graphic Illustration is a one-credit course that provides students with experiences and instruction in object and information design. Students apply the elements of design and sharpen visual communication skills. They design projects that allow them to manipulate graphic applications and demonstrate mastery of these skills. Topics of study include interior design, fashion illustrations, computer and hand drawings, exploration of software, package design, typography, and digital photography. Skills developed in these areas prepare students for the final course in the sequence, Studio and Portfolio. Digital Design is the prerequisite for Graphic Illustration.

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Safety

Students will:

1. Practice personal and laboratory safety rules, regulations, and procedures for hardware and software in an advertising design laboratory.
2. Demonstrate procedures for software and hardware security and maintenance.
Examples: saving files on jump drives, compact diskettes and digital video diskettes;
locking documents on hard drives; maintaining hard drives

Advanced Typography

3. Explain key typographic elements.

Design Method

4. Solve design problems through the design process of research, thumbnails, rough drafts, and comprehensive components.

Advertising Design

5. Create campaigns through the use of creative strategy skills, visual communication, and digital design.
 - Using various drawing techniques for advertising design

Advance Digital Imagery

6. Explain the effect of design, including logo, pictograms, and symbols, on corporate identity in advertising design.

Digital Photography

7. Utilize digital rendering, photo manipulation, and three-dimensional applications in advanced digital design.
Example: photo software

Package Design

8. Combine marketing, design process, typography, and color skills to solve a design product packaging problem.

Interactive Media Design

9. Utilize elements and principles of planning, designing, and scripting of a Web site design.
 - Identifying relationships among text, graphics, audio, video, animation, and interactivity

Greenhouse Production and Management

Greenhouse Production and Management is a one-credit course related to the production of greenhouse crops. Topics include career opportunities, safety, plant propagation, growing media, plant identification, greenhouse production, pest control, business management, and equipment and facilities. The hands-on approach to learning is a key component in this course.

Content standards for this course are not intended to serve as the entire curriculum. Teachers are encouraged to expand the curriculum beyond the limits of these content standards to accommodate specific community interests and utilize local resources. This course encourages critical thinking, use of the scientific method, integration of technology, development of student leadership skills, and application of knowledge and skills related to practical questions and problems. Safety concepts are integrated into instruction to the maximum extent possible.

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Career Opportunities

Students will:

1. Describe careers in the greenhouse production and management industry.

Safety

2. Describe safety precautions related to the greenhouse production and management industry.

Plant Propagation

3. Demonstrate propagation methods for greenhouse plants.
4. Practice seed germination techniques in greenhouse operations.

Growing Media

5. Adjust greenhouse growing media properties by adding amendments.
 - Adjusting the pH of greenhouse growing media
6. Prepare growing media mixtures for greenhouse plants.

Plant Identification

7. Identify greenhouse plants by common name.

Greenhouse Production

8. Differentiate among environmental factors affecting greenhouse plant growth.
 - Controlling environmental conditions for plant growth in the greenhouse
Examples: temperature control, ventilation, watering
9. Produce seasonal greenhouse crops.
Examples: winter—poinsettias
spring—trumpet lilies
10. Identify common greenhouse plant disorders.
Examples: root rot, insect damage, fungus
11. Select types of fertilizers and methods of application used in greenhouse production.

Greenhouse Pest Control

12. Apply pesticides to greenhouse crops.
 - Identifying safety and first aid precautions in greenhouse management
 - Using correct pesticides for intended target in greenhouse management
 - Disposing of containers and leftover pesticide mixtures according to Environmental Protection Agency (EPA) standards

Business Management

13. Select quality greenhouse plants for marketing.
14. Demonstrate managerial skills for successfully operating a greenhouse business.

Greenhouse Equipment and Facilities

15. Maintain greenhouse facilities.
16. Maintain equipment used in greenhouse operations.

Hair Coloring

Hair Coloring is a one-credit course that provides students with study and experience in hair coloring and lightening. Emphasis is placed on color application, laws, levels and classifications of color, and problem solving. Upon successful completion of this course, students are able to identify all phases of hair coloring and its effects upon the hair and perform procedures for hair coloring and lightening. Problem-solving and critical-thinking skills are essential, and many opportunities are provided for student growth in level of competence. The prerequisite for this course is Introduction to Cosmetology.

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Principles of Color Theory

Students will:

1. Identify primary, secondary, and tertiary hues on a color wheel.
2. Interpret laws of color theory with regard to base colors, levels, and tones.
3. Distinguish among factors that influence color selection.
Examples: color harmony, skin tone, complexion, computer imaging
4. Describe possible reactions to various hair coloring chemicals.
5. Compare characteristics and qualities of hair coloring developers.
6. Identify classifications of hair coloring.
7. Analyze skin tones to determine compatibility to hair color.

Hair Color Application Techniques

8. Demonstrate safety procedures used prior to hair coloring.
 - Practicing patch and strand tests
 - Using a cosmetology record card
9. Differentiate among temporary, demi-permanent, semipermanent, and permanent hair coloring techniques.
10. Describe techniques for performing hair lightening, special effects, and corrective hair coloring.
11. Differentiate among types of products used for various classifications of hair coloring.

12. Analyze hair and scalp to determine types of hair color application.
13. Demonstrate temporary, demi-permanent, semi-permanent, and permanent hair coloring techniques.
14. Demonstrate techniques for performing hair lightening, special effects, and corrective hair coloring.

Health Explorations

Health Explorations is a one-half credit course for middle and junior high school students. It introduces students to a variety of helping professions in the health care sciences. Students explore career possibilities including, but not limited to, nursing, medicine, physical therapy, emergency medicine, medical laboratory technology, respiratory therapy, environmental services, and informational services. Course content provides students with knowledge regarding common skills, education and training, and job requirements in selected health fields.

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Career Opportunities

Students will:

1. Describe career opportunities in the health care delivery system, including types and levels of health careers, required education and training, employability skills, salary, and delivery system opportunities.
2. Identify pioneers who made major contributions to the field of health care.
Examples: Louis Pasteur, Alexander Fleming, George Washington Carver, William Debakey
3. Compare ancient and current health care practices.
Examples: ancient—surgeries involving lobectomies
current—technologies involving stethoscopes and robotics
 - Comparing ancient and current health care apparel

Ethics

4. Compare ethical and unethical conduct in medical careers.
Examples: ethical—maintaining client confidentiality
unethical—taking client's valuables

Communication Skills

5. Describe verbal and nonverbal communication techniques appropriate for the health care setting.

Medical Terminology

6. Identify selected medical terms and abbreviations associated with health care.

Safety

7. Differentiate between medical and surgical asepsis.
Examples: hand washing, gloving, gowning

Technical Skills

8. Demonstrate basic skills in first aid and cardiopulmonary resuscitation (CPR).
9. Describe concepts related to basic skills for selected health careers.
Examples: landfill laboratory, oxygen saturation, walking on crutches

Health Informatics

Health Informatics is a one-credit course that introduces students to careers in health information services. Course content specifics core knowledge and skills and work-based experiences needed by workers in the health informatics career path. Foundations of Health Science and Medical Terminology are prerequisite courses. Upon successful completion of the course, students may enroll in the Advanced Health Seminar or Work-Based Experience Seminar and are eligible to take the Certified Coding Associate (CCA) examination.

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Career Opportunities

Students will:

1. Describe careers, roles, and responsibilities of individuals working in health informatics.

Technology Skills

2. Determine the accuracy of electronic medical records based on organizational and external regulatory standards.
3. Interpret medical terminology used in health informatics to enter client data and to complete medical forms.
4. Use technology to access, process, and retrieve medical information.

Legal and Ethical Implications

5. Describe legal and ethical regulations as they relate to health informatics.
Examples: Health Insurance Portability and Accountability Act (HIPAA), Patients' Bill of Rights

Medical Coding

6. Utilize common informatics manuals required in health informatics for coding medical procedures and treatments.
Examples: Current Procedural Terminology User Manual, International Classification of Diseases code, Clinical Modification code

Safety

7. Apply safety principles needed in health informatics.
Example: body mechanics

Employability Skills

8. Demonstrate workplace readiness skills in health informatics.
Examples: regular attendance, adherence to dress code, efficient time management

Communication Skills

9. Demonstrate the ability to interpret, transcribe, and communicate information, data, and observations.
10. Explain the computerized system for insurance reimbursement, including diagnostic-related groups (DRGs) and ambulatory payment classification (APC) groups.

Health Promotion and Wellness

Health Promotion and Wellness is a one-half credit course designed to enable students to develop an understanding of personal, client, and community health. The course emphasizes wellness concepts related to positive health behaviors. It also provides a foundation for comprehending preventive measures regarding health and wellness in the health care delivery system.

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Health-Illness Continuum

Students will:

1. Analyze an individual's health status to determine placement on the health-illness continuum.
 - Comparing passive and active strategies of health promotion
Examples: passive—fluoridation of drinking water, fortification of homogenized milk with vitamin D
active—smoking cessation, weight control, medical check-up
 - Outlining positive health promotion practices related to each body system
Examples: integumentary system—skin self-examination, sunscreen application
cardiovascular system—healthy diet, exercise, blood pressure control, smoking cessation
reproductive system—annual mammogram after age forty, prostate examination
2. Distinguish between holistic care and disease-oriented care.
3. Differentiate between acute and chronic illnesses.
4. Analyze social and environmental concerns to determine effect on personal health and wellness.
Examples: high crime rate and quality of life, air pollution and lung disorders, second-hand smoke and respiratory illnesses, noise pollution and hearing loss, hazardous wastes and carcinogens

Client Needs

5. Distinguish among the levels of Maslow's hierarchy of needs to determine the priority of basic human needs.
6. Identify stages of the Change Model.
7. Identify components of a client's health history.

Health Beliefs

8. Describe the Health Belief Model.
9. Identify internal and external variables that influence health beliefs and practices.
Examples: internal—religion, genetics, developmental stage
external—media, peers, socioeconomic background

Level of Prevention

10. Identify the three levels of prevention in health care delivery systems.
Examples: primary—health education programs, immunizations programs
secondary—hearing and vision screening, mammograms
tertiary—cardiac rehabilitation, diabetes management classes

Safety

11. Explain safety practices required in health care agencies.
Examples: washing hands, wearing plastic gloves during food preparation, practicing proper disposal of hazardous materials

Health Science Internship

Health Science Internship is a one or two-credit course designed for students in Grades 11 or 12. This course provides students with the knowledge and skills necessary for becoming a health care worker or for preparing students for postsecondary health care education programs. Theory and laboratory components comprise at least ten percent of the course. Health Science Internship is designed to be completed in a hospital, extended care facility, rehabilitation center, medical office, imagery laboratory, or other health care facility. The prerequisite for the course is Foundations of Health Science.

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Students will:

1. Demonstrate basic health care skills according to facility protocol.
Examples: taking vital signs, applying cardiopulmonary resuscitation (CPR), gaining first aid certification, explaining body mechanics
2. Identify basic treatments for selected diseases and disorders.
3. Critique key workplace readiness skills needed in a health care career.
4. Demonstrate legal and ethical behaviors in the health care setting.
5. Synthesize medical terminology used within the health care facility or agency.
6. Utilize electronic methods of communication within the health care facility or agency.
7. Develop a health and wellness plan based on client health history.
8. Analyze medications and treatments of selected clients using medical references to determine classifications, indications, contra-indications, side effects, and dosages.
9. Demonstrate therapeutic communication skills in the health care facility.
Examples: reporting medical information to immediate supervisor, communicating with client and family or caregiver
10. Describe client care procedures, including surgical procedures, Foley catherizations, and tooth extractions.
11. Explain techniques used in selected client care situations, including providing bed baths, taking vital signs, performing range of motion (ROM) exercises, and performing audiometry and vision screening.

Heating and Heat Pump Systems

This a one-credit course that introduces students to the fundamental concept of heating systems and heat pumps. Emphasis is placed on identification and operation of different components and advanced problem-solving techniques. Students learn to troubleshoot problems in gas heat, electrical heat, and heat pumps. Students enrolled in this course are able to read with comprehension both text and diagrams. Basic mathematics skills are required for understanding and analyzing airflow problems. Students use different meters and instruments to obtain information to be used to follow flow charts. Instruction in this course consists of both individual and group classroom and laboratory activities. Upon completion of this course, students demonstrate skills necessary for servicing and installing different types of heating systems and their components such as gas piping and refrigerant piping. Students also demonstrate skills necessary to determine proper airflow and airflow characteristics. Special emphasis is given to heat pump components and their operation.

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Students will:

1. Demonstrate safety rules, regulations, and procedures for heating, ventilation, air-conditioning, and refrigeration (HVACR).
2. Determine temperature rise across a gas furnace.
3. Determine the condition of a combustion chamber.
4. Practice techniques for heating system component replacement.
Examples: fan-limit control, gas valve, transformer, wall thermostat, blower motor
5. Determine airflow for a heat pump.
6. Determine the condition of a heating element.
7. Determine the condition of motor and blower for HVACR systems.
8. Demonstrate the procedure for checking sequencers.
9. Describe components of an electric heat pump.
10. Demonstrate the procedure to test and replace components of an electric heat pump.
11. Perform preventive maintenance on HVACR equipment.
Examples: gas-fueled equipment, electric heating equipment, forced-air furnaces, air handlers, electronic air cleaners, humidifiers, indoor and outdoor heat pump coils
12. Estimate material and labor costs for HVACR system installation and repairs.

Heating, Ventilation, Air-Conditioning, and Refrigeration Electrical Components and Controls

This is a one-credit course that introduces students to electrical components and controls for the heating, ventilation, air-conditioning, and refrigeration (HVACR) system. Emphasis is placed on advanced problem-solving techniques in respect to electrical components and circuitry. Students enrolled in this course possess good problem-solving skills as well as an ability to follow flow charts and diagrams. They also exhibit good reading and writing skills as well as basic mathematics skills. Instruction in this course consists of both individual and group classroom and laboratory activities. Students learn to systematically troubleshoot electrical problems in the HVACR system. Upon completion of this course, students demonstrate skills necessary to identify problems and replace defective electrical components in an HVACR system. Skills learned in this course may also be used in other trades.

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Students will:

1. Demonstrate safety rules, regulations, and procedures when working with electrical circuits used in HVACR systems.
2. Demonstrate techniques involved with assembly and disassembly of a single-phase motor.
3. Determine resistance of windings in a split-phase motor to identify start-run windings.
4. Determine common start-and-run terminals of a single-phase compressor motor.
5. Demonstrate preventive maintenance procedures for a window air conditioner.
6. Demonstrate the procedure for replacing a double-shaft fan motor.
7. Demonstrate troubleshooting techniques to solve electrical problems encountered in HVACR electrical systems.
8. Demonstrate procedures used for replacing electrical components in an HVACR system.
9. Interpret schematic wiring diagrams for HVACR systems and system com

Heating, Ventilation, Air-Conditioning, and Refrigeration Maintenance

This is a one-credit course that introduces students to concepts used in preventing breakdown in a heating, ventilation, air-conditioning, and refrigeration (HVACR) system. Emphasis is placed on interpreting information gathered about the system and using that information to prevent further breakdowns. Students enrolled in this course possess a mechanical aptitude as well as the ability to comprehend both written and verbal communication. They are able to read and write reports as well as utilize basic mathematics skills. Instruction in this course consists of both individual and group classroom and laboratory activities. Instruction provides students with basic knowledge necessary for performing basic preventive maintenance responsibilities in the HVACR industry. This course combines many skills learned in other courses in the HVACR curriculum. These skills can also be transferred to other areas of study in the career and technical education program.

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Students will:

1. Demonstrate safety rules, regulations, and procedures as applicable to HVACR maintenance.
2. Explain various types of HVACR preventive maintenance programs, including those used in residential and commercial systems.
3. Explain benefits associated with equipment maintenance.
4. Develop a preventive maintenance program for electric heat systems, gas heat systems, heat pump systems, and packaged heat and cooling units.
5. Demonstrate techniques used for troubleshooting gas heating and electric furnaces.
6. Explain the combustion theory for gas and oil related to HVACR.
7. Explain possible causes of system failure in cooling and heating units.
8. Determine procedures used to correct system malfunctions in cooling and heating units.
9. Demonstrate techniques used for troubleshooting cooling systems.
10. Demonstrate techniques used for troubleshooting heat pumps.
 - Demonstrating procedures for troubleshooting HVACR electric controls
 - Demonstrating procedures for methods used to balance air and heat systems

Horticultural Science

Topics in Horticultural Science include career opportunities, safety, plant physiology, growing media, greenhouse facilities, greenhouse and nursery crop production, plant identification and classification, pest management, hydroponics and vegetable gardening, and technological applications.

Content standards for this course are not intended to serve as the entire curriculum. Teachers are encouraged to expand the curriculum beyond the limits of these content standards to accommodate specific community interests and utilize local resources. This course encourages critical thinking, use of the scientific method, integration of technology, development of student leadership skills, and application of knowledge and skills related to practical questions and problems. Safety concepts are integrated into instruction to the maximum extent possible.

This course may be taught as a one-credit or half-credit course. For a half-credit course, content standards 1, 2, 3, 4, 5, 6, 7, 9, 13, 14, and 16 must be included.

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Career Opportunities

Students will:

1. Explain the importance of horticulture to local, state, national, and world economies.
2. Identify careers in horticulture.

Safety

3. Describe safety practices in horticulture.

Plant Physiology

4. Describe vegetative structures and functions in annuals, biennials, and perennials.
Examples: root for plant anchor and support, stem for plant support, leaf for photosynthesis and respiration
 - Identifying sexual reproductive structures and functions of plants
Examples: flower, fruit, seed
 - Identifying asexual reproductive structures and functions of plants
Examples: stem, root, leaf

5. Describe the purpose and use of growth regulators.
Examples: rooting, growth stimulant, retardant

Growing Media

6. Differentiate soil from soilless media in the horticulture industry.
7. Identify components of soil.
Examples: sand, silt, clay
8. List macronutrients and micronutrients needed for plant growth.
 - Identifying the function of macronutrients and micronutrients
Examples: major macronutrients—nitrogen, phosphorus, potassium
secondary macronutrients—calcium, sulfur, magnesium
micronutrients—zinc, iron, boron, copper, manganese, carbon, hydrogen, oxygen, molybdenum, chloride
 - Recognizing common nutrient deficiency symptoms
9. Design short- and long-term fertilization plans based on information provided by a soil test.
 - Comparing organic and inorganic fertilizers
 - Demonstrating fertilizer application methods
 - Describing pH modification procedures

Greenhouse Facilities

10. Describe various greenhouse designs and types of coverings.
Examples: designs—even-span, Gothic arch, uneven-span, Quonset, lean-to, attached or gutter-connected
coverings—glass, polyethylene, fiberglass, acrylic, polycarbonate
 - Comparing methods used in controlling greenhouse temperatures
Examples: misting, heating, ventilating
 - Describing tables or benches used in greenhouses
Examples: wood, welded wire, prefabricated plastic

Greenhouse and Nursery Crop Production

11. Design greenhouse and nursery crop production schedules.
12. Compare container and field nurseries.
13. Describe techniques for maintaining plants, including pruning, mulching, fertilizing, and irrigating.

Plant Identification and Classification

14. Identify common names of greenhouse and nursery plants.
 - Explaining the importance of the binomial classification system

Pest Management

15. Identify plant damage caused by insects.
 - Describing types of pesticides
Examples: herbicides, miticides, insecticides, fungicides, rodenticides, molluscides, nematocides
 - Describing the Integrated Pest Management (IPM) concept
 - Identifying practices required in the safe use of pesticides

Hydroponics and Vegetable Gardening

16. Compare hydroponic systems used in the horticulture industry.
Examples: sand culture, gravel culture, bag culture, aeroponic, continuous flow, nutrient film technique
17. Design a vegetable garden plan, including site and suitable plant varieties for the local area.

Technology Applications

18. Utilize various technologies in the horticulture industry.
Examples: computers, computer software, watering timers, sensors

Hospitality and Tourism

Hospitality and Tourism is a one-credit course that serves as the prerequisite for all pathways included in the Hospitality and Tourism cluster. Major topics include introduction to hospitality and tourism, recreation, travel and tourism, lodging, restaurant and food and beverage services, safety and sanitation, customer relations, and quality services. The required school-based laboratory for the Hospitality and Tourism cluster is a commercial food service kitchen with a food-serving and dining area. School-based laboratory experiences are essential for students to develop skills in the hospitality and tourism industry.

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Introduction to Hospitality and Tourism

Students will:

1. Trace the history of hospitality and tourism industries, including culinary and food services, lodging, travel and tourism, and legal and ethical issues.
2. Apply mathematical, reading, writing, terminology, critical-thinking, decision-making, communication, financial literacy, and problem-solving skills to hospitality and tourism industries.
3. Explain the impact of goal setting, teamwork, and technical skills on careers in hospitality and tourism industries.
 - Recognizing the importance of FCCLA programs to hospitality and tourism industries
4. Determine technology tools that impact hospitality and tourism industries.
5. Determine career pathways, entrepreneurial opportunities, and required credentials related to hospitality and tourism.

Recreation, Travel, and Tourism

6. Compare types of recreation, travel, and tourism activities.
Examples: amusement parks, museums, sporting events, destination vacations, cruises, spas, resorts, tours, attractions, theaters, reunions
7. Describe strategies involved in planning various events, including golf tournaments, weddings, and anniversary celebrations.

Lodging

8. Determine stages in the guest cycle, including pre-arrival, arrival, occupancy, and departure.
9. Identify criteria used for classifying hotel properties.
10. Identify the role of various departments within a lodging facility.
Examples: housekeeping, maintenance, landscaping

Restaurant and Food and Beverage Services

11. Organize the back-of-the-house and front-of-the-house of a culinary laboratory for function, efficiency, time management, and cost.
12. Demonstrate operation of food preparation and nonfood commercial equipment, according to Occupational Safety and Health Administration (OSHA) standards.
 - Classifying small and large food preparation equipment
 - Describing the calibration of food preparation equipment
 - Measuring portions with ladles, cups, spoons, and scales
 - Analyzing warranties and service agreements for proper maintenance of food preparation equipment
 - Identifying proper handling, storage, and cleaning of food preparation equipment
13. Apply culinary calculations to recipe conversions, including weight and volume, calories and fat grams, and food temperature conversions.
14. Demonstrate safety when using various cutting tools in a commercial culinary laboratory.
 - Comparing knife cuts used in the culinary industry
Examples: julienne, bâtonnet, brunoise, dice, tourne, rondelle, chiffonade
 - Identifying sharpening tools, including stone and steel
 - Illustrating safe handling and washing techniques for sharpening tools
 - Selecting proper cutting tools, including knives, mandolins, choppers, and food processors for various tasks
 - Demonstrating safe knife-sharpening techniques
15. Assess factors that affect food quality, including taste, appearance, color, and texture.
16. Explain the importance of developing standardized recipes in a food service operation.
 - Interpreting recipe instructions
 - Analyzing a recipe for spice and seasoning substitutions and adjustments
17. Define important dietary terms, including bland, low-fat, low-sodium, low-cholesterol, and fat-free diets.
 - Recognizing various food allergies
 - Identifying eating disorders
 - Classifying major nutrients
 - Preparing healthy recipes for special diets

Safety and Sanitation

18. Describe the Hazard Analysis and Critical Control Point (HACCP) and Material Safety and Data Sheets (MSDS) standards.
 - Identifying foodborne illnesses and hygiene procedures for avoiding each
 - Demonstrating proper handling, preparation, and storage of food
 - Demonstrating compliance with health codes for food service related to chemical storage, pest control, and garbage disposal

Customer Relations and Quality Services

19. Describe basic service skills used in hospitality and tourism industries, including welcoming and processing guests, overseeing customer comfort, and handling customer complaints.
20. Compare styles of food service, including counter, tray line, seated, banquet, and catering.
 - Demonstrating table-setting techniques

Housing

Housing may be taught as a one-credit or half-credit course. For a half-credit course, content standards 1, 2, 3, 4, 5, 7, 9, 11, 12, 13, and 18 must be included. The course introduces students to the selection and planning of living environments to meet needs and wants of individuals and families across the life span. Course content provides opportunities for students to explore housing options, architectural styles of housing, factors that influence housing selection, housing legislation and regulations, ownership options, home construction and repairs, home furnishings and accessories, home maintenance, landscape design, home safety, environmental and energy issues, technology, and career options related to the housing industry.

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Housing Acquisition

Student will:

1. Describe housing needs of individuals and families across the life span.
2. Compare factors that influence the options and selection of housing.
Examples: needs and wants, location, safety and security, energy efficiency, aesthetic preference, mobility, maintenance, zoning laws, trends, cost, income, architectural styles, floor plan
3. Determine procedures for acquiring housing, including interpreting legal agreements in real estate transactions, analyzing financing options, and comparing advantages and disadvantages of renting and owning a home.

Architecture and Planning

4. Interpret building construction terms, local codes, and symbols used in the planning and construction of housing.
5. Identify architectural styles of houses throughout history.
6. Determine ways remodeling and renovating can meet the housing needs of individuals and families.
7. Design floor plans to meet individual and family needs across the life span.
8. Evaluate benefits of a well-designed landscape when planning a home.

Backgrounds and Furnishings

9. Apply elements and principles of design when making decisions about the exterior and interior of the home, including use of the color wheel.
10. Compare factors that affect furniture and equipment design and selection.
Examples: lifestyle, status, cost, maintenance, durability, suitability, special needs
11. Critique the quality of furniture and equipment based on price, material, workmanship, construction details, and style.
12. Evaluate background treatments for the interior of the home, including basic textiles, floor and wall coverings, window styles and treatments, and various forms of lighting.

Maintenance and Safety

13. Describe home maintenance techniques and benefits of each.
14. Create a safety plan for the home, including proper insurance coverage.
15. Analyze techniques to organize space in the home.
16. Demonstrate simple home repairs.
Examples: simple plumbing, caulking
17. Describe environmental and ecological issues relating to housing decisions.
Examples: hybrid construction materials, energy saving, retrofitting, co-housing, interior air quality

Planning Space

18. Critique aspects of a well-designed house, including elements of a functional kitchen, bath, and home office.
Examples: cabinet layout, countertops
 - Interpreting drawings, including computer-aided design (CAD) drawings
 - Explaining technological advances in home designs
Examples: thermal and moisture protection, energy efficiency
 - Identifying ecological advances in home design

Technology and Careers

19. Assess ways technology impacts organizing and maintaining the home.
20. Analyze career options related to housing and interior design.

Human Body Structures and Functions

Human Body Structures and Functions is a one-credit course designed to help students develop a basic knowledge of the normal structure and function of the human body. The course uses an integrated approach for teaching medical terminology to the health care student by incorporating medical terminology into instruction regarding human body structures and functions and the disease process.

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Students will:

1. Use appropriate anatomical terminology.
Examples: proximal, superficial, medial, supine, superior, inferior, anterior, posterior
2. Identify anatomical body planes, body cavities, and abdominopelvic regions of the human body.
3. Classify major types of cells, including squamous, cuboidal, columnar, simple, and stratified.
4. Classify tissues as connective, muscular, nervous, or epithelial.
5. Identify anatomical structures and functions of the integumentary system.
 - Identifying accessory organs
 - Recognizing diseases and disorders of the integumentary system
Examples: decubitus ulcer, melanoma, psoriasis
 - Using medical terminology related to the integumentary system
 - Assessing the integumentary system for abnormalities
6. Identify bones that compose the skeletal system.
 - Identifying functions of the skeletal system
 - Identifying subdivisions of the skeleton as axial and appendicular skeletons
 - Classifying types of joints according to movement
 - Identifying the four bone types
 - Identifying various types of skeletal system disorders
Examples: fractures, arthritis
7. Identify major muscles, including origins, insertions, and actions.
 - Describing common types of body movements, including flexion, extension, abduction, and adduction
 - Classifying muscles based on functions in the body, including prime movers, antagonists, synergists, and fixators
 - Comparing skeletal, smooth, and cardiac muscles based on microscopic anatomy
 - Identifying diseases and disorders of the muscular system
Examples: muscular dystrophy, multiple sclerosis, strain

8. Identify structures of the nervous system.
 - Explaining differences in the function of the peripheral nervous system and the central nervous system
 - Labeling parts of sensory organs, including the eye, ear, tongue, and skin receptors
 - Recognizing diseases and disorders of the nervous system
Examples: Parkinson's disease, meningitis
9. Identify structures of the cardiovascular system.
 - Tracing the flow of blood through the body
 - Identifying components of blood
 - Describing blood cell formation
 - Distinguishing among human blood groups
 - Describing common cardiovascular diseases and disorders
Examples: myocardial infarction, mitral valve prolapse, varicose veins, arteriosclerosis
10. Identify structures and functions of the digestive system.
 - Tracing the pathway of digestion from the mouth to the anus using diagrams
 - Identifying disorders affecting the digestive system
Examples: ulcers, Crohn's disease, diverticulitis
11. Identify structures and functions of the respiratory system.
 - Tracing the pathway of the exchange of oxygen and carbon dioxide
 - Recognizing common disorders of the respiratory system
Examples: asthma, bronchitis, cystic fibrosis
12. Identify structures and functions of the reproductive system.
 - Differentiating between male and female reproductive systems
 - Recognizing stages of pregnancy and fetal development
 - Identifying disorders of the reproductive system
Examples: endometriosis, sexually transmitted diseases, prostate cancer
13. Identify structures and functions of the urinary system.
 - Tracing the filtration of blood from the kidney to the urethra
 - Recognizing diseases and disorders of the urinary system
Examples: kidney stones, urinary tract infections
14. Identify endocrine glands and their functions.
 - Describing effects of hormones produced by endocrine glands
 - Identifying common disorders of the endocrine system
Examples: diabetes, goiter, hyperthyroidism
15. Identify physiological effects and components of the immune system.
 - Contrasting active and passive immunity
 - Evaluating the importance of vaccines
 - Recognizing disorders and diseases of the immune system
Examples: acquired immunodeficiency syndrome (AIDS), acute lymphocytic leukemia

Industrial Systems and Maintenance I

This one-credit course is designed to provide students with the fundamental knowledge and skills for this area of the construction industry. Emphasis is placed on job safety and maintenance, oxyfuel equipment, lubrication, introduction to bearings, copper and plastic piping practices, planning space, and technology and careers. Upon successful completion of this course, students perform basic tasks related to industry.

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Mechanical Theory

Students will:

1. Explain linear and rotary motion as it relates to industrial systems.
2. Define mechanics of motion, including work, energy, and power as related to industrial systems.
 - Explaining mechanical advantages, including the use of levers and incline planes

Lubrication

3. Explain Occupational Safety and Health Administration (OSHA) standards, Material Safety Data Sheets (MSDS) requirements, and Environmental Protection Agency (EPA) regulations.
4. Explain properties of grease and oil related to industrial systems.
5. Explain how to select lubricants related to industrial systems.
6. Demonstrate use of lubrication equipment to apply lubricants to gears, bearings, and chains.

Introduction to Bearings

7. Identify ball, roller, thrust, guide, flanged, and take-up bearings.
 - Explaining applications for selected bearings

Piping Practices

8. Identify types and sizes of plastic, copper, and ferrous metal pipes.
9. Explain precautions to be taken when installing piping.

10. Demonstrate cutting, bending, joining, and insulating copper and plastic piping according to specifications provided.
11. Demonstrate safety precautions for the installation, operation, and maintenance of refrigeration and air-conditioning equipment.
12. Demonstrate manual and machine pipe-threading techniques to join lengths of metal pipe.
13. Describe methods used to join piping systems.

Piping Systems

14. Identify types and uses of piping systems, including the system of color-coding.
15. Explain thermal expansion related to piping systems.

Couplings

16. Identify coupling types.
Examples: rigid, flexible
17. Describe applications for selected rigid and flexible couplings.
 - Demonstrating installation and removal of couplings

Drive Systems

18. Explain various applications for selecting belts and chain drive types relative to industrial systems.
19. Describe various types, actuation methods, and application methods for selected clutches and brakes.
20. Explain procedures for mounting and lubrication of open and closed gears.
 - Describing factors that contribute to failure of open and closed gears.
21. Explain applications for open and closed gears.

Pneumatics

22. Explain the compressed air theory relative to industrial maintenance.
 - Defining units of pressure and volume
 - Defining properties of gases, including isothermic, isobaric, isochoric, and standard volume
23. Explain pressure and flow, including Bernoulli's principle.

24. Identify types of air compressors and compressor accessories.
Examples: reciprocating, rotary, air receivers, inlet filter
25. Explain air humidity and air dehydration, including aftercoolers and air dryers.
26. Describe the operation and function of various actuators.

Valves

27. Describe various valve functions, types, and operations involved in industrial manufacturing.

Circuit Design

28. Demonstrate concepts of circuit design, including cylinder controls.

Industrial Systems and Maintenance II

This one-credit course is designed to provide students with the fundamental knowledge and skills for this area of the construction industry. Emphasis is placed on job safety, mechanical seals, belt and chain drives, bearings, gaskets and packing, pumps, ferrous metal piping practices, piping systems, and couplings. Upon successful completion of this course, students perform basic tasks related to the industry.

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Oxyfuel Equipment

Students will:

1. Demonstrate the setup of oxyfuel equipment, including lighting and adjusting the torch.
2. Demonstrate shutdown and disassembly of oxyfuel equipment, including safe handling of cylinders.
3. Demonstrate oxyfuel cutting of straight line and squares shapes, piercing and slot cutting, bevels, washing, and gouging.

Mechanical Seals

4. Explain types of mechanical seals.
5. Explain the classification of mechanical seals.
6. Demonstrate installation of various mechanical seals.

Bearings

7. Demonstrate removal and installation of bearings, including troubleshooting techniques.

Gaskets and Packing

8. Identify various types of seals, including gaskets, gasket material, packing, and O-rings.
9. Demonstrate gasket fabrication.

Pumps

10. Explain the operation of centrifugal pumps, rotary pumps, reciprocating pumps, metering pumps, and vacuum pumps.
11. Explain net positive suction head and cavitation for a variety of pumps.
12. Demonstrate pump installation.

Hydraulics

13. Demonstrate safety procedures as prescribed by approved industry standards.
14. Explain principles of hydraulic theory relative to industrial maintenance.
 - Defining units of pressure
 - Defining properties of hydraulic fluids
15. Explain pressure and flow relative to the operation of hydraulic systems.
 - Identifying types of pumps, motors, valves, and cylinders
 - Defining properties of hydraulic fluids
16. Explain common maintenance tasks used to prevent hydraulic system failures.

Industrial Systems and Maintenance III

This one-credit course is designed to provide students with the fundamental knowledge and skills for this area of the construction industry. Emphasis is placed on job safety, valves, basic hydraulic systems, conventional alignment, vibration analysis, and maintenance of valves. Upon successful completion of this course, students perform basic tasks related to the industry.

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Valves

Students will:

1. Demonstrate installation and removal of threaded and flanged valves.
 - Identifying various valve types
2. Explain the purpose of valve packing.

Basic Pneumatic Systems

3. Explain pneumatic safety and physical characteristics of gases.
4. Explain the pneumatic transmission of energy related to basic pneumatic systems.
5. Explain principles of compressor operation and compressed gases.
6. Explain various types of compressors used in pneumatic systems.
7. Explain compressed-air treatment used in pneumatic systems.
8. Explain pneumatic system components and symbols used in pneumatic systems.

Conventional Alignment

9. Align couplings using the straightedge and feeler gauge method.
 - Explaining types of misalignment
 - Eliminating coupling stress
10. Align couplings using the dial indicator method.

Vibration Analysis

11. Analyze vibration in industrial equipment and its causes.
12. Explain different kinds of basic vibration test equipment.
13. Explain vibration monitoring of industrial equipment.
14. Demonstrate field balancing of machines.

Maintaining Valves

15. Demonstrate removal and installation of threaded and flanged valves.
16. Demonstrate replacement of valve stem O-rings and bonnet gaskets.
17. Demonstrate repacking of commonly used valves.

Industrial Systems and Maintenance IV

This one-credit course is designed to provide students with the fundamental knowledge and skills for this area of the construction industry. Emphasis is placed on job safety, preventive and predictive maintenance; reverse alignment; laser alignment; troubleshooting and repairing pneumatic equipment and hydraulic equipment; and flow, pressure, level, and temperature. Upon successful completion of this course, students perform basic tasks related to this industry.

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Preventive and Predictive Maintenance

Students will:

1. Explain preventive and predictive maintenance of industrial equipment and systems.
2. Explain nondestructive and destructive material testing.
3. Explain concepts of ultrasonic and radiography related to preventive and predictive maintenance.
4. Explain various types of inspections, including eddy current, optical liquid penetrant, magnetic particle, acoustic emissions, and infrared testing.
5. Explain the concept of tribology related to industrial equipment.

Reverse Alignment

6. Explain conditions that cause misalignment of industrial equipment.
7. Practice reverse dial indicator alignment using a graphical alignment chart.

Laser Alignment

8. Explain soft foot, thermal growth, and coupling stress related to equipment alignment.
9. Demonstrate proper operation of a laser alignment system.

Troubleshooting and Repairing Pneumatic Equipment

10. Perform pneumatic system preventive maintenance procedures.

Troubleshooting and Repairing Hydraulic Equipment

11. Inspect hydraulic system equipment for system function.
12. Explain basic hydraulic principles to be considered before troubleshooting hydraulic-driven equipment.

Flow, Pressure, Level, and Temperature

13. Describe types of flow measurement used in industrial monitoring.
14. Describe conditions that affect flow, pressure, level, and temperature in industrial systems.

Industrial Wiring

This one-credit course is designed to provide students with the fundamental knowledge and skills for this area of the construction industry. Emphasis is placed on job safety; cable tray, contractors and relays; industrial load calculations; raceway, box, and fitting fill requirements; lamps, ballasts, and components; and industrial conduit bending. Upon successful completion of this course, students assist in wiring a commercial building with supervision.

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Safety

Students will:

1. Demonstrate safety procedures as recognized by governing agencies and approved industry standards when testing and replacing components or installing wiring.
Examples: lockout, tagout
2. Identify electrical hazards and how to avoid and minimize them in the workplace.

Cable Tray

3. Demonstrate methods used to support and secure cable tray used in industrial wiring applications.
4. Demonstrate the fabrication of complex cable tray configurations, including turns, offsets, and methods of hanging, according to specifications in industrial applications.

Contactors and Relays

5. Describe the operation of solid-state and mechanical contactors in industrial wiring.
6. Install contactors and relays according to National Electrical Code (NEC) specifications.
7. Install a simple control circuit.

Industrial Load Calculations

8. Calculate load for single- and three-phase branch circuits.
9. Determine ampacity for single- and three-phase loads.

10. Select conductors and over-current protection devices appropriate to the load of specified equipment.
Examples: welding machines, motors, heating and cooling equipment

Raceway, Box, and Fitting Fill Requirements

11. Calculate conduit size by conduit and box fill requirements according to the NEC handbook.
12. Determine electrical box and cabinet fill requirements.
 - Identifying bending radius requirements

Lamps, Ballasts, and Components

13. Identify occupancy sensors, photoelectric sensors, and timers used to control circuits.
14. Describe the function of ballasts in lighting systems.
15. Install various lighting components.

Rigid Conduit Bending

16. Calculate common conduit bends used in industrial applications.
17. Use pneumatic and electrical benders to produce conduit bends according to specifications.

Information Technology Fundamentals

Information Technology Fundamentals is a one-credit course that introduces students to the knowledge base and technical skills for information technology careers. Students study the nature of business and demonstrate knowledge of the functions of information systems in business. Emphasis is placed on maintaining a safe working environment and on building interpersonal skills needed for working in the information technology environment. Students demonstrate appropriate knowledge and behaviors regarding legal responsibilities of information technology professionals. They explore a variety of information technology career opportunities and develop a personal career plan to meet career goals and objectives. It is recommended that Business Technology Applications be taken prior to enrollment in this course.

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Computer Basics

Students will:

1. Distinguish between input and output devices, including monitor, keyboard, mouse, and scanner.
2. Utilize mathematics skills to convert between two number systems, including decimal, binary, and hexadecimal.

Hardware Installation

3. Perform computer maintenance and upgrading of computer components and portable devices.
4. Practice basic procedures of installing, configuring, optimizing, and upgrading printers and scanners.

Software Installation

5. Identify fundamentals of using operating systems.
6. Perform basic configuration and optimization by updating and upgrading operating systems.

Troubleshooting and Maintenance

7. Utilize troubleshooting techniques for personal computer components and portable devices.
8. Perform preventive maintenance on personal computer components and portable devices, operating systems, and computer security systems.
9. Identify tools, diagnostic procedures, and troubleshooting techniques for operating systems, printers and scanners, and security.
10. Demonstrate the construction of a computer system, including the installation of hardware and software.
11. Demonstrate configuring, upgrading, and optimizing security.

Career Opportunities

12. Determine career and entrepreneurial opportunities, responsibilities, and educational and credentialing requirements related to the information technology industry.
13. Use communication skills effectively when communicating with customers and colleagues.
14. Exhibit job-related professional behavior, including confidentiality, respect for the customer and customer's property, and adherence to privacy laws.
15. Interpret research data to predict anticipated changes in computer systems.

Network Basics

16. Identify fundamental principles of networks.
17. Demonstrate configuring, optimizing, and upgrading of networks.
18. Identify tools, diagnostic procedures, and troubleshooting techniques for networks.

Information Technology Support and Services

Information Technology Support and Services is a one-credit course designed to provide students with knowledge of computer hardware, operating systems, and computer software applications. This course provides students with additional skills necessary to effectively plan, develop, and administer both a local area network (LAN) and a wide area network (WAN). Topics addressed in this course include network operating systems, network architectures, network protocols, and network security. In addition, network scalability and adaptability are discussed regarding emerging computer technologies. It is recommended that Business Technology Applications be taken prior to enrollment in this course.

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Customer Service

Students will:

1. Demonstrate customer service skills related to information technology support and services.
2. Utilize mathematics skills to develop information technology budgets and support costs.
3. Develop information technology short- and long-term budgets, including calculating supply costs, preventive maintenance repairs, hardware replacement, and hardware and software upgrades.

Troubleshooting

4. Analyze computer problems to determine solutions by using the troubleshooting process.
5. Apply the troubleshooting process to repair computer problems with software and hardware components.
6. Analyze technical support to identify support requirements, skill-level needs, customer needs, information and data analysis, and data and system configuration to formulate a support plan.
 - Demonstrating proper documentation for support provided
 - Utilizing oral and written communication skills to train computer users

System Design and Upgrading

7. Demonstrate ability to manage network user account access, including assigning of account privileges, producing required documentation, and maintaining training manuals.

8. Manage software systems, including performing configuration management activities, updating virus protection software, and evaluating application software packages.
9. Explain components of information system analysis and design.
 - Initiating a system design project
 - Evaluating applications within the information system
10. Utilize research results to evaluate software requirements to meet various system needs.
11. Identify the purchasing process for determining system needs related to equipment, supplies, and upgrades.

Career Opportunities

12. Determine career and entrepreneurial opportunities, responsibilities, and educational and credentialing requirements related to information technology support and services career opportunities.

Ethics

13. Explain ethical uses of electronic media and communication devices for various situations.
14. Explain the importance of information privacy in the workplace.
 - Examples: protecting employee and customer information, disposing of confidential information appropriately

Insurance Services

Insurance Services is a one-credit course designed to help students develop skills related to insurance services, including life, health, and property insurance, as they gain product knowledge of the industry. Students examine characteristics of insurance policies, learn insurance terminology used to explain insurance risks and benefits, distinguish between policy types and coverage, and create and complete insurance-related documents to process information. Students develop effective techniques used to gather client information and serve customers, including providing timely, accurate information to meet customer needs; resolve customer complaints; and effectively answer consumer questions.

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Coverage

Students will:

1. Differentiate among automobile, health, life, renter, and homeowner insurance coverages and policies to determine appropriate uses and advantages of each.
2. Evaluate a variety of insurance products and premiums for personal needs.
Examples: automobile, homeowner, disability, life
3. Utilize reading skills to identify main components of major insurance company policy options.
Examples: policy options—liability insurance, uninsured motorist coverage, collision coverage

Economics

4. Determine factors that affect insurance costs and premiums.
5. Analyze insurance characteristics to explain underwriting functions.
 - Processing required paperwork in insurance underwriting
 - Adding endorsements to policies
 - Adjusting insurance claims
6. Analyze claims data for determining the percent of increase or decrease between current and past years' statistics.
Examples: teenage automobile accidents, tornado or hurricane catastrophes

Customer Service

7. Determine required information needed to correctly issue insurance policies and other insurance-related documents.
8. Demonstrate correct techniques for acquiring and processing information using a variety of media.
Examples: telephone, fax machine, e-mail, online resources
9. Determine procedures needed to effectively serve customers, including providing timely information and resolving conflicts.
 - Using technical skills for research
10. Use communication skills, including listening and tactfulness, when communicating with customers and colleagues.

Risk Management

11. Interpret principles of risk management related to insurance, including benefits for risk reduction.
12. Determine the impact governmental insurance programs have on society.

Ethics

13. Analyze types of insurance fraud to determine effects on policyholders.
14. Determine ethical issues facing the insurance industry.
15. Evaluate regulatory insurance requirements to determine compliance.
16. Explain reasons insurers cancel policies.
 - Explaining reasons policyholders cancel policies
17. Demonstrate job-related professional behavior, including respect for the customer and the customer's property and adherence to privacy laws.

Career Opportunities

18. Determine career and entrepreneurial opportunities, responsibilities, and educational and credentialing requirements related to insurance services.

Interior Design I

Interior Design I is a one-credit course that introduces students to historical aspects and contemporary trends in housing and interior design. Course content provides opportunities for students to explore elements and principles of design; blueprinting; space planning by creating functional, safe, and aesthetic spaces for individuals and families across the life span; furniture style; furniture and accessory selection; technology; and careers in the field of interior design.

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Interior Design Industry

Students will:

1. Summarize the history of the interior design industry.
2. Determine basic characteristics and uses of textiles in the interior design industry.
3. Identify laws, regulations, and educational and licensure requirements for becoming an interior designer.

Client and Interior Designer Relationship

4. Determine the impact of client preferences, values, ideals, and budget in creating a design project.
5. Demonstrate appropriate responses to criticism and praise of an individual interior design project.

Architectural Design

6. Determine the impact of architectural design and decorating styles when planning a client design project.
7. Compare historical architectural details to current housing and interior design trends.

Space Planning and Floor Planning

8. Evaluate floor plans to determine interior design functions.
9. Plan residential spaces in relationship to safety, privacy, aesthetic needs, traffic patterns, activity, function, and efficiency to meet client specifications.

Furniture and Interior Treatments

10. Evaluate various types of period furnishings.
 - Comparing types of wood and finishes used in furniture construction, including care required
11. Select background treatments, including flooring, wall treatments, window treatments, lighting, and ceiling treatment according to client specifications.
12. Calculate materials needed for interior design projects.
Examples: floor coverings, window treatments, wall coverings, hard surfaces, furnishings, bedding

Design Studio

13. Determine facility space, tools, equipment, and furnishings needed to operate an interior design business.
14. Analyze how media design, techniques, and processes are used to design interiors.
15. Apply elements and principles of design to solve specific problems for the selection and design of interiors.
16. Demonstrate skills in sketching furnishings and interior space to create interior designs to meet client specifications.
17. Evaluate a variety of interior design plans in relation to function and design.
18. Utilize technology to create a design project.

Interior Design II

Interior Design II is a one-credit course. The prerequisite for this course is Interior Design I. The course introduces students to business practices and procedures of the interior design business. Content provides opportunities for students to explore design project development, business planning and operations, and interior design techniques by applying drawing skills and elements and principles of design, technology, and careers in the field of interior design.

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Interior Designer

Students will:

1. Determine functions of an interior designer in the planning, design, and execution of residential and commercial space.
2. Explain the sequence of procedures used in completing a design project, including conducting interviews, creating a design concept, presenting the design concept, obtaining client approval, determining cost estimates, making purchases of products and services, and supervising the work and completion of services.

Business Practices

3. Determine factors to consider when locating an interior design business.
Examples: geographic and economic characteristics of the community, economic characteristics of prospective clients
4. Demonstrate business practices required to operate an interior design business, including determining fees; completing a letter of agreement; collecting payment; keeping client job books; utilizing bookkeeping and accounting practices; and writing sales receipts, purchase orders, and invoices.
5. Demonstrate the ability to maintain an inventory of tools, equipment, supplies, and materials used in interior design projects.
6. Interpret pricing tables and diagrams of products used in interior design.
7. Categorize roles of fiscal management for the interior design industry.
8. Explain management and marketing services, including advertising needs and work roles of sales and marketing staff.

9. Describe personnel management policies and procedures necessary to operate an interior design business.
Examples: determining necessary staffing, supervising staff, delegating authority, making job assignments, creating work schedules, setting goals
10. Analyze a budget to determine financial limitations for interior design clients.
11. Calculate area, size, circumference, and square footage required to complete an interior design project.
12. Compare information on sales, products, and services used in designing interiors.
13. Select materials and products for a project, including applying elements of art and principles of design.
14. Describe the need for respecting customer requests in the interior design industry.

Visual Presentation

15. Utilize technology in managing and marketing an interior design business.
16. Demonstrate use of presentation boards to assist clients in visualizing the design project.
17. Apply universal design techniques to the design of interiors.
18. Demonstrate computer-aided design (CAD) techniques in the design of interior space.

Intermediate Architectural Design

Intermediate Architectural Design is a one-credit course that provides students with instruction regarding more advanced and detailed architectural plans. Topics include introduction to multilevel residential design; plumbing plans; heating, ventilation, and air-conditioning (HVAC) plans; site plans; and stair construction. Upon successful completion of this course, students are able to organize, lay out, and draw more advanced-level residential architectural plans in greater detail. The prerequisite for this course is Introduction to Architectural Design.

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Residential Multilevel Floor Plan

Students will:

1. Create a basic multilevel residential floor plan, including symbols, dimensions, window and door schedule, and notes.
 - Identifying elements and features found on residential multilevel floor plans
 - Identifying interior design considerations in multilevel floor plans
 - Determining room relationships and exterior design factors in multilevel floor plans

Residential Plumbing Plan

2. Create a plumbing plan, including symbols, fixtures, and notes.
 - Identifying plumbing terms, abbreviations, and definitions
 - Explaining the placement of water supply lines and waste discharge in a plumbing plan

Residential Heating, Ventilation, and Air-Conditioning Plans

3. Create a residential HVAC system plan using needed symbols.
 - Identifying standard heating and cooling systems

Residential Site Plan

4. Create a residential site plan layout using plan notes, terms, symbols, and dimensions.
 - Identifying types of site plans
 - Describing site layout and location

Residential Stair Construction and Layout

5. Create a drawing of a stairway for a multilevel residential dwelling.
 - Applying stair components to a drawing of a residential stairway
 - Determining rise and run for a residential stairway

Intermediate Computer Numerical Control

Intermediate Computer Numerical Control (CNC) is a one-credit course that provides an introduction to manufacturing processes and job opportunities for students who are pursuing careers in manufacturing. Students use critical-thinking skills and principles of science, mathematics, and safety. This entry-level course may be taken in the Manufacturing cluster. Students must meet academic goals and expectations of business and industry. Topics include advanced CNC programming, setup, and proper operations. Students receive instruction regarding national skills standards of the National Tooling and Machining Association (NTMA) and National Institute for Metalworking Skills (NIMS).

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Safety

Students will:

1. Apply safety rules, regulations, and procedures for use of CNC equipment.
2. Demonstrate care and safety for CNC machines.
Examples: maintenance—operating, cleaning, lubricating, setting up

Operations

3. Demonstrate intermediate skills for writing a CNC program.
 - Identifying G and M codes
 - Identifying speed and feed codes
 - Identifying cutter positioning codes
 - Writing an intermediate CNC mill program for straight, angular, and circular moves
 - Writing an intermediate CNC lathe program for turning, facing, angle cuts, and corner radii
4. Demonstrate advanced skills for writing a CNC program.
 - Defining G and M codes
 - Defining speed and feed codes
 - Writing advanced CNC milling programs for straight, angle, radii, and circular cuts
 - Writing advanced CNC lathe programs for turning, facing, corner radii, threading, and angle cuts
5. Demonstrate proper setup of CNC machines, including homer setup and tool setup.

Intermediate Drafting Design

Intermediate Drafting Design is a one-credit course designed to further the development of students' knowledge regarding use of drafting design practices and procedures. Students expand their ability to illustrate more complex objects using the computer-aided drafting (CAD) system. Topics include sectioning, auxiliary views, threads and fasteners, pictorials, and the continuation of conventional dimensioning practices. Upon successful completion of the course, students are able to develop section views, primary auxiliary views, thread representations and pictorial views, and apply dimensions properly on a drawing. The prerequisite for this course is Introduction to Drafting Design.

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Section Views

Students will:

1. Demonstrate the proper use of sectional view concepts to create a full section, half section, broken-out section, offset section, revolved section, and a removed section.
 - Utilizing cutting planes
 - Applying section lining

Auxiliary Views

2. Create drawings of inclined surfaces.
 - Constructing primary auxiliary views

Threads and Fasteners

3. Create drawings illustrating detailed, schematic, and simplified thread representations.
 - Identifying common thread terms

Pictorial Views

4. Utilize pictorial concepts to produce an isometric drawing.
 - Identifying oblique, trimetric, and diametric views

Dimensioning

5. Apply dimensions, notes, and other relative information to a drafting design project.
Examples: dimensions—angular, linear, tolerances
 - Utilizing American National Standards Institute (ANSI) dimensioning standards
 - Identifying dimensioning symbols and tolerances

Intermediate Lathe and Benchwork

Intermediate Lathe and Benchwork is a one-credit course that provides an introduction to manufacturing processes and job opportunities for students who are pursuing careers in manufacturing. Students use critical-thinking skills and principles of science and safety. This entry-level course may be taken in the Manufacturing pathway. Topics include lathe maintenance, lathe operations, and benchwork operations. Students who choose to enter the Manufacturing cluster must meet academic goals and expectations of business and industry. Student instruction in manufacturing reflects national skill standards of the National Tooling and Machining Association (NTMA) and the National Institute for Metalworking Skills (NIMS).

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Safety

Students will:

1. Apply safety rules, regulations, and procedures for lathe and benchwork.

Maintenance

2. Demonstrate maintenance of the lathe, including cleaning, inspecting, lubricating, and setting up.

Operations

3. Demonstrate intermediate lathe operations, including calculating speed and feed per material and tooling, aligning the tailstock, reaming a hole, boring a hole, counterboring a hole, forming a cut, machining an O-ring groove, parting off the work piece, turning a shaft between centers, and turning close-tolerance diameters.
4. Demonstrate intermediate boring, turning, facing, and tapping on a work piece.
5. Demonstrate advanced-level engine lathe operations, including calculating speed and feed for appropriate materials and tooling, turning multiple diameters, using a taper attachment, power tapping on a lathe, chasing right and left hand internal threads, boring a hole, and boring an internal angle.
6. Demonstrate advanced boring, turning, facing, and tapping on a work piece according to NIMS Level I standards.

Benchwork Safety

7. Apply benchwork skills and safety practices, including broaching an internal keyway, installing a press fit bushing, hand-grinding cutting tools, using a pitch gage and a micrometer for determining thread size, and laying out a part according to print specifications.
8. Demonstrate care and safety for a bench grinder.
Examples: maintenance—operating, cleaning, lubricating, setting up
9. Demonstrate grinding techniques, including setting up and grinding a threading tool, grinding a right hand angle turning tool, grinding a grooving tool, grinding an angle using a sine bar, and grinding a grooving tool.

Intermediate Mill and Surface Grinder

Intermediate Mill and Surface Grinder is a one-credit course that provides an introduction to manufacturing processes and job opportunities for students who are pursuing careers in manufacturing. Students use critical-thinking skills and principles of science, mathematics and safety. This course may be taken in the Manufacturing pathway. Students who choose to enter the Manufacturing cluster must meet academic goals and expectations of business and industry. Topics include instruction in advanced milling and grinding operations. Student instruction in manufacturing reflects the national skills standards of the National Tooling and Machining Association (NTMA) and the National Institute for Metalworking Skills (NIMS).

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Mill Safety

Students will:

1. Apply safety rules, regulations, and procedures for operating milling machines.
2. Demonstrate care and safety for milling machines.
Examples: maintenance—operating, cleaning, lubricating, setting up

Milling Operations

3. Demonstrate milling machine operations, including setting up and using a rotary table, machining a woodruff keyway, cutting T-slots, centering a rotary table, boring and counterboring a hole, machining slots in a work piece, power tapping a hole, machining a close-tolerance square block, calculating speed and feed per material and tooling, milling multiple steps in a work piece, and milling pockets on a work piece.
4. Demonstrate operations for milling steps, slots, angles, and pockets in a work piece.
5. Demonstrate advanced milling operations, including calculating speed and feed for specified materials and tooling; power tapping a hole; indicating a round hole; milling a block square to close-tolerance; milling precise angles on a work piece; milling steps, slots, and pockets on a work piece; and drilling a precise circular hole pattern.
Example: sine calculations
6. Demonstrate procedures for milling advanced steps, slots, angles, and pockets in a work piece according to NIMS Level I standards.

Grinding Operations

7. Use grinding techniques, including grinding a grooving tool, grinding an angle using a sine bar, and grinding a block square and parallel according to NIMS Level I standards.
8. Demonstrate care and safety for a surface grinder.
Examples: maintenance—operating, cleaning, lubricating, setting up

Introduction to Advertising Design

Introduction to Advertising Design is a one-credit course that provides students with orientation experiences and laboratory safety for working in an advertising design studio environment. Topics of study include art history, art production, art criticism, design elements and principles, and materials and media utilized in the field of visual communication. Particular emphasis is placed on related academic skills. Successful completion of this course prepares students for the next course in the Advertising Design program, Digital Design. This course or an equivalent visual arts credit is a prerequisite for other courses in the Advertising Design program.

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Orientation

Students will:

1. Identify rules, regulations, employability skills, and their purposes related to the advertising design program.
 - Describing professional relationships with coworkers and employers in advertising design
 - Identifying art careers and related postsecondary education options

Safety

2. Identify personal and laboratory safety rules, regulations, and procedures for fire, electrical tools, and equipment in advertising design.

Decision Making and Problem Solving

3. Solve advertising design problems using media, techniques, and processes.
 - Utilizing research in advertising design to solve problems
 - Applying decision-making techniques to advertising design, including thumbnails, rough drafts, and comprehensives
 - Recognizing multicultural and nonsexist dimensions of an advertising design
 - Evaluating results of actions implemented in advertising design problems

Integrated Academics

4. Use basic mathematics, writing, and science skills in advertising designs for scaling, page composition, media properties, and material costs.

Visualization Techniques

5. Demonstrate rendering skills and techniques used in advertising design.

Color Communications

6. Apply color psychology and basic methods of digital color management to advertising design.
7. Identify the role of color in marketing and branding through advertising design projects.

History and Theory

8. Recognize the role of visual communication from the prehistoric era to the present.
Examples: cave paintings, Gutenberg press, digital photography
 - Identifying characteristics and purposes of a variety of historical and cultural works of art
 - Describing the function and meaning of specific advertising media from a variety of cultures, times, and places
 - Analyzing ideas, issues, or themes of various historical periods for their influence on characteristics of advertising
 - Analyzing selected illustrations for historical and cultural influences and aesthetics
 - Analyzing layouts and designs for visual, spatial, and functional differences throughout history
 - Describing specific symbols, trademarks, and logos used in advertising and their relationship to historical and cultural content

Conceptual Process

9. Demonstrate strategic processes in advertising design, including techniques of research and analysis, thinking, and copywriting.
 - Justifying artist intention and purpose in selected works, illustrations, and layouts
 - Comparing themes, issues, and modes of expression in advertising with other creative disciplines
 - Selecting subjects, symbols, and ideas from daily life as subject matter for design

Digital Imagery

10. Demonstrate skills in desktop publishing as they apply to advertising design.

Critical Skills and Evaluations

11. Critique advertising design projects for compositional accuracy.

Design

12. Solve communication problems with effective graphic design solutions using principles, elements, and current theories of design.

Introduction to Agriscience

Introduction to Agriscience is an exploratory course that provides Grade 7 students with an overview of the agriculture industry. Topics include career opportunities, safety, impact of agriculture, supervised agricultural experiences, leadership development, environmental science, animal science, plant science, technology and biotechnology, agribusiness, and woodworking.

Content standards for this course are not intended to serve as the entire curriculum. Teachers are encouraged to expand the curriculum beyond the limits of these content standards to accommodate specific community interests and utilize local resources. This course encourages critical thinking, use of the scientific method, integration of technology, development of student leadership skills, and application of knowledge and skills related to practical questions and problems. Safety concepts are integrated into instruction to the maximum extent possible.

Introduction to Agriscience may be taught as a 35-, 70-, or 140-hour course. It may be offered as a component of a rotation course allowing students to explore different career fields. If a course contains two 70-hour rotations, content standards 1, 2, 3, 5, 6, 10, 11, 13, 16, and 19 must be taught. If a course contains four 35-hour rotations, content standards 1, 2, 5, 6, 16, and 19 must be taught.

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Career Opportunities

Students will:

1. Identify career opportunities within the agriculture industry.

Safety

2. Identify safety rules and procedures required for working with hand and power tools in agricultural operations.

Impact of Agriculture

3. Determine the impact of the agriculture industry on the economies of Alabama, the United States, and the world.
 - Describing major factors in world consumer preferences
4. Describe basic human needs, including food, clothing, and shelter.
 - Describing benefits of an abundant, inexpensive, and safe food supply produced by United States farmers for the American population
 - Examples: abundance—*independence from foreign food imports*
 - inexpensive—*less income spent on food*
 - safe food supply—*better overall health of populations*

Supervised Agricultural Experience

5. Describe criteria for selecting a SAE.
Examples: years in program, career interest, career advantages
 - Identifying requirements of a SAE, including manageability, availability of facilities, financing, and record keeping

Leadership Development

6. Demonstrate qualities of leadership, including cooperation, citizenship, and communication.
Examples: cooperation—teamwork
citizenship—community service
communication—written and verbal skills

Environmental Science

7. Contrast sources of agricultural and nonagricultural pollution in water supplies.
Examples: agricultural pollution—fertilizers, pesticides
nonagricultural pollution—trash, industrial wastes
8. Differentiate renewable from nonrenewable natural resources.
Examples: renewable—water, trees
nonrenewable—fossil fuels
9. Compare methods of soil, water, and wildlife conservation.
Examples: soil—cover cropping, wind breaks, no-till farming, terracing
water—creating water reservoirs
wildlife—restocking, following governmental regulations
10. Explain benefits of forests and woodlands.
Examples: aesthetics, recreation, building materials, wildlife, water, air purification

Animal Science

11. Compare structure, size, and scale of various breeds of domesticated animals.
 - Describing the importance of domesticated animals
 - Describing benefits of various breeds of domesticated animals

Plant Science

12. Explain the role of plants in the transfer of energy through food chains.
13. Describe the structure and function of seeds.
 - Describing proper handling, storage, and care of seeds

14. Distinguish fruits from vegetables.
 - Identifying locally grown fruits and vegetables
15. Explain the impact of fertilizers and pesticides on plant growth.

Technology and Biotechnology

16. Analyze biotechnology to determine benefits to the agriculture industry.
Examples: improved productivity, medical advancements, environmental benefits
17. Describe technology used in the agriculture industry.
Examples: remote sensing, robotics, global positioning systems (GPS), geographical information systems (GIS), electronic reference sources, data management software

Agribusiness

18. Explain the importance of agribusiness marketing skills, including salesmanship, customer service, and advertising.

Woodworking

19. Interpret a woodworking project plan.
 - Identifying whole number and fractional designations on a standard ruler
 - Recognizing uses of basic woodworking tools and materials
 - Demonstrating techniques for sanding and finishing wood

Introduction to Animation and Visual Communication

Introduction to Animation and Visual Communication is a one-credit course that introduces students to the animation industry. Emphasis is placed on safety in a laboratory and studio environment. Students apply the principles of animation to visually communicate thoughts, feelings, and ideas. Topics of study include animation history, criticism, production, and materials and media utilized in the field. Successful completion of this course prepares students for subsequent courses in animation.

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Safety

Students will:

1. Apply laboratory safety rules, regulations, and procedures for animation.

Orientation to Skill Program

2. Practice appropriate rules and procedures for the animation classroom and laboratory.
Examples: setup, operation, maintenance of pencil test systems and computer systems
3. Create an education plan for an animation career that includes postsecondary and apprenticeship education opportunities for animator, clean-up artist, in-betweeners, layout artist, storyboard artist, and visual development artist.

History of Animation

4. Compare characteristics and purposes of a variety of historical and cultural works of animation.
 - Describing the function and meaning of specific animation from a variety of cultures
 - Analyzing historical and cultural animated works to understand forms, subjects, themes, and symbols

Basic Design and Aesthetics

5. Evaluate original works of animation for quality, meaning, and intent utilizing principles of animation and design.
 - Solving applicable visual arts problems to produce animation
 - Evaluating the quality of animation in terms of principles of animation and design

Exploration of Medium

6. Develop multiple-animated interpretations to communicate an idea, emotion, or special effect, including the application of principles of animation, design, and media techniques and processes.
7. Solve visual arts problems that communicate ideas, emotions, or special effects.

Animation Technology

8. Describe the role and influences of new technologies on animation and visual communication.
9. Use a variety of electronic resources to research topics.
10. Apply technology to an animation task, including creating effects, editing for clarity and entertainment, and recording for visual review.

Introduction to Architectural Design

Introduction to Architectural Design is one-credit course that introduces students to the basic terminology, concepts, and principles of the architectural design field. Students are introduced to various careers involving architecture and principles of architectural design. Emphasis is placed on floor plan layout, electrical plans, foundation plans, wall sections, roof design, and evaluations. Upon successful completion of this course, students are able to draw a basic residential architectural construction drawing.

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Residential Floor Plans

Students will:

1. Create a basic residential floor plan, including symbols, dimensions, window and door schedule, and notes.
 - Recognizing elements and features found on residential floor plans
 - Utilizing sketches in preliminary layouts
 - Identifying basic interior design considerations
 - Determining room relationships and exterior design factors

Residential Electrical Plans

2. Create a residential electrical plan, including notes and symbols.
 - Identifying elements and features found on a residential electrical plan
 - Explaining fire and smoke alarm requirements

Foundations

3. Draw a residential foundation plan, including footings, pier details, notes, and dimensions.
 - Identifying primary features included in foundation plans
Examples: foundation plans—slab construction, crawl space construction

Residential Wall Sections

4. Design a residential wall section for common building materials, including notes and dimensions.
 - Identifying primary features included in wall section views as related to slab and crawl space construction

Roof Design

5. Identify styles and materials used in roof systems.

Examples: styles—gable, hip
materials—fiberglass, metal

- Identifying roof pitch
- Identifying overhang

Elevations

6. Create residential elevation plans.

- Explaining historical influences on current home design
- Identifying exterior features of common residential styles
- Describing common exterior materials used for roofing, walls, doors, and windows

Introduction to Biotechnology

Introduction to Biotechnology is a one-credit course designed to provide an overview of the biotechnology field. It is suggested that this elective course be offered to advanced senior level students. Subject matter includes career choices, skill development, and application of science concepts relative to biomedical research and development. Students gain a basic understanding of laboratory procedures fundamental to biomedical research through course topics that include Mendelian genetics, gene structure and function, inheritance patterns, genetic abnormalities, and the Human Genome Project. Additional topics include communication skills, history and development of the field of biomedical research, and comprehension of the legal environment, and technology transfer aspects of biomedical research. Upon completion of the course, job shadowing, virtual “job shadowing,” or clinical internship opportunities may also be available through biotechnology companies, local universities, medical schools, and diagnostic laboratories.

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Career Opportunities

Students will:

1. Trace the history of biotechnology.
 - Identifying scientific fields relevant to biotechnology
 - Describing both scientific and non-scientific careers and role and responsibilities of individuals working in biotechnology

Safety

2. Exhibit appropriate safety procedure in the laboratory.
Examples: demonstrating proper use of personal protection devices, maintaining a sanitary laboratory environment, handling biological and chemical hazards properly, following laboratory protocols, maintaining proper documentation, labeling, and record keeping

Biochemistry Concepts

3. Explain concepts important to solution preparation.
 - Explaining concepts of molecular mass, mole, and formula weight
 - Calculating molecular mass of specific molecules and the molarity of a solution
 - Preparing solutions of defined concentration
Example: preparing serial dilutions of specific solutions
 - Adjusting the pH of specific solutions with commonly used acids and bases

Genetics and Cell Biology Concepts

4. Correlate key cellular components to function.
Examples: nucleus, chromosome, ribosome, mitochondria
5. Describe the process of meiosis and the cell cycle, including the hereditary significance of each.
 - Comparing typical and atypical chromosome karyotypes
 - Comparing spermatogenesis and oogenesis using charts
6. Describe the significance of Mendel's work to the development of the modern science of genetics, including the laws of segregation and independent assortment.
7. Describe inheritance patterns based on gene interactions.
 - Predicting patterns of heredity using pedigree analysis
 - Identifying incomplete dominance, codominance, and multiple allelism
8. Describe occurrences and effects of sex linkage, autosomal linkage, crossover, multiple alleles, and polygenes.
9. Describe the structure and function of deoxyribonucleic acid (DNA), including replication, translation, and transcription.
 - Applying the genetic code to predict amino acid sequence
 - Describing methods cells use to regulate gene expression
 - Defining the role of ribonucleic acid (RNA) in protein synthesis
 - Performing DNA extraction and separation techniques
 - Analyzing DNA previously amplified using polymerase chain reaction (PCR)
10. Explain the structure of eukaryotic chromosomes, including transposons, introns, and exons.
11. Describe factors such as radiation, chemicals, and chance that cause mutations.
 - Describing effects of genetic variability on adaptations
 - Describing how DNA mutations impact both the organism and population
12. Explain how the Hardy-Weinberg principle provides a baseline for recognizing evolutionary changes in gene frequency due to genetic drift, gene flow, nonrandom mating, mutation, and natural selection.
13. Differentiate among major areas in modern biotechnology, including plant, animal, microbial, forensic, and marine.
Examples: hybridization, cloning, insulin production, DNA profiling, bioremediation
 - Describing techniques used with recombinant DNA
Examples: DNA sequencing, isolation of DNA segments, PCR
 - Demonstrate proper maintenance of bacterial cultures, including preparing growth media and culturing microorganisms
 - Demonstrating recombinant DNA techniques in bacteria, including performing a plasmid transformation and a restriction digest

14. Explain the development, purpose, findings, and applications of the Human Genome Project.
 - Analyzing results of the Human Genome Project to predict ethical, social, and legal implications
 - Describing medical uses of gene therapy, including vaccines and tissue and antibody engineering
 - Using computer bioinformatics resources to provide information regarding DNA, protein, and human genetic diseases
 - Examples: National Center for Biotechnology Information (NCBI), protein data bank, gene reviews
15. Describe the replication of DNA and RNA viruses, including lytic and lysogenic cycles, using diagrams.

Introduction to Commercial Photography

Introduction to Commercial Photography is a one-credit course that provides students with the opportunity to experience practical training in current and emerging photographic technology. The curriculum is based on industry standards designed to provide specialized skills and technical knowledge relevant to photography. Students focus on essential elements in camera, film development, darkroom procedures, safety, history, and composition principles. This course is the prerequisite for Medium Format Photography and for Large Format Photography.

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Orientation

Students will:

1. Describe purposes, rules, and regulations relative to commercial photography.
2. Research career opportunities available in commercial photography.

Camera Operations and Controls

3. Demonstrate the use of a 35mm camera, including loading film, identifying basic camera controls, and adjusting shutter speed, focus, and film speed.

Film Developing and Printing

4. Identify equipment and tools needed for processing black-and-white film.
 - Explaining aspects of chemistry involved in film developing
 - Demonstrating chemical safety rules in combining developers and other chemicals
 - Explaining the importance of proper agitation and temperature for developing and printing film
 - Describing the proper nomenclature of the enlarger for large format printing
 - Evaluating density and contrast in a print
 - Demonstrating archival processing for maximum permanence
 - Creating enlargements of prints

Laboratory Skills

5. Demonstrate the process for producing photographs.

History

6. Analyze early inventions in photography for their impact on modern photography.
 - Critiquing a gallery of contemporary photography
 - Comparing early and modern images
 - Analyzing motion in early photography
 - Classifying pictorial photography as art

Safety Orientation

7. Explain the importance of safety precautions to avoid hazards in the commercial photography workplace.
 - Demonstrating the importance of wearing protective gear while mixing photography chemicals
 - Describing safety procedures for work in a darkroom
 - Describing environmental issues regarding disposal of chemicals used in photography

Lighting Techniques

8. Practice photography with available natural light or lighting equipment.
 - Identifying photography lighting equipment
 - Identifying qualities of light with regard to photography

Digital Imaging

9. Demonstrate light conversion into an electronic image.
 - Determining overall resolution and pixilation of a digitized image
 - Comparing similarities and differences of digital camera sharpness to conventional film cameras
 - Determining the most direct pathway to digitize images
 - Evaluating high-resolution film scanners
 - Employing digital backs to existing 35mm and medium format cameras
 -

Business Ownership

10. Describe ways to establish business ownership in the photography industry.
 - Comparing advantages and disadvantages of owning a commercial photography business
 - Evaluating marketing components of a photography business
 - Determining freelance photography opportunities

Photography Marketing

11. Explain marketing functions used by a photography business.
 - Identifying the role of market research
 - Explaining the role of competition in marketing

Employability Skills

12. Demonstrate procedures for obtaining employment in commercial photography, including job search, completion of a résumé, application, and interview.

Introduction to Computer Numerical Control

Introduction to Computer Numerical Control (CNC) is a one-credit course that provides an introduction to manufacturing processes and job opportunities for students who are pursuing careers in manufacturing. Students use critical-thinking skills and principles of science, mathematics, and safety. This entry-level course may be taken in the Manufacturing cluster. Students who choose to enter the Manufacturing cluster must meet academic goals and expectations of business and industry. Topics include CNC programming and CNC operations. Standards are based on National Institute for Metalworking Skills (NIMS) Level I CNC Mill and NIMS Level I CNC Lathe.

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Safety

Students will:

1. Apply safety rules, regulations, and procedures when using CNC equipment.
2. Demonstrate care and maintenance for CNC machines.
Examples: maintenance—operating, cleaning, lubricating, setting up

Operations

3. Identify basic G and M codes, speed and feed codes, and cutter positioning.
4. Demonstrate skills for writing a basic CNC mill program for straight and circular moves.
5. Demonstrate skills for writing a basic CNC lathe program for turning, facing, and corner radii.

Projects

6. Create a finished project using CNC mill.
Example: NIMS Level I CNC Mill
7. Create a finished project using CNC lathe.
Example: NIMS Level I CNC Lathe

Introduction to Cosmetology

Introduction to Cosmetology is a one-credit course that provides students with a study of concepts related to the cosmetology profession. Specific topics include cosmetology history and opportunities, professional image, infection control, and basic fundamentals and principles of hair care and design. Students also gain initial practical experience in sanitation, shampooing, hair shaping, and hairstyling. Upon successful completion of this course, students are able to practice safety and sanitary precautions as they perform basic cosmetology procedures. Introduction to Cosmetology is the prerequisite to Chemical Services, Hair Coloring, Introduction to Spa Techniques, Advanced Spa Technique Applications, Salon Practices and Management, and State Board Practicum.

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Foundation

Students will:

1. Apply mathematical, reading, writing, critical-thinking, decision-making, and problem-solving skills to perform work in the cosmetology industry.
2. Demonstrate teamwork and skills necessary for developing long-range goals and projects that impact the cosmetology industry.
Example: career and technical student organization (CTSO) program of work
3. Utilize technology and information technology tools that impact management and services provided by the cosmetology industry.

Salon Safety and Sanitation

4. Apply safety rules and regulations related to cosmetology, including fire equipment, tools, Material Safety Data Sheets (MSDS), and Environmental Protection Agency (EPA) procedures.

Cosmetology History and Opportunities

5. Explain the origin and historical advancements of hairstyling in cosmetology and barbering.
6. Identify pioneers of modern cosmetology and their contributions to the industry.
7. Describe career opportunities available in the cosmetology industry.
Examples: stylist, barber, salon manager, esthetician, nail technician, makeup artist

Professional Image

8. Apply concepts related to personal hygiene, physical poise, professional dress, and workplace ethics in cosmetology and barbering.
9. Demonstrate effective communication skills while performing duties associated with cosmetology.

Infection Control, Principles, and Practice

10. Identify types and classifications of bacteria.
Examples: nonpathogenic, pathogenic
11. Practice infection control techniques relative to cosmetology, including performing wet and dry sanitizing procedures for safety and decontamination.
 - Differentiating between sterilization, disinfection, and sanitation
 - Using Occupational Safety and Health Administration (OSHA) requirements for infection control and disposal of chemicals in cosmetology

Fundamentals of Hair Care

12. Demonstrate draping procedures for hair services.
Examples: dry, wet, chemical
13. Demonstrate procedures for shampooing, rinsing, conditioning, and caring for the scalp and hair.
 - Identifying various types of shampoos and conditioners, emulsions and suspensions, and pH codes
 - Analyzing conditions of the scalp and hair
 - Applying procedures for scalp massages and treatments
Examples: hot oil treatment, ultraviolet ray treatment

Principles of Hair Design

14. Explain principles and elements of hairstyle and design.
 - Explaining the relationship of facial types to styling principles for male and female design
 - Describing the use of various tools and equipment for hairstyling
 - Identifying the five elements and five principles of hair design
 - Identifying basic patterns for haircutting
15. Apply techniques for hair shaping and design.
 - Utilizing correct hair shaping terminology
 - Demonstrating how to section hair, including basic elevation, angles, and guidelines
 - Demonstrating face shaving and beard and mustache trimming techniques based on facial structure, including final shaving of the face and neck

16. Demonstrate methods of haircutting, including clipper over comb, wet and dry, arching, scissor cut, and razor cut.
 - Demonstrating correct techniques for holding combs, shears, clippers, trimmers, razors, and thermal styling tools
 - Demonstrating edge and clean neckline techniques with razors, clippers, or shears
17. Demonstrate hairstyling techniques, including braiding, pressing, wrapping, and roller control.

Introduction to Criminal Justice

Introduction to Criminal Justice is a one-credit course designed to introduce students to a variety of topics in this area of study, including ethics and professionalism, constitutional and criminal laws, the court system, trial processes, juvenile justice and correctional systems, and human diversity. Students also gain knowledge regarding possible careers in the field of criminal justice.

The minimum required content may be expanded to accommodate specific community interests and utilize local resources. This course encourages critical thinking, use of the scientific method, integration of technology, development of student leadership skills, and application of knowledge and skills related to practical questions and problems.

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Career Opportunities

Students will:

1. Describe career opportunities in the criminal justice system.
 - Identifying leadership opportunities, benefits, and awards available through participation in career and technical student organization (CTSO) events
 - Demonstrating procedures for obtaining employment, including developing a résumé, completing a job application, and participating in a mock interview

Ethics and Professionalism

2. Interpret the code of ethics for the criminal justice system.

Constitutional and Criminal Laws

3. Explain how political, moral, and economic concerns lead to the development of laws.
 - Differentiating state and federal laws
 - Describing the impact of local ordinances

Court System

4. Compare federal, state, and municipal ordinances.
 - Describing Alabama's court system

Trial Process

5. Describe the role of individuals involved in the trial process.

Juvenile Justice System

6. Identify programs and agencies within the juvenile justice system.
 - Identifying law enforcement procedures related to juvenile offenders

Correctional System

7. Evaluate federal, state, and local correctional systems.
 - Describing various types of community-based programs provided by correctional systems

Awareness of Human Diversity

8. Identify factors that may affect human relations in criminal justice operations within culturally diverse communities.

Introduction to Drafting Design

Introduction to Drafting Design is a one-credit course that serves as an introduction to the drafting design technology field. It provides essential information that builds a strong foundation for the entire program. Emphasis is placed on student orientation, safety, tools and procedures, geometric construction, sketching, dimensioning practices, visualization, and orthographic projection concepts. Computer-Aided Drafting (CAD) functions and techniques using CAD software applications are introduced. Upon successful completion of this course, students are able to utilize tools and interpret basic drafting standards to complete a multi-view drawing. This entry-level course is a prerequisite to all other drafting design technology classes.

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Orientation

Students will:

1. Relate the importance of drafting design technology in today's technological work force.

Safety

2. Demonstrate the safe handling of drafting design tools according to classroom and environmental practices, procedures, and regulations.

Applied Mathematics for Drafting

3. Demonstrate mathematics skills related to drafting design, including basic fractions, scale reading, and conversion of customary to metric and metric to customary measurements.
 - Solving higher-order mathematics applications
Example: calculating thread depth and pitch
 - Calculating architectural computations
Examples: area, rise and run

Drafting Instruments and Techniques

4. Demonstrate the use of drawing media and drafting instruments.
Examples: architectural scales, graphite, lead holders
 - Utilizing computer software for drafting applications
 - Reproducing drafting originals
Examples: print, plot, blueprint, photocopy

Lettering and Drawing Techniques

5. Demonstrate drafting techniques for freehand sketching, lettering, geometric figures, and the alphabet of lines to create a drawing.

Multi-View Drawings

6. Construct basic multi-view, two-dimensional drawings, including visualizing principle views, creating third-angle projections, selecting proper drawing scale, and organizing layout of primary views.

Basic Dimensioning

7. Apply dimensions and notes to multi-view drawings, utilizing the American National Standards Institute (ANSI) dimensioning standards and decimal, metric, or dual dimensioning.

Fundamentals of Computer-Aided Drafting

8. Utilize CAD software to generate a multi-view drawing using appropriate file management techniques, basic drawing commands, and basic dimensioning techniques.
Examples: file management techniques—create, set up, and save files
basic drawing commands—line, ellipse, circle, scale
basic dimensioning techniques—linear, angular
 - Utilizing CAD software and computer to print a multi-view drawing

Introduction to Electricity for Heating, Ventilation, Air-Conditioning, and Refrigeration Systems

This is a one-credit course that introduces students to the basic knowledge and skills regarding electrical theory, circuitry, and computers as they relate to heating, ventilation, air-conditioning, and refrigeration (HVACR). Emphasis is placed on safety and basic concepts of electrical circuits. Students learn to systematically troubleshoot circuits by interpreting wiring diagrams. Students enrolled in this course display competence in reading, writing, and mathematics skills as well as problem-solving techniques. Students exhibit basic competencies in physical science as it relates to electricity and are able to comprehend both verbal and written instruction. Instruction in this course consists of both individual and group classroom and laboratory activities. Upon successful completion of this course, students demonstrate basic understanding of safety, electrical terms, symbols, laws, and circuit testing instruments. This course is a prerequisite to HVACR Electrical Components and Controls.

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Students will:

1. Demonstrate safety rules, regulations, and procedures when working with electrical systems.
2. Demonstrate use of hand tools and power tools related to HVACR systems.
3. Use various meters to measure electrical values.
Examples: analog, digital
4. Demonstrate the use of Ohm's law and Joule's law.
5. Demonstrate procedures for testing fuses and capacitors.
6. Demonstrate procedures for building series, parallel, and series-parallel circuits.
7. Determine the functional condition of motor windings in a single-phase compressor.
8. Demonstrate testing procedures for electrical components, including fan relays, contactor relays, capacitors, and motor windings.
9. Determine procedures for measuring heat anticipator amperes.
10. Demonstrate procedures for installing heating and cooling thermostats.
11. Explain conductors, insulators, and related symbols used in HVACR.
12. Demonstrate procedures for making proper electrical connections.
13. Explain various types of wiring diagrams, including pictorial, line, and schematic used in HVACR.

Introduction to Fire Science

Introduction to Fire Science is a one-credit course that provides students with competencies related to a cluster of public service job preparatory programs and helps students develop knowledge and skills necessary for success and advancement in a specialized public service job preparatory program. Students study possible careers, employability skills, leadership, basic first aid, blood-borne pathogens, fire management services, legal services, and law enforcement services.

Content standards in this course are not intended to serve as the entire curriculum. Teachers are encouraged to expand the curriculum beyond the minimum required content to accommodate specific community interests and utilize local resources. This course encourages critical thinking, use of the scientific method, integration of technology, development of student leadership skills, and application of knowledge and skills related to practical questions and problems. Safety concepts are integrated into instruction to the maximum extent possible.

Career and technical student organizations are integral, cocurricular components of each career and technical education course. These organizations serve as a means to enhance classroom instruction while helping students develop leadership abilities, expand workplace-readiness skills, and broaden opportunities for personal and professional growth.

Career Opportunities

Students will:

1. Describe career opportunities in fire science.

Safety

2. Identify safety practices in fire science.

Fire Behavior

3. Describe the fire triangle.
 - Explaining classes of fire, including associated hazards
 - Identifying products of combustion commonly found in structural fires
 - Explaining units of heat measurement, including British Thermal Unit (BTU), Fahrenheit, Celsius, and calorie

Communication Skills

4. Identify fire service communication skills.
 - Reporting observations in written or oral form

Communication Equipment

5. Describe the use of emergency communication equipment.
 - Defining fire department radio communication procedures for routine and emergency traffic situations

Portable Fire Extinguishers

6. Demonstrate the use of portable fire extinguishers.
 - Identifying the classification of types of fire as they relate to the use of portable extinguishers

Structural Design

7. Identify factors that increase hazards to firefighters in buildings being constructed, renovated, or demolished.
 - Listing signs of potential building collapse
 - Describing actions to be taken when imminent building collapse is suspected

Personal Protective Equipment

8. Explain the use of personal protective equipment in fire science.
 - Describing hazardous atmospheres that require the firefighter to wear a Self-Contained Breathing Apparatus (SCBA)
 - Describing maintenance procedures for emergency equipment

Ropes and Knots

9. Compare types of ropes and knots, including applications in fire science.

Search and Rescue

10. Identify search, rescue, and extrication techniques in fire science.

Ground Ladders

11. Demonstrate the use of ground ladders.
 - Labeling parts of a fire service ladder
 - Identifying types of fire service ground ladders

Ventilation

12. Assess ventilation systems for fire hazards.
 - Matching types of ventilation systems to their descriptions
 - Identifying signs of potential back draft

Fundamentals of a Water Supply System

13. Describe types of water supply systems.
 - Listing recommended water distribution system pipe sizes for residential, business, and industrial long mains
 - Identifying types of water main valves
 - Distinguishing between wet-barrel and dry-barrel fire hydrants

Fire Hose

14. Identify the nozzle and hose for a given fire situation.

Water Streams

15. Assess the importance of a water stream when fighting fires.
 - Explaining guidelines for maintaining water pressure when fighting fires
 - Explaining discharge rates for low-volume, hand-line, and master water streams

Introduction to Fisheries Technology

This is a one-credit course designed to introduce students to local fishing industries within the state. Students study rules and regulations pertaining to each type of fishing industry and the equipment and processing techniques used to harvest seafood from local waters. Also included in the course are ways technology has impacted equipment and techniques over time.

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Commercial Hook and Line Fishing

Students will:

1. Describe working vessels in the commercial hook and line fishing industry.
 - Identifying required equipment utilized in the commercial hook and line fishing industry
2. Compare state and federal licenses and rules and regulations associated with the commercial hook and line fishing industry.

Net Fishing

3. Describe working vessels in the net fishing industry related to the commercially important species fishing industry.
 - Identifying required equipment utilizing the net fishing industry related to the commercially important species fishing industry
4. Compare state and federal licenses, rules, and regulations associated with the net fishing industry related to the commercially important species fishing industry.

Charter Fishing

5. Describe working vessels in the charter fishing industry.
 - Identifying required equipment utilized in the charter fishing industry
6. Compare state and federal licenses and rules and regulations associated with the charter fishing industry.

Longline Fishing

7. Describe working vessels in the longline fishing industry.
 - Identifying required equipment utilized in the longline fishing industry
8. Compare state and federal licenses and rules and regulations associated with the longline fishing industry.

Ecology and Conservation

9. Explain impacts of ecology and conservation on commercial fishing.

Introduction to Graphic Arts

Introduction to Graphic Arts is a one-credit course that provides students with information regarding safety, image preparation, press operations, and finishing operations in a laboratory setting. Mathematics skills are evaluated and reinforced as needed. Upon successful completion of the course, students exhibit skills enabling them to enter specialized advanced graphic arts courses. This course is the prerequisite for Digital File Preparation; Advanced Digital File Preparation; Camera, Image Assembly, and Plate Making; Offset Press Operations; and Binding and Finishing.

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Introduction

Students will:

1. Define the role of graphics in the free enterprise system.
Examples: print markets, types of print businesses, printing ranking, typical business flow, printing industry associations
 - Recognizing types of companies that employ persons with graphic arts skills
Examples: commercial printers, direct mail printers, periodical printers
 - Identifying the relationship of counterfeiting and copyright laws related to graphic arts
2. Identify major printing processes, including flexography, gravure, lithography, screen printing, and digital.
 - Identifying advantages and disadvantages of major printing processes
 - Listing typical products produced by major printing processes
 - Explaining sequential steps in technical production flow from idea to finished graphic arts product
 - Interpreting production information on a job docket or ticket

Safety

3. Explain safety rules for graphic arts, including press procedures, paper cutter procedures, Occupational Safety and Health Administration (OSHA) approved methods to dispose of waste materials, and Material Safety Data Sheets (MSDS).
4. Describe proper use of safety equipment, including fire safety equipment, first aid kit, eye wash station, protective safety procedures, dress code, and warning labels.
5. Describe necessary steps for addressing injury in the graphics arts laboratory.

Digital File Preparation

6. Identify various software applications and file formats for graphic arts.
 - Comparing portable document file (PDF) format to native files for proofs
 - Describing various file formats and their extensions
 - Examples: document (doc), Graphics Interchange Format (GIF), bitmap (BMP), Tagged Information File Format (TIFF), hypertext markup language (HTML)
 - Describing the difference between a raster image and a vector graphic
7. Explain the purpose of a folding dummy and imposition.

Image Capture and Digital File Output

8. Describe uses of image capture and digital file output equipment and processes, including basic scanning and digital camera hardware and digital platemaking equipment for offset plates.
 - Identifying the difference between line art and continuous tone originals, trapping and proofing, and hard and soft proofs

Color Theory

9. Explain color usage in graphic arts technology.

Press and Bindery Operations

10. Identify basic press system quality control devices.
 - Examples: color bars, densitometer
11. Identify padding equipment materials and hand tools, stapling and stitching equipment and supplies, punching and drilling equipment and tools, folding equipment, collating equipment, die cut equipment, and embossing equipment.
 - Explaining different binding methods and applications, including case binding, perfect binding, saddle stitching, and lay-flat binding
 - Describing the mailing and distribution process of printed products
 - Recognizing basic procedures used to produce die cut, embossed, and foil products
12. Describe basic bindery operations in graphic arts.
 - Identifying advantages and disadvantages of in-line, off-line, and near-line finishing
 - Identifying basic paper types, including weights, grades, grain directions, and classifications used in the printing industry
 - Creating basic folds for printed products
 - Creating a basic paper cut from a parent sheet and a master cutting diagram for making cuts
 - Utilizing punching and drilling equipment
 - Demonstrating side, saddle-stitched, or stapled products

Measurement and Basic Mathematics

13. Calculate measurements for graphic arts technology, including line dimensions for printing, type in points and line length, volume for mixing chemicals, and original images for reduction and enlargement.
14. Solve mathematics problems related to graphic arts, including type calculations, liquid measurements, conversion problems, and paper-cutting calculations.
 - Determining volume for mixing chemicals in the pressroom

Job Search and Interpersonal Skills

15. Describe desirable work ethics and habits needed for the graphic arts industry.
Examples: teamwork, adherence to dress code, communication skills
16. Research career options in the graphic arts industry.
17. Evaluate job opportunities, including wages, benefits, and employment responsibilities in the graphic arts industry.
18. Describe a commercial printing operation and production department following research and industry site visits.

Introduction to Heating, Ventilation, Air-Conditioning, and Refrigeration

Introduction to Heating, Ventilation, Air-Conditioning, and Refrigeration (HVACR) is a one-credit course that introduces students to the basic skills used in the HVACR industry. Students enrolled in this course exhibit a mechanical aptitude; are able to comprehend written, verbal, and hands-on instruction; display the ability to visualize a completed project; and possess the physical dexterity to use basic hand tools. Instruction consists of both individual and group classroom and laboratory activities and provides students with the knowledge and skills used throughout the HVACR industry and other trades. Upon completion of this course, students exhibit skills in mathematics, hand tools, torches, and tools particular to the HVACR industry. This course is a prerequisite to all courses in the HVACR pathway.

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Students will:

1. Explain job opportunities related to the HVACR program.
2. Apply safety rules, regulations, and procedures for HVACR.
3. Construct fittings, including flare connections and swage joints, to specifications.
4. Demonstrate the process of bending tubing for specific angles.
5. Demonstrate setup of oxyacetylene and air acetylene welding.
6. Demonstrate oxyacetylene welding processes, including lighting and adjusting torch, soft-soldering copper fittings and tubings, and silver brazing.
7. Demonstrate techniques for cutting and threading galvanized and black iron pipe to specification.
8. Interpret blueprints for HVACR, including symbols, components, and specifications.
9. Demonstrate the use of basic technical mathematics skills.

Introduction to Lathe

Introduction to Lathe is a one-credit course designed for students who are pursuing careers in manufacturing. Students apply critical-thinking skills and principles of mathematics and observe safety rules and regulations as they are introduced to the manufacturing process and job-related opportunities. Job shadowing and internship are appropriate work-based learning strategies for this course. The prerequisite for this course is Introduction to Precision Machinery. Students who enter the Manufacturing cluster must meet academic goals and expectations of business and industry.

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Safety

Students will:

1. Demonstrate care and safety for an engine lathe.
Examples: maintenance—operating, cleaning, lubricating, setting up

Lathe Operations

2. Demonstrate engine lathe operations, including mounting the chuck on the lathe, indicating the round stock in an independent jaw chuck, indicating the square stock in an independent jaw chuck, sharpening the lathe tool bit, centering or positioning cutting tools, face cutting a work piece, turning multiple diameters, center drilling a work piece, demonstrating angle cuts, knurling a work piece, threading a work piece, calculating speed and feed per material, and tooling.
Examples: threading a work piece—chasing right and left hand external threads, manually tapping a hole, countersinking a hole, drilling a hole, picking up lead on existing threads
3. Demonstrate the ability to turn stock to specifications using a variety of methods and materials related to lathe operations.

Project

4. Demonstrate the ability to produce a completed lathe project according to specifications.
5. Demonstrate use of measuring tools, including calipers, dial indicators, and micrometers to produce precision lathe projects.

Introduction to Law and the American Legal System

Introduction to Law and the American Legal System is a one-credit course that provides students with an opportunity to develop an understanding of the principles and practices of the American legal system. Students learn fundamental aspects of career opportunities, history and development of law, sources of law in society, civil law, criminal law and procedure, ethics and the justice system, reasoning skills, trial procedures, and communication and research skills.

Content standards for this course are not intended to serve as the entire curriculum. Teachers are encouraged to expand the curriculum beyond these minimum required content standards to accommodate specific community interests and utilize local resources. This course encourages critical thinking, use of the scientific method, integration of technology, development of student leadership skills, and application of knowledge and skills related to practical questions and problems.

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Career Opportunities

Students will:

1. Explain career opportunities within the American legal system.

History and Development of Law

2. Trace the history and development of the American legal system.

Sources of Law in Society

3. Describe fundamental sources of law in American society.
 - Comparing common law with statutory law

Civil Law

4. Explain how principles of tort law affect human behavior.
 - Analyzing factual scenarios for presence of actionable torts
 - Identifying elements of negligence regarding civil law
5. Describe the development of the United States Constitution.
 - Explaining fundamental constitutional rights
 - Explaining contemporary issues involving constitutional law
6. Explain principles of family law in Alabama, including requirements for marriage and grounds for divorce.

7. Identify fundamental concepts of commercial law.
8. Describe statutes related to consumers.
 - Explaining state and federal statutes regarding consumer rights
Example: fair debt collections law
 - Explaining basic bankruptcy laws
9. Differentiate among principles of probate law, including types of property and ownership rights and responsibilities.
10. Describe the structure of the civil court system.
 - Comparing federal, state, and local court systems
 - Describing jurisdiction and function of district, circuit, and appellate courts
11. Identify contractual elements, obligations, and consequences of breach of contract.
12. Explain basic rules of evidence in the justice system.
 - Describing types of evidence presented in court proceedings
 - Defending admissibility of evidence in the legal process

Criminal Law and Procedure

13. Describe basic principles and procedures of criminal law.

Ethics and the Justice System

14. Assess ethical issues of the American legal system.

Reasoning Skills

15. Formulate legal arguments for various areas of law.

Trial Procedures

16. Prioritize stages of trial and court proceedings.
17. Create a case presentation for a mock trial.

Communication and Research Skills

18. Demonstrate written communication and public speaking skills necessary for a career in a legal field.
 - Researching legal issues for a mock trial

Introduction to Manufacturing

This is a one-credit course designed to provide students with the fundamental knowledge and skills needed in the manufacturing industry. Emphasis is placed on job safety, use of manufacturing materials, primary manufacturing processes, secondary manufacturing processes, and manufacturing systems. Upon successful completion of this course, students perform basic tasks related to the manufacturing industry.

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Safety

Students will:

1. Apply safety rules, regulations, and procedures related to manufacturing.
Examples: personnel, plant floor, interpretation of Material Safety Data Sheets (MSDS), Environmental Protection Agency (EPA), Occupational Safety and Health Administration (OSHA) rules and regulations

Manufacturing Materials

2. Identify types of manufacturing materials, including metallic, polymeric, ceramic, and composites.
3. Interpret properties of manufacturing materials, including physical, mechanical, chemical, thermal, academic, electrical and magnetic, acoustical, and optical.

Primary Manufacturing Processes

4. Explain thermal, mechanical, and chemical changes in manufacturing materials.

Secondary Manufacturing Processes

5. Demonstrate casting and molding processes, including mold preparation and pouring or forcing liquids.
6. Demonstrate die forming and roll forming of materials.
7. Explain separating processes for cutting and shearing material.
8. Explain conditioning processes for thermal, mechanical force, and chemical action.
9. Demonstrate temporary, permanent, two-part, and multiple-part assembling processes.

10. Demonstrate finishing processes, including product protection and appearance.

Manufacturing Systems

11. Compare custom, intermittent, and continuous manufacturing systems.
12. Identify improvements in manufacturing processes, including value adding, non-value adding, control systems, and factors to control.

Introduction to Maritime Engineering

This one-credit course introduces students to basic electrical and mechanical systems found aboard many of today's commercial vessels. Electrical systems covered include principles of alternating current (AC) and direct current (DC) circuits and the practical operation of shipboard electrical systems. Mechanical systems addressed include marine air-conditioning and refrigeration as well as propulsion and engine control systems. Students are introduced to basic diesel engine principles, including fuel, lubrication, cooling, and exhaust systems and are able to identify the major components of each system.

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Safety

Students will:

1. Apply safety rules, regulations, and procedures associated with basic maritime engineering, including first aid, fire, electrical, tools, and equipment.

Electrical Systems

2. Distinguish between various components of maritime electrical systems, including meters, transformers, converters, inverters, and batteries.
 - Evaluating principles of AC and DC circuits
3. Compare generators and shore-side power sources in relation to marine vessel electrical systems.
 - Explaining the operation of shipboard systems

Mechanical Systems

4. Explain the importance of air-conditioning and refrigeration compressors, condensers, thermostats, refrigerants, fans, heat pumps, water-cooled systems, and air-cooled systems.

Pumping Systems and Piping

5. Describe the importance of maritime pumping system components, including pumps, manifolds, piping, tanks, and valves.
6. Explain different aspects of the maritime pumping system as related to freshwater, gray water, sewage, and fuel.

Propulsion Systems

7. Compare various types of propulsion, including propeller, set pitch and variable pitch, sail, jet, cyclonical, and Z-drive.

Engine Control Systems

8. Distinguish between maritime or engine manual and electric control systems.

Diesel Engines

9. Describe diesel engine systems.

Inboard and Outboard Gasoline Engines

10. Describe components of gasoline engines, including the fuel system, lubricating system, cooling system, exhaust system, and intake system.
11. Demonstrate preventive maintenance on inboard gasoline engines.
12. Demonstrate preventive maintenance on outboard gasoline engines.

Introduction to Masonry

Introduction to Masonry is a one-credit course designed to provide students with the basic knowledge and skills of masonry. Emphasis is placed on safety, tools of the trade, measuring, blueprint reading and layout, and masonry wall construction. Upon successful completion of this course, students demonstrate basic block and brick construction techniques.

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Safety

Students will:

1. Apply safety rules, regulations, and procedures for masonry construction.
2. Identify rules and regulations related to masonry construction.

Orientation

3. Describe skills needed to work as a mason.
4. Identify tools and equipment used in performing masonry work.

Blueprint and Layout

5. Interpret construction drawings and specifications for masonry construction.
6. Identify components and types of mortar used in masonry construction.
 - Demonstrating various mortar mixing procedures using specified equipment
Examples: mixing mortar by hand, mixing mortar with a mechanical mixer
7. Describe types of masonry bonds.
8. Describe various techniques used in masonry wall construction.
Examples: masonry bonds, setup, joints, construction

Jointing

9. Demonstrate basic block and brick construction techniques.
10. Use basic bricklaying procedures, including mixing of mortar, laying a mortar bed for block and brick, and laying bricks with a head joint.

11. Identify composition, reinforcement, and forms used for concrete construction.

Foundations

12. Identify various kinds of footings, including continuous, spread, stepped, and pier.
13. Demonstrate site layout and measurements for a slab-on-grade with existing foundation and a slab-on-grade with integral foundation.
14. Demonstrate the finishing of concrete according to specifications for a masonry project.

Estimation

15. Determine materials and supplies needed for a masonry project.

Introduction to Metal Fabrication

Introduction to Metal Fabrication is a course that provides students with opportunities to examine safety and technical information in metal fabrication and to participate in hands-on activities in the laboratory. Topics include career opportunities, safety, identification and selection, metal preparation and finishing, metal cutting, weld quality, and shielded metal arc welding (SMAW).

Content standards for this course are not intended to serve as the entire curriculum. Teachers are encouraged to expand the curriculum beyond the limits of these content standards to accommodate specific community interests and utilize local resources. This course encourages critical thinking, use of the scientific method, integration of technology, development of student leadership skills, and application of knowledge and skills related to practical questions and problems. Safety concepts are integrated into instruction to the maximum extent possible.

This course may be taught as a one-credit or half-credit course. For a half-credit course, content standards 1, 2, 3, 4, 6, 9, 12, and 13 must be included.

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Career Opportunities

Students will:

1. Identify careers available in metal fabrication.
2. Describe the history of metal fabrication and its impact on the industry.
Examples: history—blacksmithing, oxyfuel development, arc welding, metal inert gas (MIG) welding, tungsten inert gas (TIG) welding
impact—automated systems making jobs obsolete, reduction in number of workers in job market

Safety

3. Demonstrate safety procedures used in the metal fabrication industry.

Identification and Selection

4. Explain uses of metal fabrication tools and equipment.
Examples: tools—hacksaw, cold chisel, file, drill, chipping hammer, metal vise grips, grinder, striker, tip cleaner, wire brush, tongs
equipment—welding helmet, fuel valves, oxyfuel torches
5. Differentiate among types of metal used in metal fabrication.
Examples: iron, aluminum, steel, tin, titanium, copper, magnesium, chromium, zinc

Metal Preparation and Finishing

6. Demonstrate techniques for preparing metal for fabrication.
Examples: stripping, cleaning, grinding, buffing

Metal Cutting

7. Prepare an oxyfuel unit for operation.
 - Explaining color-coding of oxyfuel tanks and hoses
Examples: green for oxygen, orange or black for acetylene
 - Comparing shaded lenses used in oxyfuel welding and cutting
 - Checking for cracks and leaks in oxyfuel hoses and regulators
8. Use an oxyfuel torch, including adjusting the flame to neutral and cutting and fusing metal.
9. Demonstrate procedures for using plasma arc cutting equipment.
 - Describing the plasma arc cutting process
 - Identifying components of plasma arc cutting equipment
 - Cutting metal with a plasma arc cutter

Weld Quality

10. Analyze weld imperfections to determine corrective measures.
11. Compare destructive and nondestructive weld testing methods.

Shielded Metal Arc Welding

12. Explain the SMAW process.
 - Comparing various types of welding electrodes used in SMAW
Examples: E6010, E6013, E7014
13. Demonstrate procedures for adjusting and operating the SMAW machine.
 - Identifying various types of weld joints
Examples: butt, lap, corner, T
 - Contrasting methods of striking an arc
Examples: scratching, tapping, weaving
 - Identifying types of welds
Examples: stringer, overlap, fillet
 - Demonstrating techniques for flat, vertical, horizontal, and overhead welding

Metal Assembly

14. Cut threads in metal using a tap.
15. Cut metal threads using a die.
16. Explain the process of laying out and cutting sheet metal.
17. Demonstrate the use of rivets in sheet metal assembly.

Introduction to Metal Inert Gas and Flux Cored Arc Welding

Introduction to metal inert gas (MIG) welding and flux cored arc welding (FCAW) is a one-credit course that provides students with opportunities to examine safety and technical information in metal fabrication and participate in hands-on activities in the laboratory. Topics include career opportunities, safety, planning metal structures, identification and selection, and weld quality.

Content standards for this course are not intended to serve as the entire curriculum. Teachers are encouraged to expand the curriculum beyond the limits of these content standards to accommodate specific community interests and utilize local resources. This course encourages critical thinking, use of the scientific method, integration of technology, development of student leadership skills, and application of knowledge and skills related to practical questions and problems. Safety concepts are integrated into instruction to the maximum extent possible.

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Career Opportunities

Students will:

1. Identify career opportunities in MIG welding and FCAW.

Safety

2. Demonstrate safety concepts required in MIG welding and FCAW.

Planning Metal Structures

3. Interpret welding symbols on blueprints.
4. Explain the procedure for planning and estimating materials needed to complete a metal fabrication project.
5. Explain the importance of metal preparation for welding.

Identification and Selection

6. Determine uses of tools and equipment in MIG welding and FCAW.
Examples: tools—hacksaw, cold chisel, file, drill, chipping hammer, metal vise grips, grinder, striker, tip cleaner, wire brush, tongs
equipment—welding helmet, fuel valves, MIG welder, FCAW welder

7. Distinguish among types of metal, used in MIG welding and FCAW.
Examples: iron, aluminum, steel, tin, titanium, copper, magnesium, chromium, zinc

Weld Quality

8. Critique MIG welding and FCAW welds for imperfections.
 - Determining corrective measures to improve welds
 - Explaining weld testing methods
9. Explain various parts of MIG welding and FCAW machines.
10. Compare shades of lenses needed in MIG welding and FCAW.
11. Explain how tensile strength, polarity, and rate of travel affect weld quality.
12. Demonstrate the use of MIG and FCAW welders.
 - Identifying various types of weld joints
Examples: butt, lap, corner, T
 - Adjusting MIG welding and FCAW machine settings for welding
 - Utilizing flat, vertical, horizontal, and overhead welding positions
 - Identifying stringer, weave, overlap, and fillet welds

Introduction to Milling, Drill Press, and Surface Grinder

Introduction to Milling, Drill Press, and Surface Grinder is a one-credit course that provides an introduction to manufacturing processes and job opportunities for students who are pursuing careers in manufacturing. Students use critical-thinking skills and principles of science, mathematics, and safety. This entry-level course may be taken in the Manufacturing cluster. Students who choose to enter the Manufacturing cluster must meet academic goals and expectations of business and industry. Topics include milling techniques, drill press techniques, and grinding techniques.

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Mill Safety

Students will:

1. Apply safety rules, regulations, and procedures related to milling, drill press, and surface grinder applications.
2. Explain the care and safety for milling machines.
Examples: maintenance—operating, cleaning, lubricating, setting up
3. Demonstrate types of milling cutters and applications, including center drill, drill, reamer, taps, end mills, fly cutter, and carbide insert cutters.
4. Demonstrate milling machine operations, including verifying that a machining vice is true to machine axis, verifying that the machine head is perpendicular to the machine table, using work piece clamping techniques, milling a flat surface, milling steps in a work piece, performing slot milling, milling a square block, calculating speed and feed per material and tooling, and milling a pocket in a work piece.

Surface Grinder Safety

5. Explain care and safety for a surface grinder.
Examples: maintenance—operating, cleaning, lubricating, setting up
6. Demonstrate grinding techniques, including mounting a grinding wheel, dressing a grinding wheel, grinding a flat surface, and grinding a work piece square and parallel.

Drill Press Safety

7. Demonstrate care and safety for a drill press.
Examples: maintenance—operating, cleaning, lubricating, setting up
8. Demonstrate drill press techniques.
Example: National Institute for Metalworking Skills (NIMS) Level I drill press standards
9. Demonstrate a hardness test on a work piece, including a file test and a Rockwell hardness test.

Introduction to Nail Care and Applications

Introduction to Nail Care and Applications is a one-credit course that focuses on all aspects of the nail care industry. Specific topics include nail care history and opportunities, nail and skin services, sanitation and bacteriology, and salon conduct. Upon successful completion of this course, students are able to demonstrate professional conduct, recognize nail disorders and diseases, and identify and perform procedures for sanitation and nail care services. This course is a prerequisite for Nail Art and Applications and State Board Practicum Pathway B.

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Nail Care History and Career Opportunities

Students will:

1. Document the origin of nail care technology and advancements made in the industry.
2. Describe career opportunities available in the nail care industry.
Examples: nail technician, manicurist, pedicurist, nail artist

Nail and Skin Theory and Services

3. Describe the structure and composition of the nail.
4. Describe diseases, disorders, and growth of the nail.
 - Identifying diseases of the nail that should not be treated in the salon
 - Differentiating among diseases of the nail, including mold and fungus
5. Identify products, supplies, and implements needed for a manicure and pedicure.
6. Demonstrate procedures for basic manicure, pedicure, and artificial nail services.
 - Exhibiting correct setup of a manicure table
 - Demonstrating proper setup of a pedicure station
 - Utilizing massage techniques when giving a manicure or pedicure
 - Applying tips, wraps, acrylic nails, and gels
 - Repairing broken or split nails
7. List preservice and postservice steps of an artificial nail procedure.
8. Explain the anatomy and physiology of the arm and hand.
 - Relating layers, blood vessels, and regeneration of the skin to nail and skin services
9. Identify the five shapes of a nail.
10. Demonstrate the correct technique for applying nail polish.

Sanitation and Bacteriology

11. Demonstrate safety and infection control procedures for nail care services, including applying sanitation and disinfection procedures on tools and implements and demonstrating safety precautions when applying artificial nails.
12. Demonstrate procedures for handling a blood spill.

Salon Conduct

13. Explain concepts related to establishing a professional image in the nail care profession, including personal hygiene, physical poise, appropriate attire, and effective communication skills.
14. Practice acceptable work ethics related to individual responsibility, integrity, honesty, and personal conduct.

Introduction to Navigation Technology

This is a one-credit course essential for students pursuing a license for any vessel tonnage class. The primary focus is on international and inland rules for preventing collisions at sea. Topics include applications; definitions; light and day shapes; steering and sailing rules with sound signals for vessels in meeting, crossing, and overtaking situations; vessels in restricted visibility; and aids to navigation.

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Safety

Students will:

1. Apply safety rules, regulations, and procedures for intermediate navigation technology.

Boating Laws and Regulations

2. Analyze federal boating laws and regulations, including registration related to marine navigation.
 - Comparing federal and state jurisdiction
 - Demonstrating knowledge of boundary lines

Rules of Navigation

3. Explain rules of navigation pertaining to light and day shapes, right of way, and whistle signals.
4. Differentiate between privileged and burdened vessels.
5. Explain common types of distress signals related to navigation.

Aids of Navigation

6. Describe the buoyage system of the United States.
Examples: describing buoy light characteristics, identifying fog signals
7. Identify lights and light ships, including light sector, range lights, ranges of visibility, geographic range, and luminous range.

Chart Plotting

8. Interpret charts, including metric charts and feet and fathom charts, soundings, and landmarks.
 - Utilizing plotting basics, including tools, time, speed, and distance
9. Determine the role of the International Association of Lighthouse Authority in the maritime industry, including aids to navigation, colors, heights, conversion scales, traffic separation schemes, correction data, notes, and terms.

Global Positioning System Navigation

10. Explain fundamentals of Global Positioning System (GPS) navigation, including accuracy and all weather capabilities.
 - Demonstrating proper use of the GPS unit, including setting waypoints, return path, and autopilot

Introduction to Pharmacy

Pharmacy is a one-credit course that introduces students to the pharmacy profession. Course content emphasizes the history of medicine, mathematics, technology, and legal issues. Foundations of Health Science is a prerequisite course. Upon successful completion of this course, students may choose to continue studies in Advanced Health Seminar or Work-Based Experience Seminar.

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Career Opportunities

Students will:

1. Trace the development of pharmaceuticals.
 - Demonstrating the use of pharmaceutical resources
Examples: *Physicians' Desk Reference* (PDR), hospital formulary
2. Compare roles of the pharmacist and pharmacy technician in various settings, including the hospital and retail pharmacy.

Legal and Ethical Implications

3. Describe ethical characteristics required in the pharmacy workplace.
Examples: maintaining a positive attitude, adhering to dress code, displaying professionalism in public relations
4. Explain state laws and regulations pertaining to a career in pharmacy.
Examples: delegating responsibilities by pharmacist to pharmacy technician, maintaining the confidentiality of pharmacy clients
 - Identifying functions of pharmacy regulatory agencies such as the Drug Enforcement Administration (DEA), the Food and Drug Administration (FDA), and the Occupational Safety and Health Administration (OSHA)

Medical Terminology

5. Translate medical terms, symbols, and abbreviations from prescriptions to laymen's terms.

Technology

6. Use technology to facilitate transactions in a pharmacy.
Examples: computer, fax machine, cash register

Mathematics Concepts

7. Use mathematics concepts in pharmaceutical settings.
Examples: calculating decimals, fractions, proportions, intravenous (IV) flow, and dosages; converting units between systems of measurement

Technical Skills

8. Demonstrate the procedure for filling prescriptions in a simulated pharmacy setting, including accepting medication orders, preparing prescription orders, labeling information, and dispensing drugs.

Pharmacology

9. Identify classifications of selected drugs.
Examples: analgesic, antibiotic, antiemetic
10. Explain routes used for the administration of medicine during a simulated medical case study.
Examples: intramuscular, sublingual, intravenous
11. Differentiate among drug interactions, drug reactions, and side effects.

Introduction to Precision Machining

Introduction to Precision Machining is a one-credit course that provides an introduction to manufacturing processes and job opportunities for students who are pursuing careers in manufacturing. Students use critical-thinking skills while expanding upon the principles of science. This entry-level course may be taken in the Manufacturing cluster. Students entering the Manufacturing cluster must meet academic goals and expectations of business and industry.

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Introduction

Students will:

1. Summarize purposes, rules, and regulations relative to the Precision Machining Technology program.

Safety

2. Apply safety rules, regulations, and procedures for precision machining technology.
Examples: laboratory, fire, electrical, and equipment safety

Print Reading

3. Identify blueprint symbols and lines related to precision machining.
Examples: dual dimensions, limit dimensioning, scales and rulers, single and multi-view drawings

Drill Press

4. Demonstrate care and safety for a drill press.
Examples: maintenance—operating, cleaning, lubricating, setting up
5. Demonstrate drill press operations, including hand sharpening a drill bit, center drilling and drilling a work piece, countersinking a hole, counter boring a hole, and calculating speed and feed per material and tooling.

Power Saws

6. Demonstrate care and safety for vertical and horizontal power saws.
Examples: maintenance—operating, cleaning, lubricating, setting up

7. Demonstrate saw operations, including installing a saw blade, straight cutting a work piece, sawing an angle, and sawing a slot on a vertical saw.

Benchwork

8. Apply benchwork skills and safety practices related to precision machining.
 - Demonstrating layout with combination square and scribe
Examples: whole circle using length of chord; layout with Vernier height gage; hand tapping internal threads, producing external threads with a threading die; ring testing a grinding wheel, mounting a grinding wheel on a bench grinder and adjusting safety guards; hand grinding various cutting tools
9. Demonstrate skills in mathematics concepts related to precision machining.

Career Path Opportunities

10. Identify career opportunities available in the precision machining industry.

Introduction to Robotics

This one-credit course is designed to provide students with the fundamental knowledge and skills of robotics. Emphasis is placed on fundamentals of electrical current, digital circuits, electronic control systems, and the design and operation of robotic systems.

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Orientation

Students will:

1. Identify the use of robotics in industry, including career opportunities in the field.
2. Apply safety rules, regulations, and procedures in the robotics industry.

Fundamentals of Electrical Current

3. Identify chemical, mechanical, and solar sources of electricity.
4. Explain the relationship of the atom to an electrical charge.
5. Explain electrical terms and units of measures, including direct and alternating current measured in amperes, voltage measured in volts, resistance measured in ohms, power measured in watts, and conductors and insulators.
6. Identify components of the basic circuit.
7. Construct electrical circuits, including soldering and breadboarding techniques.

Digital Circuits

8. Explain basic digital principles, including signal levels and signal types.
9. Explain various digital number systems.
10. Interpret logic gate symbols used in digital circuits.
11. Determine the truth table for each logic gate as specified in robotic applications.

Electronic Control Systems

12. Identify open and closed loop control systems.
13. Interpret symbols used in control circuit diagrams.
14. Explain types of programming methods and input and output devices used in motion control systems.

Design

15. Explain robotic terms, including controller, teach pendant, manipulator, end-effector and end-or arm-tooling, degrees of freedom, work envelope, and power supplies.
16. Describe types of robot configurations, including revolute, Selective Compliant Assembly Robot Arm (SCARA), Cartesian, cylindrical, spherical, and jointed-arm.
17. Identify specialty robots used in automated systems.

Operation

18. Demonstrate the proper use of input and output devices for performing robotic tasks.
19. Explain the operation of fluid power systems used in robotic systems.
20. Evaluate robotic activities.
 - Identifying problems
 - Determining proper repair procedures

Introduction to Spa Techniques

Introduction to Spa Techniques is a one-credit course that focuses on the structure and function of various systems of the body, massage techniques, skin care, and hair removal. Upon successful completion of this course, students are able to assemble sanitized materials, follow procedures for product application, recognize skin disorders, and demonstrate facial massage movements and hair removal. Safety and sanitary precautions are emphasized in the performance of these services. The prerequisite for this course is Introduction to Cosmetology.

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Anatomy and Physiology

Students will:

1. Explain scientific principles related to the study of organs and tissues relevant to cosmetology.
 - Identifying types of tissues found in the body
2. Describe the function and principle parts of the nervous, skeletal, muscular, and circulatory systems as they relate to cosmetology and barbering.
3. Describe the structure, composition, and function of the skin.
 - Explaining factors that influence the aging process of skin
 - Identifying contagious and noncontagious skin disorders
 - Identifying various types of skin
 - Explaining regeneration of the skin

Basic Facial Care

4. Describe procedures for performing a basic facial treatment.
5. Identify various types of massage movements and their effects.
6. Describe types of electrical current used in facial treatment and related safety precautions.
7. Describe techniques for performing hair removal.
 - Differentiating between permanent and temporary hair removal
8. Demonstrate basic facial massage movements.
 - Identifying products and supplies used to perform a basic facial
9. Identify safety and infection control procedures for skin care services.

Skin Care, Cosmetics, and Applications

10. Identify categories, types, and uses of professional skin care products and cosmetics.
11. Describe characteristics of facial types.
 - Identifying considerations for creating color harmony based on skin tone, needs, and preferences
12. Demonstrate the application of makeup, including analysis and recommendation, based on facial type.

Introduction to Television Production

Introduction to Television Production is a one-credit course that provides students with a basic overview of television production skills and professions. Students participate in classroom and laboratory activities regarding all aspects of television performance, production, and operations. Upon successful completion of this course, students are prepared for a specialized high school course or for further study in television, film and communications at the college level. This course is a prerequisite for Television Production—Photography and Editing; Television Production—Studio Operations; and Advanced Television Production.

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History of Television

Students will:

1. Explain the growth of communication, including telegraph, wireless, early radio and television, electronic and satellite news gathering technology, and Internet broadcasting.
 - Describing the development of networks, cable, and satellite television and their impact on broadcasting
 - Describing the impact television has on society and politics
 - Assessing recent technological developments in television production
 - Predicting the future of telecommunications

Safety

2. Identify safety hazards associated with television production.
 - Practicing precautions while using electrical equipment in television production
 - Demonstrating care for television production gear and tapes in various weather situations
 - Utilizing proper care for television lamps and bulbs
 - Identifying live television remote location safety procedures
 - Organizing and manipulating digital files safely in television production

Basic Camera Operation

3. Demonstrate video camera setup, movement, and operation.
4. Utilize proper handling, care, and storage techniques of camera, tripod, and accessories.

Sound

5. Critique audio quality for television production.
 - Recognizing audio production components, including microphones, natural sound, voice and audio track, sound-on-tape, sound bites, audio level, interruptible foldback (IFB), and earpiece
 - Using audio equipment correctly

Lighting

6. Demonstrate studio and field lighting for television, including back, key, fill, and natural light, and three-point lighting and camera lighting functions.
Examples: camera lighting functions—white-balance and black-balance, filters

Performance

7. Demonstrate appropriate on-camera performance, including clear speech, diction, eye contact, gestures, posture, and appearance.

Interviewing

8. Assess the quality of television interviews and sound bites, including length and content.
 - Utilizing standard television interview questions
Examples: who, what, where, when, why, how
 - Describing preinterviewing techniques for television
Examples: brainstorming, researching
 - Evaluating television interview footage

Writing

9. Demonstrate effective television script writing format.
Examples: news, audio and video, screenplay, storyboard
10. Identifying television conversational writing style, including simple word usage, short sentence structure, “say it, see it” theory, present tense form, active and passive voice, and objective and subjective point of view.
 - Prioritizing information for television production

Editing

11. Use applicable editing techniques for television production, including transitions, in-and-out points, trimming, and video sequencing.
 - Defining basic terms associated with television editing
Examples: edit-in-camera, assemble edit, insert edit, jump cuts, linear, nonlinear, flash frames, control track

Commercials

12. Create a commercial using basic television production skills.
 - Utilizing basic television advertising terms and techniques, including purpose, process, and persuasive devices
Examples: revenue, market research, target audience, ratings, humor, testimonial, bandwagon

Public Service Announcements

13. Create a public service announcement using basic television production skills.
 - Explaining the purpose of a television public service announcement
Examples: informing, changing opinion, promoting a cause

News

14. Create a news story using basic television production skills.
 - Recognizing common television news terms, including story types and career positions
 - Determining format, fact selection, teases, and lead sentences in television prerecorded and live news story organization

Introduction to Veterinary Science

Introduction to Veterinary Science is a one-credit course designed to provide students with an introduction to the veterinary science profession. Topics include career opportunities, safety, humane treatment, laws and regulations, anatomy and physiology, animal health, and veterinary services.

Content standards for this course are not intended to serve as the entire curriculum. Teachers are encouraged to expand the curriculum beyond the limits of these content standards to accommodate specific community interests and utilize local resources. This course encourages critical thinking, use of the scientific method, integration of technology, development of student leadership skills, and application of knowledge and skills related to practical questions and problems. Safety concepts are integrated into instruction to the maximum extent possible.

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Career Opportunities

Students will:

1. Compare job characteristics of various careers in veterinary science.

Safety

2. Identify safety precautions for veterinary science personnel.

Humane Treatment

3. Describe responsibilities of animal control and humane societies.
 - Describing responsible ownership of animals
4. Describe humane treatment of animals.
5. Describe effects of captivity on exotic animals.

Laws and Regulations

6. Identify laws and regulations involving animals.
Examples: leash laws, noise control, mandatory euthanasia

Anatomy and Physiology

7. Describe various body systems of animals, including skeletal, muscular, circulatory, respiratory, nervous, urinary, endocrine, and digestive.

Animal Health

8. Identify methods of disease prevention in animals.
Examples: worming, vaccination
 - Analyzing symptoms of animal diseases for diagnostic purposes
 - Selecting drugs to treat animals
Examples: antibiotics, wormers
 - Describing environmental factors affecting animals
9. Demonstrate procedures for administering vaccinations, including subcutaneous and intramuscular.
10. Identify proper hygiene for animals.
11. Describe normal and abnormal animal behaviors.
Examples: normal—signs of contentment, playfulness
abnormal—aggression, loss of appetite

Veterinary Services

12. Differentiate among veterinary services for various animals.

Introduction to Welding

This a one-credit course that provides students with a fundamental understanding of welding safety, basic shielded metal arc welding (SMAW), blueprint reading, weld symbols, and identification of shop equipment. Students acquire knowledge for safe operation of SMAW processes and oxyfuel cutting. Upon successful completion of this course, students are able to interpret lines, views, and dimensions of weld joint configurations and weld symbols; identify oxyfuel cutting equipment and components; determine proper setup of equipment for application; identify safety hazards and welding equipment related to SMAW; and make quality welds with E6010 and E7018 electrodes in flat, horizontal, vertical, and overhead positions. This entry-level course may be taken as one of the optional technical courses with credit applied to the Industrial Maintenance Technology program.

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Orientation

Students will:

1. Identify job opportunities and career pathways related to the welding industry.

Safety

2. Summarize rules and regulations related to the welding industry.
 - Describing personal protection equipment used by welders
 - Demonstrating ways to avoid welding fumes
 - Explaining uses for Material Safety Data Sheets (MSDS) related to welding
 - Explaining ways to avoid electrical hazards when welding

Basic Shielded Metal Arc Welding

3. Demonstrate operation of SMAW equipment.
4. Demonstrate tapping and scratching methods for striking and maintaining an arc.
5. Demonstrate correct methods for welding a pad of beads with an E6010 and an E7018 electrode in flat, horizontal, vertical, and overhead positions.
6. Select the proper electrode for an identified welding task.
 - Identifying factors that affect electrode selection

Drawings

7. Interpret welding specifications in blueprints and drawings.
 - Identifying measuring tools and instruments used in welding
8. Interpret types of lines on welding drawings, including object, visible, hidden, leader, extension, dimension, and center.
9. Interpret basic views on a welding drawing, including pictorial, top, front, sides, back, and detailed.

Welding Symbols

10. Explain various parts of a welding symbol.
11. Draw welding symbols based on the observation of actual welds.

OxyFuel Cutting

12. Demonstrate safety techniques for setting up and using oxyfuel cylinders and equipment.
13. Perform a variety of oxyfuel gas cutting tasks to specification.

Java Programming

Java Programming is a one-credit course designed to provide students with a conceptual understanding of object-oriented programming. Students learn to use Java language object-oriented technologies to solve business problems. Topics also include language fundamentals and the Java language application programming interface (API). Students create classes, objects, and applications using Java language.

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Software Development

Students will:

1. Utilize research results to distinguish between Java and other programming languages.
2. Analyze objects in Java code to develop effective programs.
3. Utilize mathematics skills to assist in evaluating system and software requirements to determine usability.
4. Demonstrate the effective use of Java tools for software development.
5. Explain basics of creating classes, including methods, arguments, and return values.
6. Construct objects to meet Java program requirements.
7. Demonstrate the Java software development process.
8. Design a software application using Java tools.
9. Implement a simple applet by writing the code, performing unit testing, and debugging the program.
10. Determine how to handle errors in package creation.

Customer Service

11. Demonstrate Java software testing.
12. Analyze quality assurance tasks to produce quality products.
13. Identify maintenance and customer support functions.

Career Opportunities

14. Determine career and entrepreneurial opportunities, responsibilities, and educational and credentialing requirements in the Java programming field.

Leadership

15. Apply skills in communication, leadership, and teamwork in the Java programming field.
 - Applying problem-solving and critical-thinking skills to resolve workplace conflict

Landscape Design and Management

The Landscape Design and Management course allows students to become more knowledgeable about and appreciative of landscape design and management. Topics include career opportunities, safety, landscape design, plant selection, landscape growth and the environment, landscape establishment and management, interior plantscaping and xeriscaping, landscape business management, and technology.

Content standards for this course are not intended to serve as the entire curriculum. Teachers are encouraged to expand the curriculum beyond the limits of these content standards to accommodate specific community interests and utilize local resources. This course encourages critical thinking, use of the scientific method, integration of technology, development of student leadership skills, and application of knowledge and skills related to practical questions and problems. Safety concepts are integrated into instruction to the maximum extent possible.

This course may be taught as a one-credit or half-credit course. For a half-credit course, content standards 1, 2, 3, 4, 5, 6, 8, and 9 must be included.

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Career Opportunities

Students will:

1. Compare job characteristics for various careers in landscape design and management.

Safety

2. Identify safe use of pesticides, power equipment, and hand tools in the landscaping industry.

Design

3. Apply principles of landscape design, including simplicity, balance, focalization of interest, rhythm and line, scale and proportion, and unity.
 - Describing computer programs used in landscape planning
 - Designing a landscape plan, including enhancement features
Examples: fencing, birdbath, gazebo, walkway, driveway

Landscape Plant Selection

4. Identify common plants used in landscape design.
Examples: trees, shrubs, ground covers, vines, flowers, turfgrass
 - Describing physical and cultural characteristics of common plants used in landscape design
Examples: physical—color, flowering, foliage, fruiting
cultural—cold or heat hardiness, sun or shade tolerance

Landscape Growth and the Environment

5. Describe environmental factors that affect plant growth.
 - Explaining the importance of specific plant processes
Examples: photosynthesis, respiration, transpiration
6. Analyze landscape plants for symptoms of nutrient deficiencies.
Examples: primary nutrients—nitrogen, phosphorus, potassium
secondary nutrients—calcium, sulfur, magnesium
trace nutrients—boron, manganese, chlorine, zinc, molybdenum, iron, copper, aluminum
7. Explain environmental issues related to landscape design and management.

Landscape Establishment and Management

8. Demonstrate methods for planting shrubs, trees, annuals, bulbs, groundcovers, and vines.
9. Describe techniques used for establishing and maintaining landscapes, including pruning, fertilizing, irrigating, mulching, and controlling pests.
 - Identifying insects, diseases, and weeds that pose a problem in the landscape
 - Describing types of selective and nonselective pesticides used in the landscaping industry
10. Identify criteria for the selection of hand tools, power tools, power equipment, and machinery for a specific landscape task.
 - Describing basic maintenance procedures required for tools and equipment used in landscaping
11. Describe the purpose of various sprinklers within an irrigation system.
Examples: impulse, oscillating, automatic, pop-up
 - Describing methods of drainage in a landscape
Examples: tiling, sloping

Interior Plantscaping and Xeriscaping

12. Identify common needs for indoor plants used in interior plantscaping.
Examples: light, media, watering and drainage, fertilization, temperature, humidity
 - Explaining principles of interior design
 - Selecting techniques used to achieve xeriscaping concepts

Business Management

13. Demonstrate business-related work ethics and managerial skills for the successful operation of a landscape business.
Examples: work ethics—following instructions, being on time, cooperating with others
managerial skills—record keeping, budgeting, pricing, scheduling work, inventorying, purchasing, advertising, handling customer complaints, communicating in oral and written form

Technology

14. Identify advancements in technology that enhance the landscaping industry.

Large Format Photography

Large Format Photography is a one-credit course that provides students with skills needed to effectively organize, develop, create, and manage a photography business. This course focuses on broad, transferable skills and strategies for commercial photography, including studio operation, leadership, training, and advanced operation in large digital photography.

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Large Format Cameras

Students will:

1. Apply laboratory safety rules, regulations, and procedures for large format digital photography, including cleaning, storing, and replenishing chemicals.
2. Demonstrate the ability to use large format cameras, including the Camera ZII, a pinhole camera with 4x5 film, and the Cambo View Camera.
3. Explain the history of the view camera, including the concept behind the camera's appearance in the tenth century, invention of the camera obscura, invention of light sensitive materials in the early nineteenth century, and the construction of the first studio view cameras.
4. Demonstrate various view camera applications.
 - Identifying the correct perspective for tailoring exposure and development
 - Utilizing multiple exposures with various types of light
 - Photographing landscapes with self-developing film to produce a final image
 - Demonstrating methods to retouch large negatives or transparencies
 - Creating artistic studio images of stationary subjects
5. Describe various view camera designs, including monorail, flatbed, front- and rear-standard, ground-glass, bellows, and cable-release.

Camera Styles

6. Determine advantages and functions of various camera styles.
 - Describing dimensions of the monorail camera and its impact on corporate and industrial portraiture
 - Using modified wide-angle lenses to photograph architecture and interiors
 - Describing portability limits of the monorail camera in the field
 - Using macro- and microlenses for close-up photography

Accessory Equipment

7. Identify essential accessories for a view camera, including exposure meters, gelatin filters, screw-in filters, and lens shades.

Techniques and Processes

8. Combine visual elements in large format photography.
 - Producing portraiture employing a diverse range of techniques and processes
 - Creating multiple solutions to photographic problems
 - Producing portraits for entry into competitions

Evaluation

9. Evaluate various photographs for origins of specific images and ideas.
 - Determining ways photographs differ visually, spatially, and functionally
 - Describing how visual differences of photographs are related to history and culture
 - Critiquing aesthetics of selected works of art

Digital Cameras

10. Utilize professional-grade digital equipment and software, including church portrait and directory manager software and digital studio backgrounds.

Portfolio

11. Create a portfolio that reflects exceptional quality photographic works for an internship.

Law in Society

Law in Society is a one-half or one-credit course designed to acquaint students with basic legal principles common to business and personal activities. This course is an overview of criminal, civil, contract, and consumer law. Topics include evaluating contracts, purchasing appropriate insurance, interpreting state and federal criminal law, and representing other businesses as employee or contractor. For a half-credit course, content standards 1, 2, 4, 6, 7, 8, 11, 12, 13, and 14 must be included.

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Criminal Law

Students will:

1. Interpret components and categories of state and federal criminal law.
Example: steps in criminal proceedings

Ethics

2. Differentiate between ethics and law using research results.
 - Determining consequences of illegal and unethical conduct
 - Interpreting laws related to the illegal and unethical use of computers

Classifications and Origins of Law

3. Critique influences, sources, and structure of the law and court systems.
Example: connection to constitution and branches of government
4. Analyze classifications of law, including procedural and substantive and private and public, for distinguishing characteristics.

Career Opportunities

5. Determine career and entrepreneurial opportunities, responsibilities, and educational and credentialing requirements related to the legal profession.

Civil Law

6. Interpret components of civil law, including negligence, torts, intentional torts, strict liability, and absolute liability.
Examples: categories and penalties of civil law

Contract Law

7. Critique components of contract law.
Examples: characteristics of contract law, effects of breach of contract

Consumer Law

8. Critique components of national and international sales and consumer law.
 - Analyzing sales laws to determine compliance with the Uniform Commercial Code
 - Comparing express and implied warranties
 - Interpreting contracts
 - Identifying protections and penalties provided by copyright and trademark lawsExamples: print, music, video, software

Labor Relations

9. Analyze labor relation components to determine effects on employees and employers.

Agency Law

10. Compare various relationships associated with agency law as they relate to conducting global business.
Examples: agent and professional athlete, broker and seller

Real Property

11. Explain legal rules that apply to real property ownership.

Bankruptcy Law

12. Compare various types of bankruptcy law and their impact on business and consumers.

Insurance

13. Explain types of insurance options available to consumers.

Domestic Relations

14. Explain laws that apply to marriage, divorce, and child custody.

Legal Assistance

15. Analyze various resources to acquire legal assistance.

Environmental Law

16. Explain the purpose of environmental laws.

Estate Planning

17. Determine how trusts and wills are used in estate planning.

E-Commerce

18. Analyze e-business and e-marketing laws, regulations, and procedures to determine their effects on business and consumers.

Life Connections

Life Connections may be taught as a one-credit or half-credit course. For a half-credit course, content standards 2, 4, 5, 6, 7, 8, 10, 13, 14, 16, and 18 must be included. The course focuses on practical problems related to nurturing human development throughout the life span and life cycle. Course content provides opportunities for students to explore basic needs of individuals regarding human growth and development; stages across the life span; career planning; dating and marriage; financial management; parenting decisions; relationship adjustments; middle-age, retirement issues, and intergenerational living; balancing work, family, and community responsibilities; improving the quality of life; community resources and services; technology; and careers related to families as they progress through the life cycle.

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Life Span and Life Cycle

Students will:

1. Differentiate between life span and life cycle.
2. Explain major milestones of stages in the family life cycle, including conditions that influence human growth and development.
 - Comparing human developmental theories

Beginning Stage

3. Develop a career plan, portfolio, and résumé based on personal interests and abilities.
 - Evaluating career paths in relation to personal interests and abilities
4. Evaluate a couple's readiness for marriage by explaining the significance of dating, describing issues to discuss during the engagement period, and determining issues that may impact a couple's relationship.
5. Compare marriage laws, customs, and traditions and their impact on a couple.
6. Demonstrate management of individual and family resources, including the purchase of food, clothing, shelter, and transportation.
 - Evaluating benefits of budget preparation and accurate financial record maintenance

Parenting Stage

7. Determine factors influencing a couple's decision to become parents, including responsibilities, rewards, and challenges.

8. Explain ages and stages of child development, including prenatal development, infancy, toddler, preschooler, school-age child, and adolescent.

Launching Stage

9. Explain responsibilities of parents in preparing their children to leave home.
10. Describe common marital adjustments during the launching stage and ways to resolve each.

Middle-Age Stage

11. Describe the impact of “empty nest” on parents.
 - Identifying agencies or organizations for community involvement or volunteerism opportunities for adults
12. Explain the impact of intergenerational living situations on individuals and families throughout the life cycle.
Examples: challenges, rewards, coping skills
13. Describe effects of divorce on family members.

Retirement Stage

14. Recognize the impact of aging on the physical, emotional, and intellectual well-being of the individual.
Examples: stages of grief, dementia, physical limitations
15. Compare types of housing and care options available to older adults.

Balancing Work and Family

16. Determine personal qualities that contribute to healthy relationships with family, friends, and coworkers, including effective communication techniques, conflict resolution techniques, and the importance of good character.
17. Analyze the significance of work for self, family, and society.
 - Identifying strategies, community resources, and services available to balance work, family, and community responsibilities

Technology and Careers

18. Assess ways technology impacts individuals and families throughout the life cycle.
19. Determine careers related to families as they progress through the life cycle.

Lodging I

Lodging I is a one-credit course. The prerequisite for this course is Hospitality and Tourism. Students perform tasks related to the operation of lodging facilities and the care of guests who use these facilities, either through direct guest contact or the provision of background services that enhance the guest experience.

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Hospitality Industry

Students will:

1. Compare classifications of lodging properties for affiliations, levels of service, ownership, size, and target market.
2. Distinguish functions of various departments of a hotel, including accounting, security, engineering, front desk, housekeeping, maintenance, human resources, and sales and marketing.
3. Determine trends and issues associated with the lodging industry.
4. Assess ways technology impacts and is used in the lodging industry.
5. Assess career options, entrepreneurial opportunities, and credentials associated with the lodging industry.

Business Operations

6. Compare cost efficiency for resorts, large hotel chains, and independently owned lodging establishments.
7. Critique sales opportunities available in the lodging industry.

Lodging Structure

8. Compare types of services offered by the lodging industry.
Examples: bed and breakfast, tour, business travel, leisure, destination, theme packets

Front Desk

9. Summarize the role of front desk staff, including cashiering and accounting, receiving reservations, and creating departmental log reports.

Housekeeping Functions

10. Determine roles of the housekeeper in hotel operations, including guest room cleaning, managing inventory, and reporting damaged property.

Guest Services and Relations

11. Describe strategies for maintaining positive guest relations.
12. Demonstrate strategies for resolving guest complaints.
13. Summarize duties of the concierge and bell hop.

Safety and Security

14. Describe safety and security associated with the lodging industry, including Occupational Safety and Health Administration (OSHA) standards, emergency response, and housekeeping security.

Cultural Diversity

15. Explain how cultural diversity impacts the hospitality and tourism industry.

Economics

16. Analyze effects of the economy on the hospitality and tourism industry to apply appropriate strategies in developing new products or services.

Lodging II

Lodging II is a one-credit course. The prerequisite for this course is Lodging I. Lodging II focuses on the application of basic principles of the hotel and lodging industry. Students develop skills in various functional areas of hotel operation, including front desk operations, guest registration, housekeeping, convention sales, food and beverage services, and guest services.

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Management, Leadership, and Human Resources

Students will:

1. Explain the importance of management and leadership in the hotel and lodging industry.
 - Describing different management and leadership styles
 - Identifying the role of the hotel general manager and hotel owners
2. Compare management functions of hotels related to different types of ownership, including franchised, independent, and chain-affiliated properties.
3. Describe national standards and certification and licensing procedures related to the hotel and lodging industry.
4. Demonstrate skills necessary in the hospitality industry to communicate with guests, clients, and vendors.
Examples: writing business letters, making presentations, speaking, listening
5. Analyze ways technology impacts and is used in the management and operation of the lodging industry.
6. Compare the annual operating budget for a small hotel property to a large convention hotel.

Managing Guest and Public Relations

7. Determine public relation skills required for the hotel and lodging industry, including responding to customer needs, preferences, and interests and resolving customer complaints.
8. Critique the role of public relations in the lodging industry.
Example: increased profitability

Marketing, Sales, and Promotions

9. Explain how marketing and promotions affect the hotel and lodging industry.

10. Compare advertising mediums and public relations strategies used in the lodging industry, including print, broadcast, and electronic advertising.
11. Analyze strategies for making sales in the hotel and lodging industry.

Housekeeping Management

12. Determine management responsibilities for the housekeeping department, including inventory control, staffing, and scheduling.

Front Desk Management

13. Analyze management responsibilities for the front desk, including designing a guest registration system, tracking guest accounts, creating work schedules, and applying time management techniques.

Group Events Management

14. Explain the importance of management responsibilities for group events, including banquets, conventions, and exhibits.

Finance Function

15. Summarize fiscal management procedures related to the hotel and lodging industry, including creating budget reports, forecasting room availability, compiling an annual budget, and calculating quarterly profit and loss statements.

Franchising

16. Evaluate lodging franchise operations for profitability in the marketplace, including licensing procedures.

Legal and Social Environment of Business

17. Determine legal responsibilities and liability issues of the hotel and lodging industry.
Examples: permits, insurance, tax, contractual agreements
18. Interpret laws applicable to the safety and protection of employees in the hotel and lodging industry.
Examples: wage and hour, hiring, labor, workers compensation, Civil Rights Act, public health, Occupational Safety and Health Administration (OSHA)

Management Principles

Management Principles is a half-credit or one-credit course designed to provide students with an understanding of the organizational functions of businesses, including quality concepts, project management, and problem solving. Topics include analyzing functions of management, examining leadership styles, and reviewing organizational structures. For a half-credit course, content standards 1, 2, 5, 6, 11, 12, and 13 must be included.

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Management

Students will:

1. Explain how effective decision-making skills and processes are used in evaluating the procedures for management decisions related to credit, insurance, marketing, product development and distribution, pricing and promotion, human resources planning, and employee and organizational development.
2. Analyze functions of management to determine major responsibilities of supervisors.
Examples: human resources, marketing, production, customer service
3. Interpret research results to determine factors and trends affecting recruiting, training, and retention of employees in the modern workplace.
Examples: factors and trends—downsizing, team development, quality control, scheduling
4. Explain how management leadership styles and methods influence individuals and groups to cooperatively achieve organizational goals.
5. Utilize organizational skills needed to manage business operations and maintain an orderly flow of work, including maintaining schedules and calendars; organizing documents, forms, and manuals; and following workplace policies and procedures.

Organization

6. Compare advantages and disadvantages of different organizations, including sole proprietorships, partnerships, corporations, franchises, and cooperatives, to determine how an organization's structure affects management decisions.
7. Interpret organizational structures by using various charts.
Examples: matrix, line and staff, team

Communication

8. Describe barriers to and methods for improving the communication process in the corporate world.

Ethics

9. Determine ways to manage conflict and stress in the workplace.

Career Opportunities

10. Critique strategies for uniting a diverse workforce.
 - Defining diversity and its importance in the workplace
 - Describing conditions needed to bring together people from various backgrounds
11. Determine career and entrepreneurial opportunities, responsibilities, and educational and credentialing requirements related to management career opportunities.

Legal Implications

12. Describe financial and legal operations of a business.
 - Preparing financial documents
Examples: financial statements; budget, revenue, profit, and income statements;
balance sheets; bank statements
 - Identifying types of negotiable instruments
 - Interpreting the importance of copyrights, patents, and trademarks
13. Explain how the workplace has changed as a result of labor legislation.
Examples: drug testing, sexual harassment, safety, right to privacy, affirmative action

Marine Technology

This one-credit course provides students with an introduction to various types of technologies used aboard common marine vessels. Students learn safety and first aid procedures, nautical terms, and boat maintenance procedures. Other topics include life saving equipment and engine, fuel, and electrical systems.

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Safety

Students will:

1. Apply safety rules, regulations, and procedures for marine technology, including first aid, fire, electrical, tools, equipment, and fueling.

Types of Vessels

2. Identify various types of vessels commonly used in the marine industry, including runabouts, cruisers, sailboats, and commercial vessels.

Nautical Terms

3. Define terms relative to marine technology, including general terms, structural terms, ropes and lines, navigational terms, equipment terminology, and construction detail terms.

Small-Boat Handling

4. Demonstrate small-boat handling techniques.

Safety Afloat

5. Explain emergency procedures associated with seamanship, including man overboard, fire, leaks and damage control, assistance, and abandoning ship.
6. Identify safety equipment associated with marine technology.
7. Demonstrate marine and boat maintenance procedures, including life-saving equipment, engine and fuel systems, electrical systems, and inspections.
8. Demonstrate first aid procedures while aboard a vessel.

Marlinspike Seamanship

9. Demonstrate various types of knots, hitches, and splices.
Examples: square knot, bowline, clove hitch, single becket, double becket, rolling hitch, French bowline, bowline on a bight, anchor bend, round turn and two half-hitches, sheepshank, figure eight

General Navigation

10. Explain navigational aides, including lights, day shapes, whistle signals, buoys, markers, charts, and the Global Positioning System (GPS).
11. Apply navigational terms, including navigation lights, anchor lights, day shapes, and whistle signals.
 - Identifying navigational rules, including pilot rules, steering and sailing rules, general prudential rule, rules of good seamanship, and penalties
12. Explain various communications, including very high frequency (VHF), ultra high frequency (UHF), marine advisories, radar, and medium frequency (MF).

Marketing Principles

Marketing Principles is a one-credit course designed to provide students with an overview of in-depth marketing concepts. Students develop a foundational knowledge of marketing and its functions, including marketing information management, pricing, product and service management, entrepreneurship, and promotion and selling. Students examine the need for sales and marketing strategies. Students practice customer relationship skills, ethics, technology applications, and communicating in the workplace.

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Basic Marketing Concepts

Students will:

1. Interpret research results to analyze the purpose, definition, concepts, benefits, and strategies of marketing for their impact on individuals and businesses.
 - Categorizing target markets
 - Evaluating the marketing mix and segmentation and their contribution to successful marketing
 - Differentiating between marketing and merchandising
 - Differentiating between indirect and direct marketing
2. Differentiate among laws and regulations associated with marketing.
3. Explain differences among business enterprises of sole-proprietorship, partnership, corporation, franchise, and licensing.

Research

4. Analyze methods of conducting market research to gain a competitive edge.

Economics

5. Explain economic concepts, international trade, and the free enterprise system in a global economy.
 - Determining the interrelationship of business, government, and individuals
 - Evaluating the effect of cultural beliefs and values on economic goals and decisions
 - Determining the role e-commerce plays in the marketing of goods and services
 - Assessing the role of government in a free enterprise system
 - Analyzing the use of natural resources and recycling in economic systems

Sales and Promotions

6. Explain concepts and techniques of selling.
 - Analyzing customer buying decisions for influencing factors
 - Demonstrating the selling process and techniques used in marketing and management
 - Performing calculations for completing sales transactions
7. Analyze promotional and merchandising tools and types of promotions in marketing and management to optimize revenue.
 - Distinguishing between institutional and promotional advertising media
 - Combining elements of advertising and merchandising for developing a display

Merchandising

8. Use cost analysis to evaluate methods for purchasing and distributing merchandise.
 - Comparing methods of stock handling and inventory control
 - Explaining the process of ordering and receiving
 - Determining the most efficient channels of distribution
9. Critique factors affecting pricing decisions.
 - Evaluating branding, packaging, labeling, and pricing strategies

Career Opportunities

10. Determine career and entrepreneurial opportunities, responsibilities, and educational and credentialing requirements in marketing.
 - Demonstrating the employment process, including job source research; résumé preparation; letters of application, acceptance, refusal, and resignation; application form completion; and mock interviews

Communication and Interpersonal Skills

11. Demonstrate interpersonal skills and the ability to work cooperatively as needed in the workplace with team members, supervisors, and customers from diverse cultural backgrounds using creative problem-solving, decision-making, and critical-thinking strategies.
12. Demonstrate effective written communication skills for the workplace by creating a variety of business communications for the workplace using correct grammar and terminology.
13. Demonstrate effective oral presentation skills using research materials and media to sustain listener attention and interest.
 - Preparing support materials to accompany presentations
 - Demonstrating the ability to speak effectively to customers, clients, coworkers, and supervisors using appropriate grammar and terminology

14. Demonstrate the ability to write clear directions, descriptions, and explanations as used in the workplace.
 - Explaining steps of a new product development as it relates to product life cycles
 - Explaining types and purposes of consumer and business credit

Masonry in High-Rise Construction

This one-credit course is designed to provide students with the fundamental knowledge and skills for this area of the construction industry. Emphasis is placed on job safety, site layout, blueprints, surface inspection and estimation of materials.

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Safety

Students will:

1. Apply safety rules, regulations, and procedures related to high-rise construction.
2. Apply safety guidelines related to high-rise construction.

Site Layout

3. Demonstrate block and brick construction techniques employed in high-rise construction.
4. Explain all-weather construction techniques for masonry in high-rise construction.
5. Demonstrate construction techniques for masonry walls and other stone building surfaces.
6. Classify various materials such as glass block, acid brick, and refractory brick.

Surface

7. Recognize signs of deterioration in masonry structures.
8. Describe causes of efflorescence, cracking, and faulty mortar joints.
9. Explain procedures for preventing and correcting efflorescence, cracking, and faulty mortar joints.
10. Explain procedures for preventing and correcting water damage in basements due to masonry design.

Blueprints

11. Recognize the difference between commercial and residential masonry drawings.

12. Identify basic keys, abbreviations, and other references contained in a set of commercial masonry drawings.

Estimation

13. Explain procedures for calculating costs associated with high-rise masonry construction.

Inspection

14. Explain inspection procedures used for masonry in high-rise construction projects.

Masonry Special Applications and Finishes

This one-credit course is designed to provide students with the fundamental knowledge and skills for this area of the construction industry. Emphasis is placed on job safety and demonstration of a variety of special applications and finishes in masonry, including decorative accents.

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Safety

Students will:

1. Apply safety rules, regulations, and procedures relative to masonry construction.
2. Prepare a foundation with footings.
 - Using surveying and transit equipment for preparing a foundation with footings
3. Design door and window layout for block and brick construction.
4. Demonstrate procedures for corner pole setup.
5. Demonstrate arch and circle brick construction procedures.

Decorative Accents

6. Describe procedures for creating a stone and glass wall.
7. Demonstrate procedures for applying decorative accents, including stucco, ceramic, tile, stamped concrete, and copings.
8. Describe various types of masonry, stone, block, and decorative block.
9. Construct fireplace and chimney designs.

Estimation

10. Determine materials and supplies needed for a masonry construction project.

Mechanical and Electrical Components I

This is a one-credit course that provides students with classroom and laboratory instruction in collision-related mechanical repairs. Emphasis is placed on the diagnosis and repair of suspension, steering, brakes, and hydraulic systems. Upon successful completion of the course, students diagnose and repair collision-damaged mechanical components. This course incorporates all personal and environmental safety practices associated with clothing; respiratory protection; eye protection; hand tools; power equipment; proper ventilation; and the handling, storage, and disposal of chemicals and materials in accordance with local, state, and federal safety and environmental regulations.

This course incorporates current guidelines and standards set forth by the Automotive Service Excellence (ASE) and the National Automotive Technicians Education Foundation (NATEF), including any updates or changes. Content standards provide students with information regarding task lists, tools and equipment, program hours, laboratory operation, and safety standards.

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Safety Precautions

Students will:

1. Demonstrate personal and environmental safety practices for basic automotive mechanical and electrical components, including clothing, eye protection, hand tools, power equipment, and proper ventilation.

Suspension

2. Demonstrate procedures for inspecting and repairing automotive suspensions.

Steering

3. Determine procedures for inspecting and repairing non-racking pinion and rack-and-pinion steering and alignment.
4. Apply procedures for diagnosing wheel alignment conditions.
5. Demonstrate procedures for diagnosing and correcting tire problems.

Disc Brake System Diagnosis and Repair

6. Analyze disc brake problems to perform corrective action.

7. Apply techniques for removing, cleaning, inspecting, and installing disc brakes.

Hydraulic System Diagnosis

8. Determine hydraulic system problems.
9. Apply specialized hydraulic procedures, including measuring and adjusting brake pedal height, bleeding, and flushing the system.

Mechanical and Electrical Components II

This is a one-credit course that provides students with classroom and laboratory instruction in collision-related electrical and mechanical repairs. Emphasis is placed on the diagnosis and repair of electrical heating, air-conditioning, and cooling. Upon successful completion of the course, students diagnose and repair collision-damaged mechanical and electrical components. This course incorporates all personal and environmental safety practices associated with clothing; respiratory protection; eye protection; hand tools; power equipment; proper ventilation; and the handling, storage, and disposal of chemicals and materials in accordance with local, state, and federal safety and environmental regulations.

This course incorporates current guidelines and standards set forth by the Automotive Service Excellence (ASE) and the National Automotive Technicians Education Foundation (NATAEF), including any updates or changes. Content standards provide students with information regarding task lists, tools and equipment, program hours, laboratory operation, and safety standards. Mechanical and Electrical Components I is a prerequisite for this course.

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Safety Precautions

Students will:

1. Demonstrate personal and environmental safety practices for intermediate mechanical and electrical components, including clothing, eye protection, hand tools, power equipment, and proper ventilation.

General Electrical System Diagnosis

2. Demonstrate accuracy in electrical and electronic system diagnosis.
 - Demonstrating proper work order procedures
3. Identify electrical and electronic system concerns.
 - Determining necessary action for electrical and electronic system concerns

Battery Diagnosis and Service

4. Demonstrate battery tests and battery service procedures for both conventional and hybrid vehicles.
 - Inspecting and cleaning battery cables, connectors, clamps, and hold-downs

Charging System Diagnosis and Repair

5. Explain charging system component operations.

Heating and Air-Conditioning

6. Identify procedures for complying with environmental regulations related to refrigerants and coolants.
7. Demonstrate proper procedures for diagnosing and repairing heating and air-conditioning systems.

Cooling System

8. Demonstrate procedures for diagnosing and repairing cooling systems.
9. Demonstrate procedures for refilling, recovering, and bleeding cooling systems.

Drivetrain

10. Demonstrate procedures for inspecting and replacing a drivetrain.

Fuel, Intake, and Exhaust Systems

11. Demonstrate procedures for inspecting and replacing fuel, intake, and exhaust systems.

Restraint Systems

12. Explain procedures for inspecting and replacing active, passive, and supplemental restraint systems.

Medium Format Photography

Medium Format Photography is a one-credit course designed to provide students with skills in studio techniques, photographic theory, medium format, and digital imaging. This course emphasizes portfolio development for use in applications for employment, scholarships, and college admissions. Introduction to Commercial Photography is the prerequisite for this course.

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Orientation

Students will:

1. Apply laboratory safety rules, regulations, and procedures in medium format photography.
2. Describe responsibilities of photography and advertising personnel, including laboratory technician, graphic artist, and commercial and journalistic photographer.

Medium Format Cameras

3. Describe the basic structure and function of medium format film and cameras.
 - Comparing relationships among medium format and 35mm cameras, including negative size
 - Explaining body types and functions of medium format cameras
4. Demonstrate the use of 120mm format cameras, including exposure controls, metering, and depth of field.

History of Photography

5. Compare historical and contemporary influences and developments on modern photography.
 - Critiquing photographic works by famous photographers
 - Identifying personal styles of historical photographs
 - Identifying styles and content of photographs

Medium Format Cameras

6. Prepare studio lighting equipment for use with medium format cameras.
 - Distinguishing various flash and strobe sync settings for medium format cameras
 - Utilizing strobe meter, slave units, sync cords, umbrellas, and reflectors for medium format cameras

Theory

7. Analyze film and digital images for visual, spatial, and functional differences.
8. Interpret the impact of digital photography on modern photography, modern art, Web design, and graphic design.
9. Describe the impact of computer technology on medium format photography.
 - Identifying major developments in medium format photography
 - Critiquing digital photographic works
 - Utilizing trade reports to enhance technical instruction on photography

Digital Photography

10. Demonstrate the use of industry standard software with digital cameras.
Examples: multimedia presentation with visual elements, photographs with customized software

Computer Applications

11. Utilize integrated computer technology for creating projects, including research, word processing, database, presentation, spreadsheet, and Web browsers.

Entrepreneurship

12. Demonstrate customer service skills to support business opportunities.
 - Researching industry certification and credentialing for photography
 - Developing technical writing skills used in the photography industry
 - Utilizing industry certification software for photography
13. Compare business organizations with regard to history, organizational structure, products and services, employment potential, educational requirements, financial stability, and long-term employment goals.
14. Utilize Web sites for potential photographic entrepreneur opportunities.

Digital Manipulation

15. Demonstrate the manipulation of a digital image, including deleting, transforming, applying filters, extracting, retouching, enhancing color, and manipulating image size, resolution, and orientation.
 - Proofing a digital image for desired outcome
16. Describe the process of optimizing images for a Web page.
Examples: Joint Photographic Experts Group (JPEG) and Tagged Image File Format (TIFF), background transparency, original material protection

Portfolio

17. Apply specialized skills to create a photographic portfolio that demonstrates performance of advanced studio photographic techniques, personal talents, and capabilities for job qualifications.

Motor Control

Motor Control is a one-credit course designed to provide students with the fundamental skills and knowledge needed for career opportunities in this area of the electrical industry. Emphasis is placed on safety, calculations, relays, schematic diagrams, electronic theory and components, alternating current (AC) and direct current (DC) motors, fire alarms, transformers, and basic logic controllers. Upon successful completion of this course, students complete basic tasks related to the electric motor industry. Students also troubleshoot electrical motor problems.

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Safety

Students will:

1. Demonstrate safety procedures as recognized by governing agencies and approved industry standards when testing and replacing components or installing wiring.
Examples: lockout, tagout
2. Identify electrical hazards and how to avoid and minimize them in the workplace.

Calculations

3. Determine the size of wire needed for branch and feeder circuits for electric motors.
4. Select over-current and short-circuit protection devices for electric motors.

Motor Controls

5. Recognize contactors and relays on schematic drawings.
 - Selecting appropriate contactors and relays for use in specified applications
 - Selecting pilot devices for use in specified control systems
6. Explain how to connect motor controllers according to National Electrical Code (NEC) requirements.

Basic Electronic Theory

7. Describe characteristics of solid-state devices.
8. Identify common types of transistors by their characteristics.
9. Interpret electronic schematic diagrams common to motor control systems.

10. Install diodes, light-emitting diodes (LEDs), silicon-controlled rectifiers (SCRs), and solid-state devices.

Alternating and Direct Current Motors

11. Identify AC and DC motors from schematic drawings and physical characteristics.
 - Demonstrating the ability to connect motors for high- and low-voltage applications

Fire Alarm Systems

12. Describe functions of various fire alarm system components.
13. Explain types of circuitry that connect fire alarm components.
 - Interpreting the National Fire Protection Association (NFPA 72®): National Fire Alarm Code®* for installation and maintenance

Specialty Transformers

14. Describe functions of current and potential transformers.
 - Connecting current transformers
 - Connecting potential transformers
15. Install shielded, constant current, and specialty transformers according to NEC requirements.

Electrical Controls and Devices

16. Interpret motor control schematics.
17. Describe procedures for installing manual and magnetic motor starters for various switches in accordance with NEC requirements.
18. Install various motor control devices.

*National Fire Alarm Code® is a registered trademark of the National Fire Protection Association, Inc., Quincy, MA 02169.

Basic Programmable Logic Controllers

19. Draw a common ladder diagram according to specifications.
20. Identify symbols, terms, and devices used for programmable logic controller (PLC) operations.
21. Write a single PLC application utilizing pushbuttons, coils, timers, and lights.
22. Describe troubleshooting techniques used to solve wiring problems.

Multimedia Design

Multimedia Design is a one-credit course designed to provide students with hands-on skills involving graphic design, digital photography, Web publishing, and digital video production. Students use various hardware peripherals and software for completing documents.

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Multimedia Hardware and Software

Students will:

1. Compare types of multimedia, including presentation, desktop publishing, Web page design, graphic design, digital photography, and digital video use in creating projects.
2. Utilize a variety of input devices for digitizing multimedia information, including digital camera, video, scanner, Internet downloads, and graphic software.
3. Use a variety of software and equipment to create, modify, and enhance multimedia projects.

Graphic Design

4. Demonstrate appropriate techniques associated with graphic design.
Examples: selecting, resizing, manipulating graphics, changing resolution, rastering, retouching photographs, correcting color, creating images
5. Utilize precision tools to manipulate images.
Examples: deleting, moving, rotating, setting custom alignment guides, extracting and applying filters
6. Utilize graphic design software to create business and personal publications.
Examples: newsletters, brochures, business cards, calendars
7. Apply integration principles for importing scanned, digitized graphics and text, tables, charts, and pictures into a publication.
8. Utilize research results to interpret the impact of media and copyright laws on media publications.
Examples: ethical issues, authenticity

Web Design

9. Explain differences among Web sites, Web pages, and Web browsers.
 - Identifying Web elements, including hypertext markup language (HTML) tags, headings, and body
10. Develop interactive Web pages and sites using a variety of component formats, including HTML, HTML editors, and Web authoring programs.
 - Examples: components—guest book, forms, hit counter, marquees, hover button, transition, banner advertisements, navigational schemes
11. Determine the applicable format for converting digital files.
 - Examples: Joint Photographic Experts Group (JPEG), Graphics Interchange Format (GIF) Portable Network Graphics (PNG), Music Player 3 (MP3), Tagged Image File Format (TIFF)
12. Apply knowledge of project management to ensure a quality product.
13. Demonstrate the manipulation of digital image file sizing.
 - Optimizing resolution for Web and print publications

Career Opportunities

14. Determine career and entrepreneurial opportunities, responsibilities, and educational and credentialing requirements related to multimedia design.

Multimedia Publications

Multimedia Publications is a one-credit course designed to provide students with the ability to utilize digital equipment and multimedia digital imaging software, produce interactive media projects, and develop publication layouts. Students use various hardware peripherals as well as the Internet for integrating skills to create a variety of publications.

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Multimedia Components

Students will:

1. Identify multimedia components, including presentations, publication layout, graphic design, digital video production, and Web design.
2. Design enhanced multimedia projects that utilize various computer options.
3. Create interactive media projects that utilize various technologies.

Publishing

4. Develop original, creative, professional, and appealing publication layouts.
5. Demonstrate effective writing skills in the development of multimedia publications.
6. Analyze images for visual, spatial, and functional differences.
7. Develop publication grids for effective page layout.
8. Utilize research results to determine current media and copyright law compliance.

Photography

9. Utilize multimedia equipment to produce computer images.
10. Differentiate between indoor and outdoor lighting methods.
11. Describe changes in photography over time, including equipment, ideas, issues, and themes.
12. Determine effective tools for media production, development, and project management.
13. Demonstrate proper use of digital-imaging software and equipment.

14. Compare elements of photography with other creative disciplines.
Examples: themes, issues, expressions

Career Opportunities

15. Determine career and entrepreneurial opportunities, responsibilities, and educational and credentialing requirements related to the multimedia publishing industry.

Nail Art and Applications

Nail Art and Applications is a one-credit course that provides students with a study of and practice in advanced nail techniques. Upon successful completion of this course, students are able to identify and apply procedures and techniques for nail sculpturing and nail art. The prerequisite for this course is Introduction to Nail Care Applications. This course is a prerequisite for State Board Practicum Pathway B.

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Professional Image

Students will:

1. Demonstrate principles of a positive personal and professional image, including demonstrating professional dress in a salon, practicing good work ethics, and applying effective communication and human relations skills.
2. Determine through consultation client needs and preferences for nail care services.

Nail Art Theory and Services

3. Demonstrate advanced techniques of nail services for manicure, pedicure, gel nail design, natural and artificial nails, and acrylic application.
4. Differentiate among various products used in nail art.
Examples: stencils, paints, thinners, assorted brushes, airbrushing
5. Demonstrate proper techniques in applying nail art products on natural nails, acrylic nails, gel nails, and fiberglass nails.
6. Explain the importance of proper ventilation when working with artificial nails.
7. Apply preservice and postservice steps of an artificial nail application.
8. Utilize advanced massage techniques when giving a manicure and pedicure.
9. Demonstrate a paraffin-wax hand treatment.
10. Demonstrate safe and correct handling, sterilization, sanitation, and storage of salon cosmetics and materials, implements, tools, and equipment.
11. Apply regular rebalance procedures and repairs for damaged nails.

National Electrical Code and Journeyman's Preparation

This one-credit course is designed to provide students with the fundamental knowledge and skills needed for this area of the electrical industry. Students have opportunities to learn code requirements for hazardous locations, modular home communities, garages, theaters, hospitals, airport hangers, service stations, explosion-proof applications, and special equipment. Upon successful completion of this course, students are able to understand and use the National Electrical Code (NEC) in preparation for the Journeyman's Competency Test.

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Hazardous Locations

Students will:

1. Define class-one, class-two, and class-three hazardous locations and installations.

Modular Home Community

2. Interpret service and grounding code requirements for a modular home community.

Commercial Garages

3. Interpret NEC requirements for commercial garages.
Examples: electrical services, grounding, hazardous locations

Theaters

4. Identify NEC requirements for theaters.
Examples: services, grounding, stage lighting

Hospitals

5. Utilize research skills to determine NEC requirements for hospitals, including services, grounding, emergency generation, color coding for special circuits, and exit lighting.

Airport Hangers

6. Interpret NEC requirements for explosion-proof electrical services and grounding for airport hangers.

Service Stations

7. Determine NEC requirements for electrical services, grounding, and explosion-proof electrical services for service stations.

Explosion-Proof Applications

8. Interpret NEC requirements for the installation of explosion-proof equipment, conduits, and fittings.

Special Equipment

9. Apply research skills for interpreting NEC requirements for swimming pools, spas, and hot tubs.
10. Identify NEC requirements for electric welding machines.

Networking I

Networking I is a one-credit course designed to provide students with skills involving a hands-on, career-oriented approach to learning networking that includes practical experiences. This course includes activities that emphasize the application of networking in terms of implementation and career opportunities. It is recommended that Information Technology Fundamentals be taken prior to this course.

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Computer Basics

Students will:

1. Describe the purpose and function of personal computers, including software applications and Internet applications.
2. Explain digital representations of common forms of data.
Examples: binary, hexadecimal
3. Demonstrate the process of installing, verifying, and upgrading computer components.

Networking

4. Determine appropriate components and peripheral devices to meet networking requirements.
5. Explain how communication occurs across a local Ethernet network.
6. Describe access layer devices and communication methods on a local Ethernet network.
7. Differentiate between client and server interaction.
8. Describe various components and structures of a wireless local area network (LAN).
9. Analyze wired and wireless networks for common hardware and connection issues.
10. Utilize the troubleshooting process to identify and solve common problems with a LAN.
 - Interacting with the computer help desk
 - Utilizing a bottom-up or top-down troubleshooting methodology

System Design

11. Describe the purpose of a layered model to illustrate the interaction of various protocols.
12. Utilize mathematics skills to design a LAN.
13. Describe the process of using and connecting to an Internet Service Provider (ISP).
14. Compare various methods of obtaining an Internet Protocol (IP) address.
15. Describe applications of Network Address Translation (NAT) on a home or small business network.

Security

16. Evaluate wireless security issues and mitigation strategies for improved security.
17. Utilize research results to determine ways to improve network security, including evaluating current network threats and methods of attack.
18. Describe attack mitigation strategies and different security applications.

Career Opportunities

19. Determine career and entrepreneurial opportunities, responsibilities, and educational and credentialing requirements related to networking professions.

Networking II

Networking II is a one-credit course designed to provide students with skills involving hands-on learning by installing a router, configuring a server, and performing disaster recovery. This course includes a strong emphasis on proper safety practices and industry ethics. The prerequisite for this course is Networking I.

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Advanced Networking

Students will:

1. Describe the structure of the Internet and how it affects communication between hosts, including installing, configuring, and troubleshooting network devices for Internet and server connectivity.
2. Design a basic wired infrastructure to support network traffic, shared resources, and Web services.
3. Utilize mathematics skills to implement basic wide area network (WAN) connectivity using Telco services.
4. Justify the use of Network Address Translation (NAT) and Port Address Translation (PAT).
5. Describe the Open System Interconnection (OSI) model and the process of encapsulation.

Troubleshooting and Maintenance

6. Demonstrate proper disaster recovery procedures.
7. Perform server backups.
8. Interpret various Transmission Control Protocol (TCP) and Internet Protocol (IP) messages.
9. Isolate system failures to improve network performance.
10. Utilize an organized, layered procedure to troubleshoot problems.

Security

11. Utilize research results to assist in selecting a network monitoring system.
12. Evaluate network security considerations for improved network security.

Career Opportunities

13. Determine career and entrepreneurial opportunities, responsibilities, and educational and credentialing requirements related to small to medium business or Internet Service Provider (ISP) professions.

Networking III

Networking III is a one-credit course designed to provide students with skills needed to perform routing and switching in an enterprise network. Students configure a switch with virtual local area networks (VLANs) and inter-switch communication. Students perform troubleshooting using a structured methodology. The prerequisite for this course is Networking II.

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Advanced Networking

Students will:

1. Develop a classful or classless addressing scheme.
2. Calculate the most efficient use of address space for a network.
3. Create access lists to permit or deny specific traffic on an enterprise network.
4. Analyze effects of access lists on network devices and traffic patterns to determine relevant access.
5. Construct a network for an approved network design.
6. Utilize local area network (LAN), wide area network (WAN), and VLAN troubleshooting using a structural methodology and the Open System Interconnection (OSI) model.

Network Design

7. Analyze LAN technologies to design a network.
8. Identify applications and traffic found on an enterprise network.
9. Design a switching scheme with VLAN and inter-switch communication.
10. Organize routing protocols to design a network.
11. Evaluate WAN technologies for a network design.
12. Utilize research results to analyze enterprise networking for anticipated changes.
13. Develop an addressing plan for a network design to provide adaptability, manageability, and scalability.

Career Opportunities

14. Determine career and entrepreneurial opportunities, responsibilities, and educational and credentialing requirements in enterprise networks.

Networking IV

Networking IV is a one-credit course designed to provide students with skills needed to design and support computer networks. Students learn technical skills and soft skills needed to succeed in entry-level networking professions. The prerequisite for this course is Networking III.

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Advanced Networking

Students will:

1. Design an Internet Protocol (IP) addressing scheme to meet local area network (LAN) requirements.
2. Analyze network devices to determine the impact of network devices on LAN performance.
3. Develop an equipment list to meet LAN design requirements.
4. Construct a prototype network incorporating elements of network design.
5. Use research results to assist in evaluating LAN, wide area network (WAN), and virtual local area network (VLAN) troubleshooting using a structured methodology and the Open System Interconnection (OSI) model.

Advanced Network Design

6. Evaluate customer requirements to determine networking design needs.
7. Design a simple Internetwork using available technology.
8. Analyze client software to determine the impact of applications on network design.
9. Develop a customer proposal presentation, including installing and configuring a prototype Internetwork and selecting and upgrading network software.
10. Defend the network design prototype to verify customer requirements have been met.

Career Opportunities

11. Determine career and entrepreneurial opportunities, responsibilities, and educational and credentialing requirements related to network designing.

Nonstructural Analysis and Damage Repair I

Nonstructural Analysis and Damage Repair I is a one-credit course that provides students with current and emerging technologies in analysis and repair of collision-damaged nonstructural components. Emphasis is placed on methods, equipment, and processes used to inspect, measure, repair, and replace nonstructural components. Upon successful completion of the course, students perform basic repairs on automotive nonstructural components. This course incorporates all personal and environmental safety practices associated with clothing; respiratory protection; eye protection; and the handling, storage, and disposal of chemicals and materials in accordance with local, state, and federal safety and environmental regulations.

This course incorporates current guidelines and standards set forth by the Automotive Service Excellence (ASE) and the National Automotive Technicians Education Foundation (NATEF), including any updates or changes. Content standards provide students with information regarding task lists, tools and equipment, program hours, laboratory operation, and safety standards.

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Safety Precautions

Students will:

1. Explain personal and environmental safety practices for basic vehicle damage repair, including clothing, eye protection, hand tools, power equipment, and ventilation.

Preparation

2. Identify techniques for nonstructural vehicle repair.

Outer Body Panel Repairs, Replacements, and Adjustments

3. Identify procedures for repairing, replacing, and adjusting outer body panels and associated hinges and latches.

Metal Finishing and Body Filing

4. Explain metal finishing procedures for vehicle dent repair.
5. Explain body filling techniques for vehicle damage repair.

Moveable Glass and Hardware

6. Explain procedures for inspecting, repairing, and replacing moveable glass and associated hardware.

Plastics and Adhesives

7. Explain procedures for the repair of plastics related to vehicle damage repair.
 - Identifying different types of plastics and adhesives

Nonstructural Analysis and Damage Repair II

This is a one-credit course that provides specialized, advanced classroom and laboratory experiences in the application of current and emerging technologies for methods, equipment, and processes used to inspect, measure, repair, and replace nonstructural components. Upon successful completion of the course, students perform advanced repairs in automotive nonstructural components such as outer body panel repair and replacement, moveable glass and hardware, and plastics and adhesives. Nonstructural Analysis and Damage Repair I is a prerequisite for this course.

This course incorporates current guidelines and standards set forth by the Automotive Service Excellence (ASE) and the National Automotive Technicians Education Foundation (NATEF), including any updates or changes. Content standards provide students with information regarding task lists, tools and equipment, program hours, laboratory operation, and safety standards.

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Safety Precautions

Students will:

1. Demonstrate personal and environmental safety practices for intermediate vehicle damage repair, including clothing, eye protection, hand tools, power equipment, and ventilation.

Preparation

2. Demonstrate techniques for nonstructural vehicle repair.

Outer Body Panel Repairs, Replacements, and Adjustments

3. Demonstrate procedures for repairing, replacing, and adjusting outer body panels and associated hinges and latches.

Metal Finishing and Body Filling

4. Demonstrate proper metal finishing procedures for vehicle dent repair.
5. Demonstrate proper body filling techniques for vehicle damage repair.

Moveable Glass and Hardware

6. Demonstrate correct procedures for inspecting, repairing, and replacing moveable glass and associated hardware.

Plastics and Adhesives

7. Demonstrate correct procedures for the repair of plastics related to vehicle damage repair.
 - Identifying different types of plastics and adhesives

Nursery Production and Management

Nursery Production and Management is a one-credit course designed to introduce students to the production of nursery crops. Topics include career opportunities, safety, basic plant science, plant propagation, nursery growing media, plant identification, nursery production, nursery pest control, business management, and equipment and facilities.

Content standards for this course are not intended to serve as the entire curriculum. Teachers are encouraged to expand the curriculum beyond the limits of these content standards to accommodate specific community interests and utilize local resources. This course encourages critical thinking, use of the scientific method, integration of technology, development of student leadership skills, and application of knowledge and skills related to practical questions and problems. Safety concepts are integrated into instruction to the maximum extent possible.

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Career Opportunities

Students will:

1. Identify career opportunities in the nursery production and management industry.

Safety

2. Describe safety precautions related to the nursery production and management industry.

Basic Plant Science

3. Differentiate among environmental factors affecting nursery plant growth.
4. Describe uses of primary, secondary, and trace nutrients.
Examples: primary nutrients—nitrogen, phosphorus, potassium
secondary nutrients—magnesium, calcium, sulfur
trace nutrients—iron, manganese, boron, molybdenum, copper, zinc, chloride, aluminum
5. Interpret results of a soil analysis.
 - Differentiating among components of soil
Examples: sand, silt, clay
 - Describing methods for adjusting pH
 - Calculating the amount of fertilizer needed for nursery crops

Plant Propagation

6. Demonstrate propagation methods for nursery plants.

Nursery Crop Growing Media

7. Adjust nursery growing media properties by adding amendments.
8. Prepare growing media mixtures for nursery plants.

Plant Identification

9. Identify nursery plants by common name.

Nursery Production

10. Control environmental conditions for plant growth in the nursery industry.
Examples: temperature, ventilation, water, light
11. Produce nursery crops.
12. Identify nursery plant problems.
Examples: root rot, insect damage, fungus
13. Select types of fertilizers and methods of application used in nursery production.

Nursery Pest Control

14. Apply pesticides to nursery crops.
 - Identifying safety and first aid precautions in nursery crop production
 - Selecting correct pesticides for intended targets in nursery crop production
 - Disposing of containers and left-over pesticide mixtures according to Environmental Protection Agency (EPA) standards in nursery crop production

Business Management

15. Select quality nursery plants for marketing.
16. Demonstrate managerial skills needed for successful operation of a nursery business.

Equipment and Facilities

17. Demonstrate maintenance of nursery crop growing facilities, including propagation structures, greenhouses, shade houses, and mist equipment.
18. Maintain power equipment used in nursery operations.

Offset Press Operations

Offset Press Operations is a one-credit course that offers practical experience in offset printing. Training includes the safe operation and maintenance of equipment following instructions and specifications, the make-ready process, and the production of quality printed products. Students demonstrate problem-solving skills and become proficient in related mathematics and chemistry. The prerequisite for this course is Introduction to Graphic Arts.

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Safety

Students will:

1. Identify basic systems and parts of a press.
2. Demonstrate safe work habits and operation procedures in press operations.

Operations

3. Interpret printed production information from a job docket or ticket.
4. Select basic paper types, sizes, and weights in the printing industry.
Examples: types—wire or felt, watermarks, carbonless sequence
sizes—8 ½ x 11 inches, 11 x 17 inches, 8 ½ x 14 inches
weights—30 pound, 40 pound, 50 pound
5. Analyze basic press operation systems.
Examples: offset, flexography
6. Identify uses of and problems associated with offset ink types, including oil-based, rubber-based, acrylic, and waterless inks.
 - Describing offset ink mixing, additives, and driers
7. Demonstrate the use of fountain solutions and additives.
 - Explaining the purpose of foundation solutions and additives
 - Identifying pH or conductivity, mixing, testing materials, equipment, and procedures of fountain solutions and additives
8. Compare advantages and disadvantages of digital printing to those of offset printing.
9. Demonstrate the make-ready process for paper, including sheet size, impression, and cylinder.
10. Demonstrate the make-ready process for inking and dampening systems.

11. Create a single- and multiple-color print job, including single- and two-sided documents using a metal or polyester plate.
Examples: two-color job with register marks, without register marks, and with color bars; single-color job on two- or three-part carbonless stock and envelopes; two-sided job using work and tumble and work and turn; job on heavy stock; multicolor, two-sided job
12. Describe techniques used to install and set a blanket for an offset press operation.

Maintenance

13. Demonstrate procedures for major cleanup and maintenance of offset press operations, including proper wash-up techniques for inking systems, dampening systems, and cylinders and demonstrating roller care and maintenance of inking and dampening systems.
14. Evaluate heavy solid work, including making needed adjustments to improve quality.
Examples: color match, closing registration, estimating ink quantity and costs

Painting and Refinishing I

This is a one-credit course designed to provide students with an introduction to current technologies relative to basic principles of automotive finishes. This course incorporates all personal and environmental safety practices associated with clothing; respiratory protection; eye protection; tools; power equipment; proper ventilation; and the handling, storage, and disposal of chemicals and materials in accordance with local, state, and federal safety and environmental regulations.

This course incorporates current guidelines and standards set forth by the Automotive Service Excellence (ASE) and the National Automotive Technicians Education Foundation (NATEF), including any updates or changes. Content standards provide students with information regarding task lists, tools and equipment, program hours, laboratory operation, and safety standards.

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Safety Precautions

Students will:

1. Demonstrate personal and environmental safety practices for basic painting and refinishing, including clothing, eye protection, hand tools, power equipment, and proper ventilation.

Surface Preparation

2. Describe procedures for surface painting and refinishing.

Spray Gun and Related Equipment

3. Demonstrate inspection and cleaning of spray guns and related equipment.

Paint Mixing, Matching, and Application

4. Determine type and color of paint on the vehicle according to manufacturer's vehicle information.

Paint Defects—Causes and Cures

5. Identify paint defects.

Final Detail

6. Describe procedures involved with final detail for painting and refinishing.
7. Summarize procedures for the completion of an estimate of repair.

Painting and Refinishing II

Painting and Refinishing II is a one-credit course that provides students with specialized classroom and laboratory experiences in the application of various automotive paint finishes. Instruction and practice are provided regarding the diagnosis and repair of automotive surface defects. Upon successful completion of the course, students properly apply automotive paint finishes. Painting and Refinishing I is a prerequisite for this course.

This course incorporates all personal and environmental safety practices associated with clothing; respiratory protection; eye protection; hand tools; power equipment; proper ventilation; and the handling, storage, and disposal of chemicals and materials in accordance with local, state, and federal safety and environmental regulations.

This course incorporates current guidelines and standards set forth by the Automotive Service Excellence (ASE) and the National Automotive Technicians Education Foundation (NATEF), including any updates or changes. Content standards provide students with information regarding task lists, tools and equipment, program hours, laboratory operation, and safety standards.

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Safety Precautions

Students will:

1. Demonstrate personal and environmental safety practices for intermediate painting and refinishing, including clothing, eye protection, hand tools, power equipment, and proper ventilation.

Surface Preparation

2. Explain procedures for surface painting and refinishing.

Spray Gun and Related Equipment

3. Demonstrate the proper care and use of high-volume, low-pressure (HVLP) or low-volume, low-pressure (LVLP) spray guns.

Paint Mixing, Matching, and Application

4. Determine techniques for mixing paint for use in spray guns.
5. Describe proper spraying techniques for applying paint finishes.

Paint Defects—Causes and Cures

6. Describe causes of paint defects.

Final Detail

7. Explain procedures involved with final detail in painting and refinishing.
8. Explain procedures for the completion of an estimate of repair in painting and refinishing.

Painting and Refinishing III

This is a one-credit course designed to provide advanced students with the technology associated with automotive final detail finishes, including instruction in the principles of collision cost estimating. This course incorporates all personal and environmental safety practices associated with clothing; respiratory protection; eye protection; tools; power equipment; proper ventilation; and the handling, storage, and disposal of chemicals and materials in accordance with local, state, and federal safety and environmental regulations. Painting and Refinishing I and Painting and Refinishing II are prerequisites for this course.

This course incorporates current guidelines and standards set forth by the Automotive Service Excellence (ASE) and the National Automotive Technicians Education Foundation (NATEF), including any updates or changes. Content standards provide students with information regarding task lists, tools and equipment, program hours, laboratory operation, and safety standards.

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Safety Precautions

Students will:

1. Demonstrate personal and environmental safety practices for advanced painting and refinishing, including clothing, eye protection, hand tools, power equipment, and proper ventilation.

Surface Preparation

2. Demonstrate procedures for surface painting and refinishing.

Spray Gun and Related Equipment

3. Demonstrate test and setup procedures involved in spray gun calibration.

Paint Mixing, Matching, and Application

4. Demonstrate paint mixing, matching, and application procedures.

Paint Defects—Causes and Cures

5. Demonstrate corrective action to remove paint defects.

Final Detail and Repair

6. Demonstrate procedures involved in painting and finishing final detail.
7. Demonstrate procedures for the completion of an estimate of repair.

Parenting

Parenting may be taught as a one-credit or half-credit course. For a half-credit course, content standards 2, 3, 4, 5, 6, 8, 10, 12, 15, 16, 17, 18, and 19 must be included. The course allows students to focus on parenting roles and responsibilities. Content provides opportunities for students to explore family structures and stages of the family life cycle; roles and responsibilities of parents across the life span; factors influencing the decision to become a parent; preparation for parenthood; birth defects; challenges of teen pregnancy and parenthood; signs and changes in pregnancy; prenatal development, labor, and delivery; stages of child development; children with exceptionalities; meeting physical, health, and safety needs of children and adolescents; positive parent-child relations; guidance and discipline of children and adolescents; sources of parenting information, support, and assistance; technology impacting parenting; and career opportunities related to parenting. Observational experiences are encouraged in this course.

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Parenting Decisions

Students will:

1. Describe family structures and their impact on parenting, including stages of the family life cycle, functions of each family member, and ways to maintain a strong family.
2. Explain roles and responsibilities of parents across the child's life span.
 - Comparing myths and realities of parenting
3. Analyze factors that influence the decision to become a parent, including cost of having and rearing a child; environmental influences impacting the health of the child and mother; age, maturity, and genetics of parents; and the need to assess career goals.
4. Explain the impact of birth defects on the decision to become a parent, including types, causes, prevention, and treatment.

Becoming a Parent

5. Explain social, financial, emotional, and educational challenges of teen pregnancy and parenthood, including risks to the mother and child.
6. Determine factors associated with pregnancy and childbirth, including signs and physical changes associated with pregnancy, stages of prenatal development, pros and cons of prenatal testing, stages of the birth process, and postnatal care for the mother and infant.
7. Recognize the impact children have on individual family members.

Parenting Practices

8. Compare child development theories.
 - Identifying child development stages
9. Describe parenting practices for children who are gifted, mentally ill, or intellectually or physically disabled.
10. Determine ways parents meet children's physical, intellectual, emotional, and social needs, including promoting independence, enhancing a child's self-concept, teaching self-discipline, teaching consequences of behavior, building children's character, and selecting age-appropriate toys for infants, toddlers, and preschoolers.
11. Evaluate methods used by parents to help children cope with stress and family crisis.
12. Describe skills for promoting communication between parent and child.
13. Describe ways a parent can foster early brain development and lifelong learning.
Examples: language, play, reading, music, art, dramatic play
14. Identify appropriate child care providers, agencies, services, resources, and other support systems available to meet needs of parents and children.
 - Explaining ways to balance work and family
15. Explain how parents protect children from harm, disease, and illness, including identifying preventive health care practices.
 - Comparing childhood diseases, symptoms, and treatments
16. Summarize childhood emergency situations and appropriate responses.
17. Compare types, causes, and prevention of child abuse and neglect.
18. Prepare nutritious snacks and meals for children.
 - Applying sanitation procedures in the kitchen
 - Exhibiting safe and correct use of kitchen equipment

Technology and Careers

19. Determine the impact of technology on parenting and parenting practices.
20. Explain career options related to parenting, parent-child relationships, and services provided to parents.

Personal Finance

Personal Finance may be taught as a one-credit or half-credit course. For a half-credit course, content standards 1, 5, 6, 7, 8, 9, 10, 11, 13, 16, 17, and 18 must be included. The course introduces students to the management of personal and family resources to achieve personal goals and financial literacy. Content provides opportunities for students to explore consumer behavior, laws and legislation, consumer protection, consumer rights and responsibilities, consumer decision making, advertising and promotional techniques, individual and family money management, banking services, use of credit, income tax, technology, and careers in providing financial services to individuals and families.

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Consumer Decisions and Behavior

Students will:

1. Compare factors that impact consumer purchasing decisions throughout the life span.
Examples: personal choice and values, attitudes, wants and needs, social influences
2. Describe state and federal consumer protection laws for individuals and families, including identity protection and credit laws.
3. Determine procedures for resolving consumer problems and complaints.
4. Explain the importance of taking responsibility for personal financial decisions.

Money Management

5. Determine factors that affect money management, including career choice, education, skills, and economic conditions.
 - Identifying opportunity costs of financial decisions
6. Explain how taxes, government transfer payments, and employee benefits relate to disposable income.
 - Comparing net and gross income
7. Determine practices that allow individuals and families to maintain financial security.
Examples: determining needs and wants, creating a budget, setting goals, keeping records, developing a personal financial plan, saving, investing
8. Compare money-management tools and services available from financial institutions.
Examples: checking and savings account statements, online banking procedures, direct deposit, money transfer services, loans, online payment services

9. Demonstrate procedures for completing and filing income tax forms, including utilizing software for income tax preparation.
 - Explaining terms used in personal tax forms
10. Explain factors that affect creditworthiness.
 - Assessing credit options available to individuals and families
 - Identifying ways to avoid or correct credit problems
 - Analyzing dangers incurred by young adults with credit cards
 - Determining sources, types, and risks of loans for individuals or families
 - Describing steps for obtaining a credit report
11. Compare benefits of saving and investing for individuals or families, including factors that affect the rate of return on investments, sources of investment information, characteristics of savings and investment options, and stages of investing.
 - Calculating annual interest and annual yield
12. Distinguish between retirement and estate planning options available to individuals and families.
13. Compare types, lengths, and costs of care, life, health, disability, homeowner, and renter insurance, including disability, waiting period, and disability benefits.
 - Exploring the impact of uninsured and underinsured motorists
 - Explaining the difference between independent insurance agencies and franchised agencies

Consumer Spending

14. Critique the impact of advertising and sales propaganda on individual and family spending decisions.
15. Analyze shopping skills in relation to individual and family resource management across the life span.
 - Comparing technologically advanced products and services
Examples: choosing a telephone service provider, buying a home computer, choosing an Internet service provider
16. Determine strategies for acquiring the most economical product or service.
Examples: product research, comparison shopping, shopping plan
17. Determine factors that affect the cost of goods and services, including sales tax, tips, coupons, discounts, and unit pricing.
18. Prioritize steps involved in making consumer purchases, including transportation and housing.
 - Calculating cost and finance charges
 - Defining terminology associated with consumer purchases
 - Predicting required maintenance of transportation and housing

Technology and Careers

19. Determine the impact of technology on personal financial management.
20. Explain career options and entrepreneurial opportunities related to the management of personal financial resources.

Plant Biotechnology

Plant Biotechnology is a one-credit course that provides students with an opportunity to develop an understanding of principles and practices of plant genetics and biotechnology regarding agriculturally related products and services. Topics include career opportunities, safety, cellular biology, biotechnology advancement, applied genetics and biotechnology concepts, and social and environmental impacts of biotechnology.

Content standards for this course are not intended to serve as the entire curriculum. Teachers are encouraged to expand the curriculum beyond the limits of these content standards to accommodate specific community interests and utilize local resources. This course encourages critical thinking, use of the scientific method, integration of technology, development of student leadership skills, and application of knowledge and skills related to practical questions and problems. Safety concepts are integrated into instruction to the maximum extent possible.

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Career Opportunities

Students will:

1. Identify career opportunities associated with plant biotechnology.
Examples: environmental chemist, genetic engineer, plant breeder, plant physiologist

Safety

2. Identify safety considerations and procedures required in plant biotechnology.
Examples: biohazards, chemical hazards, laboratory protocol, waste disposal

Botany Concepts

3. Identify the twelve plant kingdom divisions.
 - Classifying native Alabama plants using dichotomous keys
4. Describe phylogenetic relationships between plants and other organisms.
 - Classifying plants as vascular or nonvascular
 - Classifying seed-bearing and spore-bearing plants
 - Classifying plants as gymnosperms or angiosperms
 - Contrasting monocots and dicots
 - Describing mutualism among algae and fungi in lichens
5. List plant adaptations required for life on land.
 - Describing the alternation of generations in plants
 - Comparing characteristics of algae and plants

6. Identify major types of plant tissues found in roots, stems, and leaves.
Examples: parenchyma, sclerenchyma, collenchyma
 - Critiquing tissue-culturing procedures
Example: callus production
7. Identify types of roots, stems, and leaves.
Examples: roots—tap, fibrous
stems—herbaceous, woody
leaves—simple, compound
8. Explain the importance of soil type, texture, and nutrients to plant growth.
 - Describing water and mineral absorption in plants
 - Analyzing roles of capillarity and turgor pressure
9. Explain plant cell processes, including light-dependent and light-independent reactions of photosynthesis, glycolysis, aerobic and anaerobic respiration, and transport.
10. Describe plant responses to various stimuli.
 - Identifying effects of hormones on plant growth
Examples: gibberellin, cytokinin, auxin
 - Differentiating among phototropism, gravitropism, and thigmotropism
11. Identify life cycles of mosses, ferns, gymnosperms, and angiosperms.
12. Describe the structure and function of flower parts.
 - Describing seed germination, development, and dispersal
 - Germinating monocot and dicot seeds
13. Describe various natural and artificial methods of vegetative propagation.
Examples: natural—stem runners, rhizomes, bulbs, tubers
artificial—cutting, grafting, layering
14. Describe the ecological and economic importance of plants.
Examples: ecological—algae-producing oxygen, bioremediation, soil preservation
economic—food, medication, timber, fossil fuels, clothing
 - Analyzing effects of human activity on the plant world
15. Identify viral, fungal, and bacterial plant diseases and their effects.
Examples: viral—tobacco mosaic, Rembrandt tulips
fungal—mildew, rust
bacterial—black rot

Biotechnology Advancement

16. Explain the historical development of plant biotechnology.
Examples: making cheese, wine, bread; distilling vinegar; pickling fruits and vegetables
 - Identifying medical advancements in plant biotechnology
Examples: insulin, vaccines, vitamin enrichment of grains, therapeutic proteins
 - Describing environmental advancements in plant biotechnology
Examples: reduced pesticide usage, lower energy requirements, disease-resistant plants, herbicide-resistant plants, bioremediation, phytoremediation
 - Describing food product advancements in plant biotechnology, including genetic alteration and selective breeding
Examples: increased yield, potatoes with higher solid content, higher protein peanuts, tomatoes with longer shelf life, *Bacillus thuringiensis* (Bt) corn

Applied Genetics and Biotechnology Concepts

17. Describe methods of genetic engineering.
Examples: tissue culturing, plant breeding
18. Explain the concept of hybridization as it relates to plant biotechnology.
19. Evaluate properties of plants for selecting superior plants for harvest.
Examples: cold tolerance, salt tolerance, ripening rate, higher starch content, Vitamin A content, water and mineral absorption

Social and Environmental Impacts of Biotechnology

20. Identify public agencies that conduct research and regulate the usage of plant biotechnology.
Examples: United States Department of Agriculture (USDA), Environmental Protection Agency (EPA), Food and Drug Administration (FDA)
 - Describing positive and negative aspects of labeling genetically modified organisms for import and export
 - Evaluating effects of plant hormones on plants, animals, and human growth and development
Examples: indigenous hormones, intentionally introduced hormones, unintentionally introduced hormones
 - Describing how public opinion on marketing, sales, labeling, and government regulations affect plant products grown in the United States

Plumbing and Pipefitting I

Plumbing and Pipefitting I is a one-credit course that provides students with knowledge of fundamental plumbing principles and practices. Topics include basic plumbing safety; plumbing tools; oxyfuel cutting; motorized equipment; and various pipes, fittings, and materials. Upon successful completion of this course, students apply basic plumbing principles. This entry-level course may be taken as one of the optional technical courses with credit applied to the Industrial Maintenance Technology program.

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Introduction

Students will:

1. Identify career opportunities, responsibilities, and characteristics of a plumber and pipe fitter.

Safety

2. Demonstrate the use of safety procedures and protective equipment used in plumbing and pipefitting.
3. Identify job site hazards specific to plumbers and pipefitters.
4. Explain safety precautions when working in and around trenches and excavations.

Plumbing Tools

5. Identify basic hand and power tools used in plumbing and pipefitting trades.
6. Demonstrate the use of plumbing and pipefitting manuals and power tools.
7. Perform selected pipe-joint preparation tasks using power tools.

Integrated Academics

8. Identify parts of a fitting and various pipe-measuring techniques.
9. Determine fitting allowances and thread makeup using dimension tables.
10. Calculate end-to-end measurements using fitting allowances and thread makeup.
11. Use tables of trigonometric values to calculate pipe travel.

12. Demonstrate the use of various reference materials used by plumbers and pipefitters.

Oxyfuel Cutting

13. Demonstrate the safe and effective use of oxyfuel equipment.

Motorized Equipment

14. Demonstrate the operation and use of motor-driven equipment used by plumbers and pipefitters.

Drawings

15. Demonstrate the use of blueprints and drawings used in plumbing and pipefitting.
 - Sketching isometric, orthographic, and schematic drawings used in plumbing and pipefitting

Plastic Pipes and Fittings

16. Demonstrate various techniques, materials, and schedules used in installing and supporting assorted piping.
17. Identify types of materials and schedules used with copper piping.

Pipes and Fittings

18. Assemble plastic, copper, threaded and valve, cast-iron, and carbon steel pipe.
19. Demonstrate techniques for installing butt and socket welds.
20. Demonstrate techniques for installing threaded pipe assemblies and bell and spigot pipe assemblies.

Plumbing and Pipefitting II

Plumbing and Pipefitting II is a one-credit course that provides instruction to enable students to read and follow schematics, diagrams, and rough-in sheets to install or repair plumbing fixtures and to troubleshoot and make repairs. Topics include commercial drawings, excavations, underground pipe installation, various drain installations, valve types, pipes, fittings, and electricity in plumbing. Upon successful completion of this course, students make plumbing repairs and install plumbing fixtures. The prerequisite for this course is Plumbing and Pipefitting I. Emphasis is placed on safety and testing water supply and drain lines. Hangers, supports, structural penetrations and fire-stopping materials are also covered.

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Integrated Academics

Students will:

1. Calculate $11\frac{1}{4}$, $22\frac{1}{2}$, 45, 60, and 72 degree offsets, parallel offsets, and rolling offsets on pipe applications, including using a framing square to find the travel in a piping offset and using a folding rule to find given angles.

Commercial Drawing

2. Interpret information from a site plan to locate plumbing entry points, wall chases, material takeoff, and drain water, vent pipe, and water supply systems.
 - Developing estimates for installation of piping systems
 - Establishing piping fixture locations

Excavations

3. Explain the use of shoring materials and premanufactured support systems used in pipeline installation.
4. Determine the grade and elevation of a trench for a sewer line.

Underground Pipe Installation

5. Identify types of underground piping materials and fittings by size and classification.
Examples: chlorinated polyvinyl chloride (CPVC), polyvinyl chloride (PVC), ductile iron, carbon steel

Installing Roof, Floor, and Area Drains

6. Demonstrate the installation of various drain systems.
Examples: floor, roof, other specified areas

Types of Valves

7. Demonstrate how to service various types of valves used in plumbing and pipefitting applications.

Installing and Testing Water Supply Piping

8. Install a water distribution system using various hangers and fittings.
9. Install a properly sized water service line, including backflow prevention.

Installing Plumbing Fixtures, Valves, and Faucets

10. Demonstrate the installation of bathtubs, shower stalls, valves, faucets, water closets, urinals, lavatories, sinks, and pop-up drains.

Electricity in Plumbing Applications

11. Demonstrate safety precautions that must be followed when working on or near electrical equipment.
12. Calculate wattage consumed by an energized circuit.
13. Determine voltage, current, and resistance measurements using electrical test equipment.
 - Determining the position of leads for reading voltage, current, and resistance

Hangers, Supports, Structural Penetrations, and Fire-Stopping Materials

14. Identify hangers and supports used to install drainage, waste, and vent (DWV) and water supply systems.
15. Install pipe hangers and supports according to local codes and manufacturer's specifications.
16. Demonstrate the installation of common types of fire-stopping materials used in penetrations through fire-rated structural members.
Examples: walls, floors, ceilings

Installing and Testing Drainage, Waste, and Wet Piping

17. Develop a material takeoff from a given set of piping plans.
18. Determine the location of fixtures and field routing of plumbing from plans and fixture rough-in sheets.
19. Describe a building sewer system, a building drain, and a DWV system using appropriate hangers on correct grade.
20. Determine correct function by testing a DWV system.

Plumbing and Pipefitting III

Plumbing and Pipefitting III is a one-credit course that provides instruction regarding proper methods for joining all types of pipe and fittings. Emphasis is placed on plumbing materials, tools, supplies, equipment, and methods of installation. Topics include fixtures; valves; faucets; drainage, waste, and vent systems; water distribution; water heater installation; fuel systems; and crew leader introductory skills. Upon successful completion of this course, students join various pipe and fittings; make plumbing repairs; test drain, waste, and vent (DWV) piping; and install plumbing fixtures. The prerequisite for this course is Plumbing and Pipefitting II.

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Corrugated Stainless Steel Tubing

Students will:

1. Demonstrate various techniques used in hanging, supporting, measuring, cutting, joining, and grooving corrugated stainless steel tubing according to specifications.

Fixtures, Valves, and Faucets

2. Identify types of plumbing fixtures and faucets.
Examples: sinks, lavatories, bathtubs, bath-shower modules
3. Identify procedures for repairing plumbing fixtures, valves, and faucets.
4. Identify procedures for maintaining plumbing fixtures, valves, and faucets.

Drainage, Waste, and Vent Systems

5. Identify functions of various components of a drainage system.
6. Explain the importance of traps in various piping systems.

Water Distribution Systems

7. Describe the process by which water is distributed in municipal, residential, and private water systems.
8. Explain relationships between components of a water distribution system.

Water Heater Installation

9. Explain functions of water heater components.
10. Describe installation procedures for electric and gas water heaters.

Fuel Gas Systems

11. Describe the function and properties, safety precautions, and hazards of major components of various fuel systems.
12. Design a fuel gas system according to specifications.

Crew Leader Introductory Skills

13. Explain the history, trends, economic conditions, and training of professionals in the plumbing and pipefitting industry.
14. Define roles and characteristics of plumbing and pipefitting crew leaders.

Police Patrol

Police Patrol is a one-credit course developed to assist students in choosing police patrol as a career. Areas of instruction in this one-credit course are safety, patrol procedures, written reports, traffic control procedures, defensive tactics, physical wellness and job-related health issues, business security, and drug enforcement.

The minimum required content standards for this course may be expanded to accommodate specific community interests and utilize local resources. This course encourages critical thinking, use of the scientific method, integration of technology, development of student leadership skills, and application of knowledge and skills related to practical questions and problems. Safety concepts are integrated into instruction to the maximum extent possible.

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Career Opportunities

Students will:

1. Explain career opportunities in law enforcement.

Safety

2. Explain patrol safety precautions, first aid, and cardiopulmonary resuscitation (CPR) techniques.
 - Explaining various techniques for removing a victim from a dangerous situation

Patrol Procedures

3. Describe duties and responsibilities of patrol officers.
 - Identifying patrol types and zones
 - Identifying procedures for dealing with domestic violence
4. Describe ways patrol officers establish rapport with citizens.
 - Describing current trends in community-oriented policing

Written Reports

5. Describe the purpose and content of various police reports.

Traffic Control Procedures

6. Explain traffic accident investigations.
 - Describing the positioning of emergency vehicles and personnel during a traffic accident investigation
7. Describe traffic stop procedures.
 - Identifying various traffic violations
 - Explaining the Pursuit Intervention Technique (PIT)
8. Identify duties involved in directing traffic.
 - Explaining the use of barricades and cones as traffic barriers
 - Demonstrating various hand signals used for directing traffic

Defensive Tactics

9. Describe police defensive tactics for Alabama officers.
 - Describing the use of force continuum in defensive tactics
 - Explaining weapon safety procedures for patrol officers
 - Describing the four elements of arrest

Physical Wellness

10. Explain the importance of physical wellness to a patrol officer.

Sexually Transmitted Diseases

11. Describe the transmission and treatment of sexually transmitted diseases (STDs).
12. Examine infection control techniques that can protect patrol officers from STDs.

Business Security

13. Explain the importance of patrol officers routinely monitoring local businesses.

Drug Enforcement

14. Identify techniques of drug enforcement used by patrol officers.
 - Explaining the importance of drug-seeking dogs for police patrol

Poultry Science

Poultry Science is a one-credit course that allows students to develop an appreciation of the importance of the poultry industry. Topics include career opportunities, safety, environmental issues, breeds of poultry, nutrition and disease prevention, consumer issues, biotechnological advancement, and management and marketing practices.

Content standards for this course are not intended to serve as the entire curriculum. Teachers are encouraged to expand the curriculum beyond the limits of these content standards to accommodate specific community interests and utilize local resources. This course encourages critical thinking, use of the scientific method, integration of technology, development of student leadership skills, and application of knowledge and skills related to practical questions and problems. Safety concepts are integrated into instruction to the maximum extent possible.

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Career Opportunities

Students will:

1. Describe various careers associated with poultry science.
2. Explain the history of poultry science.

Safety

3. Demonstrate the safe handling of chemicals and drugs used in poultry production.
Example: preventing chemicals from leaking into the groundwater supply
 - Identifying safety procedures for transporting poultry
Examples: securing birds in crates, securing crates on trucks

Environmental Issues

4. Identify procedures for disposal of poultry litter, including spreading wet, dry, and dehydrated litter.
5. Identify procedures for disposal of dead birds, including composting and freezing.

Breeds of Poultry

6. Identify various breeds of poultry, including chickens, ducks, geese, quail, and turkeys.
 - Describing the structure and function of poultry skeletal, digestive, reproductive, excretory, respiratory, circulatory, and nervous systems

Nutrition and Disease Prevention

7. Explain accepted feeding practices for various kinds of poultry.
8. Describe procedures for controlling diseases and parasites in poultry production.
 - Identifying symptoms for common poultry diseases and parasites
9. Describe factors to be considered in the design of energy-saving housing for poultry, including ventilation and lighting.
 - Explaining uses of automation in poultry production
Examples: feeding, watering, air-conditioning, egg collecting, removing waste
 - Analyzing cooling systems used for reducing heat stress in poultry houses
Examples: fan systems, fogging systems, evaporative cooling systems
10. Analyze health issues associated with poultry processing to avoid the spread of bacterial and viral infections.

Consumer Issues

11. Identify governmental agencies regulating the poultry industry.
Examples: Alabama Department of Agriculture and Industries, United States Department of Agriculture (USDA), Occupational Safety and Health Administration (OSHA)
 - Describing the importance of consumer education and community relations in poultry production
Examples: odor issues, irradiation of meat, water quality

Biotechnological Advancement

12. Describe biotechnological advancements in poultry science.
Examples: using eggs to produce medicines, vaccinating eggs

Management and Marketing Practices

13. Explain the operation of modern poultry businesses.
 - Comparing methods of marketing poultry products
 - Identifying advantages and disadvantages of contracting with large poultry firms

Power Equipment Technology

Power Equipment Technology is a one-credit course designed to prepare students for entry-level employment or advanced training in the power mechanics field. Topics include career opportunities, safety, tools, hydraulics, pneumatics, drivetrains, control systems, starters, and preventive maintenance.

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Career Opportunities

Students will:

1. Identify career opportunities in power equipment technology.

Safety

2. Explain safety procedures for working with power equipment systems.

Tools

3. Differentiate among common tools used with hydraulic and pneumatic systems.
Examples: mechanical tools, hose crimpers
4. Identify common test equipment used with hydraulic and pneumatic systems.
Examples: gauges, flow meters

Hydraulics

5. Identify systems in power equipment that utilize hydraulics.
6. Distinguish between single-acting and double-acting hydraulic cylinders.
7. Describe components of a hydraulic system.

8. Explain how a hydraulic system works.
 - Diagnosing problems with a hydraulic system
 - Solving problems found in a hydraulic system

Pneumatics

9. Identify parts of a pneumatic system.
10. Explain how a pneumatic system works.
 - Diagnosing problems with a pneumatic system
 - Solving problems found in a pneumatic system

Drivetrains

11. Identify power equipment drivetrain components and the functions of each.
12. Diagnose power equipment clutch and transmission problems.

Control Systems

13. Identify controls used in hydraulic and pneumatic systems.
Examples: electronic, digital, robotic, manual
14. Describe the use of compliance controls on power equipment.
Examples: engine kill switch, inertia brake control

Starters

15. Demonstrate the procedure for manual starter overhaul.
 - Diagnosing manual starter problems
16. Demonstrate the procedure for repairing electric starters.
 - Diagnosing electric starter problems

Preventive Maintenance

17. Identify preventive maintenance procedures used in checking and servicing hydraulic and pneumatic systems.
Examples: changing fluids, changing filters, checking fluid levels, checking hoses

Principles of Public Service

Principles of Public Service is a one-credit course that provides students with competencies related to a cluster of public service job preparatory programs that help students develop the knowledge and skills necessary for success and advancement in a specialized public service job preparatory program. Students study possible careers, employability skills, leadership, basic first aid, bloodborne pathogens, fire management services, legal services, and law enforcement services.

Content standards for this course are not intended to serve as the entire curriculum. Teachers are encouraged to expand the curriculum beyond these minimum required content standards to accommodate specific community interests and utilize local resources. This course encourages critical thinking, use of the scientific method, integration of technology, development of student leadership skills, and application of knowledge and skills related to practical questions and problems. Safety concepts are integrated into instruction to the maximum extent possible.

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Career Opportunities

Students will:

1. Compare job characteristics of various career opportunities in the public service industry.
 - Describing procedures for obtaining employment in the public service industry
 - Describing professional behavior in the public service workplace
2. Define public service and its areas, including emergency and fire management and legal and law enforcement services.

Safety

3. Demonstrate techniques of basic first aid and cardiopulmonary resuscitation (CPR).
 - Describing steps to ensure safety in emergency situations
4. Identify community resources and services available to individuals with diseases caused by bloodborne pathogens.
 - Distinguishing fact from fallacy regarding the transmission and treatment of diseases caused by bloodborne pathogens
 - Identifying infection control techniques designed to prevent the spread of diseases caused by bloodborne pathogens

Computer Literacy

5. Utilize technology to access, manage, and integrate information.
 - Identifying technological advancements that enhance the public service industry

Leadership Skills

6. Apply problem-solving skills to resolve issues in the public service industry.
7. Demonstrate effective communication skills.
 - Conducting a typical business meeting utilizing parliamentary procedure
8. Explain leadership skills gained through student organization activities.

Foundational Skills

9. Assess ethical and legal responsibilities that provide guidelines for conduct in the public service industry.
10. Apply mathematics, reading, and writing skills that aid in public service jobs.
 - Identifying principles of financial literacy

Fire Management Services

11. Identify basic fire science organizations.

Legal Services

12. Explain how constitutional law affects the principles of public service.

Law Enforcement Services

13. Describe patrol officer duties and responsibilities.

Professional Support Services in Education

Professional Support Services in Education is a one-credit course that provides knowledge and skills for students who are interested in pursuing careers in the professional support services area of education. The prerequisite for this course is Education and Training. Students become familiar with strategies and techniques of assessment, support services, and intervention resources available to students and their families.

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Support Services

Students will:

1. Distinguish among types of professional support services careers to determine the area of interest.
Examples: psychologist, social worker, parent educator, counselor, speech language pathologist, audio pathologist
2. Analyze tasks and responsibilities performed by professional support services staff to enhance student achievement and meet instructional goals.
3. Explain principles of support and service processes.
4. Evaluate the impact of professional support services in education.
5. Assess ways technology impacts professional support services.

Assessment

6. Determine needs of students by employing strategies and techniques used by professional support services staff.
Examples: observation, interview, consultation, testing, review of documents
7. Evaluate assessment tools used by professional support services.
8. Explain assessment results to prepare stakeholders to participate in developing an action plan for education.

Support and Intervention

9. Stimulate stakeholders to identify interests and needs of students.
10. Discuss resources available to stakeholders that enhance student educational success.

11. Stimulate stakeholders to recognize the need for proactive support, including existing barriers for educational enhancement.
12. Construct a personal or group action plan for educational success.
Examples: setting educational goals, identifying multiple sources of data and interpretation
13. Coordinate support and services to meet needs of students.
Example: stakeholder meetings
14. Explain benefits and potential resources for intervention.
15. Determine skills for advocacy of increased resources to meet needs of learners.

Recreational Power Equipment Operation

Recreational Power Equipment Operation is a one-credit course that provides students with classroom and laboratory experiences regarding equipment powered by two- and four-cycle engines available for recreational use. Examples of equipment are motorcycles, marine craft, and four-wheel all-terrain vehicles (ATVs). Students are provided instruction and hands-on practice in the diagnosis and repair of malfunctions in drive systems, engines, and marine craft. Upon successful completion of this course, students diagnose and repair basic operational problems of recreational power equipment.

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Safety

Students will:

1. Apply safety rules, regulations, and procedures necessary for recreational power equipment operation and maintenance.

Motorcycle and Four-Wheel All-Terrain Vehicle Drive Systems

2. Diagnose drive system problems, including chains, drive shafts, and transmissions to determine corrective action.
3. Demonstrate procedures for repairing drive systems, including chains, drive shafts, and transmissions.
4. Identify causes of chassis failure, including frames, wheels, brakes, and wiring harnesses.
5. Demonstrate repair procedures associated with the chassis, including frames, wheels, brakes, and wiring harnesses.
6. Demonstrate preventive maintenance on motorcycle and four-wheel ATV drive systems.

Motorcycle and Four-Wheel All-Terrain Vehicle Engines

7. Identify individual components found in motorcycles or ATVs.
8. Demonstrate preventive maintenance on motorcycles and four-wheel ATV engines.

Marine Craft

9. Identify individual components found in marine craft engines.
10. Analyze drive component problems, including gears, bearings, cooling systems, and lubricants to determine corrective action.
11. Demonstrate repair techniques for drive components, including gears, bearings, coolant systems, and lubricants.
12. Demonstrate preventive maintenance on marine craft.

Refrigerants

Refrigerants is a one-credit course that introduces students to different types of refrigerants and their physical and chemical characteristics. Emphasis is placed on student understanding of different types of refrigerants available in the heating, ventilation, air-conditioning, and refrigeration (HVACR) industry and on the rules and regulations enforced by the Environmental Protection Agency (EPA). Students enrolled in this course exhibit good reading comprehension skills and respond well to both verbal and written instructions. They display a working knowledge of physical science and chemistry and are able to understand charts and convert information from one form to another. Instruction in this course consists of both individual and group classroom and laboratory activities and provides students with knowledge of chemical and physical reactions of refrigerants used in the refrigeration system. Upon successful completion of this course, students work with different types of refrigerants in a responsible and legal manner.

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Students will:

1. Demonstrate safety rules, regulations, and procedures for handling refrigerants.
2. Describe different classes of refrigerants.
3. Explain physical and chemical properties of refrigerants.
4. Identify azeotropic mixtures and blends.
5. Identify the color and classification of refrigerants using the Pantone Matching System (PMS) color number.
6. Describe saturation pressure and temperature, including single element refrigerant, azeotropic, zeotropic, and blends.
7. Identify saturation pressure and temperatures for different types of refrigerants.
 - Identifying when saturation pressure and temperature do not match the refrigerant
8. Calculate superheat and subcooling and superheat and subcooling glide for HVACR.
9. Demonstrate recovery techniques recognized by the EPA for refrigerant applications.
10. Demonstrate the use of R410 refrigerant gauges.
11. Compare the type of refrigerant oil used with each type of refrigerant classification.

Residential and Commercial Power Equipment

Residential and Commercial Power Equipment is a one-credit course designed to prepare students for entry-level employment or advanced training in the power mechanics field. Topics include career opportunities, safety, lawn and garden chassis, chain saw, string trimmer, tillers, generators, pumps, Environmental Protection Agency (EPA) pollution controls, electrical systems, and electrical system repair on power equipment.

Content standards for this course are not intended to serve as the entire curriculum. Teachers are encouraged to expand the curriculum beyond these minimum required content standards to accommodate specific community interests and utilize local resources. This course encourages critical thinking, use of the scientific method, integration of technology, development of student leadership skills, and application of knowledge and skills related to practical questions and problems. Safety concepts are integrated into instruction to the maximum extent possible.

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Career Opportunities

Students will:

1. Recognize career opportunities related to the residential and commercial power equipment industry.

Safety

2. Demonstrate safety procedures for working with power equipment.

Lawn and Garden Chassis

3. Diagnose frame and sheet metal problems in power equipment.
 - Repairing frame and sheet metal problems in power equipment
4. Diagnose cutting-deck problems in power equipment.
 - Demonstrating the procedure for correcting cutting-deck problems

Chain Saw

5. Diagnose chain saw problems.
 - Demonstrating the procedure for correcting chain saw engine problems
 - Demonstrating the procedure for correcting bar and chain problems

String Trimmer

6. Diagnose string trimmer problems.
 - Demonstrating the procedure for correcting string trimmer engine problems
 - Demonstrating the procedure for correcting tube and cutting-head problems

Tillers

7. Diagnose tiller problems.
 - Demonstrating the procedure for correcting tiller engine problems
 - Demonstrating the procedure for correcting tiller drivetrain problems

Generators

8. Diagnose output problems in generators.
 - Demonstrating the procedure for correcting generator engine problems
 - Demonstrating the procedure for correcting generator electrical output problems

Pumps

9. Calculate the output pressure of various pumps.
10. Demonstrate the procedure for rebuilding various pumps.

Environmental Protection Agency Pollution Controls

11. Describe EPA pollution control units for power equipment.

Electrical Systems

12. Discuss the use of Ohm's law.
 - Applying Ohm's law to series and parallel circuits
 - Diagnosing electrical problems
13. Demonstrate procedures for repairing power equipment electrical systems.

Oxyfuel Equipment

14. Demonstrate safety techniques for using oxyfuel equipment.
15. Perform a variety of oxyfuel tasks, including heating metal, cutting, welding, or brazing.

Welding

16. Prepare a welding machine for operation.

Examples: flux cored, shielded metal arc

- Selecting materials for various welding techniques

Residential Landscape Establishment and Maintenance

Residential Landscape Establishment and Maintenance is a one-credit course that focuses on the residential landscape industry. Topics include career opportunities, safety, plant nutrition, pest management, plant identification, residential landscape design and maintenance, tool and equipment maintenance, residential landscape business management, and technology.

Content standards for this course are not intended to serve as the entire curriculum. Teachers are encouraged to expand the curriculum beyond the limits of these content standards to accommodate specific community interests and utilize local resources. This course encourages critical thinking, use of the scientific method, integration of technology, development of student leadership skills, and application of knowledge and skills related to practical questions and problems. Safety concepts are integrated into instruction to the maximum extent possible.

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Career Opportunities

Students will:

1. Describe job characteristics for career opportunities in the residential landscape industry.

Safety

2. Identify safety precautions in the residential landscape and maintenance industry.

Plant Identification

3. Identify residential landscape plants and turfgrasses by common name.

Designing a Plan

4. Design a residential landscape plan.
 - Choosing plants and turfgrasses for a landscape based upon selected criteria
 - Demonstrating residential landscaping techniques

Tools and Equipment

5. Identify tools and equipment used for the installation and maintenance of a residential landscape.
 - Demonstrating the maintenance of hand tools and small power equipment

6. Utilize skills needed to maintain drainage and irrigation systems.
 - Identifying various sprinklers used in an irrigation system

Residential Landscape Maintenance

7. Maintain trees, shrubs, plants, and turfgrasses in a residential landscape.
Examples: fertilizing, controlling weeds, mowing, edging, weed-eating

Nutrition

8. Select types of fertilizers and methods of application used in the residential landscape and maintenance industry.

Residential Landscape Pest Control

9. Identify insects, diseases, and weeds that affect residential landscape plants.
Examples: insects—army worms, grubs, mole crickets
diseases—dollar spot, rusts, fungi
weeds—crabgrass, pigweed
10. Differentiate among various types of pesticides used on residential landscape plants.
 - Describing techniques for preparing pesticide mixtures

Business Management

11. Demonstrate appropriate business-related work ethics and managerial skills for a lawn maintenance business.

Technology

12. Describe technological advancements in the residential landscape industry.

Residential Masonry I

This one-credit course is designed to provide students with the fundamental knowledge and skills for this area of the construction industry. Emphasis is placed on job safety and interpretation of residential masonry plans and drawings. Students construct foundations and footings, walls, and openings; prepare elevated work stations; and identify a variety of types of insulations. Upon successful completion of this course, students perform basic tasks related to the masonry industry.

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Safety

Students will:

1. Apply safety rules, regulations, and procedures for residential masonry construction.

Blueprints and Layouts

2. Interpret residential masonry plans and drawings.

Foundations and Footings

3. Demonstrate requirements for construction of various types of residential foundations.

Walls and Openings

4. Compare types of walls in residential buildings, including basic structure and function.
5. Identify the location and function of control joints and expansion joints.
6. Identify rules and regulations relative to masonry construction.
7. Construct various types of walls using reinforcing, jointing, and bonding techniques.
8. Identify various types of masonry arches.
9. Construct semicircular and jack arches.
10. Demonstrate techniques for installing masonry around windows, doors, and other openings.
11. Demonstrate techniques used to construct bracing, including pilasters.

Insulation

12. Identify various types of insulation used with masonry construction.
 - Describing installation techniques for insulation with masonry construction
13. Identify techniques used to eliminate moisture problems in various types of masonry construction.

Elevated Work

14. Describe steps for setting up and maintaining elevated workstations.
15. Demonstrate the operation of material handling and hoisting equipment used with elevated workstations.
16. Describe safety requirements and guidelines employed in elevated and high-rise construction.
17. Describe scaffold positioning and laying techniques for masonry construction.
18. Discuss industry standards for quality control and inspection of residential masonry construction.

Estimation

19. Determine materials and supplies needed for a residential masonry construction project.

Residential Masonry II

This one-credit course is designed to provide students with advanced knowledge and skills for this area of the construction industry. Emphasis is placed on job safety, identification of building codes, foundations, brick veneer walls, bonding, and estimate of materials and supplies needed for a project. Upon successful completion of this course, students perform basic tasks related to the masonry industry.

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Safety

Students will:

1. Apply safety rules, regulations, and procedures for residential masonry construction.

Building Codes

2. Identify local building codes, state building codes, and neighborhood covenants.

Foundations

3. Use modular, spacing, layout, and corner rules when constructing residential masonry foundations with varying thickness, including 4-, 8-, and 12-inch walls.
4. Construct foundation walls.
Examples: 4-, 8-, 12-inch walls

Brick Veneer

5. Construct a brick veneer wall.
6. Use residential scaffolding typical to masonry construction.

Bonding

7. Construct brick sills, steps, chimneys, and soldier courses using various bonds and laying styles.
Examples: laying styles—running, stacked, Flemish, American, herringbone

Estimation

8. Determine materials and supplies needed for a residential masonry project.

Residential Wiring

This one-credit course is designed to provide students with the fundamental knowledge and skills for this area of the construction industry. This course emphasizes safety, grounding, conduit and electrical metallic tubing (EMT) bending, boxes and fittings, conductor installation, conductor termination and splices, installation of electrical services, circuit breakers and fuses, and residential wiring systems. Upon successful completion of this course, students are able to wire a house with limited supervision.

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Safety

Students will:

1. Demonstrate safety procedures as recognized by governing agencies and approved industry standards when testing and replacing components or installing wiring in residential applications.
Examples: lockout, tagout
2. Identify electrical hazards and how to avoid and minimize them in the residential construction environment.

Grounding

3. Explain the purpose of grounding systems in residential wiring applications.
4. Distinguish between ground faults and short circuits in residential wiring applications.
5. Describe the difference between system grounding and equipment grounding related to residential wiring.
6. Demonstrate the installation of various grounding devices related to residential wiring.

Conduit and Electrical Metallic Tubing Bending

7. Demonstrate the process of conduit bending according to specifications using hand and power equipment.
 - Computing angles for conduit bends and offsets
 - Demonstrating procedures for correcting and modifying existing conduit and EMT bends

Boxes and Fittings

8. Calculate type and size of electrical boxes based on application, number, and size of conductors using the National Electrical Code (NEC) handbook.
 - Demonstrating the ability to locate and install electrical boxes according to the NEC handbook
 - Explaining the NEC requirements for supporting lighting fixtures
 - Demonstrating the ability to install lighting fixtures according to specifications

Conductor Installation

9. Select the correct size and type of conductors for residential wiring applications and NEC handbook.
10. Demonstrate different methods for installing common conductors used in residential wiring.

Conductor Termination and Splices

11. Produce quality conductor terminations.
12. Demonstrate the procedure for installing lugs and connectors onto conductors.
13. Explain the importance of using correct bolt torque when working with bus bars.
14. Demonstrate correct conductor splicing and crimping.

Installation of Electrical Services

15. Install main disconnects, switches, panel boards, and over-current protection.
 - Describing various types of residential electrical service installations
 - Calculating circuit loads for installation of electrical services

Circuit Breakers and Fuses

16. Identify devices used for over-current protection.
17. Describe the operation of circuit breakers and fuses.

Residential Wiring Systems

18. Use a specific plan to complete a wiring project for residential applications.

Robotics Applications

This one-credit course is designed to provide students with the fundamental knowledge and skills of robotics. Emphasis is placed on the applications of a variety of robotic systems. Upon successful completion of this course, students construct a robotic system with peripheral devices.

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Orientation

Students will:

1. Apply safety to procedures and rules used in robotic applications.

Systems

2. Identify applications of a robotic system.
3. Compare uses of multiple robotic systems.
4. Configure a robotic system plan to perform multiple tasks.

Peripheral Systems

5. Identify uses of robots and peripheral devices.
6. Plan a coordinated robotic system with peripheral devices.
7. Verify the function of a coordinated robotic system.

Projects

8. Construct a robotic system with various peripheral devices.
9. Predict system performance in a robotic device.
10. Verify system performance of different robotic designs.

Safety and Health Regulations

In this one-credit course students gain valuable information that serves as a foundation for further study in this area. Students learn the importance of government and industry regulations as well as individual responsibilities for performing activities from a safety perspective. Students identify common safety hazards found in the workplace and their role in minimizing and avoiding unsafe practices. Specific topics include flammable and combustible liquids, egress and fire protection, electrical safety, environmental control, machine guarding, tool safety, first aid, hazard communication, personal protective equipment, walking and working surfaces, and material handling and storage.

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Introduction

Students will:

1. Explain the importance of Occupational Safety and Health Administration (OSHA) industry regulations and individual responsibilities in workplace safety and health practices.
2. Describe job-related, high-hazard area risk assessment techniques and the impact of accidents on industry.
 - Utilizing job safety analysis worksheets
3. Compare federal and state child labor laws regarding hours and locations where youth may work, including required permits.
4. Explain worker rights according to OSHA Safety and Health Regulations standards.

Flammable and Combustible Liquids

5. Describe characteristics of flammable and combustible liquids, including flash point, flammable limits, boiling point, vapor density, vapor pressure, ignition temperature, and specific gravity.
6. Demonstrate storage and handling procedures for flammable and combustible liquids.
7. Compare classes of fire and fire extinguishers.
 - Discussing the proper use of fire extinguishers

Means of Egress and Fire Protection

8. Develop an emergency plan, including fire protection, means of egress, exit route and exits, and special concerns for confined spaces.

Electrical Safety

9. Explain assured equipment grounding programs.

General Environmental Control

10. Interpret general environmental controls, safety color codes for marking physical hazards, and specifications for accident prevention signs and tags.

Machine Guarding

11. Explain machine guarding general requirements for industrial and construction machines and operations.

Hand and Portable Power Tools

12. Explain tool safety guidelines, including hand, power, power-actuated, and pneumatic tools.

Introduction to Industrial Hygiene and First Aid

13. Explain industrial and construction health and first aid procedures, including personal protection from body fluids; skin, rash, or dermatitis incidents; and oil, gas, and chemical spills.

Hazard Communication

14. Explain the importance of hazard communication, including signs, signals, barricades, markers, lockouts, and tags used on a job site.
15. Explain the use of Material Safety Data Sheets (MSDS).

Personal Protective Equipment

16. Explain the use of personal protective equipment, including eye, face, foot, and respirator protection.

Walking and Working Surfaces

17. Explain site-specific protection procedures and safety requirements with regard to the importance of housekeeping procedures, the use of ladders and scaffolding, rigging procedures, and hazards of floor and wall openings.

Material Handling and Storage

18. Explain the importance of safety practices for manual lifting, load lifting, and rigging procedures.

Sales and Promotion Planning

Sales and Promotion Planning is a one-credit course that provides the tools necessary for the development, implementation, and management of promotional programs. The focus of this course is on utilizing promotional knowledge and skills for communicating information to achieve a desired outcome. Students develop skills related to advertising, publicity, special events, visual merchandising, displays, promotional campaigns, and advertisements to aid in promotional planning. They learn to manage the sales function to determine client needs and wants and to respond through planned, personalized communication.

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Promotional Mix

Students will:

1. Categorize elements of the promotional mix and their applications in a competitive economic environment.
 - Distinguishing among advertising, promotion, publicity, and public relations
 - Analyzing sales and promotion for the effect on e-marketing
 - Describing ethical behavior as it relates to sales and promotion
 - Analyzing the role of branding and trademarks in merchandising

Potential Markets

2. Determine techniques used to segment advertising, promotion, products, and services for potential markets.
 - Demonstrating the need for target marketing
 - Developing customer and client profiles
 - Conducting a market analysis
Examples: market size, area, and potential

Ethics

3. Utilize research results to determine regulations affecting ethical issues related to sales and promotion.
 - Describing methods used to protect intellectual property

Advertising and Promotion

4. Design an advertising and promotional campaign, including identifying a target market, determining media use, preparing a budget, and developing a timeline for a product or service.

Sales

5. Determine the importance of wholesale, retail, and professional sales in a free enterprise economy.
 - Calculating markups, sales tax, discounts, and costs of goods sold

Sales Promotion Design

6. Create sales promotion materials, including slogans, brochures, catalogs, and cross promotions, that incorporate company image and design through the use of various forms of technology.
7. Demonstrate effective sales presentation skills, including obtaining product knowledge, developing a customer base, and determining sales techniques.
8. Identify effective Internet sales methods used for Internet presentations and Internet commerce.
9. Identify various follow-up sales techniques for obtaining customer referrals for future sales.

Career Opportunities

10. Determine career and entrepreneurial opportunities, responsibilities, and educational and credentialing requirements in professional sales and promotion.

Salon Practices and Management

Salon Practices and Management is a one-credit course that enables students to develop entry-level management skills for the cosmetology industry. Students practice all phases of cosmetology in a salon setting. Upon successful completion of this course, students are able to demonstrate professional work ethics and communication skills, job-seeking and management skills, and exhibit knowledge of the technology used in salons. The prerequisite for this course is Introduction to Cosmetology.

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Legal Requirements and Considerations

Students will:

1. Determine various registrations and licensures that may be obtained in Alabama.
Examples: master cosmetologist, nail care technician, managing cosmetologist, cosmetology instructor
2. Identify continuing education requirements for a licensed practitioner.
3. Describe licensure reciprocity processes with those of other states.
4. Identify types of local and state licensures required for operating a salon.

Hairstyling Techniques

5. Demonstrate the correct use of thermal instruments, including pressing, curling, waving, and flatironing techniques, by creating advanced hair designs.
6. Apply thermal, wet, finger wave, pin curl, roller curl, blow drying, proper combing, and brushing techniques to hair design.
7. Demonstrate wig styling techniques.
 - Differentiating human hair from synthetic hair
 - Measuring the head for a wig
8. Demonstrate attaching and blending hairpieces or extensions into desired style.

Design Decisions

9. Identify creative hair designs that compliment client facial shape.
10. Analyze hair and scalp to accommodate client needs and wants.

Haircutting and Shaping

11. Demonstrate advanced haircutting and shaping techniques, including sectioning; scissor, razor, and clipper cutting; and hair thinning with advanced tools and implements.

Nail Services

12. Analyze structure, disease, and growth patterns of the nail to determine client needs and preferences as related to nail care.
13. Demonstrate proper advanced nail care services for a manicure, pedicure, creative gel nail design and natural and artificial nail care, including acrylic application techniques.
14. Evaluate the role of the beauty industry and small business as a personal career.
Examples: tracking clients and services, tracking supplies and inventory

Salon Business and Entrepreneurship

15. Practice effective management skills for a salon business.
Example: keeping financial records
 - Demonstrating skills needed by a receptionist
16. Describe procedures necessary for the operation of a successful salon, including maintaining accurate business records, communicating and interacting effectively with coworkers and clients, managing time, developing and retaining clients, and marketing professional products.
17. Determine the most effective form of salon advertising, including determining cost effectiveness and comparing forms of advertising media.
Examples: radio, television, Web pages, word-of-mouth
 - Designing appropriate advertising campaigns
18. Explain the significance of keeping abreast of current trends, technology, and techniques relative to salon practices and management.

Semiconductors

This one-credit course is designed to provide students with the fundamental knowledge and skills needed for this area of the electrical industry. Emphasis is placed on job safety, characteristics of semiconductors, symbols, semiconductor circuits, and analog circuits. Upon successful completion of this course, students perform basic tasks related to the electrical industry.

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Characteristics of Semiconductors

Students will:

1. Explain the physics of semiconductors.
 - Analyzing basic structure of semiconductors
Examples: covalent bonding, doping, P-N junction
2. Examine diode operation for general and special purpose circuits.
Examples: general purpose—small signal, rectifier
special purpose—Zener diodes, light-emitting diode
3. Explain transistor operations, including junction and field-effect transistor (FET).

Symbols

4. Interpret semiconductor schematic symbols.
Examples: diodes, transistors, FETs

Semiconductor Circuits

5. Construct semiconductor circuits, including diode and transistor.
6. Demonstrate skills related to troubleshooting semiconductor circuits.

Analog Circuits

7. Construct an analog circuit, including amplifiers and power supply.
8. Practice skills related to troubleshooting analog circuits.
9. Explain developments in emerging technology related to semiconductor materials and usage.

Senior Career Pathway Project

Senior Career Pathway Project (SCPP) is a capstone course designed for career and technical education students who have completed two or more career and technical education courses. This course allows students to utilize their secondary coursework through an experience that showcases their learning. It provides an opportunity for a student to choose an area of interest and engage in an in-depth exploration of the area while demonstrating problem-solving, decision-making, and independent-learning skills. The SCPP contributes to an educational plan of challenging courses and practical experiences that prepares students for the workplace or for pursuing further education.

During the SCPP the student works with his or her coordinating teacher, academic teachers, and with a product or process mentor who has expertise in the student's field of study. At the conclusion of the SCPP, the student presents or demonstrates knowledge gained to an audience consisting of the coordinating teacher, academic teachers, the product or process mentor, peers, and community and business representatives.

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Project Proposal

Students will:

1. Create a formal, narrative proposal that communicates a specific concept, process, or product related to a chosen career pathway.
Examples: "Effects of Refrigerants on the Ozone Layer," "Irrigation and Drainage Systems of Sports Fields," "Remodeling a Bathroom for the Physically Handicapped," "Marketing a Product for Teenagers," "Internship for Becoming a Sushi Chef," "Developing a Disaster Response Plan for a Hospital Emergency Room"

Research

2. Conduct independent research related to a selected project concept.
Examples: Internet research, related readings, original research

Project Report

3. Write a detailed report on the chosen project.
 - Demonstrating correct usage of standard writing format

Presentation

4. Produce an original multimedia presentation based upon project results.
Examples: producing a digital presentation and oral explanation, creating a documentary, presenting a project model and explanation

Portfolio

5. Design a project portfolio that includes project-related documentation.
 - Critiquing a project portfolio for components and process validity
Examples: components—abstract, table of contents, project proposal, signature sheets, journal entries, research, formal timeline, self-assessment, mentor assessments

Software Development

Software Development is a one-credit course designed to provide students with an introduction to the C++ programming language, structured elements of C++, classes, data, abstractions, inheritance, polymorphism, storage management, and a C++ programming environment. This course contains many simple programming exercises to reinforce the theory and to stimulate understanding. It is recommended that Information Technology Fundamentals be taken prior to this course.

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Customer Service

Students will:

1. Analyze customer software needs and system requirements to design an information technology-based project plan.
2. Utilize research results to assist in designing an information technology-based project plan with strategies for solving specific problems.
3. Analyze quality assurance tasks to produce quality products.
4. Evaluate maintenance and customer support functions.

Software Design

5. Demonstrate the effective use of tools for software development.
6. Relate program structure, blocks, and storage types to C++.
7. Construct console and file input and output, functions, arrays, and strings.
8. Develop a software program.
9. Differentiate between C++ and C programming languages.
10. Design a simple program that incorporates mathematics by writing the code, performing unit testing, and debugging the program.

Career Opportunities

11. Demonstrate career and entrepreneurial opportunities, responsibilities, and educational and credentialing requirements in the software development industry.

Specialty Floral Design and Management

Specialty Floral Design and Management is a one-credit course designed to enhance student employability skills, knowledge of business operations and management skills, and floral design skills. Topics include career opportunities, safety, history, employability skills, business operations, and specialty floral arrangements.

Content standards for this course are not intended to serve as the entire curriculum. Teachers are encouraged to expand the curriculum beyond these minimum required content standards to accommodate specific community interests and utilize local resources. This course encourages critical thinking, use of the scientific method, integration of technology, development of student leadership skills, and application of knowledge and skills related to practical questions and problems. Safety concepts are integrated into instruction to the maximum extent possible.

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Career Opportunities

Students will:

1. Identify careers in the floriculture industry.

Safety

2. Describe safety procedures used in the floriculture industry.

History

3. Trace the history of basic principles of design used in floriculture.

Employability Skills

4. Create a portfolio, including a résumé, cover letter, job application, and photographs, of personally designed floral arrangements.
5. Identify time management skills used in the floriculture industry.

Business Operations

6. Identify tools and equipment used in the floriculture business.

7. Explain shop operations involved in managing a floriculture business.
Examples: conducting sales and service, creating advertising and promotional displays, designing facilities, maintaining equipment

Specialty Floral Arrangements

8. Identify line designs used in specialty floral arrangements, including inverted-T, L-pattern, vertical, crescent, Hogarth curve, and contemporary freestyle.
9. Identify flowers, foliages, and potted plants used in specialty floral arrangements.
10. Describe the role of the florist in designing and planning wedding, sympathy, and special occasion arrangements.
11. Design wedding, sympathy, and special occasion arrangements.
Examples: wedding—bride and bridesmaid bouquets, groomsmen boutonnieres
sympathy—sprays, saddles, baskets, potted plants
special occasion—Valentine arrangements

Specialty Masonry Construction

This one-credit course is designed to provide students with the fundamental knowledge and skills for this area of the construction industry. Emphasis is placed on job safety, chimney construction, and decorative designs, including mantels, hearths, and garden features.

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Safety

Students will:

1. Apply safety rules, regulations, and procedures related to specialty masonry construction.

Chimney Construction

2. Interpret blueprints for decorative fireplace and chimney construction.
3. Demonstrate the building of a brick fireplace and chimney.

Decorative Design

4. Construct a decorative mantel, hearth, and face wall.
5. Interpret blueprints and measurements for decorative masonry trim.
6. Construct various types of masonry garden features, including walls and planters.
7. Construct site walls and moving edges common to specialty masonry construction.
Examples: borders, basket weave, rowlocks

Sports Medicine

Sports Medicine is a one-half credit course that introduces students to the sports medicine profession. Course content specifies core knowledge and skills needed by workers in the sports medicine field. Foundations of Health Science is a prerequisite course. It is suggested that Sports Medicine be offered to students in Grades 10-12 as an elective course. Upon successful completion of the course, students may enroll in the Advanced Health Seminar or the Work-Based Experience Seminar.

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Career Opportunities

Students will:

1. Identify roles and responsibilities of sports medicine professionals.

Anatomy

2. Describe the structure and function of human body systems as they relate to sports medicine.

Communication Skills

3. Utilize effective communication skills needed in sports medicine.
 - Documenting injury summaries using medical terminology

Employability Skills

4. Demonstrate workplace readiness skills in sports medicine.
Examples: regular attendance, efficient time management, adherence to dress code

Safety

5. Demonstrate safety skills needed in sports medicine, including preventing injuries and illnesses.

Legal and Ethical Implications

6. Describe legal and ethical responsibilities required in sports medicine.

Dietary Requirements

7. Utilize dietary guidelines, including the Recommended Dietary Allowance (RDA), to plan menus that meet various nutritional needs of the athlete.

Technical Skills

8. Describe technical skills needed in sports medicine.
Examples: taping, strengthening

Technology

9. Utilize technology needed in sports medicine.
Examples: Automated External Defibrillator (AED), Transcutaneous Electrical Nerve Stimulation (TENS)

Emergency Plans

10. Write an emergency plan for handling a catastrophic injury or death in the athletic environment.

Sports Turfgrass Production and Management

Sports Turfgrass Production and Management is a one-credit course that prepares students for sports turfgrass careers. Topics include career opportunities, safety, turfgrass growth, turfgrass management, sports fields, turfgrass tools and equipment, business management, and technology.

Content standards for this course are not intended to serve as the entire curriculum. Teachers are encouraged to expand the curriculum beyond these minimum required content standards to accommodate specific community interests and utilize local resources. This course encourages critical thinking, use of the scientific method, integration of technology, development of student leadership skills, and application of knowledge and skills related to practical questions and problems. Safety concepts are integrated into instruction to the maximum extent possible.

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Career Opportunities

Students will:

1. Describe job characteristics in various career opportunities in the sports turfgrass industry.

Safety

2. Identify workplace safety precautions for sports turfgrass personnel.

Turfgrass Growth

3. Identify common names, characteristics, and uses of warm- and cool-season perennial grasses.
 - Categorizing climatic regions in the United States to determine suitable grasses
Examples: Region 1—Kentucky bluegrass
Region 2—Bermuda grass
4. Differentiate among the growth patterns of turfgrasses, including rhizome, stolon, and bunch.
5. Explain soil preparation techniques needed during turfgrass renovations.
Examples: grading, draining, fertilizing
 - Describing components of soils and the importance of each to the turfgrass industry
 - Describing methods of establishing turfgrasses
Examples: seeding, sodding, plugging, sprigging

Turfgrass Management

6. Evaluate results of a soil analysis.
 - Comparing characteristics of primary and secondary macronutrients and micronutrients
Examples: primary macronutrients—nitrogen, phosphorus, potassium
secondary macronutrients—calcium, sulfur, magnesium
micronutrients—carbon, hydrogen, oxygen, iron, boron, manganese, copper, zinc, molybdenum, chloride
 - Describing symptoms of deficiencies in turfgrasses
7. Identify insects, diseases, and weeds that affect specific turfgrasses.
Examples: insects—army worms, grubs, mole crickets
diseases—dollar spot, fairy ring
weeds—crabgrass, annual bluegrass
8. Differentiate among various types of pesticides.
Examples: preemergence, postemergence, selective and nonselective monosodium methanearsonate (MSMA)
 - Describing techniques for preparing pesticide mixtures
 - Demonstrating safe use of pesticides
9. Explain mowing heights, frequency of mowing, and patterns of mowing for use on various turfgrasses.

Sports Fields

10. Design a sports field, including dimensions and components.
Examples: football, baseball, soccer, softball
11. Identify characteristics of various parts of a golf course, including greens, fairways, roughs, traps, and tees.
 - Describing basic design and layout features of a golf course
Examples: number of greens, number of sand traps, water features, yardage
 - Prescribing maintenance procedures for a golf course
 - Identifying responsibilities of the superintendent, director of grounds, golf professional, marshal, and maintenance crew
12. Evaluate skills needed to design drainage and irrigation systems.
 - Demonstrating skills needed to install and maintain drainage and irrigation systems
Examples: plumbing, electrical

Turfgrass Tools and Equipment

13. Identify uses of tools and equipment needed for the maintenance of turfgrasses.
Examples: tools—hand sprayers for applying pesticides, spreaders for applying fertilizers
equipment—power mowers for cutting turfgrass, gasoline blowers for removing debris

Business Management

14. Demonstrate business-related work ethics.
Examples: following instructions, being on-time, cooperating with others
- Demonstrating managerial skills for the successful operation of a landscape or turfgrass business
Examples: keeping records, budgeting, pricing, scheduling work, inventorying, purchasing, advertising, handling customer complaints, communicating in oral and written form

Technology

15. Identify advancements in technology that enhance the sports and recreation turfgrass industry.

State Board Practicum

State Board Practicum is a one-credit, culminating course that provides students with a comprehensive study of State Board procedures and practical applications in cosmetology and nail care. The course consists of Pathway A—Cosmetology, content standards 1-19, and Pathway B—Nail Care Services, content standards 1-13 and 20-22. Upon successful completion of this course, students are able to demonstrate practical skills necessary for meeting state licensure requirements and for successful employment. The prerequisites for this course depend upon the licensure the student is pursuing.

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Salon Safety and Infection Control

Students will:

1. Apply safety rules, regulations, and procedures necessary for preparation and attainment of licensure by the Alabama Board of Cosmetology.
Examples: infection prevention, disease control, blood spills, fire safety
2. Demonstrate the safe cleaning and disinfecting of salon tools, implements, equipment, and facilities during practical application.

Professional Development

3. Interpret state rules and laws governing the cosmetology and nail care industries.
4. Identify employers with career opportunities available to licensed cosmetologists and nail care technicians.
5. Exhibit ethical conduct and effective communication skills needed in the workplace.

Anatomy and Physiology

6. Identify the structure and functions of human body systems and their relationship to skin and nail care, including cellular development and the skeletal, muscular, nervous, circulatory, excretory, digestive, endocrine, and respiratory systems.

Nail and Skin Services

7. Identify nail and skin disorders and diseases commonly encountered by cosmetologists and nail technicians.

8. Apply procedures for performing manicures, pedicures, and natural and artificial nail care techniques.
9. Explain procedures for performing a facial treatment.
10. Practice facial massage movements.

Salon Management

11. Demonstrate the process of securing required local and state licensure for operating a cosmetology or nail care business.
12. Explain processes for obtaining a lease, purchasing a building, renting a booth, and designing the layout of a salon.
13. Demonstrate the process of maintaining accurate business records, developing and retaining clients, employing marketing strategies, and exhibiting employee management skills.

Chemistry and Electricity

14. Describe cosmetology procedures and practices that require a basic knowledge of chemistry and electricity.

Advanced Haircutting

15. Demonstrate various haircutting elevations utilizing appropriate tools and implements.

Trichology

16. Demonstrate proper care of the scalp and hair.

Hair Design Techniques

17. Design thermal curling, finger waves, pin curls, roller control, and blow drying for each type of hair texture.
 - Identifying facial and head shapes and contours

Chemical Services

18. Identify structural changes that occur during permanent waving, chemical relaxing, and hair coloring.
19. Demonstrate procedures for performing permanent waving, chemical relaxing, and hair coloring.

Nail Salon Services

20. Exhibit appropriate use of implements, cosmetics, and materials used in performing nail services.
21. Demonstrate advanced techniques in performing manicure, pedicure, and artificial nail services.
 - Practicing massage therapy
22. Justify regular rebalance procedures and repairs for damaged nails.

Storyboarding

Storyboarding is a one-credit course that provides students with the opportunity to visually illustrate and communicate ideas, themes, locations, and emotions. Storyboards are created through a variety of electronic, traditional, and digital media. Successful completion of this course prepares students for the Animated Filmmaking course and entry-level careers in storyboarding. Introduction to Animation and Visual Communication, Animation Layout, or a satisfactory portfolio review by the instructor are prerequisites for this course.

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Safety

Students will:

1. Apply laboratory safety rules, regulations, and procedures in storyboarding.

Orientation to Skill Program

2. Describe the use of storyboards in the animation industry.

Visual Development

3. Create story panels using design elements and organizational principles for visual arts to communicate a story idea.
 - Analyzing a story for story elements and mechanics
 - Researching a variety of environments and styles of storyboarding
 - Identifying design elements and principles for various character personalities in storyboarding

Storyboard Planning and Production

4. Solve visual arts problems in storyboarding.
5. Use a variety of media to communicate an idea, theme, and emotion in a storyboard.
Examples: camera shots and perspective, camera movements for interest or story
 - Using elements of art and principles of design that create areas of focus and interest in visual works
 - Using principles of animation to produce rough story panels
 - Producing story panels for public display and critique
 - Demonstrating reflection and self-criticism in finished storyboards

Animation Technology

6. Use technology resources to facilitate problem solving, critical thinking, decision making, and creativity in storyboarding.
 - Editing animation with technology for clarity and entertainment
 - Recording animation with technology for visual review
 - Creating animation from storyboards using technology

Structural Analysis and Damage Repair

This is a one-credit course that provides students with classroom and laboratory instruction in methods of determining structural misalignment and the processes used to effect repairs. Emphasis is placed on methods, techniques, and equipment employed in the inspection, measurement, and repair of automotive structures, including frame and body and glass components. Upon successful completion of the course, students locate, identify, and repair structural components to factory specifications. This course incorporates all personal and environmental safety practices associated with clothing; respiratory protection; eye protection; hand tools; power equipment; proper ventilation; and the handling, storage, and disposal of chemicals and materials in accordance with local, state, and federal safety and environmental regulations.

This course incorporates current guidelines and standards set forth by the Automotive Service Excellence (ASE) and the National Automotive Technicians Education Foundation (NATEF), including any updates or changes. Content standards provide students with information regarding task lists, tools and equipment, program hours, laboratory operation, and safety standards.

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Safety Precautions

Students will:

1. Demonstrate personal and environmental safety practices for basic vehicle damage repair, including clothing, eye protection, hand tools, power equipment, and proper ventilation.

Frame Inspection and Repair

2. Diagnose structural damage to conventional frame structure using tram and self-centering gauges to determine corrective action.
3. Demonstrate procedures involved in conventional frame repair.
Examples: attaching the vehicle to anchoring devices; straightening mash, sag, sideway, twist, and diamond damage

Unibody Inspection, Measurement, and Repair

4. Diagnose structural damage to a unibody frame structure using tram and self-centering gauges to determine corrective action.
5. Demonstrate proper procedures involved in unibody frame repair.
Examples: attaching the vehicle to anchoring devices; straightening mash, sag, sideway, twist, and diamond damage

Fixed Glass

6. Demonstrate proper procedures for removing, reinstalling, and replacing fixed and modular glass.

Structural Drafting

This course provides instruction regarding the theory and practical applications necessary to understand the basic design and terminology of structural steel components used in commercial buildings. Emphasis is placed on structural steel drafting techniques practiced by local industry. Upon successful completion of this course, students produce engineering and shop drawings, incorporating standard shapes, sizes, and details using the American Institute of Steel Construction (A.I.S.C.) manual.

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Orientation

Students will:

1. Relate the importance of structural steel detailing to the current technological work force.

Applied Mathematics for Structural Drafting

2. Demonstrate mathematics skills related to structural drafting technology, including calculating with fractions, reading scales, converting customary to metric and metric to customary measurements, and solving higher-order mathematics problems.

Industry Competencies

3. Identify structural steel shapes and properties.
4. Identify structural steel drafting terms, symbols, and abbreviations.
5. Identify welding symbols and annotations on structural steel detail and plan drawings.
6. Explain dimensions and notations on structural steel fabrication drawings.

Structural Steel Plans

7. Create structural steel framing drawings from an architectural sketch.

Structural Steel Details

8. Create structural steel detail connection drawings from an architectural sketch.

Structural Steel Sections

9. Produce structural steel framing sections and elevations from an architectural sketch.
 - Demonstrating the application of standard architectural and engineering scales and dimensions to structural steel details

Materials List

10. Create a materials list of structural steel components taken from structural steel plans.
 - Calculating length, area, and weight

Studio and Portfolio

Studio and Portfolio is a one-credit course that provides students with the opportunity to create a wide variety of art projects utilizing traditional and electronic portfolio presentations. Instruction allows students to focus on safety, studio projects, portfolio organization, and exhibitions in environment design. Students plan and execute a public showing of their portfolios, which involves preparing their work for presentation; selecting a date from a given timeline to exhibit, design, print, and mail invitations; and preparing a reception. They are encouraged to participate in a variety of local, state, and national contests and scholarship and volunteer programs to enhance portfolios and broaden experiences. This course prepares students for postsecondary education and entry-level positions in the area of advertising design. Introduction to Advertising Design, Digital Design, and Graphic Illustration are prerequisites for Studio and Portfolio.

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Safety

Students will:

1. Apply personal and shop safety rules, regulations, and procedures for producing, collecting, storing, and presenting visual data files.

Advertising Design

2. Create advertising design campaigns.
 - Solving advanced design problemsExamples: book jacket cover, product advertisement for a magazine

Corporate Design

3. Design corporate identities, including logo development, annual report design, and signage.

Portfolio Development

4. Organize a portfolio of professional quality works of graphic designs.
 - Preparing graphic designs for exhibit and display
Examples: matting, mounting, shrink-wrapping
 - Utilizing the digital camera to record and prepare works of graphic designs for presentations
 - Organizing an electronic portfolio

Senior Exhibit

5. Organize an exhibition, including publicizing and composing an exhibition statement.
Examples: invitation, register, e-vite, menu, thumbnail sheet

Support Services

Support Services is a one-credit course that introduces students to occupations and functions involving the direct or indirect care of clients through the creation of a therapeutic environment for providing care. This course is designed to provide the local education agency flexibility to meet health care demands in the community. Students are introduced to careers in support services and therapeutic services including, but not limited to, environmental health and safety technician, material agent, transport technician, epidemiologist, environmental services manager, industrial hygienist, and materials manager. Rigorous coursework and work-based experiences are key components of this course.

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Career Opportunities

Students will:

1. Compare roles and responsibilities of personnel in support services careers.

Legal and Ethical Implications

2. Determine legal and ethical behaviors necessary in support services.
3. Summarize quality management skills.
Examples: calibrating intravenous machines, calibrating blood pressure machines

Aseptic Procedures

4. Demonstrate decontamination techniques and procedures.
Examples: sterilizing, terminal cleaning

Safety

5. Identify safe practices required for support services.
Examples: following hazardous waste disposal policies and procedures, evaluating methods of infection control, demonstrating proper handling and storage of sterile and non-sterile items

Resource Management

6. Evaluate purchasing and distribution processes used in purchasing resources for support services.
Examples: bids, contracts, purchase orders, invoices, inventory records
7. Describe preventive maintenance systems for buildings, equipment, parts, supplies, and utilities.

Aesthetics

8. Analyze therapeutic and functional aspects of color décor and furnishings for a therapeutic setting.
9. Determine the importance of maintaining the support services facility and equipment.

Tailoring

Tailoring is a one-credit course. The prerequisite for this course is Tailoring Basics. This course is designed for students interested in exploring fashion and pattern making, garment alterations, fashion collection, laundry and dry cleaning, sales and services, and career options in the tailoring business.

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Fashion and Pattern Making

Students will:

1. Compare the construction, fitting, and finishing of sample garments in various fabrics.
2. Analyze the history of fashion design to determine fads and trends that impact custom tailoring of garments.

Garment Alterations

3. Utilize appropriate tailoring techniques and processes to alter, repair, and customize apparel products.
4. Analyze fit of garment to determine necessary alterations.
5. Identify information and standard alteration symbols included on tailoring alteration tags.

Fashion Collection

6. Sketch garment details for use in customizing or altering garments.
 - Altering fashion design using various fabrics and trimmings
 - Combining various fabric textures and patterns
7. Create a collection of garments by draping various fabrics.

Laundry and Dry Cleaning

8. Define terms commonly used in commercial textile and apparel care.
Examples: enzymes, surfactants, biodegradable
9. Identify equipment and supplies and the use of each in textile and apparel care.
10. Practice commercial care of textile and apparel products, including dry-cleaning, laundering, and pressing.

11. Analyze characteristics of textile and apparel products to meet product specification.

Sales and Service

12. Describe routine tasks performed in a tailoring business.
Examples: opening and closing, receiving and handling cash, creating work orders, housekeeping, staffing
13. Organize an inventory of supplies, notions, fabrics, equipment, and tools.
14. Analyze policies for dealing with customer complaints to achieve customer satisfaction.
15. Determine the impact of technology on the management and operations of a tailoring business.

Business Practices

16. Determine fiscal management factors related to the tailoring business.
17. Demonstrate business practices required to operate a tailoring business, including determining prices; collecting payment; keeping customer job books; utilizing bookkeeping and accounting practices; and writing sales receipts, purchase orders, and invoices.

Tailoring Basics

Tailoring Basics is a one-credit course that serves as the foundation course for the Personal Care Services pathway. The course is designed for students interested in careers in tailoring. Course content provides opportunities for students to explore equipment care and safety, garment measuring, pattern drafting and draping, garment construction, and facets of the apparel and textiles industries.

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Basics

Students will:

1. Explain the use and care of basic hand tools and notions used in tailoring.
Examples: needles, thread, beeswax, pins, chalk
2. Demonstrate basic hand-stitching skills used in shops and design houses.
Examples: basting stitch, backstitch, cross-stitch, felling stitch, modified backstitch, serging stitch
3. Apply principles of design in selecting and designing clothing and accessories.
 - Using specialty fabrics for tailoring projects

Equipment Care and Safety

4. Operate industrial and general-purpose sewing machines used in a tailoring business.
 - Identifying attachments for various sewing machines
5. Demonstrate pressing techniques.
 - Demonstrating safe use and care of equipment used in tailoring
6. Utilize technology and information technology that impacts tailoring and the tailoring business.

Garment Measuring

7. Demonstrate correct measuring procedures for fitting, altering, and customizing apparel.
 - Utilizing measuring and cutting tools, equipment, and supplies used for altering, repairing, and customizing apparel

Textiles and Apparel

8. Describe origins, properties, qualities, and drapability of natural and manufactured fabrics.

9. Analyze fabric finishes for use, appearance, and performance to determine the appropriate finish for tailoring specific garments.

Patterns

10. Compare differences in pattern drafting and pattern draping.
11. Explain how pattern size is determined.
12. Compare the use of printed patterns to draping.
13. Explain correct procedures for fitting and altering garments.
 - Identifying characteristics for proper fitting garments

Garment Construction

14. Construct a variety of garments including slacks, vests, skirts, shirts, and jackets.

Business Basics

15. Analyze the organizational structure of a tailoring business for its systematic performance and practice of ethical and legal responsibilities.
16. Demonstrate effective communication skills used to enhance customer relationships.
17. Practice safe and healthy standards in operating a tailoring business.
 - Applying proper responses to emergency situations
 - Identifying ways to prevent safety hazards
18. Explain the importance of goal setting and teamwork in the operation of a tailoring business.
19. Create a budget for personal financial stability.
20. Determine factors to consider in developing an effective career plan and procedures for obtaining employment in tailoring.

Teaching I

Teaching I is a one-credit course. The prerequisite for this course is Education and Training. Content includes information to help students implement the teaching and learning processes. Major topics are funding sources, budget preparations, legal aspects, research, teaching and learning theories, curriculum development, positive learning environments, creative teaching techniques, appropriate learning activities, instructional resources, community resources and services, scope and sequence charts, course outlines, lesson plans, testing, grading, developing partnerships, technology, and careers. School-based laboratory experiences are essential for students to develop skills in teaching. Observational experiences are a required component of this course.

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Funding and Legal Aspects

Students will:

1. Create a classroom budget utilizing funds allocated for use in the classroom.
2. Explain legal aspects of teaching.
Examples: teaching certification, tenure, accountability, liability for negligence

Learning Environment

3. Demonstrate motivational techniques used to enhance student achievement at various grade levels.
4. Determine characteristics of a positive learning environment.

Teaching and Learning

5. Assess interests and needs of students to determine instructional goals, objectives, and teaching strategies.
6. Evaluate instructional resources and materials based on rigor and relevance of content, grade level, reading level, and needs of students.
Examples: technological tools and equipment
7. Describe learning and developmental theories relative to individual student characteristics.
8. Determine teaching strategies needed to meet instructional goals and to address educational initiatives.

9. Create learning activities designed to meet instructional goals and to address educational initiatives.
10. Compare grading practices used to assess student achievement.
11. Identify stakeholders that partner to enhance the instructional program.
12. Describe community resources and services that may enhance the instructional program.
13. Describe assessment theories used in evaluating students.

Curriculum Development

14. Describe levels in which curriculum is developed for classroom instruction.
Examples: state, local, program, course, unit, daily
15. Analyze curriculum development for factors that impact the process.
16. Describe steps in curriculum development.
Examples: conducting research, planning of instruction, presenting lessons, evaluating instruction, revising instructional plans
17. Develop scope and sequence charts, course outlines, unit plans, and lesson plans.
18. Practice teaching a lesson plan.

Professionalism

19. Recognize characteristics of professionalism in the educational workplace.
20. Compare purposes of professional organizations in the field of education.

Teaching II

Teaching II is a one-credit course. The prerequisite for this course is Teaching I. Content provides students with advanced knowledge and skills used in the education field. Concepts of legal aspects of education, instructional resources, motivation, types of assessments, constructing texts, positive learning environments, lesson planning and teaching for various areas and grades, reading level of instructional materials, classroom management strategies, partnerships, public relations, professional associations, technology, and careers are included in the course. Observational experiences are a required component of this course.

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Instructional Program

Students will:

1. Develop a personal philosophy of education.
2. Critique research studies to identify effective teaching and learning practices.
3. Describe the importance of evaluating the instructional climate of a learning community.
4. Describe motivational techniques that enhance student achievement.
5. Determine the reading level of various instructional materials.
6. Determine classroom management strategies used at various grade levels.

Lesson Plans

7. Develop scope and sequence charts, course outlines, unit plans, and lesson plans for a specific subject matter and grade level.
8. Practice teaching a lesson plan for a specific subject and grade level.
9. Design instructional resources for a specific subject and grade level to meet specific instructional goals and educational initiatives.

Assessment

10. Determine types of assessments used in evaluating student achievement.
Examples: true-false, multiple-choice, matching, essay, short answer, project, skills tests, portfolio, self-tests
11. Explain steps in constructing assessments.
12. Describe assessments for specific knowledge and skills in a specific subject and grade level, including criterion-referenced, norm-referenced, rubric, formative, and summative.

Public Relations

13. Identify community partnerships that enhance instructional programs at various levels.
14. Describe a public relations program that promotes classroom and school support.

Professionalism

15. Determine characteristics of professionalism in the educational workplace.
16. Compare purposes of professional organizations in the field of education.

Technology and Careers

17. Describe technology used to organize and manage the instructional program.
18. Analyze career options and entrepreneurial opportunities related to the teaching field.

Teen Connections

Teen Connections is designed for students in Grade 8. Teen Connections may be taught as a 70- or 140-hour course. For a 70-hour course, content standards 1, 2, 3, 5, 8, 9, 13, 14, 16, 18, and 20 must be taught. Topics focus on teen connections in the home, school, and community. Course content provides opportunities for students to explore personal development; the impact of values, goals, decision making, and time management; conflict resolution; identifying family structures; member's roles and responsibilities; changes and challenges faced throughout the family life cycle; health, wellness, and a healthy appearance; money management and teen consumer decisions; teen clothing decisions; stages of child development; first aid techniques; organizing and maintaining teen living space; home safety; technology; and skills needed for workplace success.

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Personal Connections

Students will:

1. Describe how physical, social, emotional, and intellectual changes that occur during adolescence affect self-esteem and self-concept.
2. Analyze interpersonal skills needed by teenagers for success in the home, school, and community, including respecting self and others, resolving conflict, responding to peer pressure, and communicating with others.
3. Explain the impact of values, goals, and decision making on teenagers.
4. Demonstrate socially acceptable behavior of teenagers, including practicing manners, etiquette, and grooming habits.
5. Identify various family structures.
Examples: nuclear, blended, extended, single-parent
 - Recognizing how individual roles and responsibilities in the home contribute to family well-being
 - Describing changes and challenges faced throughout the family life cycle
6. Describe the importance of teen development of time management skills.

Food and Wellness Connections

7. Evaluate the relationship among nutrition, exercise, and rest in maintaining wellness.
 - Identifying health hazards susceptible to teens
 - Identifying safe methods for teens to maintain an optimum weight

8. Demonstrate the ability to select, store, prepare, and serve nutritious foods.
 - Exhibiting safe and correct use of kitchen equipment
 - Applying safety and sanitation procedures in food preparation
 - Utilizing guidelines for table setting

Consumer Connections

9. Explain the importance of money management for teens.
 - Creating a budget for teen expenditures and savings
10. Critique factors that influence individual and teen consumer decisions, including needs and wants, budget limitations, and quality of products.
 - Describing store policies affecting teen consumers
 - Explaining ways to resolve teen consumer problems
11. Describe strategies for comparison shopping among teens.

Clothing Connections

12. Describe influences of style, fads, and fashion trends in clothing selection of teenagers.
13. Demonstrate basic sewing construction skills to complete a project.
 - Utilizing sewing equipment in a safe and correct manner
14. Explain ways to maintain and care for clothing.
 - Demonstrating simple clothing repairs

Child Care Connections

15. Compare stages of child development.
 - Identifying age-appropriate child care skills
 - Developing a list of responsibilities for a caregiver
 - Analyzing ways to guide the behavior of children
16. Explain ways to handle emergencies, including first aid techniques for children.

Housing Connections

17. Demonstrate methods to maintain a clean home.
 - Identifying home sanitation, safety, and security practices
 - Developing a first aid, fire, and weather home-safety plan
18. Demonstrate strategies used for the selection and arrangement of furniture and accessories in a teenager's living space.

Technology and Career Connections

19. Describe the impact of technology on individuals and families.
20. Describe career skills needed for the workplace, including time management and teamwork.
Examples: interview skills, completion of job applications

Teen Discoveries

Teen Discoveries is an exploratory course for Grade 7 students. Teen Discoveries may be taught as a 35-, 70-, or 140-hour course. It may be offered as a component of a rotation course allowing students to explore different career fields. If a course contains two 70-hour rotations, content standards 3, 4, 5, 6, 7, 8, 11, 13, 15, 17, and 20 must be taught. If a course contains four 35-hour rotations, content standards 3, 6, 8, 13, 15, and 20 must be taught.

Emphasis is placed on understanding the physical, intellectual, emotional, and social development of teenagers. Course content provides opportunities for students to explore decision making, problem solving, and goal setting; development of manners, grooming habits, and character education; social and communication skills; interpersonal relationships with family members, friends, and peers; family roles and responsibilities; peer pressure; clothing selection and care; babysitting; arrangement of living space; food choice, food preparation and development of health and wellness habits; technology; and career awareness.

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Personal Discoveries

Students will:

1. Describe physical and emotional changes that occur during adolescence.
2. Describe the process of decision making, problem solving, and goal setting.
3. Explain the importance of character education for teenagers.
 - Describing manners used in various settings
 - Identifying grooming habits that lead to a healthy appearance
 - Describing ways to show respect for self, others, and property
4. Compare verbal and nonverbal communication skills used to improve interpersonal relationships.
 - Determining barriers to teen communication
5. Describe characteristics of healthy relationships with family and friends.
 - Explaining the role of family members and friends
 - Describing the significance of family traditions
 - Determining qualities of a true friend
6. Compare positive and negative peer pressure.

Examples: positive—involving friends in community service, tutoring peers
negative—bullying, teasing, gossiping

 - Determining causes of teen conflict

Food and Wellness Discoveries

7. Explain the importance of diet, exercise, and rest for teen health.
8. Prepare nutritious snacks.
 - Practicing safety and sanitation techniques in the laboratory
 - Using kitchen equipment in a correct manner
 - Comparing the nutritive value and cost of various foods
9. Demonstrate basic table-setting skills.

Consumer Discoveries

10. Describe ways teenagers can become wise consumers.
Examples: savings, needs versus wants, conserving resources and energy
 - Identifying the role of media in the dissemination of consumer information
11. Describe time management tools and techniques.

Clothing Discoveries

12. Determine factors that influence teen clothing selection.
Examples: individualism, trends, cost, maintenance
13. Practice basic sewing skills.
 - Utilizing sewing equipment in a safe and correct manner
14. Describe appropriate care of clothing.
 - Identifying laundering techniques
 - Explaining how to store clothes properly

Child Care Discoveries

15. Explain responsibilities involved in babysitting related to age, safety, and health of the child.
16. Describe the importance of play to child development.

Housing Discoveries

17. Explain how housing meets the needs of individuals and families.
 - Describing ways to arrange or organize teen living space
18. Determine procedures for basic household maintenance and safety.

Technology and Career Discoveries

19. Determine ways technology improves and impacts the lives of teens.
20. Describe factors that impact choosing a career.

Television Production—Photography and Editing

Television Production—Photography and Editing is a one-credit course that provides students with a variety of real-world learning opportunities through laboratory experiences in photography and editing. Students perform specialized roles in a regularly scheduled television program together with students specializing in Television Production—Writing, Producing, and Performing, and Television Production—Studio Operations. Students who successfully complete this course are prepared for Advanced Television Production; further study at the college level; or for entry-level positions in television, film, and communications industries. The prerequisite for this course is Introduction to Television Production.

Career and technical student organizations are integral, cocurricular components of each career and technical education course. These organizations serve as a means to enhance classroom instruction while helping students develop leadership abilities, expand workplace-readiness skills, and broaden opportunities for personal and professional growth.

Safety

Students will:

1. Use safety skills associated with photography and editing in television production.

Ethics and Practices

2. Apply aspects of photography and editing to television information-gathering techniques.
Examples: video and audio consent, fact confirmation, Internet use, copyright laws
3. Differentiate among styles of television photography and editing.
Examples: informative, entertaining, sensational
4. Utilize photographer and editor public relations skills.
Examples: positive attitude, polite demeanor, effective listening techniques
5. Describe ethical decisions made by the photographer and editor in television production.
Examples: shot selection, sound bite editing, abiding by libel laws, seeking formal permission

Photography and Editing

6. Demonstrate teamwork as a photographer and editor.
Examples: creative content input, team critiques
7. Combine basic setup, picture composition, and camera movement for a field camera operation.
8. Demonstrate studio camera operation.

9. Utilize basic audio and lighting techniques.
10. Demonstrate advanced editing skills using linear and nonlinear editing equipment, including the use of control track, time code, and audio postproduction.
11. Solve photography and editing problems in a regularly scheduled television program.
12. Compare photography and editing career options.
Examples: photographer, editor, filmmaker, director

Television Production—Studio Operations

Television Production—Studio Operations is a one-credit course that provides students with opportunities to participate in real-world laboratory experiences. They perform specialized roles in a regularly scheduled television program with students specializing in Television Production—Writing, Producing, and Performing and Television Production—Photography and Editing. Students who successfully complete this course are prepared for Advanced Television Production; further study in television, film, and communications industries at the college level; or for entry-level positions in television, film and communications industries. The prerequisite for this course is Introduction to Television Production.

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Safety

Students will:

1. Use safety skills associated with television production studio operations.

Ethics and Practices

2. Apply aspects of studio operations to television information-gathering techniques.
Examples: live truck, satellite feeds, tape and digital video files
3. Differentiate among television studio operation styles.
Examples: informative, entertaining, sensational
4. Utilize proper studio operations public relations skills.
Examples: clear headset communication, positive attitude, polite demeanor
5. Demonstrate ethical behavior for studio operations.
Examples: video and audio decisions, monitoring content, libel laws

Studio Operations

6. Demonstrate desirable leadership skills as a studio operations team member.
Examples: creating show rundown, giving and following directions, participating in team critiques
7. Solve simple lighting, audio, video, set design, and studio production problems.
8. Utilize a character generator and special effects generator during a production.
9. Select necessary controls on a master switcher during a television production.

10. Utilize an audio mixer during a television production.
11. Demonstrate studio operations skills in a regularly scheduled television program.
12. Compare career options for the studio operations industry.
Examples: director, lighting technician, operations manager, technical engineer, satellite or microwave live truck operator

Television Production—Writing, Producing, and Performing

Television Production—Writing, Producing, and Performance is a one-credit course that provides students with a variety of real-world learning opportunities through laboratory experiences in television writing, producing, and performing. Students perform specialized roles in a regularly scheduled television program along with students specializing in Television Production—Studio Operations and Television Production—Photography and Editing. Students who successfully complete this course are prepared for Advanced Television Production; further study in television, film, and communications at the college level; or for entry-level positions in television, film, and communications industries. The prerequisite for this course is Introduction to Television Production.

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Safety

Students will:

1. Use safety skills associated with writing, producing, and performing roles in television production.

Ethics and Practices

2. Apply aspects of writing, producing, and performing to television information-gathering techniques for a studio production.
Examples: video and audio consent, fact confirmation, Internet use, copyright laws
3. Differentiate among television styles of writing, producing, and performing.
Examples: informative, entertainment, sensational
4. Utilize correct writing, producing, performing, and public relations skills for television production.
Examples: positive attitude, polite demeanor, listening techniques
5. Demonstrate ethical behavior of a television writer, producer, and performer.
Examples: presenting unbiased content, verifying accuracy in subject matter, seeking formal permission, adhering to libel laws

Writing, Producing, and Performing

6. Demonstrate teamwork as a writer, producer, and performer.
Examples: giving and following instructions, initiating participation, engaging in team critiques, organizing content

7. Use standard interviewing skills.
Examples: question formation, preinterview techniques, interview evaluation
8. Utilize proper format, style, and content organization for television writing techniques.
9. Apply on-camera performance skills to obtain desired results.
Examples: clear speech, diction, eye contact, posture, gestures, appearance
10. Organize television content, including time management and assignment editing.
11. Use writing, producing, and performing skills in a regularly scheduled television program.
12. Compare career options in television production, including writing, producing, and performing for a career specialization.
Examples: reporter, producer, anchor, writer, actor, researcher, assignment editor, promotions editor

Therapeutic Services

Therapeutic Services is a one-credit course designed to inform students of the rapid changes in business and industry through a rigorous array of coursework and work-based experiences that prepare them for advanced learning and a wide range of health career opportunities. This course is designed to provide the local education agency flexibility to meet health care demands in the community. Students are introduced to careers in therapeutic services including, but not limited to, nursing, medicine, physical therapist, surgical technologist, respiratory therapist, emergency medical technician, and others.

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Career Opportunities

Students will:

1. Explain the historical perspective of selected therapeutic services careers.
2. Compare roles and responsibilities of personnel in therapeutic services careers.
Examples: job description, salary, education and training, occupational outlook

Legal and Ethical Implications

3. Describe legal and ethical behaviors required in therapeutic services careers.

Anatomy

4. Identify human structures and functions as they relate to therapeutic services.
Examples: respiratory system—maintaining an open airway
musculoskeletal system—range-of-motion exercises
5. Assess safe practices necessary in therapeutic services.
Examples: evaluating scene, lifting and moving client, using standard precautions
6. Calculate mathematics operations used in therapeutic services.
Examples: metric system conversion, oxygen tank time
7. Identify common medications used in therapeutic services careers.
Examples: diuretics, antibiotics, bronchodilators
8. Demonstrate clinical and technical skills necessary in therapeutic services.
Examples: cardiopulmonary resuscitation (CPR), vital sign monitoring, bed-making, crutch-walking

9. Identify diseases and disorders commonly associated with therapeutic services careers.
Examples: chronic obstructive pulmonary disease (COPD), asthma, congestive heart failure (CHF), diabetes
10. Utilize technology in a therapeutic services career setting.
Examples: computer, fax machine

Three-Dimensional Solid Model Design I

Three-Dimensional Solid Model Design I is a one-credit course intended to introduce students to three-dimensional modeling utilizing three-dimensional capabilities of computer-aided design (CAD) software. Emphasis is placed on working planes, profile creation, protrusions, extrusions, and rendering techniques. Students create two-dimensional part drawings relative to three-dimensional models. The prerequisite for this course is Intermediate Drafting Design.

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Solid Model Commands

Students will:

1. Identify three-dimensional modeling commands necessary to complete a three-dimensional solid model design.
Examples: protrude command, revolved protrusion command

Three-Dimensional Planes

2. Identify three-dimensional working planes for part sketching and profile creation.
 - Demonstrating how to attach additional working planes
Examples: parallel, inclined, perpendicular

Part Creation

3. Construct a three-dimensional model by selecting working planes, creating profiles for protrusion and extrusion, and utilizing rendering commands.

Part Features

4. Utilize commands to add features to three-dimensional models.
Examples: constructing holes, adding fillets and rounds, applying cutouts, chamfering edges

File Transitions

5. Demonstrate operations needed for converting a three-dimensional model to a two-dimensional parts drawing, including all dimension notes and other relative information.
 - Creating drawings that may incorporate primary views, sections views, and auxiliary views

Two-Dimensional Part Drawing

6. Arrange primary views, including all dimensions, notes, and other relative information needed to complete a two-dimensional drawing for production.

Examples: specifying sheet size, editing drawing information, revising drawing

Three-Dimensional Solid Model Design II

Three-Dimensional Solid Model Design II is a one-credit course intended for advanced students in three-dimensional modeling. Emphasis is placed on assembly, animation, and sheet metal concepts. Students organize and develop a career-related project based on current research and design practices. The prerequisite for this course is Three-Dimensional Solid Model Design I.

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Multipart Assembly

Students will:

1. Create a three-dimensional assembly with clearances to ensure complete functionality.
 - Describing the application of part constraints to a three-dimensional assembly

Animation

2. Create a three-dimensional animation presentation with computer-generated models and drawings.
 - Defending a three-dimensional animation presentation

Sheet Metal

3. Create sheet metal models and flat pattern drawings, including the specification of relief settings and creation of a flat pattern.

Career Readiness Project

4. Develop a career-related project based on current research and design.
Examples: research—use of the Internet
preparation—creation of three-dimensional models based on current industry needs
presentation—use of a computer software application to organize a presentation of the project

Transportation, Distribution, and Logistics

Transportation, Distribution, and Logistics is a one credit-course designed to equip students with basic knowledge of the profession, including foundational skills and safety for personal and environmental practices. Students investigate various topics related to this field with emphasis on rules and regulations, ethics, job opportunities, career development, and associated terminology. Students enhance communication skills by working with others on a professionally oriented team.

Students develop foundational skills, including locating technical information, technical writing, and solving related mathematics problems with technical applications. Additionally, students apply problem-solving and critical-thinking skills.

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Introduction

Students will:

1. Summarize purpose, rules, and regulations relative to the transportation, distribution, and logistics industries.
 - Discussing ethical and legal responsibilities for the industry
2. Explain job opportunities related to the transportation, distribution, and logistics industries.
 - Explaining the organizational structure of companies within the fields of automotive service, automotive collision repair, diesel, aviation, marine, and power equipment technology
3. Explain factors involved in developing an effective career plan for the transportation, distribution, and logistics.
 - Demonstrating appropriate procedures for obtaining employment in the industry
Examples: job applications, résumés, interviews
4. Apply terminology associated with the transportation, distribution, and logistics industries.

Safety

5. Demonstrate personal and environmental safety practices for the transportation, distribution, and logistics industries associated with clothing; eye protection, hand protection; proper lifting techniques; hand tools; power equipment; proper ventilation; and the handling, storage, and disposal of fuels, chemicals, and materials in accordance with federal, state, and local regulations.

Foundational Skills

6. Demonstrate technical tasks associated with the transportation, distribution, and logistics industries, including locating information in technical manuals, practicing technical writing skills, and solving mathematics problems to complete technical applications.
7. Apply problem-solving and critical-thinking skills by organizing technical information for scripting a transportation, distribution, and logistics document.
Examples: work orders, technical service bulletins, flat-rate manuals
8. Interpret technical information relating to job performance
9. Demonstrate communication skills related to the transportation, distribution, and logistics industries.
10. Demonstrate financial literacy competencies through real-world activities in the transportation, distribution, and logistics industries.

Technology Applications

11. Utilize information technology tools to access, manage, and integrate information.
 - Identifying technological advancements that enhance the industry

Student Organization

12. Demonstrate leadership and teamwork skills gained through student organization activities.

Tools and Equipment

13. Demonstrate use of various types of tools and equipment used in the transportation, distribution, and logistics industries.

Travel and Tourism I

Travel and Tourism I is a one-credit course. The prerequisite for this course is Hospitality and Tourism. Topics focus on the development, research, packaging, promotion, and delivery of traveler experiences that may include creating guide books, planning trips and events, managing customer travel plans, or overseeing a convention center.

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Introduction to Travel and Tourism

Students will:

1. Explain growth and trends of the travel industry.
2. Discuss cultural, environmental, and social factors that impact the travel and tourism industry.
3. Apply information regarding time zones, geographic areas, seasons, and climate to the travel itinerary for clients.
4. Compare client needs, wants, and expectations to the travel product to integrate intangible and discretionary travel options.
5. Recognize differences in language, culture, and currency exchange when planning travel for clients.
6. Describe technology utilized for the travel and tourism industry.
7. Determine career and entrepreneurial opportunities and credentialing requirements related to the travel and tourism industry.
8. Define travel and tourism terminology, including tour guides, escorts, group leaders, and independent travelers.
9. Determine key factors in building a clientele for a travel business.
10. Compare cruise, surface transportation, and air transportation industries.

Economics of Travel and Tourism

11. Distinguish among roles of government, public, and private sectors in domestic and international travel, including government agencies, regulations and policies, and international agreements between the United States and other countries.
12. Explain economic concepts as they relate to the travel and tourism industry.

Marketing of Travel and Tourism

13. Describe concepts of packaging, pricing, target marketing, and distribution of products and services in the travel and tourism industry.
14. Determine strategies for sales promotion, merchandising, and advertising.
15. Evaluate various communication techniques and media venues for the purpose of selecting the most effective manner to convey information to a target audience.

Management and Operations of Travel and Tourism

16. Analyze the role and responsibilities of the travel counselor.
 - Describing types of travel providers and services offered
17. Identify organizational skills necessary to operate a travel and tourism business, including the development of schedules, cost computations, and distance and time factors.

Safety and Security of Travel and Tourism

18. Describe safety hazards and natural disaster emergency situations that may affect client travel, including collecting safety and security information relevant to client area of travel and tourism.

Legal Issues of Travel and Tourism

19. Describe how the workplace has changed as a result of legislation.
Examples: sexual harassment, homeland security, employee testing

Travel and Tourism II

Travel and Tourism II is a one-credit course. The prerequisite for this course is Travel and Tourism I. Topics focus on economics, marketing and operations, admissions, safety and security, and local and regional tourism markets.

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Economics and Travel and Tourism

Students will:

1. Summarize the economic impact of business and pleasure in the tourism industry.
2. Explain the importance of forecasting travel and tourism data.
3. Describe the scope of the attractions industry.
4. Analyze diverse transportation, lodging, cruise, attraction, and food service options to produce a customized travel package.

Management of Travel and Tourism

5. Compare maintenance issues related to recreation, amusement, sports, and attractions industries.
6. Describe procedures for selecting, promoting, and conducting specialty tours for clients.
7. Describe admission and traffic control procedures used in the tourism industry.
Examples: admission—tickets, membership
traffic control—managing large groups, parking vehicles

Marketing of Travel and Tourism

8. Describe the impact of market segmentation, seasonality, and collaboration with other entities on designing marketing plans for the tourism industry.
9. Analyze different venues in hospitality and tourism with regard to merchandizing programs and products.
10. Critique other industries that have products or services relevant to a tourism package to gain awareness of their role and the tourism provider's role in delivering a seamless product to a client.

11. Explain community elements essential to maintain cooperative travel and tourism development.
12. Critique various market subsectors and general interests of each to design travel and tourism promotional packages.
13. Evaluate various communication techniques and media venues for the purpose of selecting the most effective manner to convey information to a target audience, including the prospective customer, the general public, a disgruntled customer, or a special needs population.
14. Explain concepts and techniques of selling products and services in the travel and tourism industry.

Safety and Security of Travel and Tourism

15. Organize safety and security information for individuals and groups in multiple environments to minimize risks, including political and social climate of an area, possible natural environmental hazards, health hazards, and terrorism emergency situations.

Legal Issues of Travel and Tourism

16. Describe legal implications and regulations of travel agents.

Technology

17. Develop content for a service-based Web site.
18. Explain technical systems utilized in travel and tourism.
Examples: global distribution system, computer reservation system

Two- and Four-Stroke Engines

Two- and Four-Stroke Engines is a course designed to prepare students for entry-level employment or advanced training in the power mechanics field. Topics include career opportunities, safety, tools, four-stroke cycle engines, two-stroke cycle engines, cooling systems, preventive maintenance, engine overhaul, and exhaust systems.

Content standards for this course are not intended to serve as the entire curriculum. Teachers are encouraged to expand the curriculum beyond these minimum required content standards to accommodate specific community interests and utilize local resources. This course encourages critical thinking, use of the scientific method, integration of technology, development of student leadership skills, and application of knowledge and skills related to practical questions and problems. Safety concepts are integrated into instruction to the maximum extent possible.

This course may be taught as a one-credit or half-credit course. For a half-credit course, content standards 1, 2, 3, 4, 5, 8, 9, 14, 15, and 16 must be included.

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Career Opportunities

Students will:

1. Compare job characteristics of various career opportunities in the power equipment industry.

Safety

2. Demonstrate safety concepts required for performing maintenance on small engine systems.

Tools

3. Identify specific tools used on small engines.

Four-Stroke Engines

4. Explain the theory of operation for four-stroke engines.
5. Identify parts of a four-stroke engine.
 - Diagnosing mechanical system problems in a four-stroke engine
 - Solving mechanical system problems in a four-stroke engine

6. Explain how the ignition system works in four-stroke engines.
 - Diagnosing ignition system problems in a four-stroke engine
 - Solving ignition system problems in a four-stroke engine
7. Explain how the fuel system works in four-stroke engines.
 - Diagnosing fuel system problems in a four-stroke engine
 - Solving fuel system problems in a four-stroke engine

Two-Stroke Engines

8. Explain the theory of operation for two-stroke engines.
9. Identify parts of a two-stroke engine.
 - Diagnosing mechanical system problems in a two-stroke engine
 - Solving mechanical system problems in a two-stroke engine
10. Explain how the ignition system works in two-stroke engines.
 - Diagnosing ignition system problems in a two-stroke engine
 - Solving ignition system problems in a two-stroke engine
11. Explain how the fuel system works in two-stroke engines.
 - Diagnosing fuel system problems in a two-stroke engine
 - Solving fuel system problems in a two-stroke engine

Cooling Systems

12. Identify air and liquid cooling system components and their functions.
 - Explaining the process and need for draining and replacing coolants
 - Diagnosing cooling system problems in small engines
 - Solving cooling system problems in small engines

Preventive Maintenance

13. Identify preventive maintenance procedures for servicing small engines.

Engine Overhaul

14. Demonstrate procedures for disassembling and cleaning small engines.
15. Demonstrate the procedure for inspecting small engines for wear.
 - Demonstrating the procedure for measuring engine components
16. Demonstrate the procedure for assembling a small engine according to manufacturer's specifications.

Exhaust Systems

17. Explain the operation of an exhaust system on a four-stroke and a two-stroke engine.

Urban Forestry

Urban Forestry is a one-credit course designed to enable students to acquire forestry knowledge and skills for in an urban setting. Topics include career opportunities, safety, climbing and rigging, urban tree management, and tree disorders.

Content standards for this course are not intended to serve as the entire curriculum. Teachers are encouraged to expand the curriculum beyond these minimum required content standards to accommodate specific community interests and utilize local resources. This course encourages critical thinking, use of the scientific method, integration of technology, development of student leadership skills, and application of knowledge and skills related to practical questions and problems. Safety concepts are integrated into instruction to the maximum extent possible.

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Career Opportunities

Students will:

1. Describe career opportunities in urban forest management.

Safety

2. Identify arborist safety standards, including International Society of Arboriculture (ISA) regulations.

Climbing and Rigging

3. Describe climbing equipment used by arborists, including saddles, lanyards, snaps, and ascenders.
 - Demonstrating various types of knots and hitches used by arborists
 - Comparing types of ropes used by arborists
4. Compare rigging techniques used by arborists.
Examples: rope-positioning, false-crotch, speed-lining
 - Explaining tensile strength, working loads, and shock loads of ropes used by arborists
 - Identifying rigging equipment used by arborists
Examples: carabiners, slings, block-and-tackle, figure-eight descenders, lowering devices
5. Identify tree-climbing techniques.

Urban Tree Management

6. Compare management strategies for urban forests.
7. Compare tree removal methods.
8. Explain reasons for cabling and bracing a tree.
 - Describing the equipment needed for cabling and bracing a tree
 - Demonstrating tree-cabling and tree-bracing techniques
9. Explain reasons for tree pruning.
 - Demonstrating tree-pruning cuts
 - Identifying the appropriate time for pruning trees
 - Identifying types of tree-pruning tools
10. Design a landscape plan for a wooded environment.
 - Describing skills needed in wooded landscaping

Tree Disorders

11. Describe major tree disorders.
 - Examining tree growth and structure
 - Identifying tree defense systems
12. Identify insects, diseases, parasites, and weeds that afflict trees.
 - Describing pest management in urban forestry, including mechanical treatment, biological treatment, chemical treatment, and genetically engineered resistance

Veterinary Science

Veterinary Science is a one-credit course designed to prepare students for entry-level employment or for advanced training in the veterinary-assisting industry. Topics include career opportunities, safety, reproduction and genetics, hormones and growth disorders, animal anesthetics and basic surgery procedures, health and management, business management practices, and applications of technology.

Content standards for this course are not intended to serve as the entire curriculum. Teachers are encouraged to expand the curriculum beyond these minimum required content standards to accommodate specific community interests and utilize local resources. This course encourages critical thinking, use of the scientific method, integration of technology, development of student leadership skills, and application of knowledge and skills related to practical questions and problems. Safety concepts are integrated into instruction to the maximum extent possible.

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Career Opportunities

Students will:

1. Describe career opportunities available in veterinary science.

Safety

2. Identify hazards in the veterinary workplace.
 - Explaining safety guidelines for handling veterinary drugs

Reproduction and Genetics

3. Identify the structure and function of female and male reproductive systems.
 - Evaluating the use of biotechnology in veterinary science
 - Identifying factors affecting an animal breeding program
Examples: heat cycle, gestation, artificial insemination, fertility
 - Evaluating functions of deoxyribonucleic acid (DNA)
 - Explaining how genotype and phenotype differ
 - Describing inherited traits

Hormones and Growth Disorders

4. Compare growth abnormalities in mammals.
Example: dwarfism
 - Identifying treatments for correcting growth disorders
Example: hormone treatments

Animal Anesthesiology and Basic Surgery Procedures

5. Explain uses of anesthesiology for surgery and grooming.
6. Differentiate among basic surgery procedures for selected animals.
Examples: cesarean, castration, spaying, nail and claw removal

Health and Management

7. Describe common viral and bacterial diseases in animals.
 - Identifying internal and external parasites
 - Categorizing housing needs for animals
8. Evaluate nutritional requirements for selected animals.
 - Describing structures and functions of the digestive system
 - Analyzing feed ingredients to determine nutritional value
9. Evaluate the importance of balanced diets for animals.
 - Distinguishing nutritional requirements at various stages of animal development
10. Differentiate restraint from control techniques for animals.

Business Management Practices

11. Identify steps for maintaining accurate animal health records in the veterinary workplace.
12. Identify techniques for enhancing customer relations in the veterinary workplace.
13. Identify accepted practices in financial management in the veterinary workplace.

Applications of Technology

14. Identify uses of technology in veterinary science.
Examples: genetic engineering, tracking devices, wireless fencing, ultrasound

Workforce Essentials

Workforce Essentials is a one-credit course that provides students with higher-level academic and occupational skills that are transferable across jobs and occupational areas. Emphasis is placed on academic foundations for careers, applied technology, career development and employment, entrepreneurship and business economics, social and ethical responsibility, leadership, and teamwork, safety and health, and technical knowledge and skills. Students build on prior knowledge, strengths, interests, and needs that enhance preparation for future employment and continuing education and training.

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Career Development and Employability Skills

Students will:

1. Explain how to research and select career opportunities.
2. Compare the relationship between educational achievement and career planning.
3. Demonstrate how to locate, evaluate, and interpret career information for a specific career.
 - Identifying education requirements for a specific career
 - Utilizing career resources, ladders, and webs
 - Explaining advantages and disadvantages of self-employment
 - Recognizing employment trends
 - Analyzing the impact of population, climate, and geographic location on occupational opportunities
4. Determine personal responsibility for making education and career choices.

Examples: demographics, local resources, professional training, formulating career plans, retraining and upgrading skills, exploring school and community resources, comparing education and job opportunities

 - Examining the effect of work on lifestyles
5. Apply skills needed for seeking, obtaining, maintaining, and changing jobs, including preparing a résumé, completing job applications, participating in a job interview, and dressing and grooming for the workplace.
 - Accessing detailed information about job openings and opportunities
Examples: skills required for a full- or part-time job, working conditions and benefits, opportunities for change

Foundation Skills

6. Explain the importance of effective communication skills in the workplace.
Examples: listening strategies, oral and written communications, proper business etiquette, informal presentations and discussions, proficiency in speaking Standard English
7. Demonstrate mathematical computation skills in the workplace.
Examples: costs and time; ratios and percentages; tables, charts, and graphs; distance, weight, area, and volume

Ethics and Social Responsibility

8. Identify ethical and unethical behavior and actions in the workplace.
 - Describing legal issues affecting business, including affirmative action; sexual harassment; local, state, and federal laws; and workplace regulations, including the Occupational Safety and Health Administration (OSHA), the Americans with Disabilities Act (ADA); and the Environmental Protection Agency (EPA)

Leadership and Teamwork

9. Explain leadership skills and practices.
 - Identifying appropriate leadership styles
 - Discussing effects of communication in various settings
Examples: pairs, small groups, teams, large groups
10. Apply leadership skills through participation in career and technical student organization (CTSO) activities.
Examples: setting goals; conducting meetings; participating in conferences, workshops, competitions, and civic and community service activities
11. Identify behaviors that promote effective teamwork.

Applied Technology

12. Determine uses, capabilities, and limitations of technological tools for achieving personal and workplace needs.
 - Utilizing common tools, equipment, machines, and materials required for a selected job
 - Assessing results of investigations related to uses and limitations of technological tools

Technical Knowledge and Skills

13. Interpret a company's vision and mission statements, goals, and objectives with regard to a specific career objective or pathway.
 - Describing products and services offered by a specific company
 - Identifying rights and responsibilities of employees and employers

14. Evaluate opportunities to obtain business- and industry-recognized work-readiness credentials.

Economics and Finance

15. Explain economic principles and concepts fundamental to entrepreneurship.
Examples: goods and services, supply and demand, private enterprise, cost-profit indicators, trends
16. Differentiate among types of employment documents and records.
Examples: tax documentation, contract information, personal income, worker's compensation, social security, pay procedures, deductions, net pay, fringe benefits, electronic fund transfers

Safety and Health

17. Formulate a workplace safety plan.
Examples: preventing illness or injuries, communicating safety information, identifying hazards, performing basic first aid, identifying safe work attire
18. Describe how worker safety regulations protect employees and employers.

Alabama High School Graduation Requirements

(Alabama Administrative Code 290-3-1-02(8)(a) (b) and (c))

1. COURSE REQUIREMENTS

The Alabama courses of study shall be followed in determining minimum required content in each discipline. Students seeking the Alabama High School Diploma with Advanced Academic Endorsement shall complete advanced level work in the core curriculum. Students receiving the Alabama High School Diploma with Credit-Based Endorsement shall complete the prescribed credits, including at least one Career and Technical Education course, for the Alabama High School Diploma and pass three of the five sections of the Alabama High School Graduation Exam, including the Mathematics section, Reading section, and one additional section.

COURSE REQUIREMENTS	Alabama High School Diploma Credits	Alabama High School Diploma with Advanced Academic Endorsement Credits	Alabama High School Diploma with Credit-Based Endorsement Credits
ENGLISH LANGUAGE ARTS	4	4	4
Four credits to include the equivalent of:			
English 9	1	1	1
English 10	1	1	1
English 11	1	1	1
English 12	1	1	1
MATHEMATICS	4	4	4
Four credits to include the equivalent of:			
Algebra I	1	1	1
Geometry	1	1	1
Algebra II with Trigonometry		1	
Mathematics Elective(s)	2	1	2
SCIENCE	4	4	4
Four credits to include the equivalent of:			
Biology	1	1	1
A physical science	1	1	1
Science Electives	2	2	2
SOCIAL STUDIES*	4	4	4
Four credits to include the equivalent of:			
Grade 9 Social Studies	1	1	1
Grade 10 Social Studies	1	1	1
Grade 11 Social Studies	1	1	1
Grade 12 Social Studies	1	1	1
PHYSICAL EDUCATION	1	1	1
HEALTH EDUCATION	0.5	0.5	0.5
ARTS EDUCATION	0.5	0.5	0.5
COMPUTER APPLICATIONS**	0.5	0.5	0.5
FOREIGN LANGUAGE***		2	
ELECTIVES	5.5	3.5	5.5
Local boards shall offer foreign languages, fine arts, physical education, wellness education, career/technical education, and driver education as electives.			
TOTAL CREDITS	24	24	24

* All four required credits in Social Studies shall comply with the current *Alabama Course of Study*.

** May be waived if competencies outlined in the computer applications course are demonstrated to qualified staff in the local school system. The designated one-half credit shall then be added to the electives credits, making a total of six electives credits for the Alabama High School Diploma and the Alabama High School Diploma with Credit Based Endorsement or four electives credits for the Alabama High School Diploma with Advanced Academic Endorsement.

*** Students earning the diploma with the advanced academic endorsement shall successfully complete two credits in the same foreign language.

2. ASSESSMENT REQUIREMENTS

Pass the required statewide assessment for graduation

Alabama High School Graduation Requirements (continued)

(Alabama Administrative Code 290-3-1-.02(8)(g)1.)

Course and assessment requirements specified below must be satisfied in order to earn the Alabama Occupational Diploma.

1. COURSE REQUIREMENTS

Effective for students with disabilities as defined by the *Individuals with Disabilities Education Act*, students must earn the course credits outlined in *Alabama Administrative Code* r. 290-3-1-.02(8)(g)1.

COURSE REQUIREMENTS	Alabama Occupational Diploma Credits
ENGLISH LANGUAGE ARTS	4
*Four credits to include the equivalent of: English I English II English III English IV	1 1 1 1
MATHEMATICS	4
*Four credits to include the equivalent of: Math I Math II Math III Math IV	1 1 1 1
SCIENCE	4
*Four credits to include the equivalent of: Science I Science II Science III Science IV	1 1 1 1
SOCIAL STUDIES	4
*Four credits to include the equivalent of: Social Studies I Social Studies II Social Studies III Social Studies IV	1 1 1 1
CAREER AND TECHNICAL EDUCATION	2
COORDINATED STUDIES OR TRANSITIONAL SERVICES	1
COOPERATIVE CAREER AND TECHNICAL EDUCATION	1
HEALTH EDUCATION	0.5
PHYSICAL EDUCATION	1
ARTS EDUCATION	0.5
ELECTIVES	2
Existing laws require LEAs to offer arts education, physical education, wellness education, career/technical education, and driver education as electives.	
TOTAL CREDITS	24

* All AOD credits shall comply with the current curriculum guides designated for AOD implementation. Local Education Agencies may add additional credits or requirements.

2. ASSESSMENT REQUIREMENTS

Take the required statewide assessment for graduation at least once (during the spring of the eleventh-grade year).

Alabama High School Diploma with Career/Technical Endorsement and Alabama High School Diploma with Advanced Career/Technical Endorsement

1. COURSE REQUIREMENTS

Students may earn an Alabama High School Diploma with Career/Technical Education (CTE) Endorsement or an Alabama High School Diploma with Advanced Career/Technical Education Endorsement by completing the required credits in the core curriculum and attaining CTE concentrator status for the career/technical education endorsement or completer status for the advanced career/technical education endorsement consistent with guidelines established by the State Department of Education and local boards of education. For the career/technical education endorsement, one additional CTE or academic credit related to the student's career objective must be earned. For the advanced career/technical education endorsement, core curriculum requirements may be satisfied by credit earned through applied academic courses, embedded credit, or substitute credit situations.

COURSE REQUIREMENTS	Alabama High School Diploma with Career/Technical Endorsement	Alabama High School Diploma with Advanced Career/Technical Endorsement
	Credits	Credits
ENGLISH LANGUAGE ARTS	4	4
Four credits to include the equivalent of: English 9 English 10 English 11 English 12	1 1 1 1	1 1 1 1
MATHEMATICS	4	4
Four credits to include the equivalent of: Algebra I Geometry Algebra II with Trigonometry Mathematics Electives (1 may be embedded or substituted)	1 1 1 2	1 1 1 1
SCIENCE	4	4
Four credits to include the equivalent of: Biology A physical science Science Electives (1 may be embedded or substituted)	1 1 2	1 1 2
SOCIAL STUDIES*	4	4
Four credits to include the equivalent of: Grade 9 Social Studies Grade 10 Social Studies Grade 11 Social Studies Grade 12 Social Studies	1 1 1 1	1 1 1 1
PHYSICAL EDUCATION	1	1
HEALTH EDUCATION	0.5	0.5
ARTS EDUCATION	0.5	0.5
COMPUTER APPLICATIONS**	0.5	0.5
CAREER/TECHNICAL EDUCATION		
(Completer Status) Three credits to include the equivalent of : Three credits in a career/technical education program, or Two credits in an occupational program plus the Advanced Cooperative Education work-based experience***	3	
(Concentrator Status) Three credits to include the equivalent of: Two credits in a career/technical education program and One career/technical education or academic credit related to student's objective		3
ELECTIVES****	2.5	2.5
Local boards shall offer foreign languages, arts education, physical education, wellness education, career/technical preparation, and driver education as elective credits. Local boards are not required to implement this diploma endorsement.		
TOTAL CREDITS	24	24

* All four required credits in Social Studies shall comply with the current *Alabama Course of Study*.

** May be waived if competencies outlined in the computer applications course are demonstrated to qualified staff in the local school system. The designated one credit will then

be added to the elective credits, making a total of three elective credits.

*** The Alabama courses of study shall be followed in determining minimum requirements for the sequence of Career/Technical Education courses.

**** Students may earn the advanced career/technical and the advanced academic endorsements concurrently if all requirements for the advanced academic endorsement are met.

2. ASSESSMENT REQUIREMENTS

Pass the required statewide assessment for graduation.

Guidelines and Suggestions for Local Time Requirements and Homework

Total Instructional Time

The total instructional time of each school day in all schools and at all grade levels shall be not less than 6 hours or 360 minutes, exclusive of lunch periods, recess, or time used for changing classes (*Code of Alabama*, 1975, §16-1-1).

Suggested Time Allotments for Grades 1 - 6

The allocations below are based on considerations of a balanced educational program for Grades 1-6. Local school systems are encouraged to develop a general plan for scheduling that supports interdisciplinary instruction. Remedial and/or enrichment activities should be a part of the time schedule for the specific subject area.

<u>Subject Area</u>	<u>Grades 1-3</u>	<u>Grades 4-6</u>
Language Arts	150 minutes daily	120 minutes daily
Mathematics	60 minutes daily	60 minutes daily
Science	30 minutes daily	45 minutes daily
Social Studies	30 minutes daily	45 minutes daily
Physical Education	30 minutes daily*	30 minutes daily*
Health	60 minutes weekly	60 minutes weekly
Technology Education (Computer Applications)	60 minutes weekly	60 minutes weekly
Character Education	10 minutes daily**	10 minutes daily**
Arts Education		

Dance
Music
Theatre
Visual Arts

Daily instruction with certified arts specialists in each of the arts disciplines is the most desirable schedule. However, schools unable to provide daily arts instruction in each discipline are encouraged to schedule in Grades 1 through 3 two 30- to 45-minute arts instruction sessions per week and in Grades 4 through 6 a minimum of 60 minutes of instruction per week. Interdisciplinary instruction within the regular classroom setting is encouraged as an alternative approach for scheduling time for arts instruction when certified arts specialists are not available.

*Established by the State Department of Education in accordance with *Code of Alabama*, 1975, §16-40-1

**Established by the State Department of Education in accordance with *Code of Alabama*, 1975, §16-6B-2(h)

Kindergarten

In accordance with *Alabama Administrative Code* r. 290-5-1-.01(5) Minimum Standards for Organizing Kindergarten Programs in Alabama Schools, the daily time schedule of the kindergartens shall be the same as the schedule of the elementary schools in the systems of which they are a part since kindergartens in Alabama operate as full-day programs. There are no established time guidelines for individual subject areas for the kindergarten classroom. The emphasis is on large blocks of time that allow children the opportunity to explore all areas of the curriculum in an unhurried manner.

It is suggested that the full-day kindergarten program be organized utilizing large blocks of time for large group, small groups, center time, lunch, outdoor activities, snacks, transitions, routines, and afternoon review. Individual exploration, small-group interest activities, interaction with peers and teachers, manipulation of concrete materials, and involvement in many other real-world experiences are needed to provide a balance in the kindergarten classroom.

Grades 7-12

A minimum of 140 clock hours of instruction is required for one unit of credit and a minimum of 70 clock hours of instruction is required for one-half unit of credit.

In those schools where Grades 7 and 8 are housed with other elementary grades, the school may choose the time requirements listed for Grades 4-6 or those listed for Grades 7-12.

Character Education

For all grades, not less than 10 minutes instruction per day shall focus upon the students' development of the following character traits: courage, patriotism, citizenship, honesty, fairness, respect for others, kindness, cooperation, self-respect, self-control, courtesy, compassion, tolerance, diligence, generosity, punctuality, cleanliness, cheerfulness, school pride, respect of the environment, patience, creativity, sportsmanship, loyalty, and perseverance.

Homework

Homework is an important component of every student's instructional program. Students, teachers, and parents should have a clear understanding of the objectives to be accomplished through homework and the role it plays in meeting curriculum requirements. Homework reflects practices that have been taught in the classroom and provides reinforcement and/or remediation for students. It should be student-managed, and the amount should be age-appropriate, encouraging learning through problem solving and practice.

At every grade level, homework should be meaning-centered and mirror classroom activities and experiences. Independent and collaborative projects that foster creativity, problem-solving abilities, and student responsibility are appropriate. Parental support and supervision reinforce the quality of practice or product as well as skill development.

Each local board of education shall establish a policy on homework consistent with the State Board of Education resolution adopted February 23, 1984. (Action Item #F-2)

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For information regarding the *Alabama Course of Study: English Language Arts* and other curriculum materials, contact Classroom Improvement, Alabama State Department of Education, 50 North Ripley Street, Montgomery, Alabama, or by mail at P. O. Box 302101, Montgomery, Alabama 36130-2101.

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Alabama Department of Education

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