

# Engineering and Technical Cluster

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## Engineering and Technical Cluster

### Cluster Description:

The Engineering and Technical Cluster offers secondary students a variety of career related pathway opportunities. Qualified instructors from industry offer a project based learning approach as students participate in rigorous job related courses that educate them in standardized industry processes related to concepts, layout, design, materials, production, assembly, quality control, maintenance, troubleshooting, construction, repair and service of industrial, commercial and residential goods and products. Along with the acquirement of skills necessary for a successful transition to postsecondary education or job placement, students work toward industry related certifications or credentials, making them more marketable in today's global society.

**Concentration:** 1600 HVAC Technician

**Courses:** 1752 HVAC I  
1753 HVAC II  
1754 HVAC III  
1755 HVAC IV

### Concentration Description:

The HVAC Technician concentration focuses on careers that will build a knowledge base and technical skills in all aspects of the Heating, Ventilation, and Air Conditioning industry. Students will have the opportunity to earn NCCER certification for each skill set mastered and be exposed to skills to develop positive work ethics.

### Course Descriptions:

#### 1752 HVAC I

This course introduces the student to the knowledge base and technical skills of the HVAC industry. HVAC I begins with the NCCER Core curriculum which is a prerequisite to all Level I completions. The students will complete modules in Basic Safety; Introduction to Construction Math; Introduction to Hand Tools; Introduction to Power Tools; Introduction to Construction Drawings; Basic Rigging; Basic Communication Skills; Basic Employability Skills; and Introduction to Materials Handling. Students will then begin developing skill sets related to the fundamentals of HVAC such as Introduction to HVAC; and Trade Mathematics. Students utilize problem-solving techniques and participate in hands-on activities to develop an understanding of course concepts. Teachers should provide each student with real world learning opportunities and instruction. Students are encouraged to become active members of the student organizations, WV SkillsUSA. The West Virginia Standards for Global 21 Learning include the following components: Global 21 Content, Literacy and Numeracy, Entrepreneurship, and Technology Standards. All West Virginia teachers are responsible for

classroom instruction that integrates learning skills, technology tools, and content standards and objectives.

### **1753 HVAC II**

HVAC II will continue to build student skill sets in areas such as Copper and Plastic Piping Practices; Soldering and Brazing; Ferrous Metal Piping Practices; Basic Electricity; Introduction to Cooling; Introduction to Heating; and Air Distribution Systems. Students utilize problem-solving techniques and participate in hands-on activities to develop an understanding of course concepts. Teachers should provide each student with real world learning opportunities and instruction. Students are encouraged to become active members of the student organizations, WV SkillsUSA. The West Virginia Standards for Global 21 Learning include the following components: Global 21 Content, Literacy and Numeracy, Entrepreneurship, and Technology Standards. All West Virginia teachers are responsible for classroom instruction that integrates learning skills, technology tools, and content standards and objectives.

### **1754 HVAC III**

HVAC III will continue to build student skill sets in areas of Commercial Airside Systems; Chimneys, Vents, and Flues; Introduction to the Hydronic Systems; Air Quality Equipment; Leak Detection, Evacuation, Recovery, and Charging; Alternating Current; Basic Electronics; and Introduction to Control Circuit Troubleshooting. Students utilize problem-solving techniques and participate in hands-on activities to develop an understanding of course concepts. Teachers should provide each student with real world learning opportunities and instruction. Students are encouraged to become active members of the student organizations, WV SkillsUSA. The West Virginia Standards for Global 21 Learning include the following components: Global 21 Content, Literacy and Numeracy, Entrepreneurship, and Technology Standards. All West Virginia teachers are responsible for classroom instruction that integrates learning skills, technology tools, and content standards and objectives.

### **1755 HVAC IV**

HVAC IV will continue to build student skill sets in areas of Troubleshooting Gas Heating; Troubleshooting Cooling; Heat Pumps; Basic Installation and Maintenance Practices; Sheet Metal Duct Systems; and Fiberglass and Flexible Duct Systems. Students utilize problem-solving techniques and participate in hands-on activities to develop an understanding of course concepts. Teachers should provide each student with real world learning opportunities and instruction. Students are encouraged to become active members of the student organizations, WV SkillsUSA. The West Virginia Standards for Global 21 Learning include the following components: Global 21 Content, Literacy and Numeracy, Entrepreneurship, and Technology Standards. All West Virginia teachers are responsible for classroom instruction that integrates learning skills, technology tools, and content standards and objectives.

**Concentration: 1620 Automotive Technology**

- Courses:** 1631 Fundamentals of Automotive Technology  
1623 Basic Engine Concepts  
1625 Brakes  
1637 Suspension and Steering

**Concentration Description:**

The Automotive Technology concentration focuses on careers that will build a knowledge base and technical skills in all aspects of the Automotive industry. Students will have the opportunity to acquire hours towards certification and be exposed to skills to develop positive work ethics.

**Course Descriptions:**

**1631 Fundamentals of Automotive Technology**

This course introduces the student to the knowledge base and technical skills as they relate to the field of Automotive Technology. In the Fundamentals of Automotive Technology class areas of study include career opportunities and practices, basic safety, tool and equipment, measuring tools and equipment, automotive specifications, electrical system basics, battery service, wheel and tire service, cooling and lubrication systems, and student organizations. Students utilize problem-solving techniques and participate in hands-on activities to develop an understanding of course concepts. Teachers should provide each student with real world learning opportunities and instruction. Students are encouraged to become active members of the student organizations, WV SkillsUSA. The West Virginia Standards for Global 21 Learning include the following components: Global 21 Content, Literacy and Numeracy, Entrepreneurship, and Technology Standards. All West Virginia teachers are responsible for classroom instruction that integrates learning skills, technology tools, and content standards and objectives.

**1623 Basic Engine Concepts**

Basic Engine Concepts will continue to build student skill sets in areas such as general engines, diagnosis of cylinder head and valve train, diagnosis and repair of engine block, and diagnosis and repair of lubrication and cooling systems. Students utilize problem-solving techniques and participate in hands-on activities to develop an understanding of course concepts. Teachers should provide each student with real world learning opportunities and instruction. Students are encouraged to become active members of the student organizations, WV SkillsUSA. The West Virginia Standards for Global 21 Learning include the following components: Global 21 Content, Literacy and Numeracy, Entrepreneurship, and Technology Standards. All West Virginia teachers are responsible for classroom instruction that integrates learning skills, technology tools, and content standards and objectives.

**1625 Brake Systems**

Brake Systems will continue to build student skill sets in areas such as diagnosis and repair of hydraulic systems, diagnosis and repair of drum brakes, diagnosis and repair of disc brakes,

power assist systems, and antilock brake systems. Students will comply with personal and environmental safety practices associated with proper ventilation, handling, storage, and disposal of brake components. Students utilize problem-solving techniques and participate in hands-on activities to develop an understanding of course concepts. Teachers should provide each student with real world learning opportunities and instruction. Students are encouraged to become active members of the student organizations, WV SkillsUSA. The West Virginia Standards for Global 21 Learning include the following components: Global 21 Content, Literacy and Numeracy, Entrepreneurship, and Technology Standards. All West Virginia teachers are responsible for classroom instruction that integrates learning skills, technology tools, and content standards and objectives.

### **1637 Suspension and Steering Diagnosis**

Suspension and Steering Diagnosis will continue to build student skill sets in areas such as diagnosis and repair of steering systems, diagnosis and repair of front suspension systems, diagnosis and repair of rear suspension systems, miscellaneous suspension and steering systems, and diagnosis and adjust wheel alignment. Students utilize problem-solving techniques and participate in hands-on activities to develop an understanding of course concepts. Teachers should provide each student with real world learning opportunities and instruction. Students are encouraged to become active members of the student organizations, WV SkillsUSA. The West Virginia Standards for Global 21 Learning include the following components: Global 21 Content, Literacy and Numeracy, Entrepreneurship, and Technology Standards. All West Virginia teachers are responsible for classroom instruction that integrates learning skills, technology tools, and content standards and objectives.

**Concentration:** 1640 Cisco Networking Academies

- Courses:**       1642 Discovery 1 Networking for Home and Small Business  
                      1644 Discovery 2 Working at a Small to Medium Business or ISP  
                      1646 Discovery 3 Introducing Routing and Switching in the Enterprise  
                      1648 Discovery 4 Design and Supporting Computer Networks

**Concentration Description:**

The Cisco Networking Academies concentration provides general networking theory, practical experience, and opportunities for career exploration and soft-skills development. The curriculum teaches networking based on application, covering networking concepts within the context of network environments students may encounter in their daily lives – from small office and home office (SOHO) networking to more complex enterprise and theoretical networking models later in the curriculum. CCNA Discovery is designed for students with basic PC skills and foundational math and problem solving skills. CCNA Discovery helps prepare students for entry-level career opportunities, continuing education, and globally-recognized Cisco CCENT and CCNA certifications.

**Course Descriptions:**

**1642 Discovery 1 Networking for Home and Small Business**

This course provides a hands-on introduction to networking and the Internet using tools and hardware commonly found in the home and small business environment. Areas of study include computers and applications, operating systems, connecting to a network, connecting to the Internet, network addressing, network services, wireless technologies, basic securities, and troubleshooting. Students will demonstrate knowledge and technical expertise necessary to plan and implement small networks across a range of applications. Emphasis will be placed on personal and professional ethics and students will explore a variety of career opportunities. Students utilize problem-solving techniques and participate in hands-on activities to develop an understanding of course concepts. Teachers should provide each student with real world learning opportunities and instruction. Students are encouraged to become active members of the student organizations, WV SkillsUSA. The West Virginia Standards for Global 21 Learning include the following components: Global 21 Content, Literacy and Numeracy, Entrepreneurship, and Technology Standards. All West Virginia teachers are responsible for classroom instruction that integrates learning skills, technology tools, and content standards and objectives.

**1644 Discovery 2 Working at a Small to Medium Business or ISP**

This course provides an introduction to routing and remote access, addressing, and network services. Areas of study include the Internet and its uses, ISP support, planning a network upgrade, planning an addressing structure, configuring network devices, routing, ISP services, and ISP responsibilities. Students will demonstrate knowledge and technical expertise necessary to provide customer support to users of small-to-medium-sized networks and across a range of applications. Emphasis will be placed on personal and professional ethics, and

students will explore a variety of career opportunities. Students utilize problem-solving techniques and participate in hands-on activities to develop an understanding of course concepts. Teachers should provide each student with real world learning opportunities and instruction. Students are encouraged to become active members of the student organizations, WV SkillsUSA. The West Virginia Standards for Global 21 Learning include the following components: Global 21 Content, Literacy and Numeracy, Entrepreneurship, and Technology Standards. All West Virginia teachers are responsible for classroom instruction that integrates learning skills, technology tools, and content standards and objectives.

### **1646 Discovery 3 Introducing Routing and Switching in the Enterprise**

This course provides more advanced configurations of switching and routing protocols, configuration of access control lists, and basic implementation of WAN links. Areas of study include networking in the enterprise, infrastructure, switching, addressing, routing with a distance vector protocol, routing with a link-state protocol, implementing enterprise WAN links, filtering traffic by using access control lists, and troubleshooting. Students will demonstrate knowledge and technical expertise in using protocols to maximize enterprise LAN and WAN performance. Emphasis will be placed on personal and professional ethics, and students will explore a variety of career opportunities. Students utilize problem-solving techniques and participate in hands-on activities to develop an understanding of course concepts. Teachers should provide each student with real world learning opportunities and instruction. Students are encouraged to become active members of the student organizations, WV SkillsUSA. The West Virginia Standards for Global 21 Learning include the following components: Global 21 Content, Literacy and Numeracy, Entrepreneurship, and Technology Standards. All West Virginia teachers are responsible for classroom instruction that integrates learning skills, technology tools, and content standards and objectives.

### **1648 Discovery 4 Design and Supporting Computer Networks**

This course provides an introduction to collecting customer requirements, translating those requirements into equipment and protocol needs, and creating a network topology which addresses the needs of the customer. Areas of study include network design concepts, gathering network requirements, characterizing the existing network, identifying application impacts on network designs, creating the network design, using IP addressing in the network design, prototyping campus networks, prototyping the WAN, and preparing the proposal. Students will demonstrate knowledge and technical expertise in the skills necessary to design small Enterprise LANs and WANs. Emphasis will be placed on personal and professional ethics, and students will explore a variety of career opportunities. Students utilize problem-solving techniques and participate in hands-on activities to develop an understanding of course concepts. Teachers should provide each student with real world learning opportunities and instruction. Students are encouraged to become active members of the student organizations, WV SkillsUSA. The West Virginia Standards for Global 21 Learning include the following components: Global 21 Content, Literacy and Numeracy, Entrepreneurship, and Technology Standards. All West Virginia teachers are responsible for classroom instruction that integrates learning skills, technology tools, and content standards and objectives.

**Concentration:** 1670 Collision Repair Technology

**Courses:** 1671 Fundamentals of Collision Repair  
1675 Non-Structural Analysis and Damage Repair  
1677 Structural Analysis and Damage Repair  
1679 Surface Preparation and Refinishing

**Concentration Description:**

The Collision Repair Technology concentration focuses on careers that will build a knowledge base and technical skills in all aspects of the Collision Repair industry. Students will have the opportunity to acquire hours towards NATEF certification and be exposed to skills to develop positive work ethics.

**Course Descriptions:**

**1671 Fundamentals of Collision Repair**

This course introduces the student to the knowledge base and technical skills as they relate to the field of Collision Repair Technology. In the Fundamentals of Collision Repair Technology class areas of study include career opportunities and practices, integrated academics, knowledge of tools and equipment, panel straightening techniques, and introduction to vehicle preparation. Safety instruction is integrated into all activities. Students utilize problem-solving techniques and participate in hands-on activities to develop an understanding of course concepts. Teachers should provide each student with real world learning opportunities and instruction. Students are encouraged to become active members of the student organizations, WV SkillsUSA. The West Virginia Standards for Global 21 Learning include the following components: Global 21 Content, Literacy and Numeracy, Entrepreneurship, and Technology Standards. All West Virginia teachers are responsible for classroom instruction that integrates learning skills, technology tools, and content standards and objectives.

**1675 Non-Structural Analysis and Damage Repair**

Non-Structural Analysis and Damage Repair will continue to build student skill sets in non-structural analysis and repair of metal and composite parts. Students will utilize integrated academics, problem-solving techniques, and manipulative skills while completing lab activities to develop an understanding of course concepts. Safety instruction is integrated into all activities. Students utilize problem-solving techniques and participate in hands-on activities to develop an understanding of course concepts. Teachers should provide each student with real world learning opportunities and instruction. Students are encouraged to become active members of the student organizations, WV SkillsUSA. The West Virginia Standards for Global 21 Learning include the following components: Global 21 Content, Literacy and Numeracy, Entrepreneurship, and Technology Standards. All West Virginia teachers are responsible for classroom instruction that integrates learning skills, technology tools, and content standards and objectives.

**1677 Structural Analysis and Damage Repair**

Structural Analysis and Damage Repair will continue to build student skill sets in frame and unibody type vehicles using welding techniques, measuring equipment, and frame machines. Students utilize problem-solving techniques and participate in hands-on activities to develop an understanding of course concepts. Teachers should provide each student with real world learning opportunities and instruction. Students are encouraged to become active members of the student organizations, WV SkillsUSA. The West Virginia Standards for Global 21 Learning include the following components: Global 21 Content, Literacy and Numeracy, Entrepreneurship, and Technology Standards. All West Virginia teachers are responsible for classroom instruction that integrates learning skills, technology tools, and content standards and objectives.

**1679 Surface Preparation and Refinishing**

Surface Preparation and Refinishing will continue to build student skill sets in preparing a surface for refinishing; inspect, clean and operate spraying equipment; detail a vehicle; and diagnose finish defects. Students utilize problem-solving techniques and participate in hands-on activities to develop an understanding of course concepts. Teachers should provide each student with real world learning opportunities and instruction. Students are encouraged to become active members of the student organizations, WV SkillsUSA. The West Virginia Standards for Global 21 Learning include the following components: Global 21 Content, Literacy and Numeracy, Entrepreneurship, and Technology Standards. All West Virginia teachers are responsible for classroom instruction that integrates learning skills, technology tools, and content standards and objectives.

**Concentration:** ET 1680 Computer Systems Repair Technology

**Courses:** 1705 Fundamentals of Computer Systems  
1664 A+ Essentials  
1665 A+ Practical Applications  
1694 Networking Essentials

**Concentration Description:**

The Computer Systems Repair Technology concentration validates foundation-level knowledge and skills necessary for a career in PC support. It is the starting point for a career. The CompTIA A+ and Network+ certifications are both international and vendor-neutral and prove competence in areas such as installation, preventative maintenance, networking, security and troubleshooting.

**Course Descriptions:**

**1705 Fundamentals of Computer Systems**

This course introduces the student to the knowledge and technical skills for all courses in the Computer Systems Repair Technology pathway. Areas of study include computer hardware, data representation, operating system, utility, productivity software, communications and networks, and the Internet. Emphasis will be placed on personal and professional ethics, and students will explore a variety of career opportunities. Students utilize problem-solving techniques and participate in hands-on activities to develop an understanding of course concepts. Teachers should provide each student with real world learning opportunities and instruction. Students are encouraged to become active members of the student organizations, WV SkillsUSA. The West Virginia Standards for Global 21 Learning include the following components: Global 21 Content, Literacy and Numeracy, Entrepreneurship, and Technology Standards. All West Virginia teachers are responsible for classroom instruction that integrates learning skills, technology tools, and content standards and objectives.

**1664 A+ Essentials**

This courses introduces the knowledge required to understand the fundamentals of computer technology, networking, and security, and will have the skills required to identify hardware, peripheral, networking, and security components. Students utilize problem-solving techniques and participate in hands-on activities to develop an understanding of course concepts. Teachers should provide each student with real world learning opportunities and instruction. Students are encouraged to become active members of the student organizations, WV SkillsUSA. The West Virginia Standards for Global 21 Learning include the following components: Global 21 Content, Literacy and Numeracy, Entrepreneurship, and Technology Standards. All West Virginia teachers are responsible for classroom instruction that integrates learning skills, technology tools, and content standards and objectives.

### **1665 A+ Practical Applications**

This course introduces the competencies for an entry-level IT professional who has hands-on experience in the lab or the field. Successful candidates will have the skills required to install, configure, upgrade, and maintain PC workstations, the Windows OS and SOHO networks. The successful candidate will utilize troubleshooting techniques and tools to effectively and efficiently resolve PC, OS, and network connectivity issues and implement security practices. Job titles in some organizations which are descriptive of the role of this individual may be: Enterprise technician, IT administrator, field service technician, PC or Support technician, etc. Ideally, the CompTIA A+ Practical Application candidate has already passed the CompTIA A+ Essentials examination. Content standards and objectives are based on testing objectives for the CompTIA A+ Practical Applications certification. Students utilize problem-solving techniques and participate in hands-on activities to develop an understanding of course concepts. Teachers should provide each student with real world learning opportunities and instruction. Students are encouraged to become active members of the student organizations, WV SkillsUSA. The West Virginia Standards for Global 21 Learning include the following components: Global 21 Content, Literacy and Numeracy, Entrepreneurship, and Technology Standards. All West Virginia teachers are responsible for classroom instruction that integrates learning skills, technology tools, and content standards and objectives.

### **1694 Networking Essentials**

This course introduces the student to the knowledge base and technical skills related to networking. Areas of study include media and topologies, protocols and standards, network implementation, and network support. Content standards and objectives are based on testing objectives for the CompTIA Network+ certification. Emphasis will be placed on personal and professional ethics, and students will explore a variety of career opportunities. Students utilize problem-solving techniques and participate in hands-on activities to develop an understanding of course concepts. Teachers should provide each student with real world learning opportunities and instruction. Students are encouraged to become active members of the student organizations, WV SkillsUSA. The West Virginia Standards for Global 21 Learning include the following components: Global 21 Content, Literacy and Numeracy, Entrepreneurship, and Technology Standards. All West Virginia teachers are responsible for classroom instruction that integrates learning skills, technology tools, and content standards and objectives.

**Concentration: 1720 Drafting**

- Courses:** 1721 Architectural Drafting  
1725 Mechanical Drafting  
1727 Drafting Techniques  
1729 Fundamentals of Drafting

**Concentration Description:**

The Drafting concentration focuses a broad range of architecture and construction careers and foundation knowledge including basic safety, plan reading, use of tools and equipment as well as how to employ positive work ethics in a drafting career.

**Course Descriptions:****1721 Architectural Drafting**

This course introduces students to the specialization of architectural drawing and design. Areas of study include architectural styles, floor plans, dimensioning and annotation, site and foundation plans, elevations and section layouts, and residential utilities. Emphasis will be placed on personal and professional ethics, and students will explore a variety of career opportunities. Students utilize problem-solving techniques and participate in hands-on activities to develop an understanding of course concepts. Teachers should provide each student with real world learning opportunities and instruction. Students are encouraged to become active members of the student organizations, WV SkillsUSA. The West Virginia Standards for Global 21 Learning include the following components: Global 21 Content, Literacy and Numeracy, Entrepreneurship, and Technology Standards. All West Virginia teachers are responsible for classroom instruction that integrates learning skills, technology tools, and content standards and objectives.

**1725 Mechanical Drafting**

This course introduces the student to the knowledge base and technical skills necessary for mechanical drafting. Areas of study include advanced dimensioning techniques, assembly drawings, threads and fasteners, gears and cams, welding, and basic solid modeling. Emphasis will be placed on personal and professional ethics, and students will explore a variety of career opportunities. Students utilize problem-solving techniques and participate in hands-on activities to develop an understanding of course concepts. Teachers should provide each student with real world learning opportunities and instruction. Students are encouraged to become active members of the student organizations, WV SkillsUSA. The West Virginia Standards for Global 21 Learning include the following components: Global 21 Content, Literacy and Numeracy, Entrepreneurship, and Technology Standards. All West Virginia teachers are responsible for classroom instruction that integrates learning skills, technology tools, and content standards and objectives.

**1727 Drafting Techniques**

This course introduces the student to techniques used in advanced orthographic projection. Areas of study include sectioning, pictorial views, auxiliary views, patterns and developments,

dimensioning, advanced 2D CAD techniques, and basic 3D modeling in CAD. Students will demonstrate knowledge and technical expertise in various fundamental drafting techniques. Students utilize problem-solving techniques and participate in hands-on activities to develop an understanding of course concepts. Teachers should provide each student with real world learning opportunities and instruction. Students are encouraged to become active members of the student organizations, WV SkillsUSA. The West Virginia Standards for Global 21 Learning include the following components: Global 21 Content, Literacy and Numeracy, Entrepreneurship, and Technology Standards. All West Virginia teachers are responsible for classroom instruction that integrates learning skills, technology tools, and content standards and objectives.

### **1729 Fundamentals of Drafting**

This course introduces the student to the knowledge base and technical skills for all courses in the Drafting concentration. Areas of study include tools and equipment, measurement, basic drafting techniques, freehand technical sketching, orthographic projection, dimensioning, basic computer skills, and drawing techniques. Emphasis will be placed on personal and professional ethics, and students will explore a variety of career opportunities. Students utilize problem-solving techniques and participate in hands-on activities to develop an understanding of course concepts. Teachers should provide each student with real world learning opportunities and instruction. Students are encouraged to become active members of the student organizations, WV SkillsUSA. The West Virginia Standards for Global 21 Learning include the following components: Global 21 Content, Literacy and Numeracy, Entrepreneurship, and Technology Standards. All West Virginia teachers are responsible for classroom instruction that integrates learning skills, technology tools, and content standards and objectives.

**Concentration:** 1730 Manufacturing Technology

**Courses:** 2470 Blueprint for Success  
2471 Manufacturing Processes  
1411 Business Computer Applications 1  
2472 Manufacturing Capstone

**Concentration Description:**

The Manufacturing concentration focuses a broad range of Manufacturing related foundation knowledge including basic safety, use of tools, and equipment as well as how to employ positive work ethics in Manufacturing related careers.

**Course Descriptions:**

**2470 Blueprint for Success**

Blueprint for Success explores individual, interpersonal and team skills critical for success in varied contexts within the workplace and other social settings. Focus is on enhancing three foundation skills of success – 1) basic skills such as speaking and listening; 2) thinking skills such as creativity, decision-making, problem-solving, reasoning, conflict resolution, etc.; 3) personal qualities such as individual responsibility, self-esteem, sociability, self-management and integrity. By gaining awareness of individual interaction styles, attributes and attitudes, students will increase abilities to cope with difficult situations and people and improve other interpersonal and social skills which support career preparation, acquisition and retention. Students will learn to use skills in critical and creative thinking, management, communication (both oral and written) and leadership to solve problems and make decisions. Written communication skills will focus on journaling and sequencing processes. Teachers should provide each student with real world learning opportunities and instruction. Students are encouraged to become active members of the student organization, WV SkillsUSA. The West Virginia Standards for Global 21 Learning include the following components: Global 21 Content, Literacy and Numeracy, Entrepreneurship, and Technology Standards. All West Virginia teachers are responsible for classroom instruction that integrates learning skills, technology tools, and content standards and objectives.

**2471 Manufacturing Processes**

This course will explore skills sets related to the manufacturing process. Students will examine specific safety procedures related to the manufacturing industry. A broad range of skills will be developed in areas of safety; mathematics and shop essentials; materials; rigging; electrical systems; hydraulics and pneumatics; programmable logic controllers; inspection procedures; supervisor essentials; and quality control. Emphasis will be placed on career exploration, job seeking skills, and personal and professional ethics. Safety instruction is integrated into all activities. Students utilize problem-solving techniques and participate in hands-on activities to develop an understanding of course concepts. Teachers should provide each student with real world learning opportunities and instruction. Students are encouraged to become active members of the student organization, WV SkillsUSA. The West Virginia Standards for Global 21 Learning include the following components: Global 21 Content, Literacy and Numeracy,

Entrepreneurship, and Technology Standards. All West Virginia teachers are responsible for classroom instruction that integrates learning skills, technology tools, and content standards and objectives.

### **1411 Business Computer Applications 1**

This area of study is designed to provide students with the knowledge to understand and apply integrated software to business applications. The students will review keyboarding and achieve basic proficiency in word processing, spreadsheets, presentations, database applications, Internet, and/or personal information programs. Emphasis will be placed on career exploration, job seeking skills, and personal and professional ethics. Safety instruction is integrated into all activities. Students utilize problem-solving techniques and participate in hands-on activities to develop an understanding of course concepts. Teachers should provide each student with real world learning opportunities and instruction. Students are encouraged to become active members of the student organization, WV SkillsUSA. The West Virginia Standards for Global 21 Learning include the following components: Global 21 Content, Literacy and Numeracy, Entrepreneurship, and Technology Standards. All West Virginia teachers are responsible for classroom instruction that integrates learning skills, technology tools, and content standards and objectives.

### **2472 Manufacturing Capstone**

This capstone course will consist of a project based learning experience utilizing a culmination of acquired skills with input and guidance from the local manufacturing industry/advisory committees. Students are encouraged to become active members of the student organization WV SkillsUSA. The West Virginia Standards for 21<sup>st</sup> Century Learning include the following components: 21<sup>st</sup> Century Content Standards and 21<sup>st</sup> Century Learning Skills and Technology Tools. All West Virginia teachers are responsible for classroom instruction that integrates learning skills, technology tools, and content standards and objectives. Emphasis will be placed on career exploration, job seeking skills, and personal and professional ethics. Safety instruction is integrated into all activities. Students utilize problem-solving techniques and participate in hands-on activities to develop an understanding of course concepts. Teachers should provide each student with real world learning opportunities and instruction. Students are encouraged to become active members of the student organization, WV SkillsUSA. The West Virginia Standards for Global 21 Learning include the following components: Global 21 Content, Literacy and Numeracy, Entrepreneurship, and Technology Standards. All West Virginia teachers are responsible for classroom instruction that integrates learning skills, technology tools, and content standards and objectives.

**Concentration:** 1740 Diesel Equipment Technology

**Courses:** 1741 Diesel Engine Components  
1744 Electronic Engine Controls  
1747 Diesel Support Systems  
1751 Fundamentals of Diesel Equipment Technology

**Concentration Description:**

The Diesel Equipment Technology concentration focuses on careers that will build a knowledge base and technical skills in all aspects of the Diesel Equipment Technology industry. Students will have the opportunity to acquire hours towards industry ASE/NATEF certification and be exposed to skills to develop positive work ethics.

**Course Descriptions:**

**1741 Diesel Engine Components**

This course introduces the student to the knowledge base and technical skills as they relate to the field of Diesel Equipment Technology. In the Diesel Engine Components class areas of study include basic engine components, primary functions, service, inspection, and assembly procedures. Safety instruction is integrated into all activities. Students utilize problem-solving techniques and participate in hands-on activities to develop an understanding of course concepts. Teachers should provide each student with real world learning opportunities and instruction. Students are encouraged to become active members of the student organizations, WV SkillsUSA. The West Virginia Standards for Global 21 Learning include the following components: Global 21 Content, Literacy and Numeracy, Entrepreneurship, and Technology Standards. All West Virginia teachers are responsible for classroom instruction that integrates learning skills, technology tools, and content standards and objectives.

**1744 Electronic Engine Controls**

This course introduces the student to the knowledge base and technical skills for concepts in diesel electronic engine controls. Areas of study include electronic control modules, electronic fuel injection, and electronic control test equipment. Emphasis will be placed on career exploration, job seeking skills, and personal and professional ethics. Safety instruction is integrated into all activities. Students utilize problem-solving techniques and participate in hands-on activities to develop an understanding of course concepts. Teachers should provide each student with real world learning opportunities and instruction. Students are encouraged to become active members of the student organizations, WV SkillsUSA. The West Virginia Standards for Global 21 Learning include the following components: Global 21 Content, Literacy and Numeracy, Entrepreneurship, and Technology Standards. All West Virginia teachers are responsible for classroom instruction that integrates learning skills, technology tools, and content standards and objectives.

### **1747 Diesel Support Systems**

This course introduces the student to the knowledge base and technical skills as they relate to Diesel Support Systems. In the Diesel Support Systems class areas of study include areas such as lubricating and cooling systems, air intake and exhaust systems, starting and charging systems, engine retarders, fuel systems, and governor operation. Safety instruction is integrated into all activities. Students utilize problem-solving techniques and participate in hands-on activities to develop an understanding of course concepts. Teachers should provide each student with real world learning opportunities and instruction. Students are encouraged to become active members of the student organizations, WV SkillsUSA. The West Virginia Standards for Global 21 Learning include the following components: Global 21 Content, Literacy and Numeracy, Entrepreneurship, and Technology Standards. All West Virginia teachers are responsible for classroom instruction that integrates learning skills, technology tools, and content standards and objectives.

### **1751 Fundamentals of Diesel Equipment Technology**

This course introduces the student to the knowledge base and technical skills as they relate to the field of Fundamentals of Diesel Equipment Technology. In the Fundamentals of Diesel Equipment Technology class areas of study include personal and shop safety, career opportunities in the diesel technology industry, the proper use of hand and power tools, basic oxyacetylene cutting, electric welding, and basic shop etiquette. Safety instruction is integrated into all activities. Students utilize problem-solving techniques and participate in hands-on activities to develop an understanding of course concepts. Teachers should provide each student with real world learning opportunities and instruction. Students are encouraged to become active members of the student organizations, WV SkillsUSA. The West Virginia Standards for Global 21 Learning include the following components: Global 21 Content, Literacy and Numeracy, Entrepreneurship, and Technology Standards. All West Virginia teachers are responsible for classroom instruction that integrates learning skills, technology tools, and content standards and objectives.

**Concentration:** 1760 Electrical Technician

**Courses:** 1756 Electrical Trades I  
1757 Electrical Trades II  
1758 Electrical Trades III  
1759 Electrical Trades IV

**Concentration Description:**

The Electrical Technician concentration focuses on careers that will build a knowledge base and technical skills in all aspects of the Electrical Trades industry. Students will have the opportunity to earn NCCER certification for each skill set mastered and be exposed to skills to develop positive work ethics.

**Course Descriptions:**

**1756 Electrical Trades I**

This course introduces the student to the knowledge base and technical skills of the Electrical Trades industry. Electrical Trades I begins with the NCCER Core curriculum which is a prerequisite to all Level I completions. The students will complete modules in Basic Safety; Introduction to Construction Math; Introduction to Hand Tools; Introduction to Power Tools; Introduction to Construction Drawings; Basic Rigging; Basic Communication Skills; Basic Employability Skills; and Introduction to Materials Handling. Students will then begin developing skill sets related to the fundamentals of Electricity such as Orientation to the Electrical Trade; and Electrical Safety. Students utilize problem-solving techniques and participate in hands-on activities to develop an understanding of course concepts. Teachers should provide each student with real world learning opportunities and instruction. Students are encouraged to become active members of the student organizations, WV SkillsUSA. The West Virginia Standards for Global 21 Learning include the following components: Global 21 Content, Literacy and Numeracy, Entrepreneurship, and Technology Standards. All West Virginia teachers are responsible for classroom instruction that integrates learning skills, technology tools, and content standards and objectives.

**1757 Electrical Trades II**

Electrical Trades II will continue to build student skill sets in areas such as Introduction to Electrical Circuits; Electrical Theory; Introduction to the *National Electrical Code*®; Device Boxes; Hand Bending; Raceways and Fittings; Conductors and Cables; Basic Electrical Construction Drawings; Residential Electrical Services; and Electrical Test Equipment. Students utilize problem-solving techniques and participate in hands-on activities to develop an understanding of course concepts. Teachers should provide each student with real world learning opportunities and instruction. Students are encouraged to become active members of the student organizations, WV SkillsUSA. The West Virginia Standards for Global 21 Learning include the following components: Global 21 Content, Literacy and Numeracy, Entrepreneurship, and Technology Standards. All West Virginia teachers are responsible for

classroom instruction that integrates learning skills, technology tools, and content standards and objectives.

### **1758 Electrical Trades III**

Electrical Trades III will continue to build student skill sets in areas of Alternating Current; Motors: Theory and Application; Electric Lighting; and Conduit Bending. Students utilize problem-solving techniques and participate in hands-on activities to develop an understanding of course concepts. Teachers should provide each student with real world learning opportunities and instruction. Students are encouraged to become active members of the student organizations, WV SkillsUSA. The West Virginia Standards for Global 21 Learning include the following components: Global 21 Content, Literacy and Numeracy, Entrepreneurship, and Technology Standards. All West Virginia teachers are responsible for classroom instruction that integrates learning skills, technology tools, and content standards and objectives.

### **1759 Electrical Trades IV**

Electrical Trades IV will continue to build student skill sets in areas of Pull and Junction Boxes; Conductor Installations; Cable Tray; Conductor Terminations and Splices; Grounding and Bonding; Circuit Breakers and Fuses; and Control Systems and Fundamental Concepts. Students utilize problem-solving techniques and participate in hands-on activities to develop an understanding of course concepts. Teachers should provide each student with real world learning opportunities and instruction. Students are encouraged to become active members of the student organizations, WV SkillsUSA. The West Virginia Standards for Global 21 Learning include the following components: Global 21 Content, Literacy and Numeracy, Entrepreneurship, and Technology Standards. All West Virginia teachers are responsible for classroom instruction that integrates learning skills, technology tools, and content standards and objectives.

**Concentration:** 1780 Electronic Systems Technician

**Courses:** 1666 Electronic Systems I  
1667 Electronic Systems II  
1668 Electronic Systems III  
1669 Electronic Systems IV

**Concentration Description:**

The Electronic Systems Technician concentration focuses on careers that will build a knowledge base and technical skills in all aspects of the Electronic Trades industry. Students will have the opportunity to earn NCCER certification for each skill set mastered and be exposed to skills to develop positive work ethics.

**Course Descriptions:**

**1666 Electronics Systems I**

This course introduces the student to the knowledge base and technical skills of the Electrical Trades industry. Electrical Trades I begins with the NCCER Core curriculum which is a prerequisite to all Level I completions. The students will complete modules in Basic Safety; Introduction to Construction Math; Introduction to Hand Tools; Introduction to Power Tools; Introduction to Construction Drawings; Basic Rigging; Basic Communication Skills; Basic Employability Skills; and Introduction to Materials Handling. Students will then begin developing skill sets related to the fundamentals of Electronics such as Introduction to the Trade; and Wood and Masonry Construction Methods. Students utilize problem-solving techniques and participate in hands-on activities to develop an understanding of course concepts. Teachers should provide each student with real world learning opportunities and instruction. Students are encouraged to become active members of the student organizations, WV SkillsUSA. The West Virginia Standards for Global 21 Learning include the following components: Global 21 Content, Literacy and Numeracy, Entrepreneurship, and Technology Standards. All West Virginia teachers are responsible for classroom instruction that integrates learning skills, technology tools, and content standards and objectives.

**1667 Electronics Systems II**

Electronics Systems II will continue to build student skill sets in areas such as Concrete and Steel Construction Methods; Pathways and Spaces; Craft Related Mathematics; Hand Bending Conduit; Introduction to the *National Electrical Code*<sup>®</sup>; and Low-Voltage Cabling. Students utilize problem-solving techniques and participate in hands-on activities to develop an understanding of course concepts. Teachers should provide each student with real world learning opportunities and instruction. Students are encouraged to become active members of the student organizations, WV SkillsUSA. The West Virginia Standards for Global 21 Learning include the following components: Global 21 Content, Literacy and Numeracy, Entrepreneurship, and Technology Standards. All West Virginia teachers are responsible for classroom instruction that integrates learning skills, technology tools, and content standards and objectives.

### **1668 Electronics Systems III**

Electronics Systems III will continue to build student skill sets in areas of DC Circuits; AC Circuits; Switching Devices and Timers; Semiconductors and Integrated Circuits; and Test Equipment. Students utilize problem-solving techniques and participate in hands-on activities to develop an understanding of course concepts. Teachers should provide each student with real world learning opportunities and instruction. Students are encouraged to become active members of the student organizations, WV SkillsUSA. The West Virginia Standards for Global 21 Learning include the following components: Global 21 Content, Literacy and Numeracy, Entrepreneurship, and Technology Standards. All West Virginia teachers are responsible for classroom instruction that integrates learning skills, technology tools, and content standards and objectives.

### **1669 Electronics Systems IV**

Electronics Systems IV will continue to build student skill sets in areas of Introduction to Electrical Drawings; Introduction to Codes and Standards; Cable Selection; Wire and Cable Terminations; and Power Quality and Grounding. Students utilize problem-solving techniques and participate in hands-on activities to develop an understanding of course concepts. Teachers should provide each student with real world learning opportunities and instruction. Students are encouraged to become active members of the student organizations, WV SkillsUSA. The West Virginia Standards for Global 21 Learning include the following components: Global 21 Content, Literacy and Numeracy, Entrepreneurship, and Technology Standards. All West Virginia teachers are responsible for classroom instruction that integrates learning skills, technology tools, and content standards and objectives.

**Concentration: 1790 STEM**

- Courses:**     2421 Communications Systems  
                  2424 Construction Systems  
                  2442 Manufacturing Systems  
                  2448 Transportation Systems

**Concentration Description:**

The STEM concentration focuses a broad range of STEM related foundation knowledge including basic safety, use of tools and equipment as well as how to employ positive work ethics in STEM related careers.

**Course Descriptions:**

**2421 Communications Systems**

This course provides opportunities for students to study and apply technological systems, concepts, and processes in communication technology. Group and individual activities engage students in creating ideas, developing innovations, and implementing design solutions as they relate to communication systems. Students will utilize problem-solving techniques and manipulative skills while completing laboratory activities to develop an understanding of course concepts. Safety instruction is integrated into all activities. Students are encouraged to become active members of the Technology Student Association (TSA), which is an integral component of the program and provides curricular opportunities that enhance student achievement. The West Virginia Standards for Global 21 Learning include the following components: Global 21 Content, Literacy and Numeracy, Entrepreneurship, and Technology Standards. All West Virginia teachers are responsible for classroom instruction that integrates learning skills, technology tools, and content standards and objectives.

**2424 Construction Systems**

This course provides opportunities for students to study and apply technological systems, concepts, and processes as they relate to construction technology. Group and individual activities engage students in creating ideas, developing innovations, and implementing design solutions as they relate to construction systems. Students will utilize problem-solving techniques and manipulative skills while completing laboratory activities to develop an understanding of course concepts. Topics range from how construction meets the needs of society to basic construction techniques. Safety instruction is integrated into all activities. Students are encouraged to become active members of the Technology Student Association (TSA), which is an integral component of the program and provides curricular opportunities that enhance student achievement. The West Virginia Standards for Global 21 Learning include the following components: Global 21 Content, Literacy and Numeracy, Entrepreneurship, and Technology Standards. All West Virginia teachers are responsible for classroom instruction that integrates learning skills, technology tools, and content standards and objectives.

**2442 Manufacturing Systems**

This course will introduce students to the basic elements of the manufacturing industry. This course provides opportunities for students to study and apply technological systems, concepts, and processes in the development and operation of a student manufacturing enterprise. Group and individual activities engage students in creating ideas, developing innovations, and implementing design solutions as they relate to manufacturing systems. Students will utilize problem-solving techniques and manipulative skills while completing laboratory activities to develop an understanding of course concepts. Safety instruction is integrated into all activities. Students are encouraged to become active members of the Technology Student Association (TSA), which is an integral component of the program and provides curricular opportunities that enhance student achievement. The West Virginia Standards for Global 21 Learning include the following components: Global 21 Content, Literacy and Numeracy, Entrepreneurship, and Technology Standards. All West Virginia teachers are responsible for classroom instruction that integrates learning skills, technology tools, and content standards and objectives.

**2448 Transportation Systems**

This course provides opportunities for students to study and apply technological systems, concepts, and processes as they relate to relocating people and goods. Group and individual activities engage students in creating ideas, developing innovations, and implementing design solutions as they relate to transportation systems. Students will utilize problem-solving techniques and manipulative skills while completing laboratory activities to develop an understanding of course concepts. Topics range from the transportation subsystems to the sources of energy used in the industry. Safety instruction is integrated into all activities. Students are encouraged to become active members of the Technology Student Association (TSA), which is an integral component of the program and provides curricular opportunities that enhance student achievement. The West Virginia Standards for Global 21 Learning include the following components: Global 21 Content, Literacy and Numeracy, Entrepreneurship, and Technology Standards. All West Virginia teachers are responsible for classroom instruction that integrates learning skills, technology tools, and content standards and objectives.

**Concentration:** 1800 Building Maintenance and Operations

- Courses:** 1774 Building Maintenance and Operations I  
1775 Building Maintenance and Operations II  
1776 Building Maintenance and Operations III  
1777 Building Maintenance and Operations IV

**Concentration Description:**

The Building Maintenance and Operations concentration focuses on careers that maintain a safe and productive environment, follow codes and regulations, identify unsafe conditions, and take corrective actions to reinstate a proper working and safe environment. Students will have the opportunity to earn NCCER certification for each skill set mastered and be exposed to skills to develop positive work ethics.

**Course Descriptions:**

**1774 Building Maintenance and Operations I**

This course introduces the student to the knowledge base and technical skills of the Building Maintenance and Operations industry. Building Maintenance and Operations I begins with the NCCER Core curriculum which is a prerequisite to all Level I completions. The students will complete modules in Basic Safety; Introduction to Construction Math; Introduction to Hand Tools; Introduction to Power Tools; Introduction to Construction Drawings; Basic Rigging; Basic Communication Skills; Basic Employability Skills; and Introduction to Materials Handling. Students will then begin developing skill sets related to the fundamentals of Building Maintenance and Operations such as Site Layout One: Distance Measurement and Leveling; and Introduction to Concrete, Reinforcing Materials and Forms. Students utilize problem-solving techniques and participate in hands-on activities to develop an understanding of course concepts. Teachers should provide each student with real world learning opportunities and instruction. Students are encouraged to become active members of the student organizations, WV SkillsUSA. The West Virginia Standards for Global 21 Learning include the following components: Global 21 Content, Literacy and Numeracy, Entrepreneurship, and Technology Standards. All West Virginia teachers are responsible for classroom instruction that integrates learning skills, technology tools, and content standards and objectives.

**1775 Building Maintenance and Operations II**

Building Maintenance and Operations II will continue to build student skill sets in areas such as Handling and Placing Concrete; Introduction to Masonry; and Masonry Units and Installation Techniques. Students utilize problem-solving techniques and participate in hands-on activities to develop an understanding of course concepts. Teachers should provide each student with real world learning opportunities and instruction. Students utilize problem-solving techniques and participate in hands-on activities to develop an understanding of course concepts. Teachers should provide each student with real world learning opportunities and instruction. Students are encouraged to become active members of the student organizations, WV SkillsUSA. The West Virginia Standards for Global 21 Learning include the following

components: Global 21 Content, Literacy and Numeracy, Entrepreneurship, and Technology Standards. All West Virginia teachers are responsible for classroom instruction that integrates learning skills, technology tools, and content standards and objectives.

### **1776 Building Maintenance and Operations III**

Building Maintenance and Operations III will continue to build student skill sets in areas of Floor Systems; Wall and Ceiling Framing; Roof Framing; and Roofing Applications. Students utilize problem-solving techniques and participate in hands-on activities to develop an understanding of course concepts. Teachers should provide each student with real world learning opportunities and instruction. Students utilize problem-solving techniques and participate in hands-on activities to develop an understanding of course concepts. Teachers should provide each student with real world learning opportunities and instruction. Students are encouraged to become active members of the student organizations, WV SkillsUSA. The West Virginia Standards for Global 21 Learning include the following components: Global 21 Content, Literacy and Numeracy, Entrepreneurship, and Technology Standards. All West Virginia teachers are responsible for classroom instruction that integrates learning skills, technology tools, and content standards and objectives.

### **1777 Building Maintenance and Operations IV**

Building Maintenance and Operations will continue to build student skill sets in areas of Exterior Finishing; Basic Stair Layout; Electrical Safety; and Residential Electrical Services. Students utilize problem-solving techniques and participate in hands-on activities to develop an understanding of course concepts. Teachers should provide each student with real world learning opportunities and instruction. Students are encouraged to become active members of the student organizations, WV SkillsUSA. The West Virginia Standards for Global 21 Learning include the following components: Global 21 Content, Literacy and Numeracy, Entrepreneurship, and Technology Standards. All West Virginia teachers are responsible for classroom instruction that integrates learning skills, technology tools, and content standards and objectives.

**Concentration:** 1810 Hydraulic and Pneumatic Troubleshooting

- Courses:** 1875 Hydraulic and Pneumatic Systems  
1876 Hydraulic and Pneumatic Maintenance  
1877 Hydraulic and Pneumatic Repair  
1878 Hydraulic and Pneumatic Troubleshooting

**Concentration Description:**

The Hydraulic and Pneumatic Troubleshooting concentration focuses on careers that will build a knowledge base and technical skills in all aspects of the Hydraulic and Pneumatic industry.

**Course Descriptions:**

**1875 Hydraulic and Pneumatic Systems**

This course introduces the student to the knowledge base and technical skills of the Hydraulic and Pneumatic industry. In the Hydraulic and Pneumatic Systems class areas of study include hydraulic principles, practical application of hydraulic systems, pneumatic principles, and practical application of pneumatic systems. Students utilize problem-solving techniques and participate in hands-on activities to develop an understanding of course concepts. Teachers should provide each student with real world learning opportunities and instruction. Students are encouraged to become active members of the student organizations, WV SkillsUSA. The West Virginia Standards for Global 21 Learning include the following components: Global 21 Content, Literacy and Numeracy, Entrepreneurship, and Technology Standards. All West Virginia teachers are responsible for classroom instruction that integrates learning skills, technology tools, and content standards and objectives.

**1876 Hydraulic and Pneumatic Maintenance**

Hydraulic and Pneumatic Maintenance will continue to build student skills in areas such as preventive maintenance practice, oil cleanliness, compressed air conditioning and maintenance scheduling of hydraulic and pneumatic systems. Teachers should provide each student with real world learning opportunities and instruction. Students are encouraged to become active members of the student organizations, WV SkillsUSA. The West Virginia Standards for Global 21 Learning include the following components: Global 21 Content, Literacy and Numeracy, Entrepreneurship, and Technology Standards. All West Virginia teachers are responsible for classroom instruction that integrates learning skills, technology tools, and content standards and objectives.

**1877 Hydraulic and Pneumatic Repair**

Hydraulic and Pneumatic Repair will continue to build student skills in areas such as assembly and disassembly of hydraulic and pneumatic components and systems, code specification recognition and repair and replacing hydraulic and pneumatic components. Teachers should provide each student with real world learning opportunities and instruction. Students are encouraged to become active members of the student organizations, WV SkillsUSA. The West Virginia Standards for Global 21 Learning include the following components: Global 21 Content,

Literacy and Numeracy, Entrepreneurship, and Technology Standards. All West Virginia teachers are responsible for classroom instruction that integrates learning skills, technology tools, and content standards and objectives.

### **1878 Hydraulic and Pneumatic Troubleshooting**

Hydraulic and Pneumatic Troubleshooting will continue to build student skills in areas such as locating and solving faults in a hydraulic and pneumatic system, procedures for testing faulty components and the use of test and measurement diagnostic equipment. Teachers should provide each student with real world learning opportunities and instruction. Students are encouraged to become active members of the student organizations, WV SkillsUSA. The West Virginia Standards for Global 21 Learning include the following components: Global 21 Content, Literacy and Numeracy, Entrepreneurship, and Technology Standards. All West Virginia teachers are responsible for classroom instruction that integrates learning skills, technology tools, and content standards and objectives.

**Concentration: 1820 Carpentry**

<b>Courses:</b>	1842 Carpentry I
	1843 Carpentry II
	1844 Carpentry III
	1845 Carpentry IV

**Concentration Description:**

The Carpentry concentration focuses on careers that will build a knowledge base and technical skills in all aspects of the carpentry industry. Learners will be exposed to a broad range of construction careers and foundation knowledge including basic safety; plan reading; use of tools and equipment; basic rigging; and how to employ positive work ethics in their careers. Students will have the opportunity to earn NCCER certification for each skill set mastered.

**Course Descriptions:****1842 Carpentry I**

This course introduces the student to the knowledge base and technical skills of the carpentry industry. Carpentry I begins with the NCCER Core curriculum which is a prerequisite to all Level I completions. The students will complete modules in Basic Safety; Introduction to Construction Math; Introduction to Hand Tools; Introduction to Power Tools; Introduction to Construction Drawings; Basic Rigging; Basic Communication Skills; Basic Employability Skills; and Introduction to Materials Handling. Students will then begin developing skill sets related to the fundamentals of Carpentry such as Orientation to the Trade; Building Materials, Fasteners, and Adhesives; and Hand and Power Tools. Students utilize problem-solving techniques and participate in hands-on activities to develop an understanding of course concepts. Teachers should provide each student with real world learning opportunities and instruction. Students are encouraged to become active members of the student organizations, WV SkillsUSA. The West Virginia Standards for Global 21 Learning include the following components: Global 21 Content, Literacy and Numeracy, Entrepreneurship, and Technology Standards. All West Virginia teachers are responsible for classroom instruction that integrates learning skills, technology tools, and content standards and objectives.

**1843 Carpentry II**

Carpentry II will continue to build student skill sets in areas such as Reading Plans and Elevations; Floor Systems, Wall and Ceiling Framing; Roof Framing; Introduction to Concrete, Reinforcing Materials, and Forms; Windows and Exterior Doors; Basic Stair Layout. Students utilize problem-solving techniques and participate in hands-on activities to develop an understanding of course concepts. Teachers should provide each student with real world learning opportunities and instruction. Students are encouraged to become active members of the student organizations, WV SkillsUSA. The West Virginia Standards for Global 21 Learning include the following components: Global 21 Content, Literacy and Numeracy, Entrepreneurship, and Technology Standards. All West Virginia teachers are responsible for

classroom instruction that integrates learning skills, technology tools, and content standards and objectives.

### **1844 Carpentry III**

Carpentry III will continue to build student skill sets in areas of Commercial Drawings; Roofing Applications; Thermal and Moisture Protection; and Exterior Finishing. Students utilize problem-solving techniques and participate in hands-on activities to develop an understanding of course concepts. Teachers should provide each student with real world learning opportunities and instruction. Students utilize problem-solving techniques and participate in hands-on activities to develop an understanding of course concepts. Teachers should provide each student with real world learning opportunities and instruction. Students are encouraged to become active members of the student organizations, WV SkillsUSA. The West Virginia Standards for Global 21 Learning include the following components: Global 21 Content, Literacy and Numeracy, Entrepreneurship, and Technology Standards. All West Virginia teachers are responsible for classroom instruction that integrates learning skills, technology tools, and content standards and objectives.

### **1845 Carpentry IV**

Carpentry IV will continue to build student skill sets in areas of Cold-Formed Steel Framing; Drywall Installation; Drywall Finishing; Doors and Door Hardware; Suspended Ceilings; Window, Door, Floor, and Ceiling Trim; Cabinet Installation; and Cabinet Fabrication. Students utilize problem-solving techniques and participate in hands-on activities to develop an understanding of course concepts. Teachers should provide each student with real world learning opportunities and instruction. Students are encouraged to become active members of the student organizations, WV SkillsUSA. The West Virginia Standards for Global 21 Learning include the following components: Global 21 Content, Literacy and Numeracy, Entrepreneurship, and Technology Standards. All West Virginia teachers are responsible for classroom instruction that integrates learning skills, technology tools, and content standards and objectives.

**Concentration:** 1870 Industrial Equipment Maintenance

**Courses:** 1871 Electrical Maintenance  
1873 Fundamentals of Industrial Equipment Maintenance  
1875 Hydraulic and Pneumatic Systems  
1985 Fundamentals of Welding Technology

**Concentration Description:**

The Industrial Equipment Maintenance concentration focuses on careers that will build a knowledge base and technical skills in all aspects of the Industrial Equipment Maintenance industry. Students will have the opportunity to be to develop positive work ethic skills.

**Course Descriptions:**

**1871 Electrical Maintenance**

This course introduces the student to the knowledge base and technical skills for entry level skills in industrial Electrical Maintenance. Areas of study include basic electrical theory and calculations, electrical tools, instruments and safety, electrical symbols and diagrams, industrial power and control circuits, electrical equipment and devices, electrical motors, and an introduction to programmable logic controllers, as applied in industrial locations. Emphasis will be placed on career exploration, job seeking skills, and personal and professional ethics. Safety instruction is integrated into all activities. Students utilize problem-solving techniques and participate in hands-on activities to develop an understanding of course concepts. Teachers should provide each student with real world learning opportunities and instruction. Students are encouraged to become active members of the student organizations, WV SkillsUSA. The West Virginia Standards for Global 21 Learning include the following components: Global 21 Content, Literacy and Numeracy, Entrepreneurship, and Technology Standards. All West Virginia teachers are responsible for classroom instruction that integrates learning skills, technology tools, and content standards and objectives.

**1873 Fundamentals of Industrial Equipment Maintenance**

This course introduces the student to the knowledge base and technical skills for entry level skills in Industrial Maintenance. Areas of study include workplace safety, measurement and calculation, tools, fasteners, lubrication and bearings, mechanical and belt drives, and mechanical alignment and vibration. Emphasis will be placed on career exploration, job seeking skills, and personal and professional ethics. Safety instruction is integrated into all activities. Students utilize problem-solving techniques and participate in hands-on activities to develop an understanding of course concepts. Teachers should provide each student with real world learning opportunities and instruction. Students are encouraged to become active members of the student organizations, WV SkillsUSA. The West Virginia Standards for Global 21 Learning include the following components: Global 21 Content, Literacy and Numeracy, Entrepreneurship, and Technology Standards. All West Virginia teachers are responsible for classroom instruction that integrates learning skills, technology tools, and content standards and objectives.

### **1875 Hydraulic and Pneumatic Systems**

This course introduces the student to the knowledge base and technical skills related to industrial Hydraulic and Pneumatic Systems. Areas of study include hydraulic principles, practical application of hydraulic systems, pneumatic principles, and practical application of pneumatic systems. Emphasis will be placed on career exploration, job seeking skills, and personal and professional ethics. Safety instruction is integrated into all activities. Students utilize problem-solving techniques and participate in hands-on activities to develop an understanding of course concepts. Teachers should provide each student with real world learning opportunities and instruction. Students are encouraged to become active members of the student organizations, WV SkillsUSA. The West Virginia Standards for Global 21 Learning include the following components: Global 21 Content, Literacy and Numeracy, Entrepreneurship, and Technology Standards. All West Virginia teachers are responsible for classroom instruction that integrates learning skills, technology tools, and content standards and objectives.

### **1985 Fundamentals of Welding Technology**

This course introduces the student to the knowledge base and technical skills for all courses in Welding Technology. Areas of study include career opportunities in welding, welding terms and processes, oxyfuel cutting, lab, and equipment safety. Safety instruction is integrated into all activities. Students utilize problem-solving techniques and participate in hands-on activities to develop an understanding of course concepts. Teachers should provide each student with real world learning opportunities and instruction. Students are encouraged to become active members of the student organizations, WV SkillsUSA. The West Virginia Standards for Global 21 Learning include the following components: Global 21 Content, Literacy and Numeracy, Entrepreneurship, and Technology Standards. All West Virginia teachers are responsible for classroom instruction that integrates learning skills, technology tools, and content standards and objectives.

**Concentration:** 1880 Industrial Technology

**Courses:** 1806 Fundamentals of Industrial Technology  
1807 Industrial Electricity  
1808 Electronic Instrumentation  
1809 Industrial Pneumatics

**Concentration Description:**

The Industrial Technology concentration focuses on careers that will build a knowledge base and technical skills in all aspects of the Industrial Technology industry. Students will have the opportunity to be exposed to skills to develop positive work ethics.

**Course Descriptions:**

**1806 Fundamentals of Industrial Technology**

This course introduces the student to the knowledge base and technical skills for entry level skills in Industrial Technology. Areas of study include workplace safety, measurement and calculation, fasteners, tools, lubrication and bearings, and power and transfer. Emphasis will be placed on career exploration, job seeking skills, and personal and professional ethics. Safety instruction is integrated into all activities. Students utilize problem-solving techniques and participate in hands-on activities to develop an understanding of course concepts. Teachers should provide each student with real world learning opportunities and instruction. Students are encouraged to become active members of the student organizations, WV SkillsUSA. The West Virginia Standards for Global 21 Learning include the following components: Global 21 Content, Literacy and Numeracy, Entrepreneurship, and Technology Standards. All West Virginia teachers are responsible for classroom instruction that integrates learning skills, technology tools, and content standards and objectives.

**1807 Industrial Electricity**

This course introduces the student to the knowledge base and technical skills for entry level skills in Industrial Electricity. Areas of study include basic electrical theory and calculations, industrial electrical safety, electrical tools and instruments, electrical symbols and diagrams, industrial power and control circuits, electrical equipment and devices, and electrical motors. Emphasis will be placed on career exploration, job seeking skills, and personal and professional ethics. Safety instruction is integrated into all activities. Students utilize problem-solving techniques and participate in hands-on activities to develop an understanding of course concepts. Teachers should provide each student with real world learning opportunities and instruction. Students are encouraged to become active members of the student organizations, WV SkillsUSA. The West Virginia Standards for Global 21 Learning include the following components: Global 21 Content, Literacy and Numeracy, Entrepreneurship, and Technology Standards. All West Virginia teachers are responsible for classroom instruction that integrates learning skills, technology tools, and content standards and objectives.

**1808 Electronic Instrumentation**

This course introduces the student to the knowledge base and technical skills for entry level skills in Electronic Instrumentation. Areas of study include introduction to programmable logic controllers, sensors, relays and starters, voltage and current measurement, and electromagnetism. Emphasis will be placed on career exploration, job seeking skills, and personal and professional ethics. Safety instruction is integrated into all activities. Students utilize problem-solving techniques and participate in hands-on activities to develop an understanding of course concepts. Teachers should provide each student with real world learning opportunities and instruction. Students are encouraged to become active members of the student organizations, WV SkillsUSA. The West Virginia Standards for Global 21 Learning include the following components: Global 21 Content, Literacy and Numeracy, Entrepreneurship, and Technology Standards. All West Virginia teachers are responsible for classroom instruction that integrates learning skills, technology tools, and content standards and objectives.

**1809 Electronic Pneumatics**

This course introduces the student to the knowledge base and technical skills related to Industrial Pneumatics. Areas of study include hydraulic principles, practical application of hydraulic systems, pneumatic principles, and practical application of pneumatic systems. Emphasis will be placed on career exploration, job seeking skills, and personal and professional ethics. Safety instruction is integrated into all activities. Students utilize problem-solving techniques and participate in hands-on activities to develop an understanding of course concepts. Teachers should provide each student with real world learning opportunities and instruction. Students are encouraged to become active members of the student organizations, WV SkillsUSA. The West Virginia Standards for Global 21 Learning include the following components: Global 21 Content, Literacy and Numeracy, Entrepreneurship, and Technology Standards. All West Virginia teachers are responsible for classroom instruction that integrates learning skills, technology tools, and content standards and objectives.

**Concentration:** 1895 Industrial Electrical Control Systems

**Courses:** 1763 Fundamentals of Electricity  
1807 Industrial Electricity  
1771 Rotating Devices and Control Circuitry  
1765 Industrial and Commercial Wiring

**Concentration Description:**

The Industrial Electrical Control Systems concentration focuses on careers that will build a knowledge base and technical skills in all aspects of the Industrial Electrical Control Industry. Students will have the opportunity to participate in leadership and competitive event opportunities through Career and Technical Student Organization, WV SkillsUSA.

**Course Descriptions:**

**1763 Fundamentals of Electricity**

This course introduces the student to the knowledge base and technical skills of the electrical industry. Fundamentals of Electricity begins with an introduction to the required safety and tools involved with electrical industry. Students will then explore Blueprint Reading, Technical Math, the use of an Electrical Multimeter, Basic Circuits, and Connections and Wire Splices. Students will utilize problem-solving techniques and participate in hands-on activities to develop an understanding of course concepts. Teachers should provide each student with real world learning opportunities and instruction. Students are encouraged to become active members of the student organizations, WV SkillsUSA. The West Virginia Standards for Global 21 Learning include the following components: Global 21 Content, Literacy and Numeracy, Entrepreneurship, and Technology Standards. All West Virginia teachers are responsible for classroom instruction that integrates learning skills, technology tools, and content standards and objectives.

**1807 Industrial Electricity**

Industrial Electricity will continue to build student skill sets in areas such as Basic Electrical Theory and Calculations, Industrial Electrical Safety, Electrical Tools and Instruments, Electrical Symbols and Diagrams, Industrial Power and Control Circuits, Electrical Equipment and Devices, and Electrical Motors. Students utilize problem-solving techniques and participate in hands-on activities to develop an understanding of course concepts. Teachers should provide each student with real world learning opportunities and instruction. Students are encouraged to become active members of the student organizations, WV SkillsUSA. The West Virginia Standards for Global 21 Learning include the following components: Global 21 Content, Literacy and Numeracy, Entrepreneurship, and Technology Standards. All West Virginia teachers are responsible for classroom instruction that integrates learning skills, technology tools, and content standards and objectives.

**1771 Rotating Devices and Control Wiring**

Rotating Devices and Control Wiring will continue to build student skill sets in areas of Safety, Control Circuitry Blueprints, Schematics and Pictorial Diagrams, Pilot Devices, Motor Controls, Relays and Starters, and AC and DC Motors. Students utilize problem-solving techniques and participate in hands-on activities to develop an understanding of course concepts. Teachers should provide each student with real world learning opportunities and instruction. Students are encouraged to become active members of the student organizations, WV SkillsUSA. The West Virginia Standards for Global 21 Learning include the following components: Global 21 Content, Literacy and Numeracy, Entrepreneurship, and Technology Standards. All West Virginia teachers are responsible for classroom instruction that integrates learning skills, technology tools, and content standards and objectives.

**1765 Industrial and Commercial Wiring**

Industrial and Commercial Wiring will continue to build student skill sets in areas of Conduit and Raceways, Lighting and Receptacle Outlets, Commercial Load Calculations, and Transformers. Students utilize problem-solving techniques and participate in hands-on activities to develop an understanding of course concepts. Teachers should provide each student with real world learning opportunities and instruction. Students are encouraged to become active members of the student organizations, WV SkillsUSA. The West Virginia Standards for Global 21 Learning include the following components: Global 21 Content, Literacy and Numeracy, Entrepreneurship, and Technology Standards. All West Virginia teachers are responsible for classroom instruction that integrates learning skills, technology tools, and content standards and objectives.

## **Concentration: 1900 Machine Tool Technology**

- Courses:**       1903 Fundamentals of Machine Tool Technology  
                      1905 Fundamentals of Machine Processes  
                      1907 Machine Tool Operations  
                      1909 Metal Trades Processes and Applications

### **Concentration Description:**

The Machine Tool Technology concentration focuses on careers that will build a knowledge base and technical skills in all aspects of the Machine Tool Technology industry. Students will have the opportunity to earn NIMS certifications that are applicable to the trade.

### **Course Descriptions:**

#### **1903 Fundamentals of Machine Tool Technology**

This course introduces the student to the knowledge base and technical skills of the Machine Tool Technology industry. In the Fundamentals of Machine Tool Technology class areas of study include hydraulic principles, practical application of hydraulic systems, pneumatic principles, and practical application of pneumatic systems. Students utilize problem-solving techniques and participate in hands-on activities to develop an understanding of course concepts. Teachers should provide each student with real world learning opportunities and instruction. Students are encouraged to become active members of the student organizations, WV SkillsUSA. The West Virginia Standards for Global 21 Learning include the following components: Global 21 Content, Literacy and Numeracy, Entrepreneurship, and Technology Standards. All West Virginia teachers are responsible for classroom instruction that integrates learning skills, technology tools, and content standards and objectives.

#### **1905 Fundamentals of Machine Processes**

Fundamentals of Machine Processes will continue to build student skills in areas such as intermediate hand tools, power tools, measuring tools, vertical band saw, surface grinding, metal lathe operations, and milling machine operations. Students utilize problem-solving techniques and participate in hands-on activities to develop an understanding of course concepts. Teachers should provide each student with real world learning opportunities and instruction. Students are encouraged to become active members of the student organizations, WV SkillsUSA. The West Virginia Standards for Global 21 Learning include the following components: Global 21 Content, Literacy and Numeracy, Entrepreneurship, and Technology Standards. All West Virginia teachers are responsible for classroom instruction that integrates learning skills, technology tools, and content standards and objectives.

#### **1907 Machine Tool Operations**

This course introduces the student to the knowledge base and technical skills for concepts in Machine Tool Operations. Areas of study include grinding techniques, lathe operations, milling operations, and CNC machining. Emphasis will be placed on career exploration, job seeking skills, and personal and professional ethics. Safety instruction is integrated into all activities.

Students utilize problem-solving techniques and participate in hands-on activities to develop an understanding of course concepts. Teachers should provide each student with real world learning opportunities and instruction. Students are encouraged to become active members of the student organizations, WV SkillsUSA. The West Virginia Standards for Global 21 Learning include the following components: Global 21 Content, Literacy and Numeracy, Entrepreneurship, and Technology Standards. All West Virginia teachers are responsible for classroom instruction that integrates learning skills, technology tools, and content standards and objectives.

### **1909 Metal Trades Processes and Applications**

Metal Trades Processes and Applications will continue to build student skills in areas of power saw operations, metal lathe operations, milling machine operations, and CNC machining operations. Students utilize problem-solving techniques and participate in hands-on activities to develop an understanding of course concepts. Teachers should provide each student with real world learning opportunities and instruction. Students are encouraged to become active members of the student organizations, WV SkillsUSA. The West Virginia Standards for Global 21 Learning include the following components: Global 21 Content, Literacy and Numeracy, Entrepreneurship, and Technology Standards. All West Virginia teachers are responsible for classroom instruction that integrates learning skills, technology tools, and content standards and objectives.

**Concentration:** 1910 Masonry

**Courses:** 1846 Masonry I  
1847 Masonry II  
1848 Masonry III  
1849 Masonry IV

**Concentration Description:**

The Masonry concentration focuses on careers that will build a knowledge base and technical skills in all aspects of the Masonry industry. Students will have the opportunity to earn NCCER certification for each skill set mastered and be exposed to skills to develop positive work ethics.

**Course Descriptions:**

**1846 Masonry I**

This course introduces the student to the knowledge base and technical skills of the Masonry industry. Masonry I begins with the NCCER Core curriculum which is a prerequisite to all Level I completions. The students will complete modules in Basic Safety; Introduction to Construction Math; Introduction to Hand Tools; Introduction to Power Tools; Introduction to Construction Drawings; Basic Rigging; Basic Communication Skills; Basic Employability Skills; and Introduction to Materials Handling. Students will then begin developing skill sets related to the fundamentals of Masonry such as Introduction to Masonry; and Masonry Tools and Equipment. Students utilize problem-solving techniques and participate in hands-on activities to develop an understanding of course concepts. Teachers should provide each student with real world learning opportunities and instruction. Students are encouraged to become active members of the student organizations, WV SkillsUSA. The West Virginia Standards for Global 21 Learning include the following components: Global 21 Content, Literacy and Numeracy, Entrepreneurship, and Technology Standards. All West Virginia teachers are responsible for classroom instruction that integrates learning skills, technology tools, and content standards and objectives.

**1847 Masonry II**

Masonry II will continue to build student skill sets in areas such as Measurements, Drawings, and Specifications; Mortar; and Masonry Units and Installation Techniques. Students utilize problem-solving techniques and participate in hands-on activities to develop an understanding of course concepts. Teachers should provide each student with real world learning opportunities and instruction. Students are encouraged to become active members of the student organizations, WV SkillsUSA. The West Virginia Standards for Global 21 Learning include the following components: Global 21 Content, Literacy and Numeracy, Entrepreneurship, and Technology Standards. All West Virginia teachers are responsible for classroom instruction that integrates learning skills, technology tools, and content standards and objectives.

### **1848 Masonry III**

Masonry III will continue to build student skill sets in areas of Residential Plans and Drawing Interpretation; Residential Masonry; Grout and Other Reinforcement; and Metal Work in Masonry. Students utilize problem-solving techniques and participate in hands-on activities to develop an understanding of course concepts. Teachers should provide each student with real world learning opportunities and instruction. Students are encouraged to become active members of the student organizations, WV SkillsUSA. The West Virginia Standards for Global 21 Learning include the following components: Global 21 Content, Literacy and Numeracy, Entrepreneurship, and Technology Standards. All West Virginia teachers are responsible for classroom instruction that integrates learning skills, technology tools, and content standards and objectives.

### **1849 Masonry IV**

Masonry IV will continue to build student skill sets in areas of Advanced Laying Techniques; Construction Techniques and Moisture Control; and Construction Inspection and Quality Control. Students utilize problem-solving techniques and participate in hands-on activities to develop an understanding of course concepts. Teachers should provide each student with real world learning opportunities and instruction. Students utilize problem-solving techniques and participate in hands-on activities to develop an understanding of course concepts. Teachers should provide each student with real world learning opportunities and instruction. Students are encouraged to become active members of the student organizations, WV SkillsUSA. The West Virginia Standards for Global 21 Learning include the following components: Global 21 Content, Literacy and Numeracy, Entrepreneurship, and Technology Standards. All West Virginia teachers are responsible for classroom instruction that integrates learning skills, technology tools, and content standards and objectives.

**Concentration:** 1920 Materials Distribution

- Courses:** 1921 Fundamentals of Materials Distribution  
1923 Materials Distribution Equipment  
1925 Materials Management  
1927 Supervisory Skills in Warehousing

**Concentration Description:**

The Materials Distribution concentration focuses on the technical and supervisory skills related to the Warehousing/Material Distribution industry.

**Course Descriptions:**

**1921 Fundamentals of Materials Distribution**

This course introduces the student to the knowledge base and technical skills for all courses in the Materials Distribution concentration. Areas of study include career opportunities, safety rules, and shipment procedures. Emphasis will be placed on career exploration, job seeking skills, and personal and professional ethics. Safety instruction is integrated into all activities. Students utilize problem-solving techniques and participate in hands-on activities to develop an understanding of course concepts. Teachers should provide each student with real world learning opportunities and instruction. Students are encouraged to become active members of the student organization, WV SkillsUSA. The West Virginia Standards for Global 21 Learning include the following components: Global 21 Content, Literacy and Numeracy, Entrepreneurship, and Technology Standards. All West Virginia teachers are responsible for classroom instruction that integrates learning skills, technology tools, and content standards and objectives.

**1923 Materials Distribution Equipment**

This course introduces the student to the knowledge base and technical skills for concepts in Materials Distribution Equipment. Areas of study include the demonstration of manual and powered equipment. Emphasis will be placed on career exploration, job seeking skills, and personal and professional ethics. Safety instruction is integrated into all activities. Students utilize problem-solving techniques and participate in hands-on activities to develop an understanding of course concepts. Teachers should provide each student with real world learning opportunities and instruction. Students are encouraged to become active members of the student organization, WV SkillsUSA. The West Virginia Standards for Global 21 Learning include the following components: Global 21 Content, Literacy and Numeracy, Entrepreneurship, and Technology Standards. All West Virginia teachers are responsible for classroom instruction that integrates learning skills, technology tools, and content standards and objectives.

**1925 Materials Management**

This course introduces the student to the knowledge base and technical skills for concepts in Materials Management. Areas of study include the preparation and operation of computer technology in materials distribution. Emphasis will be placed on career exploration, job seeking

skills, and personal and professional ethics. Safety instruction is integrated into all activities. Students utilize problem-solving techniques and participate in hands-on activities to develop an understanding of course concepts. Teachers should provide each student with real world learning opportunities and instruction. Students are encouraged to become active members of the student organization, WV SkillsUSA. The West Virginia Standards for Global 21 Learning include the following components: Global 21 Content, Literacy and Numeracy, Entrepreneurship, and Technology Standards. All West Virginia teachers are responsible for classroom instruction that integrates learning skills, technology tools, and content standards and objectives.

### **1927 Supervisor Skills in Warehousing**

This course introduces the student to the knowledge base and technical skills for concepts in Supervision Skills in Warehousing. Areas of study include managerial, training, and administrative duties. Emphasis will be placed on career exploration, job seeking skills, and personal and professional ethics. Safety instruction is integrated into all activities. Students utilize problem-solving techniques and participate in hands-on activities to develop an understanding of course concepts. Teachers should provide each student with real world learning opportunities and instruction. Students are encouraged to become active members of the student organization, WV SkillsUSA. The West Virginia Standards for Global 21 Learning include the following components: Global 21 Content, Literacy and Numeracy, Entrepreneurship, and Technology Standards. All West Virginia teachers are responsible for classroom instruction that integrates learning skills, technology tools, and content standards and objectives.

**Concentration:** 1960 Power Equipment Systems

**Courses:** 1962 Fundamentals of Power Equipment I  
1964 Fundamentals of Power Equipment II  
1966 Power Equipment Service I  
1968 Power Equipment Service II

**Concentration Description:**

The Power Equipment Systems concentration focuses on careers that will build a knowledge base and technical skills in all aspects of the Power Equipment Systems industry. Students will have the opportunity to acquire hours toward Equipment and Engine Training Counsel (EETC), Small Engine Certifications. Students are also exposed to positive work ethics.

**Course Descriptions:**

**1962 Fundamentals of Power Equipment I**

This course introduces the student to the knowledge base and technical skills for Fundamentals of Power Equipment I as a component of all courses in the Power Equipment Systems concentration. Areas of study include job seeking and keeping skills, safety, basic principles of engine operation, and air and fuel systems. Emphasis will be placed on career exploration, job seeking skills, and personal and professional ethics. Safety instruction is integrated into all activities. Students utilize problem-solving techniques and participate in hands-on activities to develop an understanding of course concepts. Teachers should provide each student with real world learning opportunities and instruction. Students are encouraged to become active members of the student organization, WV SkillsUSA. The West Virginia Standards for Global 21 Learning include the following components: Global 21 Content, Literacy and Numeracy, Entrepreneurship, and Technology Standards. All West Virginia teachers are responsible for classroom instruction that integrates learning skills, technology tools, and content standards and objectives.

**1964 Fundamentals of Power Equipment II**

This course introduces the student to the knowledge base and technical skills for Fundamentals of Power Equipment II as a component of concepts in the Power Equipment Systems concentration. Areas of study include lubrication, cooling, electrical, and exhaust systems. Emphasis will be placed on career exploration, job seeking skills, and personal and professional ethics. Safety instruction is integrated into all activities. Students utilize problem-solving techniques and participate in hands-on activities to develop an understanding of course concepts. Teachers should provide each student with real world learning opportunities and instruction. Students are encouraged to become active members of the student organization, WV SkillsUSA. The West Virginia Standards for Global 21 Learning include the following components: Global 21 Content, Literacy and Numeracy, Entrepreneurship, and Technology Standards. All West Virginia teachers are responsible for classroom instruction that integrates learning skills, technology tools, and content standards and objectives.

### **1966 Power Equipment Service I**

This course introduces the student to the knowledge base and technical skills for Power Equipment Service I as a component of concepts in the Power Equipment Systems concentration. Areas of study include: basic shop skills, safety, measurement, and complete engine system service. Emphasis will be placed on career exploration, job seeking skills, and personal and professional ethics. Safety instruction is integrated into all activities. Students utilize problem-solving techniques and participate in hands-on activities to develop an understanding of course concepts. Teachers should provide each student with real world learning opportunities and instruction. Students are encouraged to become active members of the student organization, WV SkillsUSA. The West Virginia Standards for Global 21 Learning include the following components: Global 21 Content, Literacy and Numeracy, Entrepreneurship, and Technology Standards. All West Virginia teachers are responsible for classroom instruction that integrates learning skills, technology tools, and content standards and objectives.

### **1968 Power Equipment Service II**

This course introduces the student to the knowledge base and technical skills for Power Equipment Service II as a component of concepts in the Power Equipment Systems concentration. Areas of study include: drive systems, chainsaws, and miscellaneous outdoor power equipment applications. Emphasis will be placed on career exploration, job seeking skills, and personal and professional ethics. Safety instruction is integrated into all activities. Students utilize problem-solving techniques and participate in hands-on activities to develop an understanding of course concepts. Teachers should provide each student with real world learning opportunities and instruction. Students are encouraged to become active members of the student organization, WV SkillsUSA. The West Virginia Standards for Global 21 Learning include the following components: Global 21 Content, Literacy and Numeracy, Entrepreneurship, and Technology Standards. All West Virginia teachers are responsible for classroom instruction that integrates learning skills, technology tools, and content standards and objectives.

**Concentration: 1980 Welding**

**Courses:** 1862 Welding I  
1863 Welding II  
1864 Welding III  
1865 Welding IV

**Concentration Description:**

The Welding concentration focuses on careers that will build a knowledge base and technical skills in all aspects of the Welding industry. Students will have the opportunity to earn both NCCER certification and the WV Welding Certification for each skill set mastered and be exposed to skills to develop positive work ethics.

**Course Descriptions:**

**1862 Welding I**

This course is designed to introduce the student to the knowledge base and technical skills of the Welding industry. Welding I begins with the NCCER Core curriculum which is a prerequisite to all Level I completions. The students will complete modules in Basic Safety; Introduction to Construction Math; Introduction to Hand Tools; Introduction to Power Tools; Introduction to Construction Drawings; Basic Rigging; Basic Communication Skills; Basic Employability Skills; and Introduction to Materials Handling. Students will then begin developing skill sets in the fundamentals of Welding such as Welding Safety; Oxyfuel Cutting; and Plasma Arc Cutting. Students utilize problem-solving techniques and participate in hands-on activities to develop an understanding of course concepts. Teachers should provide each student with real world learning opportunities and instruction. Students are encouraged to become active members of the student organizations, WV SkillsUSA. The West Virginia Standards for Global 21 Learning include the following components: Global 21 Content, Literacy and Numeracy, Entrepreneurship, and Technology Standards. All West Virginia teachers are responsible for classroom instruction that integrates learning skills, technology tools, and content standards and objectives.

**1863 Welding II**

Welding II will continue to build student skill sets in areas of Air Carbon Arc Cutting and Gouging; Base Metal Preparation; Weld Quality; SMAW-Equipment and Setup; Shielded Metal Arc Electrodes; SMAW-Beads and Fillet Welds; Joint Fit Up and Alignment; SMAW-Groove Welds with Backing; and SMAW-Open V-Groove Welds. Students utilize problem-solving techniques and participate in hands-on activities to develop an understanding of course concepts. Teachers should provide each student with real world learning opportunities and instruction. Students are encouraged to become active members of the student organizations, WV SkillsUSA. The West Virginia Standards for Global 21 Learning include the following components: Global 21 Content, Literacy and Numeracy, Entrepreneurship, and Technology Standards. All West Virginia teachers are responsible for classroom instruction that integrates learning skills, technology tools, and content standards and objectives.

**1864 Welding III**

Welding III will continue to build student skill sets in areas of Welding Symbols; Reading Welding Detail Drawings; Physical Characteristics and Mechanical Properties of Metals; Preheating and Postheating of Metals; GMAW and FCAW-Equipment and Filler Metals; and GMAW and FCAW-Plate. Students utilize problem-solving techniques and participate in hands-on activities to develop an understanding of course concepts. Teachers should provide each student with real world learning opportunities and instruction. Students are encouraged to become active members of the student organizations, WV SkillsUSA. The West Virginia Standards for Global 21 Learning include the following components: Global 21 Content, Literacy and Numeracy, Entrepreneurship, and Technology Standards. All West Virginia teachers are responsible for classroom instruction that integrates learning skills, technology tools, and content standards and objectives.

**1865 Welding IV**

Welding IV will continue to build student skill sets in areas of GTAW-Equipment and Filler Metals; and GTAW-Plate. Students utilize problem-solving techniques and participate in hands-on activities to develop an understanding of course concepts. Teachers should provide each student with real world learning opportunities and instruction. Students are encouraged to become active members of the student organizations, WV SkillsUSA. The West Virginia Standards for Global 21 Learning include the following components: Global 21 Content, Literacy and Numeracy, Entrepreneurship, and Technology Standards. All West Virginia teachers are responsible for classroom instruction that integrates learning skills, technology tools, and content standards and objectives.

**Concentration:** 2030 Computer Integrated Manufacturing

- Courses:**       2031 Computer Integrated Manufacturing  
                      2032 Computer Integrated Manufacturing EL 1  
                      2033 Computer Integrated Manufacturing EL 2  
                      2034 Computer Integrated Manufacturing EL 3

**Concentration Description:**

The Computer Integrated Manufacturing concentration focuses on careers that will build a knowledge base and technical skills in Computer Integrated Manufacturing with an emphasis towards Mechanical Engineering.

**Course Descriptions:**

**2031 Computer Integrated Manufacturing**

This course introduces the student to the knowledge base and technical skills of the Computer Integrated Manufacturing. In the Computer Integrated Manufacturing class areas of study includes all aspects of mechanical drawing. Students utilize problem-solving techniques and participate in hands-on activities to develop an understanding of course concepts. Teachers should provide each student with real world learning opportunities and instruction. Students are encouraged to become active members of the student organizations, WV SkillsUSA. The West Virginia Standards for Global 21 Learning include the following components: Global 21 Content, Literacy and Numeracy, Entrepreneurship, and Technology Standards. All West Virginia teachers are responsible for classroom instruction that integrates learning skills, technology tools, and content standards and objectives.

**2032 Computer Integrated Manufacturing EL 1**

Computer Integrated Manufacturing EL 1 will continue to build student skills through using AutoCAD software. Teachers should provide each student with real world learning opportunities and instruction. Students are encouraged to become active members of the student organizations, WV SkillsUSA. The West Virginia Standards for Global 21 Learning include the following components: Global 21 Content, Literacy and Numeracy, Entrepreneurship, and Technology Standards. All West Virginia teachers are responsible for classroom instruction that integrates learning skills, technology tools, and content standards and objectives.

**2033 Computer Integrated Manufacturing EL 2**

Computer Integrated Manufacturing EL 2 will continue to build student skills in the manufacturing process with an emphasis in physical characteristics, mechanical properties, composition, and classification of ferrous and non ferrous metals. Teachers should provide each student with real world learning opportunities and instruction. Students are encouraged to become active members of the student organizations, WV SkillsUSA. The West Virginia Standards for Global 21 Learning include the following components: Global 21 Content, Literacy and Numeracy, Entrepreneurship, and Technology Standards. All West Virginia teachers are

responsible for classroom instruction that integrates learning skills, technology tools, and content standards and objectives.

### **2034 Computer Integrated Manufacturing EL 3**

Computer Integrated Manufacturing EL 3 will continue to build student skills in CNC milling and turning. Teachers should provide each student with real world learning opportunities and instruction. Students are encouraged to become active members of the student organizations, WV SkillsUSA. The West Virginia Standards for Global 21 Learning include the following components: Global 21 Content, Literacy and Numeracy, Entrepreneurship, and Technology Standards. All West Virginia teachers are responsible for classroom instruction that integrates learning skills, technology tools, and content standards and objectives.

**Concentration:** 2110 Metals Technology

**Courses:** 1903 Fundamentals of Machine Tool Technology  
1907 Machine Tools Operations  
1985 Fundamentals of Welding Technology  
1993 Shielded Metal Arc Welding

**Concentration Description:**

The Metals Technology concentration focuses on technical and job readiness skills related to the Metals Technology industry.

**Course Descriptions:**

**1903 Fundamentals of Machine Tool Technology**

This course introduces the student to the knowledge base and technical skills for all courses in the Machine Tool Technology concentration. Areas of study include career exploration, measuring skills and techniques, interpreting blueprints, basic hand tools, filing and grinding, basic band saw, basic drill press, basic metal lathe, and basic milling machine operations and procedures. Emphasis will be placed on career exploration, job seeking skills, and personal and professional ethics. Safety instruction is integrated into all activities. Students utilize problem-solving techniques and participate in hands-on activities to develop an understanding of course concepts. Teachers should provide each student with real world learning opportunities and instruction. Students are encouraged to become active members of the student organizations, WV SkillsUSA. The West Virginia Standards for Global 21 Learning include the following components: Global 21 Content, Literacy and Numeracy, Entrepreneurship, and Technology Standards. All West Virginia teachers are responsible for classroom instruction that integrates learning skills, technology tools, and content standards and objectives.

**1907 Machine Tool Operations**

This course introduces the student to the knowledge base and technical skills for concepts in Machine Tool Operations. Areas of study include grinding techniques, lathe operations, milling operations, and CNC machining. Emphasis will be placed on career exploration, job seeking skills, and personal and professional ethics. Safety instruction is integrated into all activities. Students utilize problem-solving techniques and participate in hands-on activities to develop an understanding of course concepts. Teachers should provide each student with real world learning opportunities and instruction. Students are encouraged to become active members of the student organizations, WV SkillsUSA. The West Virginia Standards for Global 21 Learning include the following components: Global 21 Content, Literacy and Numeracy, Entrepreneurship, and Technology Standards. All West Virginia teachers are responsible for classroom instruction that integrates learning skills, technology tools, and content standards and objectives.

### **1985 Fundamentals of Welding Technology**

This course introduces the student to the knowledge base and technical skills for all courses in Welding Technology. Areas of study include career opportunities in welding, welding terms and processes, oxyfuel cutting, lab, and equipment safety. Safety instruction is integrated into all activities. Students utilize problem-solving techniques and participate in hands-on activities to develop an understanding of course concepts. Teachers should provide each student with real world learning opportunities and instruction. Students are encouraged to become active members of the student organizations, WV SkillsUSA. The West Virginia Standards for Global 21 Learning include the following components: Global 21 Content, Literacy and Numeracy, Entrepreneurship, and Technology Standards. All West Virginia teachers are responsible for classroom instruction that integrates learning skills, technology tools, and content standards and objectives.

### **1993 Shielded Arc Welding**

This course introduces the student to the knowledge base and technical skills for concepts in Shielded Metal Arc Welding. Areas of study include the Shielded Metal Arc Welding processes. Safety instruction is integrated into all activities. Students utilize problem-solving techniques and participate in hands-on activities to develop an understanding of course concepts. Teachers should provide each student with real world learning opportunities and instruction. Students are encouraged to become active members of the student organizations, WV SkillsUSA. The West Virginia Standards for Global 21 Learning include the following components: Global 21 Content, Literacy and Numeracy, Entrepreneurship, and Technology Standards. All West Virginia teachers are responsible for classroom instruction that integrates learning skills, technology tools, and content standards and objectives.

**Concentration:** 2120 Millwork and Cabinetmaking

- Courses:** 2126 Millwork and Cabinetmaking I  
2127 Millwork and Cabinetmaking II  
2128 Millwork and Cabinetmaking III  
2129 Millwork and Cabinetmaking IV

**Concentration Description:**

The Millwork and Cabinetmaking concentration focuses on careers that will build a knowledge base and technical skills in all aspects of the Millwork and Cabinetmaking industry. Students will have the opportunity to earn NCCER certification for each skill set mastered and be exposed to skills to develop positive work ethics.

**Course Descriptions:**

**2126 Millwork and Cabinetmaking I**

This course introduces the student to the knowledge base and technical skills of the Millwork and Cabinetmaking industry. Millwork and Cabinetmaking I begins with the NCCER Core curriculum which is a prerequisite to all Level I completions. The students will complete modules in Basic Safety; Introduction to Construction Math; Introduction to Hand Tools; Introduction to Power Tools; Introduction to Construction Drawings; Basic Rigging; Basic Communication Skills; Basic Employability Skills; and Introduction to Materials Handling. Students will then begin developing skill sets in the fundamentals of the Millwork and Cabinetmaking such as Introduction to the Trade; and Woods and Materials Used in Cabinet Construction. Students utilize problem-solving techniques and participate in hands-on activities to develop an understanding of course concepts. Teachers should provide each student with real world learning opportunities and instruction. Students are encouraged to become active members of the student organizations, WV SkillsUSA. The West Virginia Standards for Global 21 Learning include the following components: Global 21 Content, Literacy and Numeracy, Entrepreneurship, and Technology Standards. All West Virginia teachers are responsible for classroom instruction that integrates learning skills, technology tools, and content standards and objectives.

**2127 Millwork and Cabinetmaking II**

Millwork and Cabinetmaking II will continue to build student skill sets in areas such as Shop Tools Used in Cabinetmaking; Joints; Assembling the Cabinet; and Sanding and Finishing. Students utilize problem-solving techniques and participate in hands-on activities to develop an understanding of course concepts. Teachers should provide each student with real world learning opportunities and instruction. Students are encouraged to become active members of the student organizations, WV SkillsUSA. The West Virginia Standards for Global 21 Learning include the following components: Global 21 Content, Literacy and Numeracy, Entrepreneurship, and Technology Standards. All West Virginia teachers are responsible for

classroom instruction that integrates learning skills, technology tools, and content standards and objectives.

### **2128 Millwork and Cabinetmaking III**

Millwork and Cabinetmaking III will continue to build student skill sets in areas of Applying Plastic Laminate to a Countertop; Cabinet Doors; and Cabinet Drawers. Students utilize problem-solving techniques and participate in hands-on activities to develop an understanding of course concepts. Teachers should provide each student with real world learning opportunities and instruction. Students are encouraged to become active members of the student organizations, WV SkillsUSA. The West Virginia Standards for Global 21 Learning include the following components: Global 21 Content, Literacy and Numeracy, Entrepreneurship, and Technology Standards. All West Virginia teachers are responsible for classroom instruction that integrates learning skills, technology tools, and content standards and objectives.

### **2129 Millwork and Cabinetmaking IV**

Millwork and Cabinetmaking IV will continue to build student skill sets in areas of Cabinet Doors and Drawer Hardware; Cabinet Shelves and Shelf Hardware; and Mass Production Cabinetmaking. Students utilize problem-solving techniques and participate in hands-on activities to develop an understanding of course concepts. Teachers should provide each student with real world learning opportunities and instruction. Students are encouraged to become active members of the student organizations, WV SkillsUSA. The West Virginia Standards for Global 21 Learning include the following components: Global 21 Content, Literacy and Numeracy, Entrepreneurship, and Technology Standards. All West Virginia teachers are responsible for classroom instruction that integrates learning skills, technology tools, and content standards and objectives.

**Concentration:** 2140 Plumbing

**Courses:** 2081 Plumbing I  
2082 Plumbing II  
2083 Plumbing III  
2084 Plumbing IV

**Concentration Description:**

The Plumbing concentration focuses on careers that will build a knowledge base and technical skills in all aspects of the Plumbing industry. Students will have the opportunity to earn NCCER certification for each skill set mastered and be exposed to skills to develop positive work ethics.

**Course Descriptions:**

**2081 Plumbing I**

This course introduces the student to the knowledge base and technical skills of the Plumbing industry. Plumbing I begins with the NCCER Core curriculum which is a prerequisite to all Level I completions. The students will complete modules in Basic Safety; Introduction to Construction Math; Introduction to Hand Tools; Introduction to Power Tools; Introduction to Construction Drawings; Basic Rigging; Basic Communication Skills; Basic Employability Skills; and Introduction to Materials Handling. Students will then begin developing skill sets in the fundamentals of Plumbing such as Introduction to the Plumbing Profession and Plumbing Safety. Students utilize problem-solving techniques and participate in hands-on activities to develop an understanding of course concepts. Teachers should provide each student with real world learning opportunities and instruction. Students are encouraged to become active members of the student organizations, WV SkillsUSA. The West Virginia Standards for Global 21 Learning include the following components: Global 21 Content, Literacy and Numeracy, Entrepreneurship, and Technology Standards. All West Virginia teachers are responsible for classroom instruction that integrates learning skills, technology tools, and content standards and objectives.

**2082 Plumbing II**

Plumbing II will continue to build student skill sets in areas such as Plumbing Tools; Introduction to Plumbing Math; Introduction to Plumbing Drawings; Plastic Pipe and Fittings; Copper Pipe and Fittings; Cast-Iron Pipe and Fittings; Carbon Steel Pipe and Fittings; Corrugated Stainless Steel Tubing; Fixtures and Faucets; Introduction to Drain, Waste, and Vent (DWV) Systems; and Introduction to Water Distribution Systems. Students utilize problem-solving techniques and participate in hands-on activities to develop an understanding of course concepts. Teachers should provide each student with real world learning opportunities and instruction. Students are encouraged to become active members of the student organizations, WV SkillsUSA. The West Virginia Standards for Global 21 Learning include the following components: Global 21 Content, Literacy and Numeracy, Entrepreneurship, and Technology Standards. All West Virginia teachers are responsible for classroom instruction that integrates learning skills, technology tools, and content standards and objectives.

**2083 Plumbing III**

Plumbing III will continue to build student skill sets in areas of Plumbing Math Two; Reading Commercial Drawings; Hangers, Supports, Structural Penetrations, and Fire Stopping; Installing and Testing DWV Piping; Installing Roof, Floor, and Area Drains; and Types of Valves. Students utilize problem-solving techniques and participate in hands-on activities to develop an understanding of course concepts. Teachers should provide each student with real world learning opportunities and instruction. Students are encouraged to become active members of the student organizations, WV SkillsUSA. The West Virginia Standards for Global 21 Learning include the following components: Global 21 Content, Literacy and Numeracy, Entrepreneurship, and Technology Standards. All West Virginia teachers are responsible for classroom instruction that integrates learning skills, technology tools, and content standards and objectives.

**2084 Plumbing IV**

Plumbing IV will continue to build student skill sets in areas of Installing and Testing Water Supply Piping; Installing Fixtures, Valves and Faucets; Introduction to Electricity; Installing Water Heaters; Fuel Gas Systems; and Servicing of Fixtures, Valves and Faucets. Students utilize problem-solving techniques and participate in hands-on activities to develop an understanding of course concepts. Teachers should provide each student with real world learning opportunities and instruction. Students are encouraged to become active members of the student organizations, WV SkillsUSA. The West Virginia Standards for Global 21 Learning include the following components: Global 21 Content, Literacy and Numeracy, Entrepreneurship, and Technology Standards. All West Virginia teachers are responsible for classroom instruction that integrates learning skills, technology tools, and content standards and objectives.

**Concentration:** 2460 Pre-Engineering PLTW

- Courses:** 2461 Introduction to Engineering Design  
2463 Principles of Engineering  
**Select Two for Third and Fourth Course:**  
2464 Engineering Design and Development  
2462 Digital Electronics  
2465 Computer Integrated Manufacturing  
2466 Civil Engineering and Architecture  
2467 Biotechnical Engineering  
2468 Aerospace Engineering

**Concentration Description:**

The Pre-Engineering concentration focuses a broad range of engineering careers and foundation knowledge including basic safety, plan reading, use of tools and equipment as well as how to employ positive work ethics in an engineering career.

**Course Descriptions:**

**2461 Introduction to Engineering Design**

Introduction to Engineering Design is a component of the Project Lead the Way (PLTW) pre-engineering curriculum. This course teaches problem-solving skills using a design development process. Models of product solutions are created, analyzed, and communicated using solid modeling computer design software. Students utilize problem-solving techniques and participate in hands-on activities to develop an understanding of course concepts. Teachers should provide each student with real world learning opportunities and instruction. Students are encouraged to become active members of the student organizations, WV SkillsUSA. The West Virginia Standards for Global 21 Learning include the following components: Global 21 Content, Literacy and Numeracy, Entrepreneurship, and Technology Standards. All West Virginia teachers are responsible for classroom instruction that integrates learning skills, technology tools, and content standards and objectives.

**2463 Principles of Engineering**

Principles of Engineering is a component of the Project Lead the Way (PLTW) pre-engineering curriculum. This course will help students understand the field of engineering and engineering technology. Exploring various technology systems and manufacturing processes help students learn how engineers and technicians use math, science, and technology in an engineering problem solving process to benefit people. The course also includes concerns about social and political consequences of technological change. Students utilize problem-solving techniques and participate in hands-on activities to develop an understanding of course concepts. Teachers should provide each student with real world learning opportunities and instruction. Students are encouraged to become active members of the student organizations, WV SkillsUSA or WV TSA (Technology Student Association). The West Virginia Standards for Global 21 Learning include the following components: Global 21 Content, Literacy and Numeracy, Entrepreneurship, and Technology Standards. All West Virginia teachers are responsible for

classroom instruction that integrates learning skills, technology tools, and content standards and objectives.

### **2464 Engineering Design and Development**

Engineering Design and Development is a component of the Project Lead the Way (PLTW) pre-engineering curriculum. This is an engineering research course in which students work in teams to research, design, and construct a solution to an open-ended engineering problem. Students apply principles developed in the four preceding courses and are guided by a community mentor. They must present progress reports, submit a final written report, and defend their solutions to a panel of outside reviewers at the end of the school year. Safety instruction is integrated into all activities. Students utilize problem-solving techniques and participate in hands-on activities to develop an understanding of course concepts. Teachers should provide each student with real world learning opportunities and instruction. Students are encouraged to become active members of the student organizations, WV SkillsUSA or WV TSA (Technology Student Association). The West Virginia Standards for Global 21 Learning include the following components: Global 21 Content, Literacy and Numeracy, Entrepreneurship, and Technology Standards. All West Virginia teachers are responsible for classroom instruction that integrates learning skills, technology tools, and content standards and objectives.

### **2462 Digital Electronics**

Digital Electronics is a component of the Project Lead the Way (PLTW) pre-engineering curriculum. This is a course in applied logic that encompasses the application of electronic circuits and devices. Computer simulation software is used to design and test digital circuitry prior to the actual construction of circuits and devices. Students utilize problem-solving techniques and participate in hands-on activities to develop an understanding of course concepts. Teachers should provide each student with real world learning opportunities and instruction. Students are encouraged to become active members of the student organizations, WV SkillsUSA or WV TSA (Technology Student Association). The West Virginia Standards for Global 21 Learning include the following components: Global 21 Content, Literacy and Numeracy, Entrepreneurship, and Technology Standards. All West Virginia teachers are responsible for classroom instruction that integrates learning skills, technology tools, and content standards and objectives.

### **2465 Computer Integrated Manufacturing Project Lead the Way**

Computer Integrated Manufacturing is a component of the Project Lead the Way (PLTW) pre-engineering curriculum. This course will introduce students to principles of robotics and automation and CAD design. The course builds on computer solid modeling skills developed in Computer Integrated Manufacturing, and Design and Drawing for Production. Students use CNC equipment to produce actual models of their three-dimensional designs. Fundamental concepts of robotics used in automated manufacturing and design analysis are included. Students utilize problem-solving techniques and participate in hands-on activities to develop an understanding of course concepts. Teachers should provide each student with real world learning opportunities and instruction. Students are encouraged to become active members of the

student organizations, WV SkillsUSA or WV TSA (Technology Student Association). The West Virginia Standards for Global 21 Learning include the following components: Global 21 Content, Literacy and Numeracy, Entrepreneurship, and Technology Standards. All West Virginia teachers are responsible for classroom instruction that integrates learning skills, technology tools, and content standards and objectives.

### **2466 Civil Engineering and Architecture**

Civil Engineering and Architecture is a component of the Project Lead the Way (PLTW) pre-engineering curriculum. This course provides an overview of the fields of Civil Engineering and Architecture, while emphasizing the interrelationship and dependence of both fields on each other. Students use state of the art software to solve real world problems and communicate solutions to hands-on projects and activities. This course covers topics such as: roles of civil engineers and architects, project planning, site planning, building design, and project documentation and presentation. Students utilize problem-solving techniques and participate in hands-on activities to develop an understanding of course concepts. Teachers should provide each student with real world learning opportunities and instruction. Students are encouraged to become active members of the student organizations, WV SkillsUSA or WV TSA (Technology Student Association). The West Virginia Standards for Global 21 Learning include the following components: Global 21 Content, Literacy and Numeracy, Entrepreneurship, and Technology Standards. All West Virginia teachers are responsible for classroom instruction that integrates learning skills, technology tools, and content standards and objectives.

### **2467 Biotechnical Engineering**

Biotechnical Engineering is a component of the Project Lead the Way (PLTW) pre-engineering curriculum. This course will introduce students to relevant projects from the diverse fields of bio-technology, bio-engineering, bio-medical engineering, and bio-molecular engineering. This will enable students to apply and concurrently develop secondary-level knowledge and skills in biology, physics, technology, and mathematics. Students utilize problem-solving techniques and participate in hands-on activities to develop an understanding of course concepts. Teachers should provide each student with real world learning opportunities and instruction. Students are encouraged to become active members of the student organizations, WV SkillsUSA or WV TSA (Technology Student Association). The West Virginia Standards for Global 21 Learning include the following components: Global 21 Content, Literacy and Numeracy, Entrepreneurship, and Technology Standards. All West Virginia teachers are responsible for classroom instruction that integrates learning skills, technology tools, and content standards and objectives.

### **2468 Aerospace Engineering**

Aerospace Engineering is a component of the Project Lead the Way (PLTW) pre-engineering curriculum. The major focus of this course is to expose students to the world of aeronautics, flight, and engineering. Students will be introduced to activity-based, project-based, and problem-based learning through exploring the world of Aerospace Engineering. Students should have experience in physics, mathematics, and technology education. They will employ

engineering and scientific concepts in the solution of aerospace problems. The entire curriculum sequence will include experiences from the diverse fields of Aeronautics, Aerospace Engineering and related areas of study. Lessons will engage students in engineering design problems related to aerospace information systems, astronautics, rocketry, propulsion, the physics of space science, space life sciences, the biology of space science, principles of aeronautics, structures and materials, and systems engineering. Students utilize problem-solving techniques and participate in hands-on activities to develop an understanding of course concepts. Teachers should provide each student with real world learning opportunities and instruction. Students are encouraged to become active members of the student organizations, WV SkillsUSA or WV TSA (Technology Student Association). The West Virginia Standards for Global 21 Learning include the following components: Global 21 Content, Literacy and Numeracy, Entrepreneurship, and Technology Standards. All West Virginia teachers are responsible for classroom instruction that integrates learning skills, technology tools, and content standards and objectives.

<b>Virtual School Courses</b>	
<b>Virtual Course</b>	<b>CTE Course</b>
Cisco Discovery 1: Networking for Home and Small Business	1642 Cisco Discovery 1: Networking for Home and Small Business
Cisco Discovery 2: Working at a Small-to-Medium Business or ISP	1644 Cisco Discovery 2: Working at a Small-to-Medium Business or ISP
Cisco Discovery 3: Introducing Routing and Switching in the Enterprise	1646 Cisco Discovery 3: Introducing Routing and Switching in the Enterprise
Cisco Discovery 4: Designing and Supporting Computer Networks	1648 Cisco Discovery 4: Designing and Supporting Computer Networks
Computer Fundamentals A Computer Fundamentals B	1705 Fundamentals of Computer Systems