

CAREER PROGRAMS IN INDUSTRIAL OCCUPATIONS

10.0104 Radio and Television Broadcasting 10.0202 (2000 CIP)	15.1100 (1990 CIP) Technology & Pre-Engineering 21.0201 (2000 CIP)	43.0107 Criminal Justice/Police Science	43.0203 Fire Science / Firefighting	46.1000 Construction Trade (Illinois specific CIP)	47.0100 Electrical / Electronics Maintenance and Repair Technology	47.0104 Computer Installation and Repair Technology / Technician	47.0600 Vehicle Maintenance and Repair Technologies	47.0603 Autobody / Collision and Repair Technology/ Technician	48.0101 Drafting and Design Technology/ Technician General 15.1301 (2000 CIP)	48.0200 Graphic Communications 10.0300 (2000 CIP)	48.0500 Precision Metal Working	50.0402 Commercial and Advertising Art
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ORIENTATION LEVEL COURSES (9TH & 10TH GRADE)

Illinois Plan Production Comm. Transport. Energy	Illinois Plan Production Comm. Transport. Energy	Illinois Plan Production Comm. Transport. Energy	Illinois Plan Production Comm. Transport. Energy	Illinois Plan Production Comm. Transport. Energy	Illinois Plan Production Comm. Transport. Energy	Illinois Plan Production Comm. Transport. Energy	Illinois Plan Production Comm. Transport. Energy	Illinois Plan Production Comm. Transport. Energy	Illinois Plan Production Comm. Transport. Energy	Illinois Plan Production Comm. Transport. Energy	Illinois Plan Production Comm. Transport. Energy	Illinois Plan Production Comm. Transport. Energy
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PREPARATION LEVEL COURSES (11TH & 12TH GRADE)

Radio & TV Broadcast Tech I Radio & TV Broadcast Tech II Cooperative Education	Engineering Technology I Engineering Technology II Cooperative Education	Criminal Justice I Criminal Justice II Cooperative Education	Fire Science I Fire Science II Cooperative Education	Construction I Construction II Cooperative Education	Electronic I Electronic II Cooperative Education	Computer Repair I Computer Repair II Cooperative Education	Vehicle Maintenance I Vehicle Maintenance II Coop Education	Autobody I Autobody II Coop Education	Drafting & Design I Drafting & Design II Cooperative Education	Graphic Communication I Graphic Communication II Cooperative Education	Manu- facturing I Manu- facturing II Coop Education	Commercial Arts I Commercial Arts II Cooperative Education
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SPECIFIC OCCUPATIONAL PROGRAMS

The following specific occupational programs should only be offered if employment opportunities exist within the region and student interest is high. These programs include duties and tasks for specific occupational training.

10.0104 RADIO & TV BROADCASTING TECHNOLOGY

This cluster offers a sequence of planned educational classroom and laboratory experiences concerned with the preparation of individuals for a technical career in the fields of radio and television. Instruction will include the use and operation of video and DVD recording equipment, video/digital cameras, microphones, computers, lighting/grip equipment and other production equipment used in the video and audio production of television programs. Students will learn to use various types of audio recorders, amplifiers, microphones, and sound mixers to record and broadcast radio programs. Instruction will include camera operations, video editing, animation graphics, sound mixing, audio editing and special effects. Students will also learn how to maintain radio and television related equipment and systems.

This cluster includes a sequence of planned educational classroom laboratory experiences, which will develop competencies in the following duty areas:

<i>Operating, maintaining, and repairing radio broadcasting equipment</i>	<i>Performing production and post production processes</i>
<i>Operating, maintaining, and repairing television broadcasting equipment</i>	<i>Creating and adding visual and audio affects</i>
<i>Using audio and video editing hardware and software</i>	<i>Understanding FCC and other governmental agencies technical regulations regarding radio and television broadcasting</i>
<i>Using linear and nonlinear editing techniques</i>	<i>Working in a team environment</i>
<i>Creating single and multi track productions</i>	<i>Using sound and lighting techniques</i>
<i>Using single and multi cameras</i>	<i>Performing basic computer functions</i>

The following are examples of occupations for which instruction may be provided at the secondary level.

Radio and Television Specialist
Production Assistant
Broadcast Technician
Television and Video Camera Operator
Radio Operators

The following occupational listing shows examples of occupations that may require additional training in a specialized program at the postsecondary level.

Studio Engineer
Radio and Television Technical Supervisor
Television and Electronic Control Technician
Technical Operations Manager
Audio and Video Equipment Technicians
Transmission Engineer
Audio and Video Editor
Audio and Video Equipment Technicians
Technical Director
Master Control Engineer
Assistant Chief Engineer
Chief Engineer

In addition to those occupations already noted, there are other industrial occupations of a professional nature requiring extensive education beyond that received at secondary and postsecondary levels.

A regional delivery system should offer training for occupations in this field as determined by employment opportunities and the needs of the students.

Training received in this program may be used as a basis for entry level into the labor market or for further training at a postsecondary agency. Articulation between the secondary and postsecondary programs will be a part of the regional delivery systems.

Workplace skills, as well as 1) skills used in work performance that are transferable across jobs and occupations and that are instrumental to job and classroom success, 2) skills used to manage life's transitions, and 3) skills employed in the resolution of interpersonal, information or task-related problems or problems related to behavior in cooperative group settings, should be included in this curriculum. Leadership skill development is an integral part of this program and is delivered through career and technical student organization (TSA or SKILLS USA) activities. Individualized instruction and learning reinforcement are provided through cooperative career and technical education programs as well as classroom instruction.

COURSE SEQUENCE

<u>Course Title</u>	<u>Credits per Semester</u>	<u>Length in Semesters</u>	<u>Grade Level</u>
<u>Orientation</u>			
Production Technology	.5	1	9, 10

Transportation Technology	.5	1	9, 10
Communication Technology	.5	1	9, 10
Energy Utilization Technology	.5	1	9, 10

Preparation

Radio/Television Broadcasting Technology I	.5	2	11
Radio/Television Broadcasting Technology II	.5	2	12
Cooperative Education	*variable	2	11, 12

* As determined at the regional system level.

RADIO/TELEVISION BROADCASTING TECHNOLOGY SUGGESTED COURSE DESCRIPTIONS

PRODUCTION TECHNOLOGY

Length of course: 1 Semester
Credits per semester: .5
Grade level: 9, 10

Production Technology is a course designed to foster an awareness and understanding of manufacturing and construction technology. Through a variety of learning activities, students are exposed to many career opportunities in the production field. Experiences in manufacturing include product design, materials and processes, tools and equipment, including computers, safety procedures, corporate structure, management, research and development, production planning, mass production, marketing and servicing. In construction, students will be exposed to site preparation, foundations, building structures, installing utilities, and finishing and servicing structures.

TRANSPORTATION TECHNOLOGY

Length of course: 1 Semester
Credits per semester: .5
Grade level: 9, 10

Transportation Technology is a course designed to foster an awareness and understanding of the various transportation customs that make up our mobile society. Through laboratory activities the student will be exposed to the technologies of and career opportunities involved in material handling, atmospheric and space transportation, marine transportation, terrestrial transportation, and computer uses in transportation technology.

COMMUNICATION TECHNOLOGY

Length of course: 1 Semester
Credits per semester: .5
Grade level: 9, 10

Communication Technology is a course designed to foster an awareness and understanding of the technologies used to communicate in our modern society. Students will gain experience in the areas of design and drafting, radio and television broadcasting, computers in communication, photography, graphic arts, and telecommunications.

ENERGY UTILIZATION TECHNOLOGY

Length of course: 1 Semester
Credits per semester: .5
Grade level: 9, 10

Energy Utilization Technology is a course designed to foster an awareness and understanding of how we use energy in our industrial technological society. Areas of study will include conversion of energy; electrical fundamentals; solar energy resources; alternate energy resources such as wind, water, and geothermal; fossil fuels; nuclear power; energy conservation; and computer uses in energy technology. Students will use laboratory experiences to become familiar with current energy technologies.

RADIO/TELEVISION BROADCASTING TECHNOLOGY I

Length of course: 2 Semesters
Credits per semester: .5
Grade level: 11

Radio/Television Broadcasting Technology I is a skill-level course designed to provide students with the skills needed for a career in the technical aspects of radio and television broadcasting. Instruction will include camera operations, basic audio and video editing, sound and lighting techniques, and sound mixing. Students will learn the operation, maintenance, and repair of video and DVD recording equipment, video/digital cameras, microphones, computers, lighting/grip equipment and other production equipment used in the video and audio production of television programs. Students will also learn to use, maintain and repair various types of audio recorders, amplifiers, transmitters, receivers, microphones, and sound mixers to record and broadcast radio programs.

RADIO/TELEVISION BROADCASTING TECHNOLOGY II

Length of course: 2 Semesters
Credits per semester .5
Grade level: 12

Radio/Television Broadcasting Technology II is a skill-level course for students who have completed Radio/Television Broadcasting Technology I. In addition to expanding on the activities explored in the first course, students will work in a team-based environment to create a variety of video and audio related broadcast. Instruction will include single and multi camera operations, linear and nonlinear video editing, production and post production processes, animation graphics, sound mixing, multi track production, audio editing and special effects. Students will learn how to use digital editing equipment and software to electronically cut and paste video and sound segments together as well as how to regulate and monitor signal strength, volume, sound quality, brightness, and clarity of outgoing signals. This course will also provide students with an understanding of the FCC and other governmental agencies regulations related to radio and television broadcasting.

COOPERATIVE EDUCATION

Length of course: 2 Semesters
Credits per semester variable
Grade level: 11, 12

Cooperative Education is a capstone course designed to assist students in the development of effective skills and attitudes through practical, advanced instruction in school and on the job through cooperative education. Students are released from school for their paid cooperative education work experience and participate in 200 minutes per week of related classroom instruction. Classroom instruction focuses on providing students with job survival skills and career exploration skills related to the job and improving students' abilities to interact positively with others. For skills related to the job, refer to the skill development course sequences, the task list or related occupational skill standards of the desired occupational program. The course content includes the following broad areas of emphasis: further career education opportunities, planning for the future, job-seeking skills, personal development, human relationships, legal protection and responsibilities, economics and the job, organizations, and job termination.

A qualified career and technical education coordinator is responsible for supervision. Written training agreements and individual student training plans are developed and agreed upon by the employer, student and coordinator. The coordinator, student and employer assume compliance with federal, state and local laws and regulations.

SPECIFIC OCCUPATIONAL PROGRAMS

The following specific occupational programs should only be offered if employment opportunities exist within the region and student interest is high. These programs include duties and tasks for specific occupational training.

21.0201 TECHNOLOGY & PRE-ENGINEERING

This program is designed to generally prepare students to apply basic engineering principles and technical skills in support of engineers engaged in a wide variety of projects. Includes instruction in various engineering support functions for research, production, and operations, and applications to specific engineering specialties.

The following are examples of occupations, which require knowledge and skills related to the Engineering Related Technologies cluster, which require additional training in a specialized program at the postsecondary level.

Electrical and Electronic Technician
Automated Manufacturing Systems
Technician
Computer Repair Technician
Instrument Repair Technician
Computerized-Numerical Control
Technician
Biomedical Equipment Technician

Civil Engineering Technician
Electromechanical Technician
Industrial Engineering Technician
Laser Electro-Optical Technician
Broadcast Technician
Microelectronics Technician
Telecommunications Technician

In addition to those occupations already noted, there are other industrial occupations of a professional nature requiring extensive education beyond that received at secondary and postsecondary levels.

These occupations are highly technical and specialized in nature. Employment opportunities exist for workers who have gained an appropriate level of skill and knowledge in the engineering-related technologies such as civil technologies, electrical and electronic technologies, electromechanical instrumentation and maintenance technologies, industrial production technologies and mechanical and related technologies.

A regional delivery system should offer training for occupations in this field as determined by employment opportunities and the needs of the students.

Training received in this program may be used as a basis for entry level into the labor market or for further training at a postsecondary agency. Articulation between the secondary and postsecondary programs will be a part of the regional delivery systems.

Workplace skills, as well as 1) skills used in work performance that are transferable across jobs and occupations and that are instrumental to job and classroom success, 2) skills used to manage life's transitions, and 3) skills employed in the resolution of interpersonal information or task-related problems or problems related to behavior in cooperative group settings, should be included in this curriculum. Leadership skill development is an integral part of this program and is delivered through career and

technical student organization (TSA or SKILLS USA) activities. Individualized instruction and learning reinforcement are provided through cooperative career and technical education programs as well as classroom instruction.

COURSE SEQUENCE

<u>Course Title</u>	<u>Credits per Semester</u>	<u>Length in Semesters</u>	<u>Grade Level</u>
<u>Orientation</u>			
Production Technology	.5	1	9, 10
Transportation Technology	.5	1	9, 10
Communication Technology	.5	1	9, 10
Energy Utilization Technology	.5	1	9, 10
<u>Preparation</u>			
Principles of Technology I	.5	2	11
Principles of Technology II	.5	2	12
Engineering byDesign EbD – CATTs Curriculum			
Foundations of Technology	.5	2	9,10
Technological Issues	.5	2	9,10
Technological Design	.5	2	9,10
Advanced Technical Design	.5	2	11,12
Advanced Technical Application	.5	2	11,12
Engineering Design	.5	2	12
Project Lead The Way PLTW			
Introduction to Engineering Design	.5	2	9,10
Principles of Engineering	.5	2	9,10
Digital Electronics	.5	2	11,12

Computer Integrated Manufacturing	.5	2	11,12
Civil Engineering and Architecture	.5	2	11,12
Aerospace Engineering	.5	2	11,12
Biotechnical Engineering	.5	2	11,12
Engineering Design and Development	.5	2	12
Industrial Cooperative Education	*variable	2	11, 12

* As determined at the regional system level.

TECHNICAL PREPARATION SUGGESTED COURSE DESCRIPTIONS

PRODUCTION TECHNOLOGY

Length of course: 1 Semester
 Credits per semester: .5
 Grade level: 9, 10

Production Technology is a course designed to foster an awareness and understanding of manufacturing and construction technology. Through a variety of learning activities, students are exposed to many career opportunities in the production field. Experiences in manufacturing include product design, materials and processes, tools and equipment, including computers, safety procedures, corporate structure, management, research and development, production planning, mass production, marketing and servicing. In construction, students will be exposed to site preparation, foundations, building structures, installing utilities, and finishing and servicing structures.

TRANSPORTATION TECHNOLOGY

Length of course: 1 Semester
 Credits per semester: .5
 Grade level: 9, 10

Transportation Technology is a course designed to foster an awareness and understanding of the various transportation customs that make up our mobile society. Through laboratory activities the student will be exposed to the technologies of and career opportunities involved in material handling, atmospheric and space transportation, marine transportation, terrestrial transportation, and computer uses in transportation technology.

COMMUNICATION TECHNOLOGY

Length of course: 1 Semester
Credits per semester: .5
Grade level: 9, 10

Communication Technology is a course designed to foster an awareness and understanding of the technologies used to communicate in our modern society. Students will gain experience in the areas of design and drafting, radio and television broadcasting, computers in communication, photography, graphic arts, and telecommunications.

ENERGY UTILIZATION TECHNOLOGY

Length of course: 1 Semester
Credits per semester: .5
Grade level: 9, 10

Energy Utilization Technology is a course designed to foster an awareness and understanding of how we use energy in our industrial technological society. Areas of study will include conversion of energy; electrical fundamentals; solar energy resources; alternate energy resources such as wind, water, and geothermal; fossil fuels; nuclear power; energy conservation; and computer uses in energy technology. Students will use laboratory experiences to become familiar with current energy technologies.

PRINCIPLES OF TECHNOLOGY I

Length of course: 2 Semesters
Credits per semester: .5
Grade level: 11

This course provides learning experiences related to the principles that underlie today's high technology: force, work, rate, resistance, energy, power and force transformers. The course deals with these principles as they apply in each of the four kinds of systems that make up both the simplest and the most complex technological devices and equipment: mechanical systems, fluid systems, electrical systems and thermal systems. Learning experiences are designed to allow the student to acquire knowledge and skills which are transferable to postsecondary technical programs.

PRINCIPLES OF TECHNOLOGY II

Length of course: 2 Semesters
Credits per semester: .5
Grade level: 12

This course provides learning experiences related to the principles that underlie today's high technology: momentum, waves and vibrations, energy converters, transducers, radiation, optical systems, and time constraints. The course deals with these principles as they apply in each of the four kinds of systems that make up both the simplest and the most complex technological devices and equipment: mechanical systems, fluid systems electrical systems and thermal systems. Learning experiences are designed to allow the student to acquire knowledge and skills which are transferable to postsecondary technical programs.

Engineering by Design

Foundations of Technology

This course will focus on the three dimensions of technological literacy: knowledge, ways of thinking and acting, and capabilities, with the goal of students developing the characteristics of technology literate citizens. It will employ teaching/learning strategies that enable students to build their own understanding of new ideas. It is designed to engage students in exploring and deepening their understanding of "big ideas" regarding technology and makes use of a variety of assessment instruments to reveal the extent of understanding.

Technological Issues

In Technological Issues, students learn that technology allows us to extend our ability to modify or change the natural world to meet our wants and needs. However, the resulting changes can be complicated and unpredictable. Solutions to a particular problem may

cause other types of problems. Each potential technological solution creates certain issues, such as benefits, costs, risks, and limitations. Not all impacts of technology are predictable or show up right away. However, the key issues of a technology should be studied and debated prior to the technology being introduced or eliminated. Alternatives should be explored (scientific and mathematical dimensions should be integrated into the decisions).

Technological Design

In Engineering Design, engineering scope, content, and professional practices are presented through practical applications. Students in engineering teams apply technology, science, and mathematics concepts and skills to solve engineering design problems and innovate designs. Students research, develop, test, and analyze engineering designs using criteria such as design effectiveness, public safety, human factors, and ethics. This course is the capstone experience for students who are interested in Technology, Innovation, Design, and Engineering.

Impacts of Technology

Students in Impacts of Technology learn that technology is a neutral topic that can have good or bad impacts on society. Technology assessment is a structured evaluation of the application of technology in an effort to avoid inappropriate or unwanted effects. Applying design and student imagination without considering the possible effects of new products or processes can lead to technological disasters, super funded sites. And unsafe products that could have been avoided in the initial design stages. Whether a new product, system, or process has an overall positive, neutral, or negative impact depends on technology assessment and the impact on technology design.

Advanced Design Applications

In Advanced Design Applications consists of four units including Manufacturing, Energy and Power, Construction and Transportation. The Manufacturing unit examines the advances that maintain manufacturing efficiency, how human consumption affects manufacturing, how manufacturing affects the standard of living of various peoples, and how processing and changing raw materials can produce more desirable products. The Construction unit examines a number of the factors influencing the design and construction of permanent and semi-permanent structures, the practices related to construction maintenance, alteration, and renovation and the functions of the primary systems installed in those structures. The Energy & Power unit explores the relationship between energy and power technologies and all other technologies, and how modern energy and power systems impact cultures, societies, and the environment. It also offers an examination of how energy and power systems can be made more efficient and how they may be utilized in problem solving. The Transportation unit examines the complex networks of interconnected subsystems that each transportation system comprises and the roles of these components in the overall functional process of the system. It also analyzes

of the improvements and the impacts of transportation technologies on the environment, society, and culture.

Advanced Technological Applications

In the Advanced Technological Applications course, students study about four components of the Designed World, including Information Technology, Agriculture and Bio-related Technologies, Medical, and Entertainment/Recreation. The Agriculture and Biotechnologies unit explores how agricultural technologies provide increased crop yields and allow adaptation to changing and harsh environments, enabling the growth of plants and animals for various uses. It also offers an analysis of the various uses of biotechnology and the ethical considerations of those uses. The Entertainment and Recreation unit provides a study of technological entertainment and recreation systems, with an examination of the differences between these technologies, of how their use enhances human leisure-time performance, and of the social, cultural, and environmental implications of their usage. The Information Technologies unit examines how technology facilitates the gathering, manipulation, storage, and transmission of data, and how this data can be used to create useful products. It also provides students with opportunities for developing communications systems that can solve technological problems. The Medical Technologies Unit provides an analysis of how medical technologies are used to increase the quality and length of human life, and how increased use of technology carries potential consequences, which require public debate. Students will also examine tools and devices used to repair and replace organs, prevent disease, and rehabilitate the human body.

Engineering Design

Course Overview:

In Engineering Design, engineering scope, content, and professional practice are presented through practical applications. Students in engineering teams apply technology, science, and mathematics concepts and skills to solve engineering design problems and innovate designs. Students research, develop, test, and analyze engineering designs using criteria such as design effectiveness, public safety, human factors, and ethics. This course is the capstone experience for students who are interested in Technology, Innovation, Design, and Engineering.

Project Lead The Way

Principles of Engineering - A course that helps students understand the field of engineering/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.

Digital Electronics - 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.

Introduction to Engineering Design - A course that teaches problem-solving skills using a design development process. Models of product solutions are created, analyzed and communicated using solid modeling computer design software. In NYS, Circuit test the course is called Design and Drawing for Production and follows the syllabus developed by the State Education Department.

- The Roles of Civil Engineers and Architects
- Project Planning
- Site Planning
- Building Design
- Project Documentation and Presentation

Aerospace Engineering - Through hands-on engineering projects developed with NASA, students learn about aerodynamics, astronautics, space-life sciences, and systems engineering (which includes the study of intelligent vehicles like the Mars rovers Spirit and Opportunity).

Biotechnical Engineering - Relevant projects from the diverse fields of bio-technology, bio-engineering, bio-medical engineering, and bio-molecular engineering enable students to apply and concurrently develop secondary-level knowledge and skills in biology, physics, technology, and mathematics.

COOPERATIVE EDUCATION

Length of course:	2 Semesters
Credits per semester	variable
Grade level:	11, 12

Cooperative Education is a capstone course designed to assist students in the development of effective skills and attitudes through practical, advanced instruction in school and on the job through cooperative education. Students are released from school for their paid cooperative education work experience and participate in 200 minutes per week of related classroom instruction. Classroom instruction focuses on providing students with job survival skills and career exploration skills related to the job and improving students' abilities to interact positively with others. For skills related to the job, refer to the skill development course sequences, the task list or related occupational skill standards of the desired occupational program. The course content includes the following broad areas of emphasis: further career education opportunities, planning for the future, job-seeking skills, personal development, human relationships, legal protection and responsibilities, economics and the job, organizations, and job termination.

A qualified career and technical education coordinator is responsible for supervision. Written training agreements and individual student training plans are developed and agreed upon by the employer, student and coordinator. The coordinator, student and employer assume compliance with federal, state and local laws and regulations.

SPECIFIC OCCUPATIONAL PROGRAMS

The following specific occupational programs should only be offered if employment opportunities exist within the region and student interest is high. These programs include duties and tasks for specific occupational training.

43.0107 LAW ENFORCEMENT/POLICE SCIENCE

This cluster offers a sequence of planned educational classroom and laboratory experiences concerned with the preparation of individuals who want to pursue a career in law enforcement. Students will learn the history of law enforcement and the legal system, report writing and record keeping, and routine police procedures. Instruction will include an overview of crime scene management, as well as basic investigative techniques, interviewing skills, and evidence collection procedures. Students will also learn how to use law enforcement communication equipment.

This cluster includes a sequence of planned educational classroom laboratory experiences, which will develop competencies in the following duty areas:

<i>Using proper law enforcement procedures</i>	<i>Securing a crime scene</i>
<i>Collecting and preserving evidence</i>	<i>Using communication equipment</i>
<i>Conducting interviews</i>	<i>Keeping records</i>
<i>Using basic investigating techniques</i>	<i>Writing reports</i>
<i>Performing basic computer functions</i>	<i>Testifying in court</i>
<i>Maintaining law enforcement equipment</i>	<i>Controlling traffic</i>

Because of the nature of work associated with law enforcement, there are no appropriate occupations for the secondary level. This program requires an articulation agreement with a postsecondary institution. The following occupational listing shows examples of occupations that may require additional training in a specialized program at the postsecondary level.

- Airport Security Official
- Private Security Guard
- Communications Officer
- Crime Scene Photographer
- Crime Scene Investigator
- Evidence Officer
- Law Enforcement Officer
- Detective
- State Police Officer
- FBI Agent
- DEA Agent
- U.S. Marshall
- Sheriff

INS Agent
AFT Agent

In addition to those occupations already noted, there are other industrial occupations of a professional nature requiring extensive education beyond that received at secondary and postsecondary levels.

A regional delivery system should offer training for occupations in this field as determined by employment opportunities and the needs of the students.

Training received in this program may be used as a basis for entry level into the labor market or for further training at a postsecondary agency. Articulation between the secondary and postsecondary programs will be a part of the regional delivery systems.

Workplace skills, as well as 1) skills used in work performance that are transferable across jobs and occupations and that are instrumental to job and classroom success, 2) skills used to manage life's transitions, and 3) skills employed in the resolution of interpersonal information or task-related problems or problems related to behavior in cooperative group settings, should be included in this curriculum. Leadership skill development is an integral part of this program and is delivered through career and technical student organization (TSA or SKILLS USA) activities. Individualized instruction and learning reinforcement are provided through cooperative career and technical education programs as well as classroom instruction.

COURSE SEQUENCE

<u>Course Title</u>	<u>Credits per Semester</u>	<u>Length in Semesters</u>	<u>Grade Level</u>
<u>Orientation</u>			
Production Technology	.5	1	9, 10
Transportation Technology	.5	1	9, 10
Communication Technology	.5	1	9, 10
Energy Utilization Technology	.5	1	9, 10
<u>Preparation</u>			
Law Enforcement/Police Science I	.5	2	11
Law Enforcement/Police Science II	.5	2	12
Cooperative Education	*variable	2	12

* As determined at the regional system level.

LAW ENFORCEMENT/POLICE SCIENCE SUGGESTED COURSE DESCRIPTIONS

PRODUCTION TECHNOLOGY

Length of course: 1 Semester
Credits per semester: .5
Grade level: 9, 10

Production Technology is a course designed to foster an awareness and understanding of manufacturing and construction technology. Through a variety of learning activities, students are exposed to many career opportunities in the production field. Experiences in manufacturing include product design, materials and processes, tools and equipment, including computers, safety procedures, corporate structure, management, research and development, production planning, mass production, marketing and servicing. In construction, students will be exposed to site preparation, foundations, building structures, installing utilities, and finishing and servicing structures.

TRANSPORTATION TECHNOLOGY

Length of course: 1 Semester
Credits per semester: .5
Grade level: 9, 10

Transportation Technology is a course designed to foster an awareness and understanding of the various transportation customs that make up our mobile society. Through laboratory activities the student will be exposed to the technologies of and career opportunities involved in material handling, atmospheric and space transportation, marine transportation, terrestrial transportation, and computer uses in transportation technology.

COMMUNICATION TECHNOLOGY

Length of course: 1 Semester
Credits per semester: .5
Grade level: 9, 10

Communication Technology is a course designed to foster an awareness and understanding of the technologies used to communicate in our modern society. Students

will gain experience in the areas of design and drafting, radio and television broadcasting, computers in communication, photography, graphic arts, and telecommunications.

ENERGY UTILIZATION TECHNOLOGY

Length of course: 1 Semester
Credits per semester: .5
Grade level: 9, 10

Energy Utilization Technology is a course designed to foster an awareness and understanding of how we use energy in our industrial technological society. Areas of study will include conversion of energy; electrical fundamentals; solar energy resources; alternate energy resources such as wind, water, and geothermal; fossil fuels; nuclear power; energy conservation; and computer uses in energy technology. Students will use laboratory experiences to become familiar with current energy technologies.

LAW ENFORCEMENT/POLICE SCIENCE I

Length of course: 2 Semesters
Credits per semester .5
Grade level: 11

Law Enforcement/Police Science I is a skill-level course designed to prepare students to enter into the fields of law enforcement and the criminal justice system. Instruction will include the history of law enforcement and the legal system, report writing and record keeping, criminal investigation techniques, and routine police procedures. Students will learn how to use communications and dispatch equipment, perform proper search and seizure techniques, conduct basic criminal investigations, and execute correct pursuit and arrest procedures. Instruction will also include patrolling techniques, private security operations, traffic investigations, and community relations

LAW ENFORCEMENT/POLICE SCIENCE II

Length of course: 2 Semesters
Credits per semester .5
Grade level: 12

Law Enforcement/Police Science II is a skill-level course for students who have completed Law Enforcement/Police Science I. Students will learn basic investigative techniques for crimes against people and property. Instruction will include how to conduct a preliminary investigation and protect a crime scene. Students will learn how

to collect and preserve physical evidence including dusting latent prints, casting, fingerprint classification, and use of portable crime laboratory equipment. Students will learn how to conduct interviews, complete police reports, use police equipment and testify in court. Instruction will also include traffic control, personal security and law enforcement administration.

COOPERATIVE EDUCATION

Length of course:	2 Semesters
Credits per semester	variable
Grade level:	11, 12

Cooperative Education is a capstone course designed to assist students in the development of effective skills and attitudes through practical, advanced instruction in school and on the job through cooperative education. Students are released from school for their paid cooperative education work experience and participate in 200 minutes per week of related classroom instruction. Classroom instruction focuses on providing students with job survival skills and career exploration skills related to the job and improving students' abilities to interact positively with others. For skills related to the job, refer to the skill development course sequences, the task list or related occupational skill standards of the desired occupational program. The course content includes the following broad areas of emphasis: further career education opportunities, planning for the future, job-seeking skills, personal development, human relationships, legal protection and responsibilities, economics and the job, organizations, and job termination.

A qualified career and technical education coordinator is responsible for supervision. Written training agreements and individual student training plans are developed and agreed upon by the employer, student and coordinator. The coordinator, student and employer assume compliance with federal, state and local laws and regulations.

SPECIFIC OCCUPATIONAL PROGRAMS

The following specific occupational programs should only be offered if employment opportunities exist within the region and student interest is high. These programs include duties and tasks for specific occupational training.

43.0203 FIRE SCIENCE/FIREFIGHTER

This cluster offers a sequence of planned educational classroom and laboratory experiences concerned with the preparation of individuals who want to pursue a career in fire fighting and emergency medical services. It will prepare individuals to extinguish, suppress and prevent fires. Instruction will include fire-fighting tactics such as use of hoses, ropes, ladders, breathing apparatus and extinguishers. Instruction will also include fire detection systems, forcible entry techniques, vehicle and equipment maintenance, personal safety measures and evidence protection procedures. Students will also receive basic training in emergency medical techniques and hazardous materials handling.

This cluster includes a sequence of planned educational classroom laboratory experiences, which will develop competencies in the following duty areas:

<i>Using proper fire fighting procedures</i>	<i>Using fire and emergency medical equipment</i>
<i>Performing basic emergency medical treatment</i>	<i>Handling and removing hazardous materials</i>
<i>Using water supply and hose systems</i>	<i>Assessing, treating, and transporting patients</i>
<i>Collecting and preserving evidence</i>	<i>Writing reports</i>
<i>Conducting proper rescue and extraction procedures</i>	<i>Performing basic computer functions</i>
<i>Maintaining fire and emergency medical related equipment</i>	

Because of the nature of work associated with occupations related to fire and emergency medical services, there are no appropriate occupations for the secondary level. This program requires an articulation agreement with a postsecondary institution. The following occupational listing shows examples of occupations that may require additional training in a specialized program at the postsecondary level.

- Fire Fighter Trainee
- Fire Fighter Apprentice
- Fire Officer
- Emergency Medical Technician
- Apparatus Engineer
- Fire Marshal
- Fire Instructor
- Fire Inspectors
- Fire Investigators
- Hazardous Materials Officer

In addition to those occupations already noted, there are other industrial occupations of a professional nature requiring extensive education beyond that received at secondary and postsecondary levels.

A regional delivery system should offer training for occupations in this field as determined by employment opportunities and the needs of the students.

Training received in this program may be used as a basis for entry level into the labor market or for further training at a postsecondary agency. Articulation between the secondary and postsecondary programs will be a part of the regional delivery systems.

Workplace skills, as well as 1) skills used in work performance that are transferable across jobs and occupations and that are instrumental to job and classroom success, 2) skills used to manage life's transitions, and 3) skills employed in the resolution of interpersonal information or task-related problems or problems related to behavior in cooperative group settings, should be included in this curriculum. Leadership skill development is an integral part of this program and is delivered through career and technical student organization (TSA or SKILLS USA) activities. Individualized instruction and learning reinforcement are provided through cooperative career and technical education programs as well as classroom instruction.

COURSE SEQUENCE

<u>Course Title</u>	<u>Credits per Semester</u>	<u>Length in Semesters</u>	<u>Grade Level</u>
<u>Orientation</u>			
Production Technology	.5	1	9, 10
Transportation Technology	.5	1	9, 10
Communication Technology	.5	1	9, 10
Energy Utilization Technology	.5	1	9, 10
<u>Preparation</u>			
Fire Science/Fire Fighter I	.5	2	11
Fire Science/Fire Fighter II	.5	2	12
Cooperative Education	*variable	2	12

* As determined at the regional system level.

**FIRE SCIENCE/FIREFIGHTER
SUGGESTED COURSE DESCRIPTIONS**

PRODUCTION TECHNOLOGY

Length of course: 1 Semester
Credits per semester: .5
Grade level: 9, 10

Production Technology is a course designed to foster an awareness and understanding of manufacturing and construction technology. Through a variety of learning activities, students are exposed to many career opportunities in the production field. Experiences in manufacturing include product design, materials and processes, tools and equipment, including computers, safety procedures, corporate structure, management, research and development, production planning, mass production, marketing and servicing. In construction, students will be exposed to site preparation, foundations, building structures, installing utilities, and finishing and servicing structures.

TRANSPORTATION TECHNOLOGY

Length of course: 1 Semester
Credits per semester: .5
Grade level: 9, 10

Transportation Technology is a course designed to foster an awareness and understanding of the various transportation customs that make up our mobile society. Through laboratory activities the student will be exposed to the technologies of and career opportunities involved in material handling, atmospheric and space transportation, marine transportation, terrestrial transportation, and computer uses in transportation technology.

COMMUNICATION TECHNOLOGY

Length of course: 1 Semester
Credits per semester: .5
Grade level: 9, 10

Communication Technology is a course designed to foster an awareness and understanding of the technologies used to communicate in our modern society. Students will gain experience in the areas of design and drafting, radio and television broadcasting, computers in communication, photography, graphic arts, and telecommunications.

ENERGY UTILIZATION TECHNOLOGY

Length of course: 1 Semester
Credits per semester: .5
Grade level: 9, 10

Energy Utilization Technology is a course designed to foster an awareness and understanding of how we use energy in our industrial technological society. Areas of study will include conversion of energy; electrical fundamentals; solar energy resources; alternate energy resources such as wind, water, and geothermal; fossil fuels; nuclear power; energy conservation; and computer uses in energy technology. Students will use laboratory experiences to become familiar with current energy technologies.

FIRE SCIENCE/FIRE FIGHTING I

Length of course: 2 Semesters
Credits per semester .5
Grade level: 11

Fire Science/Fire Fighter I is a skill-level course designed to provide students with the skills needed to prevent and extinguish fires, maintain and repair fire service related equipment, provide basic emergency medical treatment, and prepare public service information concerning fires and hazardous materials. Instruction will include the physical characteristics of fire as well as general safety practices, basic fire behavior, and extinguishing principles. Students will learn rescue and extrication procedures, types and use of ground ladders, proper ventilation techniques, and appropriate use of various water supply systems along with how to use ropes and tie knots. Students will also learn basic emergency medical techniques and practices, which will include medical legal considerations, terminology, airway management, patient assessment and transportation, and emergency treatment.

FIRE SCIENCE/FIRE FIGHTING II

Length of course: 2 Semesters
Credits per semester .5
Grade level: 12

Fire Science/Fire Fighter II is a skill-level course for students who have completed Fire Science/Fire Fighter I and will continue to develop those skills. Students will also learn how to use fire hoses and control property loss along with fire control techniques, detection systems, and prevention practices. Instruction will also include communication procedures, procedures for operating emergency vehicles, maintaining fire-related equipment and vehicles, and securing and protecting evidence. Students will learn procedures for treating poisonings and allergic reactions, environmental emergencies, and hazard waste removal as well as how to treat soft tissue, musculoskeletal, and head and spine injuries. Instruction will also include handling emergencies related to infants, children, and senior citizens.

COOPERATIVE EDUCATION

Length of course: 2 Semesters
Credits per semester variable
Grade level: 11, 12

Cooperative Education is a capstone course designed to assist students in the development of effective skills and attitudes through practical, advanced instruction in school and on the job through cooperative education. Students are released from school for their paid cooperative education work experience and participate in 200 minutes per week of related classroom instruction. Classroom instruction focuses on providing students with job survival skills and career exploration skills related to the job and improving students' abilities to interact positively with others. For skills related to the job, refer to the skill development course sequences, the task list or related occupational skill standards of the desired occupational program. The course content includes the following broad areas of emphasis: further career education opportunities, planning for the future, job-seeking skills, personal development, human relationships, legal protection and responsibilities, economics and the job, organizations, and job termination.

A qualified career and technical education coordinator is responsible for supervision. Written training agreements and individual student training plans are developed and agreed upon by the employer, student and coordinator. The coordinator, student and employer assume compliance with federal, state and local laws and regulations.

SPECIFIC OCCUPATIONAL PROGRAMS

The following specific occupational programs should only be offered if employment opportunities exist within the region and student interest is high. These programs include duties and tasks for specific occupational training.

46.1000 CONSTRUCTION TRADES

The Construction Occupation Program provides educational activities in the classroom, laboratory, shop and actual work setting with the opportunity to become knowledgeable of a variety of skills associated with the following occupational titles: bricklayer, carpenter, cement mason, building maintenance custodian, drywall applicators, electronics, maintenance painters, plumbers and/or pipefitters and roofers. The program sequence of organized learning experiences and skills would include erecting, installing, maintaining and repairing buildings and other structures using assorted materials such as wood, stone, brick, glass, concrete, and composition substances.

This program includes a sequence of planned educational classroom laboratory experiences that will develop competencies in the following duty areas:

- | | |
|---|--|
| <i>Applying safety practices</i> | <i>Installing service entrance</i> |
| <i>Performing supervisory functions</i> | <i>Installing switch boxes and outlet boxes</i> |
| <i>Performing housekeeping and record keeping activities</i> | <i>Maintaining existing wiring</i> |
| <i>Conducting shop operations</i> | <i>Roughing in feeders, branch circuit cables and circuits</i> |
| <i>Estimating materials</i> | <i>Trimming out electrical devices and appliances</i> |
| <i>Preparing building site</i> | <i>Installing and maintaining motors</i> |
| <i>Preparing foundations and footings</i> | <i>Using climbing equipment</i> |
| <i>Laying, jointing and pointing brick</i> | <i>Preparing surface for finishing</i> |
| <i>Constructing residential chimneys and fireplaces</i> | <i>Using compressor and spray equipment</i> |
| <i>Constructing masonry buildings</i> | <i>Finishing surfaces</i> |
| <i>Constructing concrete masonry</i> | <i>Covering walls</i> |
| <i>Performing miscellaneous masonry work</i> | <i>Maintaining structures</i> |
| <i>Sharpening tools</i> | <i>Joining pipes</i> |
| <i>Installing rough framing</i> | <i>Installing hangars and supports</i> |
| <i>Installing roof components</i> | <i>Building water distribution lines</i> |
| <i>Installing exterior finishes</i> | <i>Building drains</i> |
| <i>Installing interior finishes</i> | <i>Installing traps and cleanouts</i> |
| <i>Assembling and constructing stairs</i> | <i>Installing vents</i> |
| <i>Selecting electrical materials and determining work to be done</i> | <i>Installing fixtures</i> |
| <i>Computing service loads</i> | <i>Installing/maintaining hydronic heating systems</i> |
| <i>Installing electrical environmental control components</i> | <i>Maintaining public systems</i> |
| | <i>Maintaining the outside environment</i> |

Installing lighting fixtures

Employment opportunities available to workers with competencies in the Construction Occupations field include cement companies, industrial building maintenance businesses, residential and commercial building contractors, construction companies, department stores, plumbing contractors, hardware stores, general construction contractors, lumber companies and other places of business related to construction work. Through entrepreneurship, other employment opportunities are also available.

The following are occupations that may be trained for in the secondary setting and may require additional training at the postsecondary level.

Bricklayer

Carpenter

Building Maintenance Worker

Electrician

Maintenance Painter

Plumbers and/or Pipefitters

Cement Masons

Drywall Applicators

In addition to the occupations already noted, there are other industrial occupations of a professional nature requiring extensive education beyond that received at secondary and postsecondary levels.

A regional delivery system should offer training for occupations in this field as determined by employment opportunities and the needs of the students.

Training received in this program may be used as a basis for entry level into the labor market or for further training at a postsecondary agency. Articulation between the secondary and postsecondary programs will be a part of the regional delivery systems.

Workplace skills, as well as 1) skills used in work performance that are transferable across jobs and occupations and that are instrumental to job and classroom success, 2) skills used to manage life's transitions, and 3) skills employed in the resolution of interpersonal information or task-related problems or problems related to behavior in cooperative group settings, should be included in this curriculum. Leadership skill development is an integral part of this program and is delivered through career and technical student organization (TSA or SKILLS USA) activities. Individualized instruction and learning reinforcement are provided through cooperative career and technical education programs as well as classroom instruction.

COURSE SEQUENCE

<u>Course Title</u>	<u>Credits per Semester</u>	<u>Length in Semesters</u>	<u>Grade Level</u>
<u>Orientation</u>			
Production Technology	.5	1	9, 10
Transportation Technology	.5	1	9, 10

Communication Technology	.5	1	9, 10
Energy Utilization Technology	.5	1	9, 10

Preparation

Construction I	.5	2	11
Construction II	.5	2	12
Cooperative Education	*variable	2	11, 12

*As determined at the regional system level.

CONSTRUCTION OCCUPATIONS
SUGGESTED COURSE DESCRIPTIONS

PRODUCTION TECHNOLOGY

Length of course: 1 Semester
Credits per semester: .5
Grade level: 9, 10

Production Technology is a course designed to foster an awareness and understanding of manufacturing and construction technology. Through a variety of learning activities, students are exposed to many career opportunities in the production field. Experiences in manufacturing include product design, materials and processes, tools and equipment, including computers, safety procedures, corporate structure, management, research and development, production planning, mass production, marketing and servicing. In construction, students will be exposed to site preparation, foundations, building structures, installing utilities, and finishing and servicing structures.

TRANSPORTATION TECHNOLOGY

Length of course: 1 Semester
Credits per semester: .5
Grade level: 9, 10

Transportation Technology is a course designed to foster an awareness and understanding of the various transportation customs that make up our mobile society. Through laboratory activities the student will be exposed to the technologies of and career

opportunities involved in material handling, atmospheric and space transportation, marine transportation, terrestrial transportation, and computer uses in transportation technology.

COMMUNICATION TECHNOLOGY

Length of course: 1 Semester
Credits per semester: .5
Grade level: 9, 10

Communication Technology is a course designed to foster an awareness and understanding of the technologies used to communicate in our modern society. Students will gain experience in the areas of design and drafting, radio and television broadcasting, computers in communication, photography, graphic arts, and telecommunications.

ENERGY UTILIZATION TECHNOLOGY

Length of course: 1 Semester
Credits per semester: .5
Grade level: 9, 10

Energy Utilization Technology is a course designed to foster an awareness and understanding of how we use energy in our industrial technological society. Areas of study will include conversion of energy; electrical fundamentals; solar energy resources; alternate energy resources such as wind, water, and geothermal; fossil fuels; nuclear power; energy conservation; and computer uses in energy technology. Students will use laboratory experiences to become familiar with current energy technologies.

CONSTRUCTION I

Length of course: 2 Semesters
Credits per semester: .5
Grade level: 11

This course provides experiences related to the erection, installation and maintenance of residential buildings and related fixtures. Planned learning activities will allow students to become knowledgeable of fundamental principles and methods and to develop technical skills related to masonry, carpentry, and finish work. Instruction should include safety principles and practices, recognition of standard lumber sizes, foundation layout methods, building concepts and procedures, local state and national codes, cost estimating and blueprint reading.

CONSTRUCTION II

Length of course: 2 Semesters
Credits per semester: .5
Grade level: 12

This course provides learning experiences related to the erection, installation, maintenance and repair of building structures and related utilities. Planned learning activities should emphasize the development of more advanced knowledge's and skills than those provided in Construction Occupations I. Student technical skill experiences should include instruction and activities in safety principles and practices; performing maintenance control functions; joining pipes; building water distribution lines and drains; installing and maintaining plumbing fixtures and systems; installing switch and outlet boxes, light fixtures, service entrances; roughing in and trimming out electrical devices and appliances; preparing foundations and footings; constructing residential chimneys and fireplaces; laying, jointing and pointing brick; and advanced building and construction methods and codes. All learning experiences are designed to allow the student to acquire job-entry skills and knowledge.

COOPERATIVE EDUCATION

Length of course: 2 Semesters
Credits per semester variable
Grade level: 11, 12

Cooperative Education is a capstone course designed to assist students in the development of effective skills and attitudes through practical, advanced instruction in school and on the job through cooperative education. Students are released from school for their paid cooperative education work experience and participate in 200 minutes per week of related classroom instruction. Classroom instruction focuses on providing students with job survival skills and career exploration skills related to the job and improving students' abilities to interact positively with others. For skills related to the job, refer to the skill development course sequences, the task list or related occupational skill standards of the desired occupational program. The course content includes the following broad areas of emphasis: further career education opportunities, planning for the future, job-seeking skills, personal development, human relationships, legal protection and responsibilities, economics and the job, organizations, and job termination.

A qualified career and technical education coordinator is responsible for supervision. Written training agreements and individual student training plans are developed and agreed upon by the employer, student and coordinator. The coordinator, student and employer assume compliance with federal, state and local laws and regulations.

SPECIFIC OCCUPATIONAL PROGRAMS

The following specific occupational programs should only be offered if employment opportunities exist within the region and student interest is high. These programs include duties and tasks for specific occupational training.

47-0100 ELECTRICAL / ELECTRONICS MAINTENANCE

The Electronics Occupations Program provides educational activities in the classroom, laboratory, shop and actual work setting with the opportunity to become knowledgeable of a variety of skills associated with various electronic occupations.

This program prepares students for employment in a wide variety of occupations in the electronics field. This program includes a sequence of planned educational classroom laboratory experiences which will develop competencies in the following duty areas:

<i>Applying safety practices</i>	<i>Maintaining and repairing electronic systems</i>
<i>Analyzing D.C. circuits</i>	<i>Conducting shop operations</i>
<i>Analyzing A.C. circuits</i>	<i>Performing housekeeping and record keeping</i>
<i>Analyzing solid state devices</i>	<i>Performing supervisory functions</i>
<i>Analyzing analog circuits</i>	<i>Installing computer equipment</i>
<i>Analyzing digital electronic circuits</i>	<i>Evaluating computer diagnostics</i>
<i>Performing micro processing operations</i>	<i>Maintaining computer equipment</i>
<i>Performing lab practices</i>	<i>Servicing computer equipment</i>
<i>Recording and reporting technical material</i>	
<i>Using technical references</i>	
<i>Maintaining and repairing electrical systems</i>	

Employment opportunities are available to workers with competencies in the field of electronics in both semiskilled and skilled areas of employment. Employment centers on construction, testing, maintenance, and repair of electrical and electronic equipment. Employment is available in such diverse fields as electronic instrumentation, communications, biomedical equipment, computers and data processing equipment, electronic controls and repair and servicing of electronic consumer products. Other employment opportunities are available through entrepreneurship.

The following are examples of occupations which require skills and knowledge in the field of electronics that may be attained at the secondary and postsecondary setting:

- Computer Repair Technician
- Electrical and Electronic Technician
- Electrical Instrument Repairer
- Electro medical Equipment Repairer
- Installers, Repairers: Communication

Radio and TV Services and Repairers

In addition to those occupations already noted, there are other industrial occupations of a professional nature requiring extensive education beyond that received at secondary and postsecondary levels.

A regional delivery system should offer training for occupations in this field as determined by employment opportunities and the needs of the students.

Training received in this program may be used as a basis for entry level into the labor market or for further training at a postsecondary agency. Articulation between the secondary and postsecondary programs will be a part of the regional delivery systems.

Workplace skills, as well as 1) skills used in work performance that are transferable across jobs and occupations and that are instrumental to job and classroom success, 2) skills used to manage life's transitions, and 3) skills employed in the resolution of interpersonal information or task-related problems or problems related to behavior in cooperative group settings, should be included in this curriculum. Leadership skill development is an integral part of this program and is delivered through career and technical student organization (TSA or SKILLS USA) activities. Individualized instruction and learning reinforcement are provided through cooperative career and technical education programs as well as classroom instruction.

COURSE SEQUENCE

<u>Course Title</u>	<u>Credits per Semester</u>	<u>Length in Semesters</u>	<u>Grade Level</u>
<u>Orientation</u>			
Production Technology	.5	1	9, 10
Transportation Technology	.5	1	9, 10
Communication Technology	.5	1	9, 10
Energy Utilization Technology	.5	1	9, 10
<u>Preparation</u>			
Electronics I	.5	2	11
Electronics II	.5	2	12
Cooperative Education	*variable	2	11, 12

* As determined at the regional system level.

**ELECTRONICS
SUGGESTED ARTICULATED PROGRAM SEQUENCE**

PRODUCTION TECHNOLOGY

Length of course: 1 Semester
Credits per semester: .5
Grade level: 9, 10

Production Technology is a course designed to foster an awareness and understanding of manufacturing and construction technology. Through a variety of learning activities, students are exposed to many career opportunities in the production field. Experiences in manufacturing include product design, materials and processes, tools and equipment, including computers, safety procedures, corporate structure, management, research and development, production planning, mass production, marketing and servicing. In construction, students will be exposed to site preparation, foundations, building structures, installing utilities, and finishing and servicing structures.

TRANSPORTATION TECHNOLOGY

Length of course: 1 Semesters
Credits per semester: .5
Grade level: 9, 10

Transportation Technology is a course designed to foster an awareness and understanding of the various transportation customs that make up our mobile society. Through laboratory activities the student will be exposed to the technologies of and career opportunities involved in material handling, atmospheric and space transportation, marine transportation, terrestrial transportation, and computer uses in transportation technology.

COMMUNICATION TECHNOLOGY

Length of course: 1 Semester
Credits per semester: .5
Grade level: 9, 10

Communication Technology is a course designed to foster an awareness and understanding of the technologies used to communicate in our modern society. Students will gain experience in the areas of design and drafting, radio and television broadcasting, computers in communication, photography, graphic arts, and telecommunications.

ENERGY UTILIZATION TECHNOLOGY

Length of course: 1 Semester
Credits per semester: .5
Grade level: 9, 10

Energy Utilization Technology is a course designed to foster an awareness and understanding of how we use energy in our industrial technological society. Areas of study will include conversion of energy; electrical fundamentals; solar energy resources; alternate energy resources such as wind, water, and geothermal; fossil fuels; nuclear power; energy conservation; and computer uses in energy technology. Students will use laboratory experiences to become familiar with current energy technologies.

ELECTRONICS I

Length of course: 2 Semesters
Credits per semester: .5
Grade level: 11

This course provides learning experiences related to the testing, maintenance and repair of electronic components and circuits. Planned learning activities in this course should be coordinated to allow students to become more knowledgeable of fundamental electronic theories and laws and to develop practical skills in testing, maintaining and repairing selected electronic components, circuits, equipment and systems. Instruction should include safety principles and practices, electrical parameters and circuits, electronic component function and identification and the use and care of related test equipment. Student activities should relate to study and experience in troubleshooting and repairing selected components and circuits found in electronic products such as radio, television, computers, phonographs, tape recorders and players, garage door openers, stereos, metal detectors and smoke detectors. Selection of representative components and circuits should be carefully planned to provide learning experiences appropriate to individual student abilities and interests and should relate to job-entry-level skill requirements of local employers.

ELECTRONICS II

Length of course: 2 Semesters
Credits per semester: .5
Grade level: 12

This course provides planned learning activities designed to allow students to gain knowledge's and skills in testing, maintaining and repairing electronic equipment and systems. Learning activities in this course should emphasize the development of more advanced knowledge's and skills than those provided in Electronics Occupations I.

Student learning experiences should include instruction and activities in safety principles and practices, FCC licensure requirements, troubleshooting methods, alignment and calibration procedures, solid-state and digital devices, electrical and electronic drawings and specifications, logs and reports, Occupational Safety and Health Administration requirements and customer relations. Learning experiences designed to allow the student to acquire other job-entry skills, attitudes and knowledge's could include the testing, maintenance and repair of equipment or systems such as communication systems, audiovisual equipment, video systems, radios, televisions, tape recorders and players, stereos, computers, commercial sound systems, and consumer products such as electronic organs and games, calculators and security systems. Instruction and experiences should also include use and care of related test equipment, hand tools and hardware, the use of technical manuals and data and employer/employee relations.

COOPERATIVE EDUCATION

Length of course:	2 Semesters
Credits per semester	variable
Grade level:	11, 12

Cooperative Education is a capstone course designed to assist students in the development of effective skills and attitudes through practical, advanced instruction in school and on the job through cooperative education. Students are released from school for their paid cooperative education work experience and participate in 200 minutes per week of related classroom instruction. Classroom instruction focuses on providing students with job survival skills and career exploration skills related to the job and improving students' abilities to interact positively with others. For skills related to the job, refer to the skill development course sequences, the task list or related occupational skill standards of the desired occupational program. The course content includes the following broad areas of emphasis: further career education opportunities, planning for the future, job-seeking skills, personal development, human relationships, legal protection and responsibilities, economics and the job, organizations, and job termination.

A qualified career and technical education coordinator is responsible for supervision. Written training agreements and individual student training plans are developed and agreed upon by the employer, student and coordinator. The coordinator, student and employer assume compliance with federal, state and local laws and regulations.

SPECIFIC OCCUPATIONAL PROGRAMS

The following specific occupational programs should only be offered if employment opportunities exist within the region and student interest is high. These programs include duties and tasks for specific occupational training.

47.0104 COMPUTER INSTALLER AND REPAIRER

This cluster offers a sequence of planned educational classroom and laboratory experiences concerned with the preparation of individuals to install, maintain, upgrade and repair personal computers, servers, networks, and peripherals. Students will learn how to install, upgrade and troubleshoot various hardware components such as motherboards, hard drives, CD-ROMS, memory, power supplies, video cards, sound cards and network cards. It will prepare individuals to maintain, troubleshoot, and secure network hardware and software. At the same time it will prepare individuals to work with end-users and provide help desk support. Consideration should also be given to instruction that leads towards industry certifications such as A+, Network +, and Cisco Certified Network Associate.

This cluster includes a sequence of planned educational classroom laboratory experiences, which will develop competencies in the following duty areas:

Installing, upgrading and repairing personal computer hardware

Installing and repairing computer peripherals such as printers

Installing, upgrading, and repairing network hardware

Installing, and updating computer software

Installing and troubleshooting network data cabling, hubs and switches

Installing and configuring network routers
Monitoring computer and network performance

Providing "help desk" service to end-users
Using diagnostic software and equipment to troubleshoot hardware and software problems

Processing data using computer equipment
Performing basic computer functions

The following are examples of occupations for which instruction may be provided at the secondary level.

Computer Help Desk Specialist
Network Installation Technician
Computer Support Specialist
Data Cabling Installer
Network Installer
PC Technician

The following occupational listing shows examples of occupations that may require additional training in a specialized program at the postsecondary level.

Network Control Operator
Network Consultant

Network Administrator
 Systems Administrator
 Network Manager
 Network Engineer
 Network Architect

In addition to those occupations already noted, there are other industrial occupations of a professional nature requiring extensive education beyond that received at secondary and postsecondary levels.

A regional delivery system should offer training for occupations in this field as determined by employment opportunities and the needs of the students.

Training received in this program may be used as a basis for entry level into the labor market or for further training at a postsecondary agency. Articulation between the secondary and postsecondary programs will be a part of the regional delivery systems.

Workplace skills, as well as 1) skills used in work performance that are transferable across jobs and occupations and that are instrumental to job and classroom success, 2) skills used to manage life's transitions, and 3) skills employed in the resolution of interpersonal, information or task-related problems or problems related to behavior in cooperative group settings, should be included in this curriculum. Leadership skill development is an integral part of this program and is delivered through career and technical student organization (TSA or SKILLS USA) activities. Individualized instruction and learning reinforcement are provided through cooperative career and technical education programs as well as classroom instruction.

COURSE SEQUENCE

<u>Course Title</u>	<u>Credits per Semester</u>	<u>Length in Semesters</u>	<u>Grade Level</u>
<u>Orientation</u>			
Production Technology	.5	1	9, 10
Transportation Technology	.5	1	9, 10
Communication Technology	.5	1	9, 10
Energy Utilization Technology	.5	1	9, 10
<u>Preparation</u>			
Computer Installer and Repairer I	.5	2	11
Computer Installer and Repairer II	.5	2	12

Cooperative Education

*variable

2

11, 12

* As determined at the regional system level.

COMPUTER INSTALLER AND REPAIRER SUGGESTED COURSE DESCRIPTIONS

PRODUCTION TECHNOLOGY

Length of course: 1 Semester
Credits per semester: .5
Grade level: 9, 10

Production Technology is a course designed to foster an awareness and understanding of manufacturing and construction technology. Through a variety of learning activities, students are exposed to many career opportunities in the production field. Experiences in manufacturing include product design, materials and processes, tools and equipment, including computers, safety procedures, corporate structure, management, research and development, production planning, mass production, marketing and servicing. In construction, students will be exposed to site preparation, foundations, building structures, installing utilities, and finishing and servicing structures.

TRANSPORTATION TECHNOLOGY

Length of course: 1 Semester
Credits per semester: .5
Grade level: 9, 10

Transportation Technology is a course designed to foster an awareness and understanding of the various transportation customs that make up our mobile society. Through laboratory activities the student will be exposed to the technologies of and career opportunities involved in material handling, atmospheric and space transportation, marine transportation, terrestrial transportation, and computer uses in transportation technology.

COMMUNICATION TECHNOLOGY

Length of course: 1 Semester
Credits per semester: .5
Grade level: 9, 10

Communication Technology is a course designed to foster an awareness and understanding of the technologies used to communicate in our modern society. Students

will gain experience in the areas of design and drafting, radio and television broadcasting, computers in communication, photography, graphic arts, and telecommunications.

ENERGY UTILIZATION TECHNOLOGY

Length of course: 1 Semester
Credits per semester: .5
Grade level: 9, 10

Energy Utilization Technology is a course designed to foster an awareness and understanding of how we use energy in our industrial technological society. Areas of study will include conversion of energy; electrical fundamentals; solar energy resources; alternate energy resources such as wind, water, and geothermal; fossil fuels; nuclear power; energy conservation; and computer uses in energy technology. Students will use laboratory experiences to become familiar with current energy technologies.

COMPUTER INSTALLER AND REPAIRER I

Length of course: 2 Semesters
Credits per semester .5
Grade level: 11

Computer Installer and Repairer I is a skill-level course designed to provide students with the skills needed to install, setup, configure, test, troubleshoot, and maintain, personal computers and peripherals. Instruction will include assembling, maintaining, and upgrading personal computers. Students will learn how to install, upgrade and troubleshoot various hardware components such as motherboards, hard drives, CD-ROMS, memory, power supplies, video cards, sound cards and network cards. Students will install and configure various desktop operating systems such as Windows, Apple, and Linux. The course will include adding and removing software programs; installing and updating system drivers; creating startup and recovery disk, and updating the BOIS and CMOS. Students will learn to conduct preventive maintenance and perform system backups, data transfer and recovery routines as well as use diagnostic utilities to troubleshoot hardware and software problems. Students will also learn how to disassemble, clean, troubleshoot and reassemble peripherals such as printers.

COMPUTER INSTALLER AND REPAIRER II

Length of course: 2 Semesters
Credits per semester .5
Grade level: 12

Computer Installer and Repairer II is a skill-level course for students who have completed Computer Installer and Repairer I. In addition, students will learn how to connect and install multiple computers and peripherals together to create a computer network. Students will build, configure, and maintain network servers along with installing and configuring various network operating systems such as Novell, Windows, and Linux. Students will learn to use troubleshooting services; system monitoring utilities, and data backup and recovery systems. Other topics will include learning how to connect various network components such as servers, computers, and printers together using data cabling, hubs, and switches. Students will learn to run, terminate, and troubleshoot data cabling. In addition, students will learn how to install and upgrade software across the network, as well as map drives and share resources such as printers, software, and files. The course will include setting up and configuring various network services such as TCP/IP, DHCP, DNS, VPN, terminal services, e-mail, and web services. Students will learn how to secure and protect network servers and data as well as setting up and configuring a firewall, intrusion detection system, and encryption software for identifying and preventing potential network attacks.

COOPERATIVE EDUCATION

Length of course:	2 Semesters
Credits per semester	variable
Grade level:	11, 12

Cooperative Education is a capstone course designed to assist students in the development of effective skills and attitudes through practical, advanced instruction in school and on the job through cooperative education. Students are released from school for their paid cooperative education work experience and participate in 200 minutes per week of related classroom instruction. Classroom instruction focuses on providing students with job survival skills and career exploration skills related to the job and improving students' abilities to interact positively with others. For skills related to the job, refer to the skill development course sequences, the task list or related occupational skill standards of the desired occupational program. The course content includes the following broad areas of emphasis: further career education opportunities, planning for the future, job-seeking skills, personal development, human relationships, legal protection and responsibilities, economics and the job, organizations, and job termination.

A qualified career and technical education coordinator is responsible for supervision. Written training agreements and individual student training plans are developed and agreed upon by the employer, student and coordinator. The coordinator, student and employer assume compliance with federal, state and local laws and regulations.

SPECIFIC OCCUPATIONAL PROGRAMS

The following specific occupational programs should only be offered if employment opportunities exist within the region and student interest is high. These programs include duties and tasks for specific occupational training.

47.0600 VEHICLE MAINTENANCE & REPAIR TECHNOLOGY

The Transportation Occupations Program provides educational activities in the classroom, laboratory, shop and actual work setting with the opportunity to become knowledgeable of a variety of skills associated with various modes of transportation. This program sequence of organized learning experiences and skills would include maintenance, repair and servicing of a variety of mechanical transportation and maintenance equipment.

This program includes a sequence of planned educational classroom laboratory experiences, which will develop competencies in the following duty areas:

<i>Preparing new vehicles</i>	<i>Servicing engine blocks</i>
<i>Servicing suspension systems</i>	<i>Servicing cylinder heads and valve trains</i>
<i>Servicing heating and cooling systems</i>	<i>Servicing electrical systems</i>
<i>Performing steering and wheel services</i>	<i>Servicing electrical accessories</i>
<i>Servicing brake systems</i>	<i>Servicing manual transmissions</i>
<i>Servicing emission control systems</i>	<i>Servicing drive lines</i>
<i>Servicing exhaust systems</i>	<i>Performing welding and oxy-fuel cutting</i>
<i>Servicing heating and air conditioning systems</i>	<i>Performing diesel engine tune-ups</i>
<i>Servicing fuel systems</i>	<i>Performing safety practices</i>
<i>Servicing ignition systems</i>	<i>Performing preventative maintenance</i>
<i>Servicing automatic transmissions</i>	<i>Performing maintenance control functions</i>
<i>Performing engine mechanical diagnosis</i>	<i>Performing precision measurements</i>
	<i>Performing chasis and cab maintenance</i>

Employment opportunities in the transportation occupations cluster field include commercial and private airports, automotive service stations, shopping centers, industrial-based centers, department stores, automobile dealerships, boat dealerships, snowmobiles/snow blower dealerships, truck maintenance businesses, lawnmower/lawn tractor dealerships and small transportation business dealerships. Through entrepreneurship, other employment opportunities are also available.

The Transportation Occupations Program provides educational activities in the classroom, laboratory, shop and actual work setting with the opportunity to become knowledgeable of a variety of skills associated with the following occupational titles:

Aircraft Mechanic
Auto Mechanic

Diesel Mechanic
 Motorboat Mechanic
 Gasoline Engine/Mower Repairer

In addition to those occupations already noted, there are other industrial occupations of a professional nature requiring extensive education beyond that received at secondary and postsecondary levels.

A regional delivery system should offer training for occupations in this field as determined by employment opportunities and the needs of the students.

Training received in this program may be used as a basis for entry level into the labor market or for further training at a postsecondary agency. Articulation between the secondary and postsecondary programs will be a part of the regional delivery systems.

Workplace skills, as well as 1) skills used in work performance that are transferable across jobs and occupations and that are instrumental to job and classroom success, 2) skills used to manage life's transitions, and 3) skills employed in the resolution of interpersonal information or task-related problems or problems related to behavior in cooperative group settings, should be included in this curriculum. Leadership skill development is an integral part of this program and is delivered through career and technical student organization (TSA or SKILLS USA) activities. Individualized instruction and learning reinforcement are provided through cooperative career and technical education programs as well as classroom instruction.

COURSE SEQUENCE

<u>Course Title</u>	<u>Credits per Semester</u>	<u>Length in Semesters</u>	<u>Grade Level</u>
<u>Orientation</u>			
Production Technology	.5	1	9, 10
Transportation Technology	.5	1	9, 10
Communication Technology	.5	1	9, 10
Energy Utilization Technology	.5	1	9, 10
<u>Preparation</u>			
Transportation I	.5	2	11
Transportation II	.5	2	12

Cooperative Education

*variable

2

11, 12

* As determined at the regional system level.

TRANSPORTATION SUGGESTED COURSE DESCRIPTIONS

PRODUCTION TECHNOLOGY

Length of course: 1 Semester
Credits per semester: .5
Grade level: 9, 10

Production Technology is a course designed to foster an awareness and understanding of manufacturing and construction technology. Through a variety of learning activities, students are exposed to many career opportunities in the production field. Experiences in manufacturing include product design, materials and processes, tools and equipment, including computers, safety procedures, corporate structure, management, research and development, production planning, mass production, marketing and servicing. In construction, students will be exposed to site preparation, foundations, building structures, installing utilities, and finishing and servicing structures.

TRANSPORTATION TECHNOLOGY

Length of course: 1 Semester
Credits per semester: .5
Grade level: 9, 10

Transportation Technology is a course designed to foster an awareness and understanding of the various transportation customs that make up our mobile society. Through laboratory activities the student will be exposed to the technologies of and career opportunities involved in material handling, atmospheric and space transportation, marine transportation, terrestrial transportation, and computer uses in transportation technology.

COMMUNICATION TECHNOLOGY

Length of course: 1 Semester
Credits per semester: .5
Grade level: 9, 10

Communication Technology is a course designed to foster an awareness and understanding of the technologies used to communicate in our modern society. Students will gain experience in the areas of design and drafting, radio and television broadcasting, computers in communication, photography, graphic arts, and telecommunications.

ENERGY UTILIZATION TECHNOLOGY

Length of course: 1 Semester
Credits per semester: .5
Grade level: 9, 10

Energy Utilization Technology is a course designed to foster an awareness and understanding of how we use energy in our industrial technological society. Areas of study will include conversion of energy; electrical fundamentals; solar energy resources; alternate energy resources such as wind, water, and geothermal; fossil fuels; nuclear power; energy conservation; and computer uses in energy technology. Students will use laboratory experiences to become familiar with current energy technologies.

VEHICLE MAINTENANCE & REPAIR TECHNOLOGY I

Length of course: 2 Semesters
Credits per semester: .5
Grade level: 11

This course provides experiences related to maintenance, repair and servicing of a variety of transportation and maintenance equipment. Planned learning activities will allow students to become knowledgeable of fundamental principles and methods and to develop technical skills related to auto mechanics, diesel mechanics, motorboat mechanics and gasoline engine/ mower repair. Instruction should include safety principles and practices; combustion engine principles; maintaining, servicing and repairing different types of transportation vehicles, as well as maintenance equipment such as lawn mowers, chainsaws and rotary tillers.

VEHICLE MAINTENANCE & REPAIR TECHNOLOGY II

Length of course: 2 Semesters
Credits per semester: .5
Grade level: 12

This course provides learning experiences related to maintenance, repair and servicing of a variety of transportation and maintenance equipment. Planned learning activities should emphasize the development of more advanced knowledge's and skill than those provided in Transportation Occupations I. Student technical skill experiences should

include instruction and activities in safety principles and practices, as well as continued development of skills associated with aircraft mechanics, auto mechanics, diesel mechanics, motorboat mechanics, and gasoline engine/mower repair. All learning experiences are designed to allow the student to acquire job-entry skills and knowledge.

COOPERATIVE EDUCATION

Length of course:	2 Semesters
Credits per semester	variable
Grade level:	11, 12

Cooperative Education is a capstone course designed to assist students in the development of effective skills and attitudes through practical, advanced instruction in school and on the job through cooperative education. Students are released from school for their paid cooperative education work experience and participate in 200 minutes per week of related classroom instruction. Classroom instruction focuses on providing students with job survival skills and career exploration skills related to the job and improving students' abilities to interact positively with others. For skills related to the job, refer to the skill development course sequences, the task list or related occupational skill standards of the desired occupational program. The course content includes the following broad areas of emphasis: further career education opportunities, planning for the future, job-seeking skills, personal development, human relationships, legal protection and responsibilities, economics and the job, organizations, and job termination.

A qualified career and technical education coordinator is responsible for supervision. Written training agreements and individual student training plans are developed and agreed upon by the employer, student and coordinator. The coordinator, student and employer assume compliance with federal, state and local laws and regulations.

SPECIFIC OCCUPATIONAL PROGRAMS

The following specific occupational programs should only be offered if employment opportunities exist within the region and student interest is high. These programs include duties and tasks for specific occupational training.

47.0603 AUTOMOTIVE BODY REPAIR

This program provides a sequence of organized learning experiences related to the repair of damaged automotive bodies and fenders. Learning activities in the classroom, laboratory, shop and actual work setting are combined to provide students with the opportunity to develop competencies in the following duty areas:

Applying safety practices
Performing housekeeping and record keeping
Performing supervisory functions
Estimating costs of repairs
Maintaining tools and equipment
Repairing body damage

Repairing frame damage
Repairing, replacing, adjusting and installing trim and accessories
Painting and refinishing
Removing and installing glass
Repairing electrical body components

Employment opportunities in the auto body repair field include automobile dealerships, auto body repair businesses, motor pool maintenance businesses, service stations and private repair businesses. Through entrepreneurship, other employment opportunities are also available.

In addition to those occupations already noted, there are other occupations of a professional nature requiring extensive education beyond that received at secondary and postsecondary levels.

A regional delivery system should offer training for occupations in this field as determined by employment opportunities and the needs of the students.

Training received in this program may be used as a basis for entry level into the labor market or for further training at a postsecondary agency. Articulation between the secondary and postsecondary programs will be a part of the regional delivery systems.

Workplace skills, as well as 1) skills used in work performance that are transferable across jobs and occupations and that are instrumental to job and classroom success, 2) skills used to manage life's transitions, and 3) skills employed in the resolution of interpersonal information or task-related problems or problems related to behavior in cooperative group settings, should be included in this curriculum. Leadership skill development is an integral part of this program and is delivered through career and technical student organization (TSA or SKILLS USA) activities. Individualized

instruction and learning reinforcement are provided through cooperative career and technical education programs as well as classroom instruction.

COURSE SEQUENCE

<u>Course Title</u>	<u>Credits per Semester</u>	<u>Length in Semesters</u>	<u>Grade Level</u>
<u>Orientation</u>			
Production Technology	.5	1	9, 10
Transportation Technology	.5	1	9, 10
Communication Technology	.5	1	9, 10
Energy Utilization Technology	.5	1	9, 10
<u>Preparation</u>			
Automotive Body and Fender Repair I	.5	2	11
Automotive Body and Fender Repair II	.5	2	12
Cooperative Education	*variable	2	11, 12

* As determined at the regional system level.

AUTOMOTIVE BODY REPAIR SUGGESTED COURSE DESCRIPTIONS

PRODUCTION TECHNOLOGY

Length of course: 1 Semester
 Credits per semester: .5
 Grade level: 9, 10

Production Technology is a course designed to foster an awareness and understanding of manufacturing and construction technology. Through a variety of learning activities, students are exposed to many career opportunities in the production field. Experiences in manufacturing include product design, materials and processes, tools and equipment, including computers, safety procedures, corporate structure, management, research and development, production planning, mass production, marketing and servicing. In construction, students will be exposed to site preparation, foundations, building

structures, installing utilities, and finishing and servicing structures.

TRANSPORTATION TECHNOLOGY

Length of course: 1 Semester
Credits per semester: .5
Grade level: 9, 10

Transportation Technology is a course designed to foster an awareness and understanding of the various transportation customs that make up our mobile society. Through laboratory activities the student will be exposed to the technologies of and career opportunities involved in material handling, atmospheric and space transportation, marine transportation, terrestrial transportation, and computer uses in transportation technology.

COMMUNICATION TECHNOLOGY

Length of course: 1 Semester
Credits per semester: .5
Grade level: 9, 10

Communication Technology is a course designed to foster an awareness and understanding of the technologies used to communicate in our modern society. Students will gain experience in the areas of design and drafting, radio and television broadcasting, computers in communication, photography, graphic arts, and telecommunications.

ENERGY UTILIZATION TECHNOLOGY

Length of course: 1 Semester
Credits per semester: .5
Grade level: 9, 10

Energy Utilization Technology is a course designed to foster an awareness and understanding of how we use energy in our industrial technological society. Areas of study will include conversion of energy; electrical fundamentals; solar energy resources; alternate energy resources such as wind, water, and geothermal; fossil fuels; nuclear power; energy conservation; and computer uses in energy technology. Students will use laboratory experiences to become familiar with current energy technologies.

AUTOMOTIVE BODY AND FENDER REPAIR I

Length of course: 2 Semesters
Credits per semester: .5
Grade level: 11

This course provides learning experiences designed to allow students to gain knowledge's and skills in repairing automotive bodies and fenders. Planned learning activities in this course should be balanced to allow students to become knowledgeable of the fundamental aspects of auto body repair methods and techniques and to develop practical skills in the basic operations required to prepare the automobile for final paint application. Instruction should emphasize safety principles and practices, hazardous materials, auto body nomenclature, function of individual components, the use of parts manuals, the identification of replacement parts, the use of auto body fillers, the use of plastic/glass fillers and special body repair tools, refinishing problems and paint preparation procedures. Practical activities should relate to experiences in writing and calculating damage estimates; removing and installing body panels, trim and glass; straightening by using hammers, bucks and jacks; and smoothing by filing, grinding and using fillers. Students should also learn to prime the area to be painted and prepare the surface for final paint application. These experiences and skills should be related to metal, fiberglass or urethane components.

AUTOMOTIVE BODY AND FENDER REPAIR II

Length of course: 2 Semesters
Credits per semester: .5
Grade level: 12

This course provides learning experiences designed to further enhance the student's skills in performing more advanced tasks related to automotive body and fender repair. Learning activities in this course should emphasize the successful application of the final paint coat and the preparation that precedes it. Emphasis should also be placed upon the identification and correction of imperfections and finish buffing of the final coat. Student learning activities should include instruction in safety principles and practices; hazardous materials; types and qualities of paints, colors and refinishing problems; glass standards and installation; special alignment techniques; customer relations; damage estimating; and insurance adjustments. Student practical activities should relate to experiences in estimating collision damage costs, preparing customer bills, removing and replacing glass surfaces, selecting paints, repainting minor and major damages, repainting total car body, drying or baking painted surfaces, post-paint cleanup and post-paint polishing.

COOPERATIVE INDUSTRIAL TECHNOLOGY EDUCATION

Length of course: 2 Semesters
Credits per semester variable
Grade level: 11, 12

Industrial Technology Cooperative Education is a capstone course designed to assist students in the development of effective skills and attitudes through practical, advanced instruction in school and on the job through cooperative education. Students are released from school for their paid cooperative education work experience and participate in 200 minutes per week of related classroom instruction. Classroom instruction focuses on providing students with job survival skills and career exploration skills related to the job and improving students' abilities to interact positively with others. For skills related to the job, refer to the skill development course sequences, the task list or related occupational skill standards of the desired occupational program. The course content includes the following broad areas of emphasis: further career education opportunities, planning for the future, job-seeking skills, personal development, human relationships, legal protection and responsibilities, economics and the job, organizations, and job termination.

A qualified career and technical industrial technology education coordinator is responsible for supervision. Written training agreements and individual student training plans are developed and agreed upon by the employer, student and coordinator. The coordinator, student and employer assume compliance with federal, state and local laws and regulations.

47.0603 Automotive Body Repair

This program provides a sequence of organized learning experiences related to the repair of damaged automotive bodies and fenders. Learning activities in the classroom, laboratory, shop and actual work setting are combined to provide students with the opportunity to develop competencies in the following duty areas:

Applying safety practices
Performing housekeeping and record keeping
Performing supervisory functions
Estimating costs of repairs
Maintaining tools and equipment
Repairing body damage

Repairing frame damage
Repairing, replacing, adjusting and installing trim and accessories
Painting and refinishing
Removing and installing glass
Repairing electrical body components

Employment opportunities in the auto body repair field include automobile dealerships, auto body repair businesses, motor pool maintenance businesses, service stations and

private repair businesses. Through entrepreneurship, other employment opportunities are also available.

In addition to those occupations already noted, there are other occupations of a professional nature requiring extensive education beyond that received at secondary and postsecondary levels.

A regional delivery system should offer training for occupations in this field as determined by employment opportunities and the needs of the students.

Training received in this program may be used as a basis for entry level into the labor market or for further training at a postsecondary agency. Articulation between the secondary and postsecondary programs will be a part of the regional delivery systems.

Workplace skills, as well as 1) skills used in work performance that are transferable across jobs and occupations and that are instrumental to job and classroom success, 2) skills used to manage life's transitions, and 3) skills employed in the resolution of interpersonal information or task-related problems or problems related to behavior in cooperative group settings, should be included in this curriculum. Leadership skill development is an integral part of this program and is delivered through career and technical student organization (TSA or SKILLS USA) activities. Individualized instruction and learning reinforcement are provided through cooperative career and technical education programs as well as classroom instruction.

COURSE SEQUENCE

<u>Course Title</u>	<u>Credits per Semester</u>	<u>Length in Semesters</u>	<u>Grade Level</u>
<u>Orientation</u>			
Production Technology	.5	1	9, 10
Transportation Technology	.5	1	9, 10
Communication Technology	.5	1	9, 10
Energy Utilization Technology	.5	1	9, 10
<u>Preparation</u>			
Automotive Body and Fender Repair I	.5	2	11
Automotive Body and Fender Repair II	.5	2	12
Industrial Cooperative Education	*variable	2	11, 12

* As determined at the regional system level.

AUTOMOTIVE BODY REPAIR SUGGESTED COURSE DESCRIPTIONS

PRODUCTION TECHNOLOGY

Length of course: 1 Semester
Credits per semester: .5
Grade level: 9, 10

Production Technology is a course designed to foster an awareness and understanding of manufacturing and construction technology. Through a variety of learning activities, students are exposed to many career opportunities in the production field. Experiences in manufacturing include product design, materials and processes, tools and equipment, including computers, safety procedures, corporate structure, management, research and development, production planning, mass production, marketing and servicing. In construction, students will be exposed to site preparation, foundations, building structures, installing utilities, and finishing and servicing structures.

TRANSPORTATION TECHNOLOGY

Length of course: 1 Semester
Credits per semester: .5
Grade level: 9, 10

Transportation Technology is a course designed to foster an awareness and understanding of the various transportation customs that make up our mobile society. Through laboratory activities the student will be exposed to the technologies of and career opportunities involved in material handling, atmospheric and space transportation, marine transportation, terrestrial transportation, and computer uses in transportation technology.

COMMUNICATION TECHNOLOGY

Length of course: 1 Semester
Credits per semester: .5
Grade level: 9, 10

Communication Technology is a course designed to foster an awareness and understanding of the technologies used to communicate in our modern society. Students will gain experience in the areas of design and drafting, radio and television broadcasting, computers in communication, photography, graphic arts, and telecommunications.

ENERGY UTILIZATION TECHNOLOGY

Length of course: 1 Semester
Credits per semester: .5
Grade level: 9, 10

Energy Utilization Technology is a course designed to foster an awareness and understanding of how we use energy in our industrial technological society. Areas of study will include conversion of energy; electrical fundamentals; solar energy resources; alternate energy resources such as wind, water, and geothermal; fossil fuels; nuclear power; energy conservation; and computer uses in energy technology. Students will use laboratory experiences to become familiar with current energy technologies.

AUTOMOTIVE BODY AND FENDER REPAIR I

Length of course: 2 Semesters
Credits per semester: .5
Grade level: 11

This course provides learning experiences designed to allow students to gain knowledge's and skills in repairing automotive bodies and fenders. Planned learning activities in this course should be balanced to allow students to become knowledgeable of the fundamental aspects of auto body repair methods and techniques and to develop practical skills in the basic operations required to prepare the automobile for final paint application. Instruction should emphasize safety principles and practices, hazardous materials, auto body nomenclature, function of individual components, the use of parts manuals, the identification of replacement parts, the use of auto body fillers, the use of plastic/glass fillers and special body repair tools, refinishing problems and paint preparation procedures. Practical activities should relate to experiences in writing and calculating damage estimates; removing and installing body panels, trim and glass; straightening by using hammers, bucks and jacks; and smoothing by filing, grinding and using fillers. Students should also learn to prime the area to be painted and prepare the surface for final paint application. These experiences and skills should be related to metal, fiberglass or urethane components.

AUTOMOTIVE BODY AND FENDER REPAIR II

Length of course: 2 Semesters
Credits per semester: .5
Grade level: 12

This course provides learning experiences designed to further enhance the student's skills in performing more advanced tasks related to automotive body and fender repair. Learning activities in this course should emphasize the successful application of the final paint coat and the preparation that precedes it. Emphasis should also be placed upon the identification and correction of imperfections and finish buffing of the final coat. Student learning activities should include instruction in safety principles and practices; hazardous materials; types and qualities of paints, colors and refinishing problems; glass standards and installation; special alignment techniques; customer relations; damage estimating; and insurance adjustments. Student practical activities should relate to experiences in estimating collision damage costs, preparing customer bills, removing and replacing glass surfaces, selecting paints, repainting minor and major damages, repainting total car body, drying or baking painted surfaces, post-paint cleanup and post-paint polishing.

COOPERATIVE EDUCATION

Length of course: 2 Semesters
Credits per semester variable
Grade level: 11, 12

Cooperative Education is a capstone course designed to assist students in the development of effective skills and attitudes through practical, advanced instruction in school and on the job through cooperative education. Students are released from school for their paid cooperative education work experience and participate in 200 minutes per week of related classroom instruction. Classroom instruction focuses on providing students with job survival skills and career exploration skills related to the job and improving students' abilities to interact positively with others. For skills related to the job, refer to the skill development course sequences, the task list or related occupational skill standards of the desired occupational program. The course content includes the following broad areas of emphasis: further career education opportunities, planning for the future, job-seeking skills, personal development, human relationships, legal protection and responsibilities, economics and the job, organizations, and job termination.

A qualified career and technical education coordinator is responsible for supervision. Written training agreements and individual student training plans are developed and agreed upon by the employer, student and coordinator. The coordinator, student and employer assume compliance with federal, state and local laws and regulations.

SPECIFIC OCCUPATIONAL PROGRAMS

The following specific occupational programs should only be offered if employment opportunities exist within the region and student interest is high. These programs include duties and tasks for specific occupational training.

48.0101 DRAFTING & DESIGN

This program is an interrelated sequence of organized learning experiences which include theory and work related to gathering and translating data and specifications into finished charts, graphs, drawings, schematics, layouts, plans, blueprints, technical illustrations, and renderings. Instruction emphasizes the development of knowledge's and skills essential for employment in the field of drafting and includes aspects of planning, preparing, reproducing, and interpreting drawings.

This program includes a sequence of planned educational classroom laboratory experiences, which will develop competencies in the following duty areas:

Planning and organizing activities
Researching information
Performing general office procedures
Preparing sketches
Performing basic layouts
Detailing drawings
Using reproduction techniques
Performing presentation techniques
Producing architectural drawings

Drawing light commercial building plans
Producing structural working drawings
Producing mechanical working drawings
Producing electrical and electronic working drawings
Producing civil engineering drawings
Using CAD command process
Producing drawings using CAD

Employment opportunities in the drafter/computer-aided drafter field include architectural firms, civil engineering firms, city government offices, mechanical engineering firms, industrial complex centers and other engineering businesses. Through entrepreneurship, other employment opportunities are also available.

A regional delivery system should offer training for occupations in this field as determined by employment opportunities and the needs of the students.

Training received in this program may be used as a basis for entry level into the labor market or for further training at a postsecondary agency. Articulation between the secondary and postsecondary programs will be a part of the regional delivery systems.

Workplace skills, as well as 1) skills used in work performance that are transferable across jobs and occupations and that are instrumental to job and classroom success, 2) skills used to manage life's transitions, and 3) skills employed in the resolution of interpersonal information or task-related problems or problems related to behavior in

cooperative group settings, should be included in this curriculum. Leadership skill development is an integral part of this program and is delivered through career and technical student organization (TSA or SKILLS USA) activities. Individualized instruction and learning reinforcement are provided through cooperative career and technical education programs as well as classroom instruction.

COURSE SEQUENCE

<u>Course Title</u>	<u>Credits per Semester</u>	<u>Length in Semesters</u>	<u>Grade Level</u>
<u>Orientation</u>			
Production Technology	.5	1	9, 10
Transportation Technology	.5	1	9, 10
Communication Technology	.5	1	9, 10
Energy Utilization Technology	.5	1	9, 10
<u>Preparation</u>			
Drafting & Design I	.5	2	11
Drafting & Design II	.5	2	12
Cooperative Education	*variable	2	11, 12

* As determined at the regional system level.

**DRAFTING & DESIGN
SUGGESTED COURSE DESCRIPTIONS**

PRODUCTION TECHNOLOGY

Length of course: 1 Semester
Credits per semester: .5
Grade level: 9, 10

Production Technology is a course designed to foster an awareness and understanding of manufacturing and construction technology. Through a variety of learning activities, students are exposed to many career opportunities in the production field. Experiences in manufacturing include product design, materials and processes, tools and equipment, including computers, safety procedures, corporate structure, management, research and development, production planning, mass production, marketing and servicing. In construction, students will be exposed to site preparation, foundations, building structures, installing utilities, and finishing and servicing structures.

TRANSPORTATION TECHNOLOGY

Length of course: 1 Semester
Credits per semester: .5
Grade level: 9, 10

Transportation Technology is a course designed to foster an awareness and understanding of the various transportation customs that make up our mobile society. Through laboratory activities the student will be exposed to the technologies of and career opportunities involved in material handling, atmospheric and space transportation, marine transportation, terrestrial transportation, and computer uses in transportation technology.

COMMUNICATION TECHNOLOGY

Length of course: 1 Semester
Credits per semester: .5
Grade level: 9, 10

Communication Technology is a course designed to foster an awareness and understanding of the technologies used to communicate in our modern society. Students will gain experience in the areas of design and drafting, radio and television broadcasting, computers in communication, photography, graphic arts, and telecommunications.

ENERGY UTILIZATION TECHNOLOGY

Length of course: 1 Semester
Credits per semester: .5
Grade level: 9, 10

Energy Utilization Technology is a course designed to foster an awareness and understanding of how we use energy in our industrial technological society. Areas of study will include conversion of energy; electrical fundamentals; solar energy resources; alternate energy resources such as wind, water, and geothermal; fossil fuels; nuclear power; energy conservation; and computer uses in energy technology. Students will use laboratory experiences to become familiar with current energy technologies.

DRAFTING & DESIGN I

Length of course: 2 Semesters
Credits per semester: .5
Grade level: 11

This course is designed to provide students interested in a career in drafting with information and practical experience needed for the development of job-related competencies. The course content would include planning and organizing activities, researching information, coordinating work and performing other general office procedures, preparing various sketches (freehand, isometric, orthographic, pictorial, oblique), performing basic layouts, detailing drawings such as sectional and isometric views, using various reproduction techniques and/or using CAD command processes to produce CAD grid drawings.

DRAFTING & DESIGN II

Length of course: 2 Semesters
Credits per semester: .5
Grade level: 12

This course continues in Drafting & Design I and emphasizes the areas of performing presentation techniques such as various graphs, producing architectural drawings, drawing light commercial building plans, interpreting codes and constructing structural working drawings, producing mechanical and electrical/electronic working drawings, producing civil engineering drawings, using and/or producing CAD drawings.

COOPERATIVE EDUCATION

Length of course: 2 Semesters
Credits per semester variable
Grade level: 11, 12

Cooperative Education is a capstone course designed to assist students in the development of effective skills and attitudes through practical, advanced instruction in school and on the job through cooperative education. Students are released from school for their paid cooperative education work experience and participate in 200 minutes per week of related classroom instruction. Classroom instruction focuses on providing students with job survival skills and career exploration skills related to the job and improving students' abilities to interact positively with others. For skills related to the job, refer to the skill development course sequences, the task list or related occupational skill standards of the desired occupational program. The course content includes the following broad areas of emphasis: further career education opportunities, planning for the future, job-seeking skills, personal development, human relationships, legal protection and responsibilities, economics and the job, organizations, and job termination.

A qualified career and technical education coordinator is responsible for supervision. Written training agreements and individual student training plans are developed and agreed upon by the employer, student and coordinator. The coordinator, student and employer assume compliance with federal, state and local laws and regulations.

SPECIFIC OCCUPATIONAL PROGRAMS

The following specific occupational programs should only be offered if employment opportunities exist within the region and student interest is high. These programs include duties and tasks for specific occupational training.

48.0200 GRAPHIC COMMUNICATIONS

The Graphic Communications Occupations Program provides educational activities in the classroom, laboratory, shop and actual work setting with the opportunity to become knowledgeable of a variety of skills associated with Graphic Communications Occupations.

This program prepares students for occupations dealing with the entire spectrum of the Graphic Communications Occupations field. This program includes a sequence of planned educational classroom laboratory experiences which will develop competencies in the following duty areas:

<i>Maintaining quality control</i>	<i>Applying safety practices</i>
<i>Cleaning and maintaining darkroom</i>	<i>Performing plate making</i>
<i>Performing camera work</i>	<i>Performing presswork</i>
<i>Performing darkroom work</i>	<i>Cleaning presses</i>
<i>Applying safety practices</i>	<i>Performing bindery work</i>
<i>Performing housekeeping and record keeping activities</i>	

The following occupational listing shows examples of occupations, which require secondary training and may require additional training in a specialized program at the postsecondary setting.

<i>Commercial Artist</i>	<i>Press Operator</i>
<i>Composer</i>	<i>Offset Lithographic Press Operator</i>
<i>Drafter</i>	<i>Platemaker</i>
<i>Photographer</i>	<i>Press Assistant</i>

In addition to those occupations already noted, there are other industrial occupations of a professional nature requiring extensive education beyond that received at secondary and postsecondary levels.

A regional delivery system should offer training for occupations in this field as determined by employment opportunities and the needs of the students.

Training received in this program may be used as a basis for entry level into the labor market or for further training at a postsecondary agency. Articulation between the secondary and postsecondary programs will be a part of the regional delivery systems.

Workplace skills, as well as 1) skills used in work performance that are transferable across jobs and occupations and that are instrumental to job and classroom success, 2) skills used to manage life's transitions, and 3) skills employed in the resolution of interpersonal information or task-related problems or problems related to behavior in cooperative group settings, should be included in this curriculum. Leadership skill development is an integral part of this program and is delivered through career and technical student organization (TSA or SKILLS USA) activities. Individualized instruction and learning reinforcement are provided through cooperative career and technical education programs as well as classroom instruction.

Employment opportunities are available to workers with competencies in the field of graphic communications in both semiskilled and skilled areas of employment. Employment is available in such diverse fields as computer repair, electrical instrument repair, electro medical equipment repair, and servicing, installing and repairing radio and television and other communications systems.

COURSE SEQUENCE

<u>Course Title</u>	<u>Credits per Semester</u>	<u>Length in Semesters</u>	<u>Grade Level</u>
<u>Orientation</u>			
Production Technology	.5	1	9, 10
Transportation Technology	.5	1	9, 10
Communication Technology	.5	1	9, 10
Energy Utilization Technology	.5	1	9, 10
<u>Preparation</u>			
Graphic Communications I	.5	2	11
Graphic Communications II	.5	2	12
Drafting	.5	2	12
Graphic Arts	.5	2	12
Cooperative Education	*variable	2	11, 12

GRAPHIC COMMUNICATIONS I

Length of course: 2 Semesters

Credits per semester: .5
Grade level: 11

This course provides learning experiences common to all graphic communications occupations. Instruction should include use of color, balance and proportion in design; three-dimensional visualization; sketching; design procedures; layout; selection of type styles; selection of appropriate drawing tools and media; and the use of the computer as a communication tool. Planned learning activities will allow students to become knowledgeable of fundamental principles and methods and to develop technical skills related to graphic arts and drafting.

GRAPHIC COMMUNICATIONS II

Length of course: 2 Semesters
Credits per semester: .5
Grade level: 12

Due to the nature of the advanced level skills within the cluster, the student, upon reaching 12th grade, should make a choice to pursue either the drafting occupations field or graphic arts occupations.

DRAFTING

Length of course: 2 Semesters
Credits per semester: .5
Grade level: 12

This course provides learning experiences related to the principles, tools, materials, techniques, equipment and processes utilized in the production and reproduction of drawings, layouts, plans and blueprints. Emphasis should be placed on three-dimensional representation using the computer as a drafting tool. Instruction is provided in freehand sketching; theory of projection; relationship of coordinate planes; object position in relation to planes; projection of straight and curved lines and surfaces; standards and requirements of dimensioning and tolerancing; isometrics of planes and solids; cavalier, cabinet, and general oblique drawing; diametric drawing; and picture planes, points of sight, visual rays, and vanishing points in perspective drawing.

Student experiences should relate to technical illustration, architectural drawing, light commercial building plans, structural working drawings, mechanical working drawings, electrical and electronic working drawings and civil engineering drawings. All learning experiences are designed to allow the student to acquire job-entry skills and knowledge.

GRAPHIC ARTS

Length of course: 2 Semesters
Credits per semester: .5
Grade level: 12

This course provides learning experiences related to the tools, materials, processes and practices utilized in the printing industry. Instruction is provided in industrial safety; stencil preparation and duplicating equipment operation; silk screen preparation and printing; machine typesetting; ink and color preparation; assembly, binding, and trimming operations; layout, paste up and copy preparation; camera and darkroom procedures; and stripping and related platemaking processes. The course provides the student with learning experiences in the use of cameras and photographic equipment, development and processing of photographic negatives and prints, negative stripping and related platemaking procedures, photocomposition, photoengraving, lithography, and offset presswork. Use of the computer in graphic arts occupations should be emphasized. All learning experiences are designed to allow the student to acquire job-entry skills and knowledge.

50.0402 Graphic Design, Commercial Artist and Illustrator

This cluster offers a sequence of planned educational classroom and laboratory experiences concerned with the preparation of individuals for a career in the fields of advertising, commercial art, graphic design, web site development, and design illustrator. Students will learn to apply artistic techniques to design and create advertisements, displays, publications, technical illustrations, marketing brochures, video graphics, computer-generated media, and interactive web sites. Instruction will include design and layout principles, along with text, drawing, rendering, graphics, sound, video, and 2D/3D animation integration to develop various print, video and digital products.

This cluster includes a sequence of planned educational classroom laboratory experiences, which will develop competencies in the following duty areas:

- Applying artistic, design, and layout principles to print, video, and digital products
- Using audio, image, graphic, and video capturing and editing hardware and software
- Using animation and 2D/3D hardware and software
- Designing and creating web pages and site
- Preparing design drafts and sketches Using HTML, HTML editors and graphical editors
- Adding interactive and dynamic elements to online content, video products and digital media
- Interviewing clients to determine design needs
- Creating product presentations
- Presenting product proposal to clients
- Creating product portfolio
- Performing basic computer functions

The following are examples of occupations for which instruction may be provided at the secondary level.

- Hypermedia Specialist
- 2D/3D artist
- Animator/ Animator Specialist
- Graphic Arts Technician
- Design Specialist
- Graphic Specialist
- Web Design Specialist

The following occupational listing shows examples of occupations that may require additional training in a specialized program at the postsecondary level.

- Print Production Technician
- Multimedia Producers
- Multimedia Developer
- Software Developer
- Commercial Artist
- Graphic Designer/Artist
- Industrial Designer

Illustrator
 Video/audio Editor
 Electronic Publisher
 Corporate Identity System Designer
 Webmaster
 Web Site Designer

In addition to those occupations already noted, there are other industrial occupations of a professional nature requiring extensive education beyond that received at secondary and postsecondary levels.

A regional delivery system should offer training for occupations in this field as determined by employment opportunities and the needs of the students.

Training received in this program may be used as a basis for entry level into the labor market or for further training at a postsecondary agency. Articulation between the secondary and postsecondary programs will be a part of the regional delivery systems.

Workplace skills, as well as 1) skills used in work performance that are transferable across jobs and occupations and that are instrumental to job and classroom success, 2) skills used to manage life's transitions, and 3) skills employed in the resolution of interpersonal, information or task-related problems or problems related to behavior in cooperative group settings, should be included in this curriculum. Leadership skill development is an integral part of this program and is delivered through career and technical student organization (TSA or SKILLS USA) activities. Individualized instruction and learning reinforcement are provided through cooperative career and technical education programs as well as classroom instruction.

COURSE SEQUENCE

Course Title	Credits per Semester	Length in Semesters	Grade Level
Orientation			
Production Technology	.5	1	9, 10
Transportation Technology	.5	1	9, 10
Communication Technology	.5	1	9, 10
Energy Utilization Technology	.5	1	9, 10

Preparation

Commercial Artist and Illustrator I	.5	2	11
Commercial Artist and Illustrator II	.5	2	12
Cooperative Education	*variable	2	11, 12

COMMERCIAL ARTIST AND ILLUSTRATOR I

Length of course:	2 Semesters
Credits per semester	.5
Grade level:	11

Commercial Artist and Illustrator I is a skill-level course designed to provide students with the skills needed for a career in the fields of advertising, commercial art, graphic design, web site development, and graphic illustrator. Students will learn to apply artistic, design, and layout principles, along with text, graphics, drawing, rendering, sound, video, and 2D/3D animation integration to develop various print, video and digital products. Students will use hardware and software programs to create, manipulate, color, paint and layer scanned images, computer graphics, and original artwork. Students will use hardware and software to capture, edit, create, and compress audio and video clips. Students will use animation and 2D/3D hardware and software to create animated text, graphics and images. Students will apply artistic techniques to design and create advertisements, displays, publications, technical illustrations, marketing brochures, logos, trademarks, packaging, video graphics, and computer-generated media.

COMMERCIAL ARTIST AND ILLUSTRATOR II

Length of course:	2 Semesters
Credits per semester	.5
Grade level:	12

Commercial Artist and Illustrator II is a skill-level course for students who have completed Commercial Artist and Illustrator I. In addition to expanding on the activities explored in the first course, students will work in a project-based environment to create a variety of interactive online and CD/DVD-based products such as web sites, catalogs, publications, marketing materials, presentations, and educational/training programs. Students will create dynamic web pages and sites using HTML, HTML editors, and graphic editors. Students will create graphic sketches, designs, and copy layouts for online content. Instruction will include how to determine size and arrangement of illustrative material and copy, select style and size of type, and arrange layout based upon available space. Students will learn how to capture and edit images, sound, and video and combine them with text and animation. Instruction will include client interviewing skills, product proposal development, and product presentation techniques. Students will also learn how to create a product portfolio.

COOPERATIVE EDUCATION

Length of course: 2 Semesters
Credits per semester variable
Grade level: 11, 12

Cooperative Education is a capstone course designed to assist students in the development of effective skills and attitudes through practical, advanced instruction in school and on the job through cooperative education. Students are released from school for their paid cooperative education work experience and participate in 200 minutes per week of related classroom instruction. Classroom instruction focuses on providing students with job survival skills and career exploration skills related to the job and improving students' abilities to interact positively with others. For skills related to the job, refer to the skill development course sequences, the task list or related occupational skill standards of the desired occupational program. The course content includes the following broad areas of emphasis: further career education opportunities, planning for the future, job-seeking skills, personal development, human relationships, legal protection and responsibilities, economics and the job, organizations, and job termination.

A qualified career and technical education coordinator is responsible for supervision. Written training agreements and individual student training plans are developed and agreed upon by the employer, student and coordinator. The coordinator, student and employer assume compliance with federal, state and local laws and regulations.

SPECIFIC OCCUPATIONAL PROGRAMS

The following specific occupational programs should only be offered if employment opportunities exist within the region and student interest is high. These programs include duties and tasks for specific occupational training.

48.0500 PRECISION METAL WORKING

This program includes a sequence of courses planned to provide educational experiences, which will enable students to develop competencies needed for employment and or continued education in the manufacturing processes, whether manual or automated.

Students will receive practical experiences to assist in understanding the total field and the relationships between the areas as related to overall success. Emphasis throughout the program will be on developing competencies in the following duty areas:

- | | |
|--|---|
| <i>Performing precision measurement</i> | <i>Performing gas metal arc welding (GMAW)</i> |
| <i>Performing layouts</i> | <i>Performing gas tungsten arc welding (FCAW)</i> |
| <i>Operating saws</i> | <i>Performing plasma arc welding (PAW)</i> |
| <i>Operating drilling machines</i> | <i>Performing submerged arc welding (SAW)</i> |
| <i>Operating bench grinders</i> | <i>Performing resistance welding</i> |
| <i>Operating lathers</i> | <i>Performing electro-slag welding (ESW)</i> |
| <i>Operating vertical milling machines</i> | <i>Performing ultrasonic welding (USW)</i> |
| <i>Operating horizontal milling machines</i> | <i>Performing laser beam welding (LBW)</i> |
| <i>Operating boring machines</i> | <i>Performing electron beam welding (EBW)</i> |
| <i>Operating surface grinders</i> | <i>Performing inertia welding</i> |
| <i>Operating inside diameter grinders</i> | <i>Performing underwater welding</i> |
| <i>Operating outside diameter grinders</i> | <i>Performing plastic welding</i> |
| <i>Operating centerless diameter grinders</i> | <i>Testing welds</i> |
| <i>Operating tool and cutter grinders</i> | <i>Assembling and disassembling machine mechanisms</i> |
| <i>Operating jig grinders</i> | <i>Installing and removing machinery</i> |
| <i>Operating electrical discharge machines</i> | <i>Maintaining hydraulic systems</i> |
| <i>Selecting materials</i> | <i>Maintaining pneumatic systems</i> |
| <i>Performing heat treatment of metals</i> | <i>Maintaining and repairing electrical systems</i> |
| <i>Performing housekeeping and record keeping activities</i> | <i>Maintaining and repairing heating and cooling devices</i> |
| <i>Performing supervisory functions</i> | <i>Inspecting and repairing cranes and elevators</i> |
| <i>Setting up numerical control/computer numerical control (NC/CNC) machines</i> | <i>Maintaining and repairing electronic control systems</i> |
| <i>Operating numerical control/computer numerical control (NC/CNC) machines</i> | <i>Installing and troubleshooting sensors</i> |
| <i>Setting up manual punch presses</i> | <i>Installing automated systems</i> |
| <i>Operating manual punch presses</i> | <i>Programming automated systems</i> |
| <i>Setting up and operating automatic punch presses</i> | <i>Programming and planning</i> |
| <i>Fastening and/or joining sheet metal</i> | <i>Performing operating functions of automated systems</i> |
| <i>Fabricating sheet metal</i> | <i>Performing communication functions</i> |
| <i>Fabricating architectural/roofing sheet metal</i> | <i>Performing quality control and quality assurance functions</i> |
| <i>Fabricating specialty/sheet metal</i> | <i>Adapting automated systems for manufacturing</i> |
| | <i>Performing shielded metal arc welding (SMAW)</i> |

*Fabricating food and beverage dispensing
equipment*
Installing sheet metal systems
Performing oxy-fuel welding (OAW)
Performing thermal cutting operations

Employment opportunities are available to workers with competencies in manufacturing at the unskilled, semiskilled and skilled levels with some positions having supervisory responsibilities. Opportunities exist in the processing of materials in the metal, plastics, ceramic and wood areas.

The following are examples of occupations for which instruction may be provided at the secondary level:

Machine Tool Operator
Punch Press Operator
Sheet Metal Worker
Combination Welder
Maintenance Repairer
Manufacturing Inspector
Numerical Control Machine Tool Operator

The following occupational listing shows examples of occupations, which may require additional training in a specialized program at the postsecondary level.

Machinist
Tool and Die Maker
Automated Manufacturing Systems Technician

A regional delivery system should offer training for occupations in this field as determined by employment opportunities and the needs of the students.

Training received in this program may be used as a basis for entry level into the labor market or for further training at a postsecondary agency. Articulation between the secondary and postsecondary programs will be a part of the regional delivery systems.

Workplace skills, as well as 1) skills used in work performance that are transferable across jobs and occupations and that are instrumental to job and classroom success, 2) skills used to manage life's transitions, and 3) skills employed in the resolution of interpersonal information or task-related problems or problems related to behavior in cooperative group settings, should be included in this curriculum. Leadership skill development is an integral part of this program and is delivered through career and technical student organization (TSA or SKILLS USA) activities. Individualized instruction and learning reinforcement are provided through cooperative career and technical education programs as well as classroom instruction.

COURSE SEQUENCE

<u>Course Title</u>	<u>Credits per Semester</u>	<u>Length in Semesters</u>	<u>Grade Level</u>
<u>Orientation</u>			
Production Technology	.5	1	9, 10
Transportation Technology	.5	1	9, 10
Communication Technology	.5	1	9, 10
Energy Utilization Technology	.5	1	9, 10
<u>Preparation</u>			
Manufacturing I	.5	2	11
Manufacturing II	.5	2	12
Cooperative Education	*variable	2	11, 12

* As determined at the regional system level.

MANUFACTURING SUGGESTED COURSE DESCRIPTIONS

PRODUCTION TECHNOLOGY

Length of course: 1 Semester
Credits per semester: .5
Grade level: 9, 10

Production Technology is a course designed to foster an awareness and understanding of manufacturing and construction technology. Through a variety of learning activities, students are exposed to many career opportunities in the production field. Experiences in manufacturing include product design, materials and processes, tools and equipment, including computers, safety procedures, corporate structure, management, research and development, production planning, mass production, marketing and servicing. In construction, students will be exposed to site preparation, foundations, building structures, installing utilities, and finishing and servicing structures.

TRANSPORTATION TECHNOLOGY

Length of course: 1 Semester
Credits per semester: .5
Grade level: 9, 10

Transportation Technology is a course designed to foster an awareness and understanding of the various transportation customs that make up our mobile society. Through laboratory activities the student will be exposed to the technologies of and career opportunities involved in material handling, atmospheric and space transportation, marine transportation, terrestrial transportation, and computer uses in transportation technology.

COMMUNICATION TECHNOLOGY

Length of course: 1 Semester
Credits per semester: .5
Grade level: 9, 10

Communication Technology is a course designed to foster an awareness and understanding of the technologies used to communicate in our modern society. Students will gain experience in the areas of design and drafting, radio and television broadcasting, computers in communication, photography, graphic arts, and telecommunications.

ENERGY UTILIZATION TECHNOLOGY

Length of course: 1 Semester
Credits per semester: .5
Grade level: 9, 10

Energy Utilization Technology is a course designed to foster an awareness and understanding of how we use energy in our industrial technological society. Areas of study will include conversion of energy; electrical fundamentals; solar energy resources; alternate energy resources such as wind, water, and geothermal; fossil fuels; nuclear power; energy conservation; and computer uses in energy technology. Students will use laboratory experiences to become familiar with current energy technologies.

MANUFACTURING I

The learning experiences provided at the 11th and 12th grade level should relate occupational-specific competencies to the material manufacturing processes involved in industry, whether manual or automated.

Length of course: 2 Semesters
Credits per semester: .5
Grade level: 11

This course offers a planned sequence of learning experiences which provide students with the opportunities to develop competencies needed for employment in a variety of manufacturing-related occupations. The nature of employment opportunities within the region will influence the content of this course. Course content should emphasize competencies common to many occupations such as applying safety practices, selecting materials, performing bench work operations, performing precision measurement, performing layouts, performing housekeeping and record keeping activities and operating a variety of tools used for separating, forming and combining materials.

MANUFACTURING II

Length of course: 2 Semesters
Credits per semester: .5
Grade level: 12

This second training level course should offer experiences, which expand upon competencies achieved during Manufacturing Occupations I. This course will begin to offer students the opportunity to specialize in specific areas of manufacturing such as machine tool set-up and operation, welding, quality control, automated machine set-up and operation and sheet metal fabrication. Course content might include the following areas: metallurgy and heat treatment of metal, advanced machine set-up and operation, numerical control/computer, numerical control machining, performing supervisory functions and installation, and maintenance and repair of machinery.

COOPERATIVE EDUCATION

Length of course: 2 Semesters
Credits per semester: variable
Grade level: 11, 12

Cooperative Education is a capstone course designed to assist students in the development of effective skills and attitudes through practical, advanced instruction in school and on the job through cooperative education. Students are released from school

for their paid cooperative education work experience and participate in 200 minutes per week of related classroom instruction. Classroom instruction focuses on providing students with job survival skills and career exploration skills related to the job and improving students' abilities to interact positively with others. For skills related to the job, refer to the skill development course sequences, the task list or related occupational skill standards of the desired occupational program. The course content includes the following broad areas of emphasis: further career education opportunities, planning for the future, job-seeking skills, personal development, human relationships, legal protection and responsibilities, economics and the job, organizations, and job termination.

A qualified career and technical education coordinator is responsible for supervision. Written training agreements and individual student training plans are developed and agreed upon by the employer, student and coordinator. The coordinator, student and employer assume compliance with federal, state and local laws and regulations.

SPECIFIC OCCUPATIONAL PROGRAMS

The following specific occupational programs should only be offered if employment opportunities exist within the region and student interest is high. These programs include duties and tasks for specific occupational training.

50.0402 COMMERCIAL ARTIST AND ILLUSTRATOR

This cluster offers a sequence of planned educational classroom and laboratory experiences concerned with the preparation of individuals for a career in the fields of advertising, commercial art, graphic design, web site development, and design illustrator. Students will learn to apply artistic techniques to design and create advertisements, displays, publications, technical illustrations, marketing brochures, video graphics, computer-generated media, and interactive web sites. Instruction will include design and layout principles, along with text, drawing, rendering, graphics, sound, video, and 2D/3D animation integration to develop various print, video and digital products.

This cluster includes a sequence of planned educational classroom laboratory experiences, which will develop competencies in the following duty areas:

<i>Applying artistic, design, and layout principles to print, video, and digital products</i>	<i>Using HTML, HTML editors and graphical editors</i>
<i>Using audio, image, graphic, and video capturing and editing hardware and software</i>	<i>Adding interactive and dynamic elements to online content, video products and digital media</i>
<i>Using animation and 2D/3D hardware and software</i>	<i>Interviewing clients to determine design needs</i>
<i>Designing and creating web pages and site</i>	<i>Creating product presentations</i>
<i>Preparing design drafts and sketches</i>	<i>Presenting product proposal to clients</i>
	<i>Creating product portfolio</i>
	<i>Performing basic computer functions</i>

The following are examples of occupations for which instruction may be provided at the secondary level.

- Hypermedia Specialist
- 2D/3D artist
- Animator/ Animator Specialist
- Graphic Arts Technician
- Design Specialist
- Graphic Specialist
- Web Design Specialist

The following occupational listing shows examples of occupations that may require additional training in a specialized program at the postsecondary level.

Print Production Technician
 Multimedia Producers
 Multimedia Developer
 Software Developer
 Commercial Artist
 Graphic Designer/Artist
 Industrial Designer
 Illustrator
 Video/audio Editor
 Electronic Publisher
 Corporate Identity System Designer
 Webmaster
 Web Site Designer

In addition to those occupations already noted, there are other industrial occupations of a professional nature requiring extensive education beyond that received at secondary and postsecondary levels.

A regional delivery system should offer training for occupations in this field as determined by employment opportunities and the needs of the students.

Training received in this program may be used as a basis for entry level into the labor market or for further training at a postsecondary agency. Articulation between the secondary and postsecondary programs will be a part of the regional delivery systems.

Workplace skills, as well as 1) skills used in work performance that are transferable across jobs and occupations and that are instrumental to job and classroom success, 2) skills used to manage life's transitions, and 3) skills employed in the resolution of interpersonal, information or task-related problems or problems related to behavior in cooperative group settings, should be included in this curriculum. Leadership skill development is an integral part of this program and is delivered through career and technical student organization (TSA or SKILLS USA) activities. Individualized instruction and learning reinforcement are provided through cooperative career and technical education programs as well as classroom instruction.

COURSE SEQUENCE

<u>Course Title</u>	<u>Credits per Semester</u>	<u>Length in Semesters</u>	<u>Grade Level</u>
<u>Orientation</u>			
Production Technology	.5	1	9, 10
Transportation Technology	.5	1	9, 10

Communication Technology	.5	1	9, 10
Energy Utilization Technology	.5	1	9, 10

Preparation

Commercial Artist and Illustrator I	.5	2	11
Commercial Artist and Illustrator II	.5	2	12
Industrial Cooperative Education	*variable	2	11, 12

* As determined at the regional system level.

**GRAPHIC DESIGN, COMMERCIAL ARTIST AND ILLUSTRATOR
SUGGESTED COURSE DESCRIPTIONS**

PRODUCTION TECHNOLOGY

Length of course: 1 Semester
 Credits per semester: .5
 Grade level: 9, 10

Production Technology is a course designed to foster an awareness and understanding of manufacturing and construction technology. Through a variety of learning activities, students are exposed to many career opportunities in the production field. Experiences in manufacturing include product design, materials and processes, tools and equipment, including computers, safety procedures, corporate structure, management, research and development, production planning, mass production, marketing and servicing. In construction, students will be exposed to site preparation, foundations, building structures, installing utilities, and finishing and servicing structures.

TRANSPORTATION TECHNOLOGY

Length of course: 1 Semester
 Credits per semester: .5
 Grade level: 9, 10

Transportation Technology is a course designed to foster an awareness and understanding of the various transportation customs that make up our mobile society. Through

laboratory activities the student will be exposed to the technologies of and career opportunities involved in material handling, atmospheric and space transportation, marine transportation, terrestrial transportation, and computer uses in transportation technology.

COMMUNICATION TECHNOLOGY

Length of course: 1 Semester
Credits per semester: .5
Grade level: 9, 10

Communication Technology is a course designed to foster an awareness and understanding of the technologies used to communicate in our modern society. Students will gain experience in the areas of design and drafting, radio and television broadcasting, computers in communication, photography, graphic arts, and telecommunications.

ENERGY UTILIZATION TECHNOLOGY

Length of course: 1 Semester
Credits per semester: .5
Grade level: 9, 10

Energy Utilization Technology is a course designed to foster an awareness and understanding of how we use energy in our industrial technological society. Areas of study will include conversion of energy; electrical fundamentals; solar energy resources; alternate energy resources such as wind, water, and geothermal; fossil fuels; nuclear power; energy conservation; and computer uses in energy technology. Students will use laboratory experiences to become familiar with current energy technologies.

COMMERCIAL ARTIST AND ILLUSTRATOR I

Length of course: 2 Semesters
Credits per semester: .5
Grade level: 11

Commercial Artist and Illustrator I is a skill-level course designed to provide students with the skills needed for a career in the fields of advertising, commercial art, graphic design, web site development, and graphic illustrator. Students will learn to apply artistic, design, and layout principles, along with text, graphics, drawing, rendering, sound, video, and 2D/3D animation integration to develop various print, video and digital products. Students will use hardware and software programs to create, manipulate, color, paint and layer scanned images, computer graphics, and original artwork. Students will

use hardware and software to capture, edit, create, and compress audio and video clips. Students will use animation and 2D/3D hardware and software to create animated text, graphics and images. Students will apply artistic techniques to design and create advertisements, displays, publications, technical illustrations, marketing brochures, logos, trademarks, packaging, video graphics, and computer-generated media.

COMMERCIAL ARTIST AND ILLUSTRATOR II

Length of course: 2 Semesters
Credits per semester .5
Grade level: 12

Commercial Artist and Illustrator II is a skill-level course for students who have completed Commercial Artist and Illustrator I. In addition to expanding on the activities explored in the first course, students will work in a project-based environment to create a variety of interactive online and CD/DVD-based products such as web sites, catalogs, publications, marketing materials, presentations, and educational/training programs. Students will create dynamic web pages and sites using HTML, HTML editors, and graphic editors. Students will create graphic sketches, designs, and copy layouts for online content. Instruction will include how to determine size and arrangement of illustrative material and copy, select style and size of type, and arrange layout based upon available space. Students will learn how to capture and edit images, sound, and video and combine them with text and animation. Instruction will include client interviewing skills, product proposal development, and product presentation techniques. Students will also learn how to create a product portfolio.

COOPERATIVE EDUCATION

Length of course: 2 Semesters
Credits per semester variable
Grade level: 11, 12

Cooperative Education is a capstone course designed to assist students in the development of effective skills and attitudes through practical, advanced instruction in school and on the job through cooperative education. Students are released from school for their paid cooperative education work experience and participate in 200 minutes per week of related classroom instruction. Classroom instruction focuses on providing students with job survival skills and career exploration skills related to the job and improving students' abilities to interact positively with others. For skills related to the job, refer to the skill development course sequences, the task list or related occupational skill standards of the desired occupational program. The course content includes the following broad areas of emphasis: further career education opportunities, planning for the future, job-seeking skills, personal development, human relationships, legal protection and responsibilities, economics and the job, organizations, and job termination.

A qualified career and technical education coordinator is responsible for supervision. Written training agreements and individual student training plans are developed and agreed upon by the employer, student and coordinator. The coordinator, student and employer assume compliance with federal, state and local laws and regulations.

