

## 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.

### **21.201.1      PLTW Technology & Pre-Engineering**

This program is designed to generally prepare students to apply basic engineering principles and technical skills in support of technologists and 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>
<b><u>Orientation</u></b>			
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
<b><u>Preparation</u></b>			
<b>Project Lead The Way PLTW</b>			
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
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.

## 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 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.