WHAT DO STUDENTS LEARN IN TECHNOLOGY EDUCATION?

In a word, it is about INNOVATION! It is about how people think! It is how to apply technology in the solutions of problems facing society. The aim is to solve problems and create opportunities within a realistic context. That context can start with the student's everyday environment and progressively move into more global issues.

Examples of technology problems and learning situations could be the cleaning of a stream that has become polluted, the creation and fabrication of an invention to solve a household problem, or designing and building of a habitat for a unique situation. The thinking process is closely related to that of an engineer, hi-tech worker, designer, or architect.

Students apply their ingenuity with tools, materials, processes, and resources to create solutions and opportunities for themselves and others. The nature of learning goes from the very early years of just "knowing" to more developed applications that might relate to the medical, agricultural, energy and power, information and communication, transportation, manufacturing, and construction technologies. It is a new and dynamic subject in our schools that is as fast moving and as up-to-date as the thinking of technology in our society! It is the future workforce thinking!

Adapted from An Educational Imperative, ITEA 2005.

For more information contact:

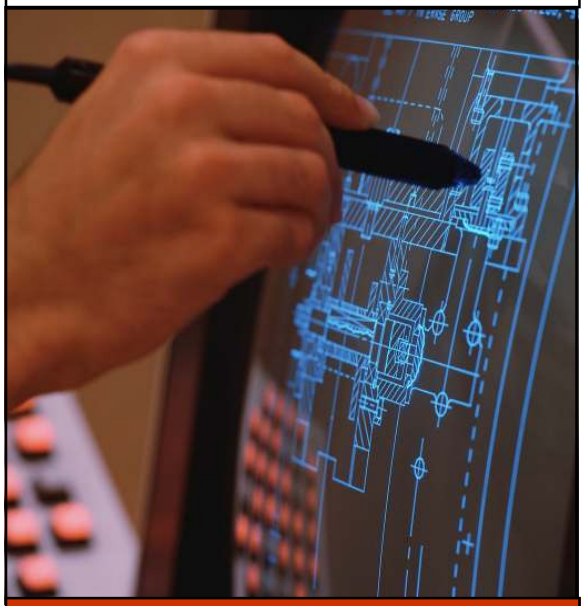
Mike Fitzgerald
Technology Education Specialist
Office of Career & Technical Education
Room 229, State House
Indianapolis, IN 46204

Phone: 317-232-6990
Fax: 317-232-9121
E-mail: mfitzger@doe.state.in.us

http://www.doe.state.in.us/octe/technologyed/welcome.html

Indiana Department of Education

INDIANA TECHNOLOGY EDUCATION



COMPUTER INTEGRATED MANUFACTURING

PROJECT LEAD THE WAY

TECHNOLOGY EDUCATION

ARE STUDENTS READY for the technological and engineered world? This question is more important today than ever before. As most kids play with technology, a central question that occurs is do they know what they can **DO** with it? Technology Education is the answer. Students who study technology apply problem-based learning that integrates (STEM) Science, Technology, Engineering, and Mathematics.

Students learn important skills and concepts needed for the workforce and society. This standards based curriculum can become a springboard for career exploration as well as a basis for determining personal goals for higher education.

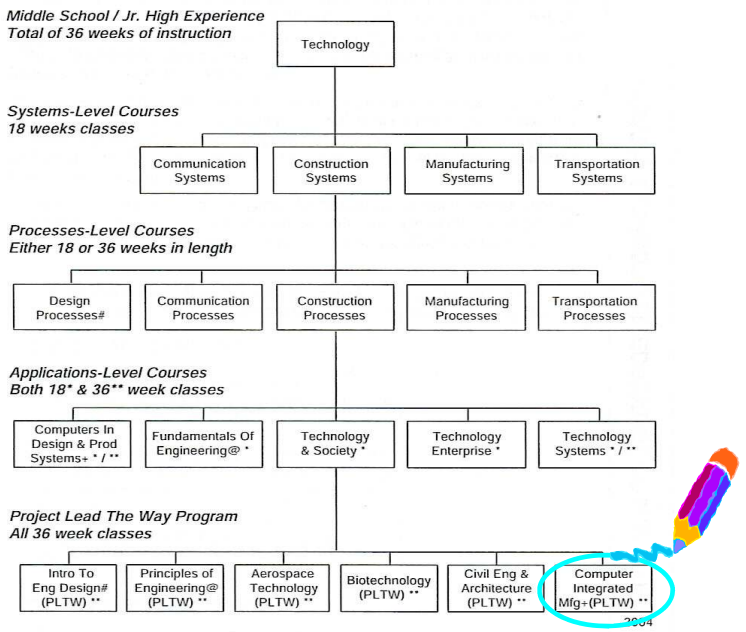
The Curriculum- The Indiana Technology Education curriculum is a **standards-based**, hands-on, minds-on program that applies and integrates academic concepts from Science, Technology Engineering, and Mathematics (STEM). The curriculum is designed for all students.

Computer Integrated Manufacturing #4810

A course that applies principles of rapid prototyping, robotics, and automation. This course builds upon the computer solid modeling skills developed in Introduction of Engineering Design. Students will use computer controlled rapid prototyping and CNC equipment to solve problems by constructing actual models of their three-dimensional designs. Students will also be introduced to the fundamentals of robotics and how this equipment is used in an automated manufacturing environment. Students will evaluate their design solutions using various techniques of analysis and make appropriate modifications before producing their prototypes. Only those schools having a signed agreement with the national Project Lead the Way organization can use this course title. Schools involved in Project Lead the Way should use this course title in lieu of the Technology Education course "Computers in Design and Production Systems."

- Suggested Grade Level: 11
- Recommended Prerequisites: Technology, Introduction to Engineering Design (Project Lead the Way), and Digital Electronics (Project Lead the Way)
- A two credit/two semester course.
- An Academic Honors Diploma elective or a Core 40 directed elective as part of a technical career area.
- A college preparation course as part of a pre-engineering program. Students are also expected to complete a college preparatory sequence of courses in mathematics.
- Competencies (content standards) defined by Project Lead the Way, Inc.
- This course is included as a component of the Engineering, Science, and Technologies career cluster and may also be included as a component of other related career clusters.

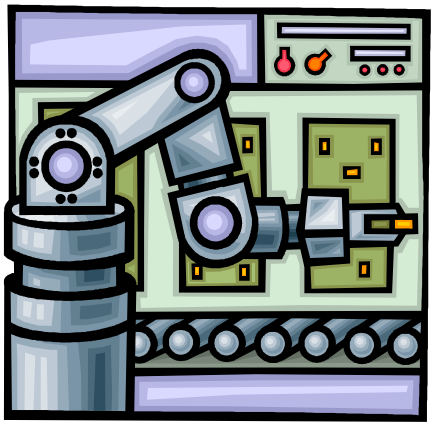
INDIANA TECHNOLOGY EDUCATION CURRICULUM



PLTW titles of **Digital Electronics** and **Engineering Design and Development** appear under the multidisciplinary category of the Indiana Department of Education guidelines.

All Technology Education courses are **Core 40 Directed Electives** as a part of a Career & Technical Area. These courses can be used in creating **4-year course plans and Career Academic Sequences** to support students in earning 8-10 credits for the Core 40 with Technical Honors Diploma.

Students working on an **Academic Honors Diploma** may also apply Technology Education credits toward their electives.



Topics of Study

This course teaches the fundamentals of computerized manufacturing technology. It builds on the solid-modeling skills developed in the Introduction to Engineering design course. Students use 3-D computer software to solve design problems. They assess their solutions through mass property analysis (the relationship of design, function, and materials), modify their designs, and use prototyping equipment to produce 3-D models. Topics of study include:

- **Computer Modeling** Two-Dimensional Object Construction, Parts Modeling, Creation of Drawing Views, Surface Modeling, Assembly Modeling, Prototyping
- **Computer Numerical Control (CNC)** Machining History of Programmable Machining, CNC Characteristics, CNC Programming, CNC Operations, Precision Measurement, CAM Software
- **Robotics** Introduction to Robotics, Robotics and Automated Systems, Robot Characteristics, Mechanical Components, Control Systems, Programming Methods, Industrial Robot Applications
- **Computer Integrated Manufacturing** Rationale for CIM Manufacturing, Types of CIM Systems, Components of CIM Systems, CIM System Applications

Requisite: Concurrent enrollment in college preparatory mathematics