

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.

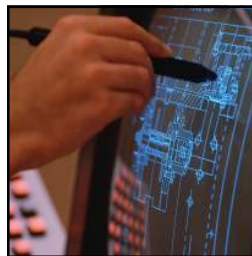
Students apply their ingenuity with tools, materials, processes, and resources to create solutions and opportunities for themselves and others. The nature of learning goes from the very early years of just "knowing" to more developed applications that might relate to the medical, agricultural, energy 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.



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For more information contact:

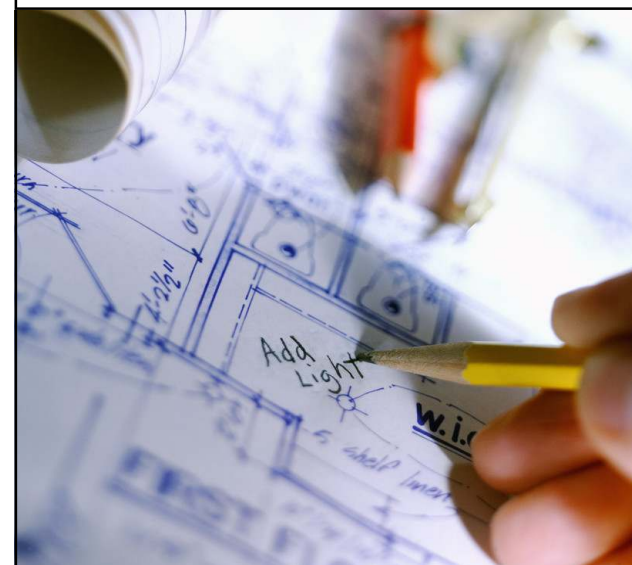
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Indiana Department of Education

INDIANA TECHNOLOGY EDUCATION



**CIVIL ENGINEERING
AND ARCHITECTURE
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.

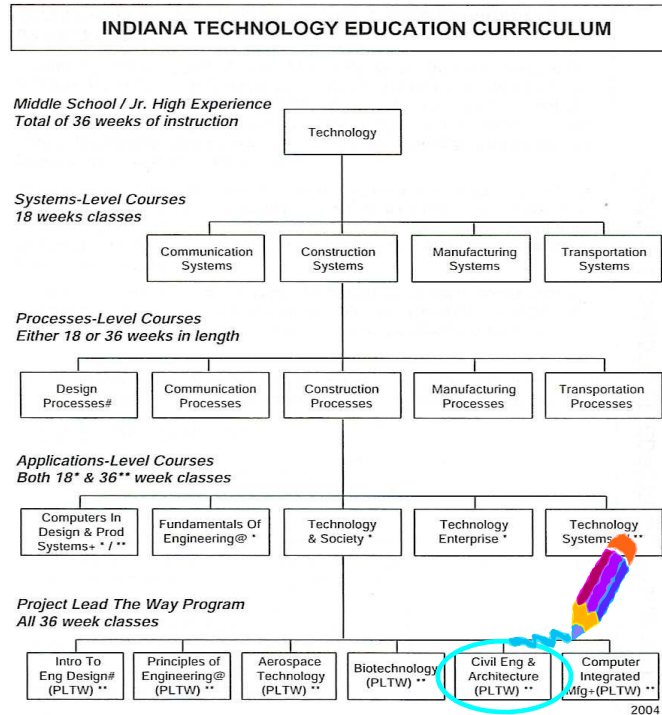
Students learn important skills and concepts needed for the workforce and society. This standards based curriculum can become a springboard for career exploration as well as a basis for determining personal goals for higher education.

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.

Civil Engineering and Architecture #4820

This course should introduce students to the fundamental design and development aspects of civil engineering and architectural planning activities. Application and design principles will be used in conjunction with mathematical and scientific knowledge. Computer software programs should allow students opportunities to design, simulate, and evaluate the construction of buildings and communities. During the planning and design phases, instructional emphasis should be placed on related transportation, water resource, and environmental issues. Activities should include the preparation of cost estimates as well as a review of regulatory procedures that would affect the project design. Only those schools having a signed agreement with the national Project Lead The Way organization can use this course title.

- Suggested Grade Levels: 11-12
- Recommended Prerequisites: Completion of two Project Lead The Way courses
- A two credit course over two semesters.
- A Core 40 directed elective as part of a technical career area.
- This course qualifies as an Academic Honors Diploma elective.
- Schools involved in Project Lead The Way must use the content standards developed for this pre-engineering program.
- This course is a component of the Engineering, Science and Technologies career cluster. It may also be included as part of the Building and Construction career cluster.



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

The major focus of the Civil Engineering and Architecture (CEA) course is a long-term project that involves the development of a local property site. As students learn about various aspects of civil engineering and architecture, they apply what they learn to the design and development of this property. The course provides freedom to the teacher and students to develop the property as a simulation or to students to model the real-world experiences that civil engineers and architects experience when developing property.

The CEA course is intended to serve as a specialization course within the Project Lead The Way sequence. The course is structured to enable all students to have a variety of experiences that will provide an overview of both fields. Students work in teams, exploring hands-on projects and activities to learn the characteristics of civil engineering and architecture.

Students use state of the art 3-D design software to design solutions to solve major course projects. They learn about documenting projects, solving problems, and communicating solutions to peers and professionals. Topics of study include:

- **Project Planning.** Students will gain an overview of civil engineering and learn about site selection, regulations, zoning, covenants, and environmental factors
- **Site Planning.** Students learn about lot layouts, public ingress/egress, utility corridors, building size and orientation, site grading, landscaping, utilities, project approval process
- **Building Design.** Plan development, floor plans, elevations, building systems, building load requirements, foundations, utilities and systems
- **Project Implementation.** Construction management, selecting contractors, bonding, scheduling, permits, change orders, inspections
- **Project Documentation and Presentation**

Requisite: Concurrent enrollment in College Preparatory Mathematics