**COURSE DESCRIPTION**

**Course** **Title:** Technological Design and Systems

**Course** **Number:** 00749

**Course** **Prerequisites:** Creating Technology

**Course** **Description:** Technological Design and Systems is a foundation course in technology for all students in the ninth grade. This exciting, hands-on course provides an overview of the systems areas of bio-related technologies, information, and physical technology. Students, working alone or in groups, will build a foundation for technological literacy by developing, producing, testing and assessing solutions to technological problems. Also, students will analyze the impact of technology on society.

**Suggested Grade** **Level**: Grade 9

**Length of Course:** One Semester

**Units of** **Credit:** .5

**PDE Certification and Staffing Policies and Guidelines (CSPG) Required Teacher Certifications:**

Technology Education CSPG 65

To find the CSPG information, go to [CSPG](https://www.education.pa.gov/Educators/Certification/Staffing%20Guidelines/Pages/default.aspx)

**Certification verified by the WCSD Human Resources** **Department:** Yes No

**WCSD STUDENT DATA SYSTEM INFORMATION**

**Course** **Level:** Academic

**Mark** **Types:** Check all that apply.

F – Final Average MP – Marking Period EXM – Final Exam

**GPA** **Type**:  GPAEL-GPA Elementary  GPAML-GPA for Middle Level  NHS-National Honor Society

UGPA-Non-Weighted Grade Point Average  GPA-Weighted Grade Point Average

**State Course Code**: Technological Processes 21052; Technology Innovation and Assessment 21054

To find the State Course Code, go to [State Course Code](https://nces.ed.gov/forum/sced.asp), download the Excel file for *SCED*, click on SCED 6.0 tab, and choose the correct code that corresponds with the course.

**TEXTBOOKS AND SUPPLEMENTAL MATERIALS**

**Board Approved Textbooks, Software, and Materials:**

**Title:** Technology Engineering

**Publisher:** Glencoe/McGraw-Hill

**ISBN #:**  978-0-07-876809-5

**Copyright** **Date:** 2008

**WCSD Board Approval** **Date:** 2009

**Supplemental Materials:** Pro/E software

**Curriculum Document**

**WCSD Board Approval:**

**Date** **Finalized:** 4/18/2024

**Date Approved:**  5/6/2024

**Implementation** **Year:** 2024-2025

**SPECIAL EDUCATION, 504, and GIFTED REQUIREMENTS**

The teacher shall make appropriate modifications to instruction and assessment based on a student’s Individual Education Plan (IEP), Chapter 15 Section 504 Plan (504), and/or Gifted Individual Education Plan (GIEP).

**SCOPE AND SEQUENCE OF CONTENT AND CONCEPTS**

**Marking Period 1**

Safety 2 days

Impacts 3 days

Systems Model 1 week

Engineering Principals 7 days

Problem Solving 5 days

Communication Technology 2 weeks, 2 days

Construction Technology 3 weeks, 1 day

**Marking Period 2**

Construction Technology 3 weeks, 1 day

Manufacturing Technology 3 weeks, 1 day

Transportation Technology 3 weeks, 1 day

Bio-related Technology 1 week, 3 days

**Marking Period 3**

Safety 2 days

Impacts 3 days

Systems Model 1 week

Engineering Principals 7 days

Problem Solving 5 days

Communication Technology 2 weeks, 2 days

Construction Technology 3 weeks, 1 day

**Marking Period 4**

Construction Technology 3 weeks, 1 day

Manufacturing Technology 3 weeks, 1 day

Transportation Technology 3 weeks, 1 day

Bio-related Technology 1 week, 3 days

**Standards/Eligible Content and Skills**

| **Performance Indicator** | **PA Core Standard and/or Eligible Content** | **Marking Period Taught** |
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| Use various approaches to communicate processes and procedures for using, maintaining, and assessing technological products and systems. | 3.5.9-12.A | MP1, MP2, MP3, MP4 |
| Critically assess and evaluate a technology that minimizes resource use and resulting waste to achieve a goal. | 3.5.9-12.B | MP1, MP2, MP3, MP4 |
| Develop a solution to a technological problem that has the least negative environmental and social impact. | 3.5.9-12.C | MP1, MP2, MP3, MP4 |
| Evaluate a technological innovation that arose from a specific society’s unique need or want. | 3.5.9-12.F | MP1, MP2, MP3, MP4 |
| Evaluate ways that technology and engineering can impact individuals, society, and the environment. | 3.5.9-12.H | MP1, MP2, MP3, MP4 |
| Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, reliability, and aesthetics as well as possible social, cultural, and environmental impacts | 3.5.9-12.I | MP1, MP2, MP3, MP4 |
| Develop a device or system for the marketplace. | 3.5.9-12.M | MP1, MP2, MP3, MP4 |
| Analyze and use relevant and appropriate design thinking processes to solve technological and engineering problems. | 3.5.9-12.N | MP1, MP2, MP3, MP4 |
| Apply appropriate design thinking processes to diagnose, adjust, and repair systems to ensure precise, safe, and proper functionality. | 3.5.9-12.O | MP1, MP2, MP3, MP4 |
| Apply a broad range of design skills to a design thinking process. | 3.5.9-12.P | MP1, MP2, MP3, MP4 |
| Implement and critique principles, elements, and factors of design. | 3.5.9-12.Q | MP1, MP2, MP3, MP4 |
| Conduct research to inform intentional inventions and innovations that address specific needs and wants. | 3.5.9-12.S | MP1, MP2, MP3, MP4 |
| Evaluate and define the purpose of a design. | 3.5.9-12.U | MP1, MP2, MP3, MP4 |
| Optimize a design by addressing desired qualities within criteria and constraints while considering trade-offs. | 3.5.9-12.W | MP1, MP2, MP3, MP4 |
| Implement the best possible solution to a design using an explicit process. | 3.5.9-12.X | MP1, MP2, MP3, MP4 |
| Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering. | 3.5.9-12.Y | MP1, MP2, MP3, MP4 |
| Safely apply an appropriate range of making skills to a design thinking process. | 3.5.9-12.AA | MP1, MP2, MP3, MP4 |
| Assess how similarities and differences among scientific, technological, engineering, and mathematical knowledge and skills contributed to the design of a product or system. | 3.5.9-12.BB | MP1, MP2, MP3, MP4 |
| Analyze how technology transfer occurs when a user applies an existing innovation developed for one function for a different purpose. | 3.5.9-12.CC | MP1, MP2, MP3, MP4 |
| Develop a plan that incorporates knowledge from science, mathematics, and other disciplines to design or improve a technological product or system. | 3.5.9-12.DD | MP1, MP2, MP3, MP4 |
| Connect technological and engineering progress to the advancement of other areas of knowledge and vice versa. | 3.5.9-12.EE | MP1, MP2, MP3, MP4 |
| Evaluate how technology enhances opportunities for new products and services through globalization. | 3.5.9-12.FF | MP1, MP2, MP3, MP4 |
| Evaluate how technology and engineering have been powerful forces in reshaping the social, cultural, political, and economic landscapes throughout history. | 3.5.9-12.GG | MP1, MP2, MP3, MP4 |
| Analyze the stability of a technological system and how it is influenced by all of the components in the system, especially those in the feedback loop. | 3.5.9-12.LL | MP1, MP2, MP3, MP4 |
| Troubleshoot and improve a flawed system embedded within a larger technological, social, or environmental system. | 3.5.9-12.MM | MP1, MP2, MP3, MP4 |
| Use project management tools, strategies, and processes in planning, organizing, and controlling work. | 3.5.9-12.OO | MP1, MP2, MP3, MP4 |
| Demonstrate the use of conceptual, graphical, virtual, mathematical, and physical modeling to identify conflicting considerations before the entire system is developed and to aid in design decision making. | 3.5.9-12.PP | MP1, MP2, MP3, MP4 |
| Implement quality control as a planned process to ensure that a product, service, or system meets established criteria. | 3.5.9-12.QQ | MP1, MP2, MP3, MP4 |
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**ASSESSMENTS**

**PDE Academic Standards, Assessment Anchors, and Eligible Content: The** teacher must be knowledgeable of the PDE Academic Standards, Assessment Anchors, and Eligible Content and incorporate them regularly into planned instruction.

**Formative Assessments: The teacher will use various assessment methods to conduct in-process evaluations of student learning.**

**Effective formative assessments for this course include:**

• Peer Assessment

• Quizzes

• Teacher Observation

• Pre-assessments of prior knowledge (e.g., Entrance cards or KWL chart)

• Bellringers/Problems of the Day (PODs)

• Discussions

• Exit ticket

• Cooperative learning

• Oral response

• Self-evaluation

• Summarizing

**Summative Assessments: The teacher will use various assessment methods to evaluate student learning at the end of an instructional task, lesson, and/or unit.**

**Effective summative assessments for this course include:**

• Documentation /Portfolio

• Project