

# PLATO Course Principles of Engineering and Technology, Semester A

## Course Overview

This one-semester course is intended to help you familiarize yourself with engineering systems and technologies. This course has thirteen lessons organized into three units. Each unit has a Unit Activity and each lesson contains one or more Lesson Activities.

This course will cover the evolution of engineering and technology, careers in engineering, and engineering systems and technologies.

You will submit the Unit Activity documents to your teacher, and you will grade your work in the Lesson Activities by comparing them with given sample responses. The Unit Activities (submitted to the teacher), and the Lesson Activities (self-checked) are the major components of this course. There are other assessment components, namely the mastery test questions that feature along with the lesson; the pre- and post-test questions that come at the beginning and end of the unit, respectively; and an end-of-semester test. All of these tests are a combination of simple multiple-choice questions and technology enhanced (TE) questions.

## Course Goals

This course will help you meet the following goals:

- Describe the relationship between engineering and technology.
- Examine the evolution of engineering and technology.
- Assess how engineering and technology influence society and the environment.
- Describe modern technologies and how they interact.
- Describe high-precision measurement technologies.
- Analyze job-specific technologies and discuss the ethical issues related to the use of technology.
- Identify the branches of engineering and the technologies associated with them.
- Describe various career opportunities.
- Discuss the importance of various employability characteristics and teamwork.

- Examine simple and compound machines and their mechanisms.
- Explain the structure and applications of fluid systems.
- Describe thermal systems and their functions.
- Examine electrical systems and analyze electrical circuits.
- Describe the applications of biotechnology.
- Examine construction technologies and analyze structural designs.

## **Prerequisite Skills**

Principles of Engineering and Technology Semester A has the following prerequisites:

- basic math knowledge
- ability to visualize and apply creativity and innovation
- familiarity with the writing process and following guidelines
- basic computer skills
- ability to structure and process information

## **General Skills**

To participate in this course, you should be able to do the following:

- Perform basic operations on a computer.
- Perform online research using various search engines and library databases.
- Communicate through email and participate in discussion boards.

*For a complete list of general skills that are required for participation in online courses, refer to the Prerequisites section of the Plato Student Orientation document, found at the beginning of this course.*

## **Credit Value**

Principles of Engineering and Technology Semester A is a 0.5-credit course.

## **Course Materials**

- Notebook
- Computer with Internet connection and speakers or headphones
- Microsoft Word or equivalent
- Microsoft Excel or equivalent
- Microsoft PowerPoint or equivalent

## Course Pacing Guide

This course description and pacing guide is intended to help you stay on schedule with your work. Note that your course teacher may modify the schedule to meet the specific needs of your class.

## Course Components and Grading Rubric

The table gives a breakdown of the weight for each component in the course. Weight represents the percentage of the total score coming from each activity.

| Course Components  | Count     | Weight      |
|--|-----------|-------------|
| <b>Pretest.</b> <i>Pretests are optional assessments, typically designed for credit recovery use. If a student shows mastery of a lesson's objective, the student may be automatically exempted from that lesson in the upcoming unit. Typically, teachers do not choose to employ exemptive pretests for first-time credit courses. Pretests are not included as a component of the student's final grade.</i>  | 3         | 0%          |
| <b>Module.</b> <i>Each module in this course contains an interactive tutorial and an associated mastery test. Tutorials may include one or more Lesson Activities that constitute tasks associated with the tutorial. The module score comes from a student's score on the mastery test.</i>   | 13        | 20%         |
| <b>Discussion.</b> <i>Online discussions allow for higher-order thinking about terminal objectives. An online threaded discussion mirrors the educational experience of a classroom discussion. Teachers can initiate a discussion by asking a complex, open-ended question. Students can engage in the discussion by responding both to the question and to the thoughts of others. Each unit in a course has one predefined discussion topic; teachers may add more discussion topics.</i> | 3         | 20%         |
| <b>Unit Activity.</b> <i>Unit Activities are at the end a unit and constitute one or more small tasks. Their purpose is to deepen understanding of key unit concepts and tie them together. Each Unit Activity includes a simple rubric. The teacher versions include both a rubric and modeled sample answers. Unit Activities are teacher graded.</i>  | 3         | 10%         |
| <b>Posttest.</b> <i>The posttest appears at the end of the unit and mirrors the pretest in structure, content, and complexity.</i>   | 3         | 20%         |
| <b>End of Semester Test.</b> <i>The end of semester test (EOS) appears at the end of the course. Students are delivered a few items from every tutorial in the course in order to assess the major course objectives.</i>  | 1         | 20%         |
| <b>Total</b>   | <b>26</b> | <b>100%</b> |

\*Teachers may manually adjust these weights if desired, per district grading requirements.

## Unit 1: Introduction to Engineering and Technology

### Summary

In this unit, you will familiarize yourself with the advancements in technology and engineering. You will examine how technology has evolved and describe some modern technologies and their applications. You will examine job-specific technologies and demonstrate safe use of technological resources.

| Day              | Activity/Objective  | Type               |
|------------------|---|--------------------|
| 1 day:<br>1      | <b>Syllabus and Plato Student Orientation</b><br><i>Review the Plato Student Orientation and Course Syllabus at the beginning of this course.</i>   | Course Orientation |
| 5 days:<br>2–6   | <b>Engineering and Technology</b><br><i>Discuss engineering and technology in the context of human necessities, culture, society, and the environment.</i>  | Lesson             |
| 5 days:<br>7–11  | <b>A Survey of Modern Technology</b><br><i>Identify key technologies, describe their use, and examine how they interact in modern society.</i>  | Lesson             |
| 5 days:<br>12–16 | <b>Job-Specific Technologies</b><br><i>Demonstrate proficiency with job-specific technologies by selecting and safely using technological resources to accomplish work responsibilities in a productive manner.</i> | Lesson             |
| 1 day:<br>17     | <b>Space Jumble</b>   | Game               |
| 5 days:<br>18–22 | <b>Unit Activity/Threaded Discussion—Unit 1</b>   | Activity           |
| 1 day:<br>23     | <b>Post-test—Unit 1</b>   | Assessment         |

## Unit 2: Career Exploration

### Summary

In this unit, you will examine the different branches of engineering and the technologies associated with them. You will explore various careers in engineering. You will identify some important employability characteristics. You will discuss the importance of leadership skills and teamwork.

| <b>Day</b>       | <b>Activity/Objective</b>  | <b>Type</b> |
|------------------|--|-------------|
| 5 days:<br>24–28 | <b>Branches of Engineering</b><br><i>Identify the major branches of engineering and describe the emerging technologies associated with them.</i>   | Lesson      |
| 5 days:<br>29–33 | <b>Careers in Engineering</b><br><i>Describe career opportunities in engineering and examine how an engineering team works.</i>  | Lesson      |
| 5 days:<br>34–38 | <b>Positive Work Ethics</b><br><i>Demonstrate a positive work ethic by coming to work every day on time, a willingness to take direction, and motivation to accomplish the task at hand.</i> | Lesson      |
| 5 days:<br>39–43 | <b>Integrity</b><br><i>Demonstrate integrity by abiding by workplace policies and laws and demonstrating honesty and reliability.</i>  | Lesson      |
| 1 day:<br>44     | <b>Para Jumble</b>   | Game        |
| 5 days:<br>45–49 | <b>Unit Activity/Threaded Discussion—Unit 2</b>  | Activity    |
| 1 day:<br>50     | <b>Post-test—Unit 2</b>  | Assessment  |

## Unit 3: Engineering Systems and Technologies

### Summary

In this unit, you will describe the components of mechanical systems and explain their mechanisms. You will examine fluid systems and their applications. You will describe thermal systems and their functions. You will identify the components of electrical systems and analyze electrical circuits. You will describe the applications of biotechnology. You will examine construction technologies and analyze structural designs.

| Day              | Activity/Objective   | Type       |
|------------------|--|------------|
| 6 days:<br>51–56 | <b>Mechanical Systems</b><br><i>Examine the concepts and components common to all mechanical systems.</i>                                | Lesson     |
| 5 days:<br>57–61 | <b>Fluid Systems</b><br><i>Explain the structure, functions, and applications of fluid systems.</i>                                      | Lesson     |
| 5 days:<br>62–66 | <b>Thermal Systems</b><br><i>Analyze and describe systems in which energy is transferred in the form of heat.</i>                        | Lesson     |
| 5 days:<br>67–71 | <b>Electrical Systems</b><br><i>Examine the components of electrical systems and apply physical laws to analyze electrical circuits.</i> | Lesson     |
| 5 days:<br>72–76 | <b>Biotechnology</b><br><i>Describe the field of biotechnology and its applications in medicine and agriculture.</i>                     | Lesson     |
| 5 days:<br>77–81 | <b>Construction Technologies</b><br><i>Examine construction technologies, analyze structural designs, and identify safety laws.</i>      | Lesson     |
| 1 day:<br>82     | <b>Thwack-A-Mole</b>   | Game       |
| 5 days:<br>83–87 | <b>Unit Activity/Threaded Discussion—Unit 3</b>  | Activity   |
| 1 day:<br>88     | <b>Post-test—Unit 3</b>  | Assessment |
| 1 day:<br>89     | <b>Semester Review</b>   |            |

|              |                             |            |
|--------------|-----------------------------|------------|
| 1 day:<br>90 | <b>End-of-Semester Test</b> | Assessment |
|--------------|-----------------------------|------------|

## Course Map

You will achieve course level objectives by completing each lesson's instruction, assignments, and assessments. For a detailed look at how the materials meet these objectives, review the [course map for Semester A](#).